The Permanent Disability Evaluation Schedule (PDES)

Appendices

Submission by the British Columbia Nurses' Union (BCNU)

October 18, 2013

In response to Workers' Compensation Board Discussion Paper on Proposed Amendments to the Permanent Disability Evaluation Schedule (PDES)

BRITISH COLUMBIA NURSES' UNION

LIST OF APPENDICES

A Critical Review of Spinal Range of Motion (ROM) as a Method of Assessing Permanent Back Injuries*

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July 30, 2013

* With reference to a policy review issued by the British Columbia Workers' Compensation Board (BC WCB) regarding its Permanent Disability Evaluation Schedule (PDES), December 2012..

A Critical Review of Spinal Range of Motion (ROM) as a Method of Assessing Permanent Back Injuries

Executive Summary

AUTHOR:
Dr. Robert Rondinelli is the Medical Editor for the *AMA Guides to the Evaluation of Permanent Impairment, 6th Edition* and a featured faculty member for the American Board of Independent Medical Examiners (ABIME) Training Program for the AMA Guides 6th edition. From 1996-2005, Dr. Rondinelli was the co-director of the American Academy of Physical Medicine and Rehabilitation (AAPM&R) Disability Certification Program. In 2010 he was the recipient of the prestigious Walter Zeiter Award from the AAPM&R for his pioneering work in the area of disability assessment. Dr. Rondinelli's qualifications are set out in full in Appendix B.

BACKGROUND:
In December, 2012, the Workers Compensation Board of BC (BC WCB) issued a policy paper as part of its public consultation process and review of the *Permanent Disability Evaluation Schedule* (PDES). The PDES is the current rating schedule used to assess a "loss of earning capacity" under section 23(2) of the *Workers Compensation Act* (Act). In its 2012 policy paper, the BC WCB proposes to retain range-of-motion (ROM) as a method of assessing permanent impairment on the basis that ROM is the scientific "gold standard" for such assessments. Dr. Rondinelli was asked to review this approach in light of the current scientific literature.

SUMMARY:
In this paper, *A Critical Review of Spinal Range-of-Motion (ROM) as a Method of Assessing Permanent Back Injuries*" ["ROM *Review*"], Dr. Rondinelli concludes that scientific studies have repeatedly shown that spinal ROM lacks validity as an indicator of spinal function for impairment rating. According to the studies, there is no clear evidence of an association between loss of spinal ROM and loss of function as measured in terms of mobility and activities of daily living (ADLs). Dr. Rondinelli also concludes that any potential relationship is confounded by other factors, including a lack of norms to measure functional ROM, lack of a consistent relationship between ROM and pain for acute and chronic lower back pain, and lack of predictive associations between loss of spinal ROM and loss of ADLs.

Dr. Rondinelli further concludes that current spinal ROM measurement techniques lack necessary levels of reliability and reproducibility, even in the hands of experienced evaluators. The magnitude of the potential measurement error is sufficient to raise doubts about any examiner's rating of spinal impairment in a clinical setting.

As a result of this review, Dr. Rondinelli recommends that spinal ROM be abandoned as the principal measure of spinal function in the PDES and that any revision of the PDES give consideration to an alternative rating system and to alternative metrics. He recommends an alternative method that plays to the diagnostic strengths of the rating physician and lends itself to the evidence-based scientific underpinnings of a diagnosis-based approach.

HIGHLIGHTS:

Dr. Rondinelli's review includes the following discussions::

- There are various permanent impairment rating [PIR] systems which relate the measurable aspects of physical impairment to their well-known effects on basic human functioning (ADLs) and assign a consensus-derived percentage estimate of loss of activity or "impairment rating". This consensus-derived percentage becomes a procedural surrogate or shortcut for a disability rating. While the PIR approach lacks content validity, it has come to be accepted as a necessary compromise, linking a physician evaluation with some measure of compensation. However, PIR systems should be evaluated by scientific criteria, including *reliability* and *validity,* as defined in the scientific community.

- ROM measurements in general have clinical significance as they are one of five factors in musculoskeletal function (others being muscle strength, coordination, endurance, and sensation) and can be affected by a variety of medical conditions. However, there is currently "some degree of chaos" in measuring joint ROM due to lack of standardization of reference systems, measuring techniques, and documentation.

- Spinal ROM measurements are more complex and even more likely to be prone to error than other ROM measurements. Recent studies have shown that spinal ROM measurement techniques yield unacceptable reliability measurements even in the hands of experienced observers measuring compliant subjects.

- Scientific studies further show that ROM ratings for spinal impairment do not necessarily correlate with other measures of physical findings, objective measures of condition severity, or functional capabilities. There is a detailed discussion of these studies and their findings.

A Critical Review of Spinal Range-of-Motion (ROM) as a Method of Assessing Permanent Back Injuries

With reference to a Policy Review Discussion Paper issued by the Workers' Compensation Board of British Columbia (BC WCB) regarding the *Permanent Disability Evaluation Schedule (PDES)* – December 2012

Robert D. Rondinelli, MD, PhD
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1 Introduction

The Workers' Compensation Board of British Columbia (BC WCB) is authorized by legislation to create a system of estimates (%) of loss of earning capacity for most types of permanent injuries and these published estimates (%) are set out in a rating schedule called the *Permanent Disability Evaluation Schedule* or *PDES*[1]. The placement of a worker's injury on the *PDES* is now based on certain methods of measuring permanent physical impairment. For injuries which do not appear on the *PDES* (such as unusual or rare injuries), these are called "unscheduled" conditions and can be assessed using other medical evidence including the *AMA Guides*. The entire BC system of awarding compensation for permanent injuries based on a % (scheduled and unscheduled) is known as the Permanent Functional Impairment (PFI) system. The BC WCB has now undertaken a public review of the *PDES* and in December, 2012 issued a discussion paper with proposed changes to the *PDES*.

The British Columbia Nurses' Union (BCNU) requested that I review the current and proposed *PDES* in light of the scientific literature and provide a report evaluating its proposed method of assessing permanent back injuries.

I have prepared this report with the following objectives in mind:

[1] The *Permanent Disability Evaluation Schedule or* PDES is published as Appendix 4 in the *Rehabilitation Services and Claims Manual, Volume II* (RSCM II). Section 23(2) of the *Workers Compensation Act* [RSBC 1996] allows the BC WCB to compile this type of rating schedule where percentages of impairment of earning capacity which can be used as a guide to determine the compensation payable for particular types of permanent disabilities.

- To provide an evidence-based overview of the concepts and models of disablement and to discuss the role and limitations of impairment rating as a theoretical and practical construct central to the process of disability determination and awards;
- To review the objectives of the Board, which any revised Schedule must continue to meet;
- To review the fundamental criteria of measurement theory whereby adequacy of measurement can be determined and sources of measurement error properly understood;
- To review the scientific evidence for adequacy of range-of-motion (ROM) as a measure of musculoskeletal function in general, and the adequacy of spinal ROM as a measure of spinal function in particular, for purposes of determining functional impairment according to the *PDES*;
- To provide a summary list of recommendations based upon the above review, to help guide revisions of the *PDES* moving forward.

2 Conceptual overview: Conceptual models of disablement, terminology and the role of Permanent Impairment Rating in disability compensation schemes for Workers' Compensation

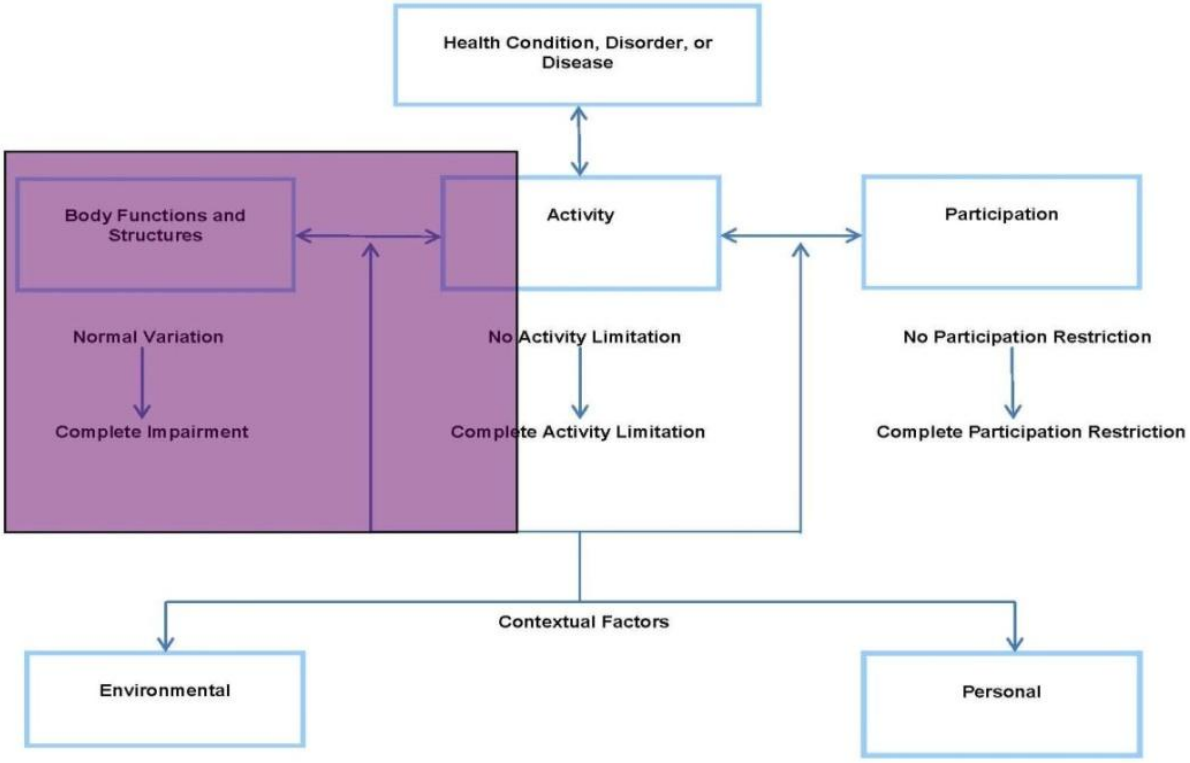
2.1 The International Classification of Functioning, Disability and Health and the Biopsychosocial Model of Disablement

The "biopsychosocial model" of disablement is now widely accepted as the preferred conceptual framework within which to understand the interaction between human disease and disability, recognizing that there are potential medical, social, personal and psychological factors that contribute to and determine the extent of disability in any given case[2]. The *biological* component refers to the physical and/or mental aspects of the individual's health condition; the *psychological* component refers to personal and psychological factors which impact on the individual's functioning; the *social* component refers to contextual and environmental factors that can ostensibly enhance or impede functional outcomes in each particular case.

In 2001, the World Health Organization (WHO) published the *International Classification of*

[2] Waddell G, Burton AK, Aylward M: A biopsychosocial model of sickness and disability. *Guides Newsletter* 2008; May-June:1-20.

Functioning, Disability and Health (ICF)[3] to replace the earlier and outdated *International Classification of Impairments, Disabilities and Handicaps (ICIDH)*[4]. This new system of classification of disease and disability embodies the "biopsychosocial model" of disease and depicts the interactive relationship and potential determinants of disability for any individual with a health condition, disorder or disease, as illustrated in Figure 1.



International Classification of Functioning, Disability, and Health Model of Disablement

Figure 1

The ICF recognizes that the normal state for individuals includes a range of variability in *body functions and body structures*, and that individuals also exhibit a normal range of variance in their ability to execute an *activity* (task or action within their personal sphere) and *participation* (involvement in life situations.) The ICF defines *impairments* as problems in body function or structure such as a significant deviation or loss from normal status;

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[3] World Health Organization. *International Classification of Functioning, Disability and Health: ICF*. Geneva, Switzerland, World Health Organization, 2001.

[4] World Health Organization. *International Classification of Impairments, Disabilities and Handicaps: A Manual of Classification Relating to the Consequences of Disease*. Geneva, Switzerland, World Health Organization, 1980

activity limitations are difficulties an individual may have in executing activities and *participation restrictions* are problems an individual may experience in their involvement in life situations.

The *AMA Guides* 6th ed.[5] has adopted the ICF terminology, definitions, and conceptual framework for disablement to replace the ICIDH terminology of earlier editions. They define *impairment rating* as a "consensus-derived percentage estimate of loss of activity reflecting severity for a given health condition and the degree of associated limitations in terms of Activities of Daily Living (ADLs)". In so doing, they are promoting metrics specific to the medical (e.g., anatomical, physiological) aspects of organ system pathology and disease and to their potential effects on basic human functioning (i.e. mobility and basic self-care); these subject areas are considered to be well within the sphere of knowledge and concern for evaluating and treating physicians who typically care for disabled patients.

Consequently, the impairment rating process is one that focuses on the left side of the ICF components of disablement (Figure 1, shaded section) and wisely avoids focus on the right side (limitations in advanced or "instrumental" ADLs; participation restrictions) which require a series of metrics and evaluative skills and expertise generally outside of the sphere of knowledge and clinical experience for the evaluating and treating physician.

In practice, jurisdictions choosing to adopt impairment ratings as a procedural surrogate for disability ratings pose a misapplication dilemma as follows. All disability systems seeking to fairly compensate for disability are faced with the challenge of adequately accounting for losses in three major domains: these typically can be viewed as losses due to *work disability*, *non-work disability*, and *quality of life (QOL)*[6] (see Figure 2).

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[5] *American Medical Association: Guides to the Evaluation of Permanent Impairment,* Sixth Edition. Chicago, American Medical Association, 2007.

[6] McGeary M, Ford M, McCutchen SR, et al, eds. *IOM Committee on Medical Evaluation of Veterans for Disability Compensation. A 21st Century System for Evaluating Veterans for Disability Benefits. The Rating Schedule.* Washington, DC, The National Academies Press, 2007, 92-138.

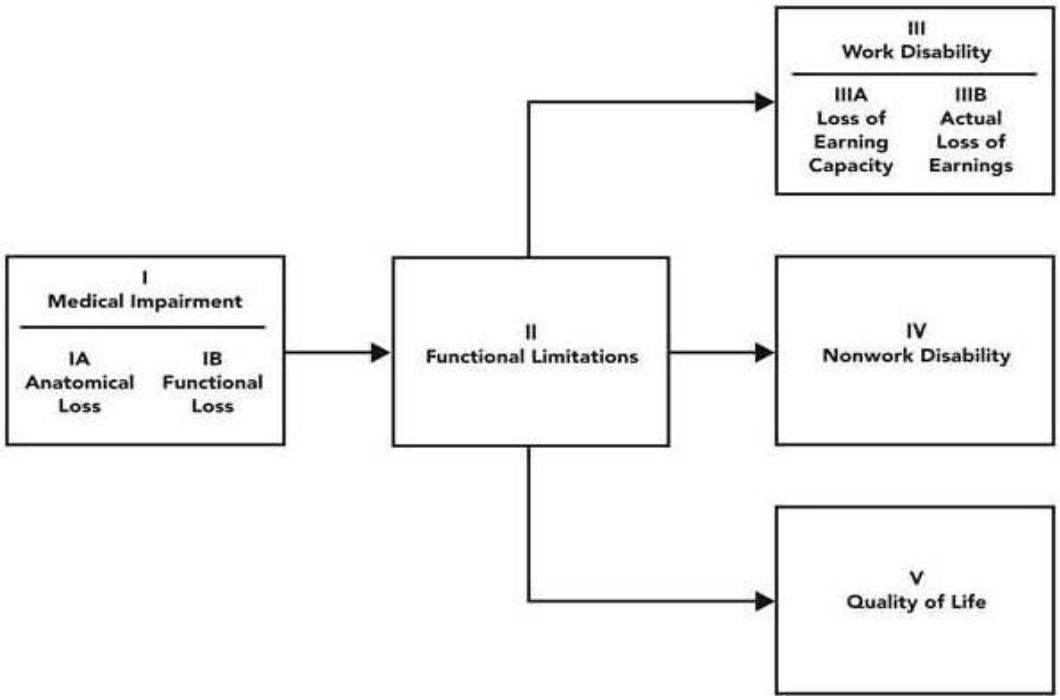

Figure 2

Since a permanent impairment rating (PIR) provides an objective measure to substantiate the severity of disability in terms of organ system pathology and loss of ADLs, it is a necessary component of any disability determination but not the sole or necessarily adequate determinant. Metrics currently exist not only to calculate losses to the impaired individual in terms of work disability (loss of earnings and/or earning capacity)[7] but also for non-work disability (losses in ability to pursue hobbies, recreation, etc.[8] and QOL (losses in terms of medical burden of care, life satisfaction, etc.)[9] Unfortunately, these latter domains are generally being overlooked since they are not typically evaluated by physicians nor are they summarily accounted for in the final disability calculation.

The above concerns notwithstanding, in order for the disability determination process to remain practical and feasible, it requires a level of procedural economy, efficiency and simplicity ultimately linking physician evaluation and reporting to some measure of compensation. Therefore, a procedural short-cutting typically takes place whereby the impairment rating percentage becomes a surrogate for the disability rating according to a predetermined formula. The adequacy of the impairment rating as an operational

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[7] Burton JF, Jr, Seabury S, McGeary M, et al. The relationship between impairments and earnings losses in multiconditional studies. Appendiox C. In: *IOM Committee on Medical Evaluation of Veterans for Disability Compensation. A 21st Century System for Evaluating Veterans for Disability Benefits. The Rating Schedule.* McGeary M, Ford M, McCutchen SR, et al, eds, Washington, DC, The National Academies Press, 2007.

[8] *Supra* note 6.

[9] *Ibid.*

surrogate in such cases is the source of ongoing debate.[10] It would appear that the PFI rating lacks content validity (see below) to capture the broader spectrum of functional loss for any given disabling condition but has come to be accepted as a measure of such in order to possibly fulfill this much needed compromise.

2.2 Historical preferences and methods of the BC WCB system for Permanent Impairment Rating

The author was provided with a history of the *PDES* and this history, as provided, is attached as Appendix A to this report.

From this history, it is apparent the *PDES* was derived from a comprehensive report by Dr. D.E. Bell to the BC WCB system in the 1960s. The *PDES* system for Permanent Impairment Rating (PIR) included the following important features:

- The disability schedule attempts to link measurements of permanent physical impairment to % estimates of approximate impairment (i.e. loss) of earning capacity of an average unskilled laborer;
- Over time, the *PDES* became integrated with a "dual system" of calculating pension awards and the current dual system operates as follows:
    1) A degree of physical impairment is first calculated according to the PDES scheduled listings for injuries to the spine and extremities, and other organ system losses including psychological losses; the PIR thus derived is considered a measure of "functional loss" at this stage of evaluation.
    2) A "loss of earnings" method exists in cases judged "so exceptional" whereby the pension awards derived by the loss of function (i.e. scheduled) method of PIR are considered grossly inadequate to the injured workers' particular circumstances.

In light of this history, this critical review proceeds based on the following:

- A "Dual System" allowing for pension awards calculated according to physical (functional) impairment in most cases, and allowing for calculation according to projected loss of earnings in exceptional cases, is expected to endure.
- The physical impairment criteria upon which the PDES physical impairment rating (PIR) is defined should reflect functional losses to the fullest extent practical and possible.

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[10] *Ibid*. See also: Rondinelli RD. Changes for the new AMA Guides to Impairment Ratings, Sixth Edition: Implications and applications for physician disability evaluations. *PMR.* 2009;1(7):643-56.

- Medical and diagnostic criteria remain acceptable for PIR determinations, and there are current examples of impairment rating systems which emphasize these criteria (see for example, the AMA *Guides*.).

- If maintaining the use of loss of ROM is shown to be an invalid approach to assessing functional loss, it should be abandoned in favor of other criteria which better meet validity, reliability, feasibility and ease of application criteria at this time.

3 Measurement issues for Permanent Impairment Rating

3.1 Level of measurement

The process of impairment rating is a diagnostic one. Criteria used for rating may be discrete (i.e. amputation) or continuous (i.e. loss of ROM); the severity of impairment may also be discrete (i.e. partial or complete amputation) or continuous (i.e. degrees of ROM lost).

There are four levels of measurement that determine how test results are analyzed and interpreted; nominal, ordinal, interval, and ratio. Nominal and ordinal scales apply to discrete measures because the scores produced fall into mutually exclusive categories. Interval and ratio scales are used to classify continuous measures because the scores produced can fall anywhere along the continuum within the available range of scores.

Nominal scales categorize objects into different classes of equivalent value and may be dichotomous (e.g., male vs. female) or non-dichotomous (e.g., red vs. yellow vs. blue). Medical diagnoses are generally nominal by nature.

Ordinal scales are used to categorize objects into mutually-exclusive, internally equivalent groups which can be rank ordered according to magnitude which is not internally equivalent (e.g. five levels of a manual muscle test).

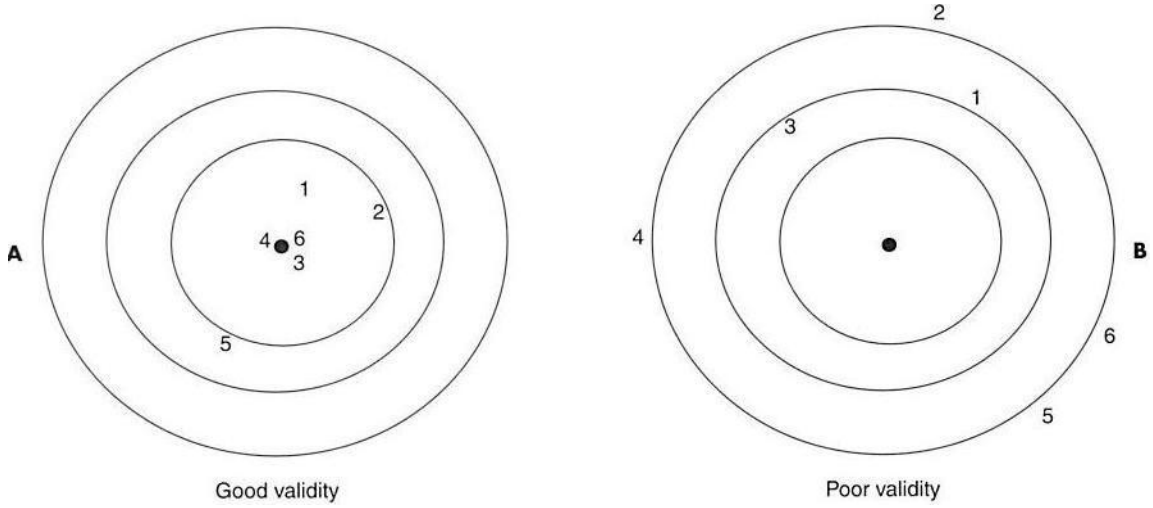
Interval scales are continuous and rank-ordered according to uniform and equivalent increments. Examples of interval measures are time (seconds, minutes, hours) and temperature (degrees Celsius vs. Fahrenheit) scales.

A *ratio scale* is an interval scale whose zero point reflects total absence of the entity being measured. Examples of ratio scales include weight (ounce and pound vs. gram and kilogram) and distance (centimeter, meter vs. inch, foot, yard).

Nominal and ordinal scales are appealing in their ease of application; however, analysis of data scored this way requires special considerations given to underlying assumptions and sources of misinference.[11] Continuous scales have the advantage of higher sensitivity and lend themselves to more rigorous statistical analyses than may be possible with discrete measures.

3.2 Validity

Validity is defined as the accuracy with which a test measures that which it is intended to measure. To use a simple analogy, think of a measurement instrument as a gun and the measurements as shots fired at a target. The validity of the instrument is its ability to hit the target at the point being aimed at (Figures 3a and 3b).



Figures 3a and 3b

Validity can be investigated while an instrument is being developed and confirmed through subsequent use. Four basic types of validity can be considered including content, construct, criterion-related, and face validity.

Content validity involves systematic examination of the test content to determine if it covers a representative sample of the particular domain being measured. For example, the various measures of lumbar ROM (surface inclinometry, surface goniometry, radiographic flexion-extension views) all have potential confounders and potentially differ with respect to their ability to measure "true" lumbar flexion and extension.

Construct validity refers to the extent that a test measures a theoretical construct. For

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[11] Hinderer S, Rondinelli R, Katz R. Measurement issues in impairment rating and disability evaluation. In: *Impairment Rating and Disability Evaluation,* Rondinelli, R., Katz, R., eds, Philadelphia, W.B. Saunders, 2000 pp 35-52.

example, impairment rating itself is a theoretic construct designed to measure severity of impairment and associated functional losses with respect to ADLs. What is actually being measured are features such as amputation level, ROM and ankylosis of the joints, strength or sensory losses and combinations thereof. The "functional loss" implied by the impairment rating can actually be tested against performance measures of hand function such as a Jebsen-Taylor test. The construct validity of the impairment rating method itself, can then be viewed relative to this "gold standard" measure of hand function.

Criterion-related validity includes two subclasses of validity (concurrent and predictive):

Concurrent validity (also referred to as *convergent validity*) is typically assessed by comparing results from one measure against a second measure which is an accepted "gold standard." For example, the contrast venogram is considered a "gold standard" test for diagnosing deep venous thrombosis. However, a less invasive (presumably safer) and less costly alternative is the venous Doppler ultrasound test. The ability of the Doppler to correctly diagnose deep venous thrombosis when compared to the contrast venogram represents its concurrent validity.

Predictive validity involves a measure's ability to predict or forecast some future outcome and may include the prognostic value of a positive or negative test result. *Discriminant validity* is a related construct and indicates whether or not test scores can distinguish between different populations that would be expected to show different degrees of some measurable quality.

Face validity merely reflects whether a test appears to measure that which is intended, and is generally based upon a consensus of opinion.

3.3 Reliability and Agreement

Reliability is the extent to which a measurement provides consistent information that is free of "random" error. Using our gun and target analogy, if the shots fired at the target form a tight cluster the gun is shooting with a high reliability regardless of where the shots cluster on the target [Figures 4a]. If the shots fail to cluster the reliability of the gun is poor [12](Figure 4b).

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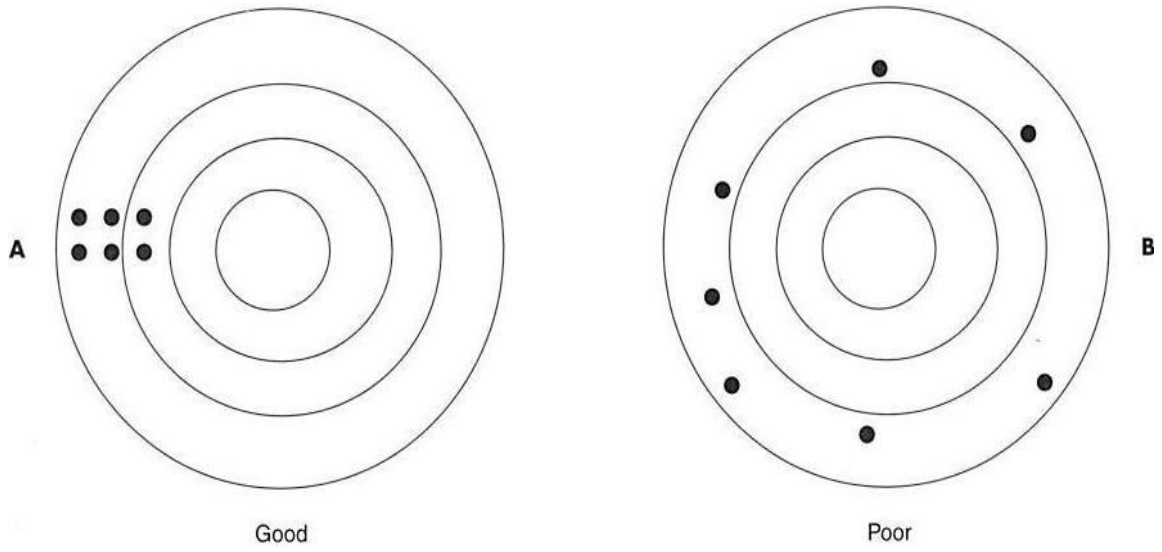
[12] *Ibid*.



Figures 4a and 4b

Agreement is the extent to which identical measurements can be made with a given measure or instrument. For example, if a number of shooters operating the same gun show similar clusters there is strong agreement. If there is poor agreement, the degree to which the shots cluster will vary among shooters.

Inter-rater reliability is the degree to which the ratings of different observers are proportional when expressed as deviations from their means; that is, the rankings of each individual relative to the rest are the same although the absolute numbers obtained may vary between raters. The *inter-rater agreement* is the extent to which independent examiners agree exactly on the magnitude of the individual measurement scores obtained.

Test-retest reliability is the most basic and essential form of reliability and provides an estimate of the variation in subject ratings obtained over time when re-examined by the same rater. *Test-retest agreement* is the extent to which a subject obtains identical scores during two separate rating sessions when rated by the same examiner.[13]

3.4 Precision and Range

Instrument responsiveness to change is influenced by its precision and range. *Precision* refers to fineness of scale of the instrument (that is, the smallest unit of change that an instrument can distinguish.) Sensitivity to change should be appropriate to the level of precision required. For example the Shober test is a useful albeit imprecise screening tool for loss of spinal mobility of the lumbar spine, and is administered simply using a tape

[13] *Ibid.*

measure calibrated in centimeters. By contrast, surface inclinometry is a more precise measure of lumbar spinal flexibility where angular comparisons of degrees of motion are being made.

Range refers to the distance between the highest and lowest possible scores of a measure. A wide range can minimize the likelihood of "ceiling" or "floor" effects. Ceiling effects occur when initial test scores are high and leave little room for functional improvement. Conversely, floor effects occur when initial scores are very low leaving little room for measuring deterioration of performance.[14]

3.5 Feasibility and Practicality

Ideally, a test or instrument should be practical (i.e. easy to use, inexpensive, quick to administer) and should play to the strengths and qualifications of the tester. Since impairment ratings are traditionally performed by physicians, the tools required for PIR should duplicate those typically used for physician evaluating and reporting about disease whenever possible. Appropriate venues for training in the proper application of same should be also readily available.

3.6 Sources of measurement and reporting error

A number of sources of variance in impairment ratings exist[15], as illustrated in Figure 5.

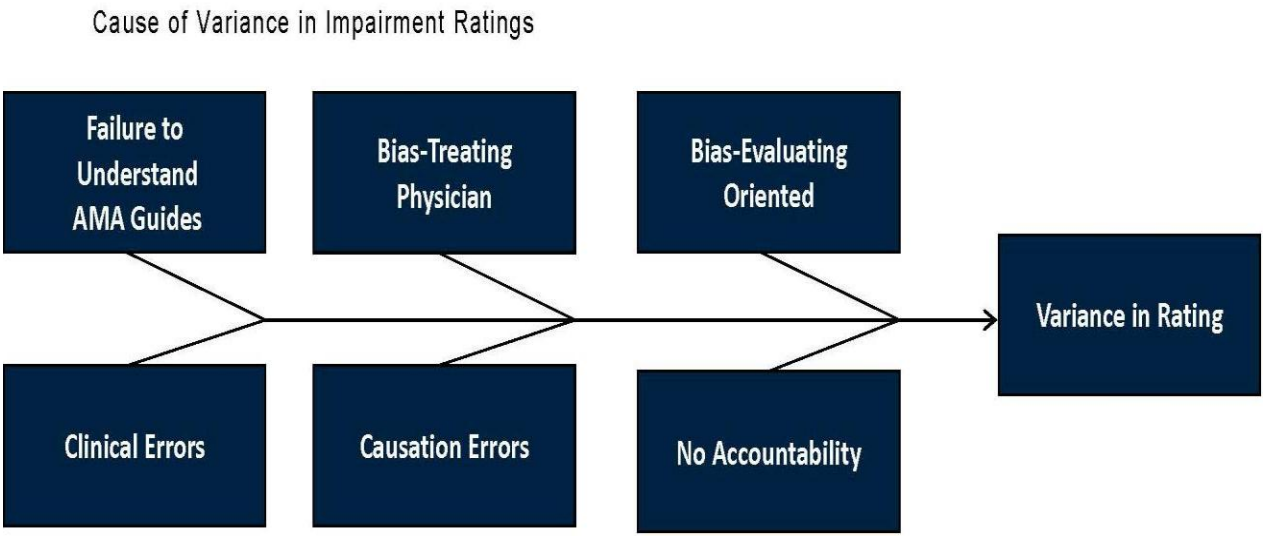


Figure 5

[14] *Ibid*.

[15] Rondinelli RD, Eskay-Auerbach M, Ranavaya MI, Brigham CR. AMA *Guides to the Evaluation of Permanent Impairment*, Sixth Edition: A response to the NCCI Study. Guides Newsletter 2012; November-December 1-9.

Among these, "error" variance may be attributable to errors in methodology and application of the *AMA Guides* or other rating guides due to failure to understand and use them correctly. Error variance (in a relative sense) may also arise through bias on the part of the treating and/or evaluating physician(s) and also the claimant(s). Other potential sources of error include errors in clinical judgment, mis-attribution of causation, and lack of accountability on the part of the raters themselves. This list is certainly not all inclusive, and some of this "error" can properly be viewed as the art of medicine itself, where clinical subjectivity, as gained from intuitive experience, differentiates the clinician from the otherwise skilled technician.[16]

4 Range-of-motion (ROM) assessment

4.1 Clinical significance

Musculoskeletal function is determined by five factors including (1) flexibility or range-of-motion (ROM), (2) muscle strength, (3) coordination or skill, (4) endurance, and (5) sensation. ROM limitations may be due to contracture of the joint capsule or ligaments, muscle contracture (including tendon shortening), joint destruction of cartilaginous surfaces and deformity, muscle weakness and pain. The physician charged with diagnosis, treatment, and rating of problems with musculoskeletal function must be able to evaluate and record function in an objective, reproducible, and accurate fashion. Goniometry is a science of measuring angular motion and goniometers are instruments designed to measure angles in relation to musculoskeletal body parts. Goniometry enables the physician to diagnose loss of musculoskeletal function in terms of ROM, to monitor response to treatment over time, and to meet statutory and legal requirements for evaluating and reporting losses in terms of impairment where applicable.[17]

Measurement of joint motion is an essential step in the evaluation of function in patients with impairment of the muscular, neurologic, and/or skeletal systems.[18] The manner in which a patient moves about, manipulates their environment, and functions in their daily life may depend heavily upon the degree to which parts of their body can tolerate active and passive ROM. Joint contracture and ankylosis may significantly impede function even when sensation and voluntary motor control are preserved.[19]

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[16] *Ibid*.

[17] Gerhardt J, Rondinelli R. Goniometric Techniques for Range of Motion Assessment. In: *Disability Evaluation. PM&R Clinics of N. America,* Rondinelli R., Katz R, eds, 12:3, pp 507-528, 2001.

[18] Cole TM, Tobis JS. Measurement of Musculoskeletal Function. In: *Krusen's Handbook of Physical medicine and Rehabilitation*, Fourth Edition, Kottke FJ, Lehmann JF, eds, Philadelphia, WB Saunders, 1990, pp20-71.

[19] *Supra* note 17.

4.2 Equipment and applications

4.2.1 General considerations

In measuring joint ROM, some degree of chaos exists because of the lack of standardization of terminology, reference coordinates, instrumentation, measuring techniques, and documentation. There are essentially two reference systems in use. The first of these, advocated by Norkin and White[20] uses an 180^0 reference system with the anatomic position at zero degrees and movement occurring up to 180^0 (within a cardinal plane) away from anatomic zero in either direction. This reference system is adopted as standard to most textbooks, including the *AMA Guides*. Another system, advocated by Knapp and West[21] considers 360^0 of reference motion available to any uniaxial joint. During joint movement, points on the limbs move about the axis of rotation defined by the center of the joint and describe the arc of a circle. The zero position, with the patient in anatomic position is arbitrarily assigned as overhead with the 180^0 position at the feet. This "Neutral Zero" measuring method[22] using a "Sagittal, Frontal, Transverse, Rotation" (SFTR) system of referencing and recording joint motion has been described in detail[23] and is promoted elsewhere as part of a global appeal for additional consensus and standardization.[24]

In addition to proper referencing and recording of joint motion, there are procedural recommendations which apply. Among these are:

- Proper stabilization of the body and measuring instruments applied to help assure reproducibility.
- Use of standardized, gravity-related (in some cases) starting positions and anatomic landmarks to allow consistent and accurate placement of the instruments themselves.
- Use of measuring instruments with standardized features, such as indication of gravity (a constant) and design that allows proper stabilization on various body parts.

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[20] Norkin CC, White J. *Measurement of Joint Motion – A Guide to Goniometry*, Second Edition. Philadelphia, FA Davis Co, 1985.

[21] Knapp ME, West CC. *Measurements of Joint Motion.* U Minn Med Bull, 1944, pp 405-412. See also: Knapp ME. *Measuring Range of Motion.* Postgrad Med 42:A123-A127, 1967.

[22] Cave EF, Roberts SM. A method of measuring and recording joint function. *J Bone Joint Surg* 18:455-466, 1936.

[23] Gerhardt J, Cocchiarella l, Lea R. *The Practical Guide to Range of Motion Assessment*, First Edition. Chicago, American Medical Association, 2002.

[24] *Ibid*. See also: Gerhardt J, Rondinelli R. Goniometric Techniques for Range of Motion Assessment. In: *Disability Evaluation. PM&R Clinics of N. America,* Rondinelli R., Katz R, eds, 12:3, pp 507-528, 2001.

- Use of standardized warm-up exercises by the examinee before measurements are taken.
- Performance of ROM measurements in standardized fashion to minimize error and improve comparability.
- Hands-on training by all who perform measurements according to the above.
- Documentation of conditions that may affect ROM measurements obtained.
- Validation of effort through repetition where necessary.[25]

4.2.2 Instrumentation

Two-arm goniometers are widely used to measure uniaxial ROM of joints of extremities. They are inexpensive and can be applied in any plane. Disadvantages include limited accuracy and reproducibility of measurements on patients with poor bony landmarks (such as individuals with significant edema or obesity) and lack of consistency maintaining a stationary arm in the starting position (based on visual assessment). Two-armed goniometers are generally unsuitable for measuring complex movement of the spine because there is no single axis of rotation in the discs and posterior facet joints[26] and a single axis of rotation is often lacking even in joints of the extremities. For example, rotation and gliding motions of the knee result in a shifting axis of rotation depending upon degree of flexion; furthermore, the resultant axis of rotation follows a spiral contour.

Spinal joints do not readily lend themselves to the superficial inspection required for goniometers and consequently goniometric techniques for measuring spinal ROM are considered highly inaccurate.[27] Motion of a spinal segment is also compounded by adjacent segment motion above and below the segment. In order to capture this regional ROM inclinometers have been recommended for measuring spinal motion in the 4th and 5th editions of the *AMA Guides.*[28]

Inclinometers are small angle-measuring devices with industrial applications recently adopted by physicians and therapists to measure angles and ROM of joints. They work like a plumb line operating on the principle of gravity. Their disadvantage is that they depend upon gravity and, therefore, must be applied to the patient properly positioned in the

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[25] *Supra* note 17.

[26] *American Medical Association: Guides to the Evaluation of Permanent Impairment,* Fourth Edition. Chicago, American Medical Association, 1993.

[27] *Ibid*.

[28] *Ibid. American Medical Association: Guides to the Evaluation of Permanent Impairment,* Fifth Edition. Chicago, American Medical Association, 2001.

vertical plane in order to operate correctly. There are two basic types: fluid pendulum devices which are inexpensive, portable and accurate within 2^0; and electronic devices which are more expensive, less portable, and often computerized.

5 Spinal ROM Assessment

5.1 Reliability of spinal goniometry and inclinometry

Generally speaking, the reliability and reproducibility of any anthropometric measurement technique (typically applied to impairment ratings) appears problematic under close scrutiny. In one classic study, eight observers, each trained rigorously in the same anthropometric techniques, measured 63 standard linear dimensions (e.g., length, width, diameter, circumference) referenced by standard surface landmarks for body parts for eight male and female subjects, respectively. For these relatively simple measurements, their results indicated that inter-observer reliability, even under such optimal conditions, is poor for both sexes. The authors' conclusion is that investigators using raw anthropometric data from multiple sources for comparative purposes must exercise considerable caution in view of this inherent measurement error.[29]

In the case of measurement of angular motion (ROM) with goniometers and inclinometers, the measurement procedures are more complex, and perhaps even more prone to errors. Numerous potential sources of error exist, including (but not limited to) choice of surface landmarks from which measurements are taken, lack of standardized, uniform measurement techniques, inherent differences in the measurement instruments themselves, and differences in the technical proficiency of the examiners themselves. Such errors may be compounded by response bias on the part of subject and examiner alike.

When goniometric techniques are applied to the spine, these deficiencies appear to become magnified. Surface inclinometry (see previous discussion) has been touted as the preferred method of assessing spinal ROM after several workers reported high inter-rater and intra-rater reliability when applied to the cervical spine[30] and lumbar spine[31], respectively.

More recent studies indicate that these techniques yield unacceptable reliability, even in the hands of experienced observers measuring compliant subjects. For example, Rondinelli

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[29] Bennett KA, Osborne RH. Inter-observer measurement reliability in anthropometry. *Hum Biol.* 58:751-759, 1986.

[30] Youdas J, Carey J, Garrett T. Reliability of measurements of cervical spine range of motion; comparison of three methods. *Phys Ther* 71:98-108, 1991.

[31] Keeley J, Meyer TG, Cox R, et al. Quantification of lumbar function. Part 5. Reliability of range-of-motion measures in the sagittal plane and in vivo torsion rotation measurement technique. *Spine* 11:31-35, 1986.

et al[32] examined the magnitude and clinical significance of surface measurement error in the determination of lumbar spinal flexion using single inclinometer, dual inclinometer, and back range-of-motion standard measurement techniques. Eight healthy subjects were examined independently by two experienced observers and three replicates of each measurement were obtained by each observer in random sequence. Reliability estimates were determined by intra-class correlation coefficients and t-test comparisons between observation series. The median range of error was 8.5^0 using the single inclinometer, 10.5^0 using the double inclinometer and 16^0 using the back range-of-motion. The intra-rater reliability was generally higher than inter-rater reliability and inter-method reliability was low in most cases. The authors concluded that significant measurement error in estimating lumbar flexion by inclinometry may be expected to occur even in controlled settings using experienced observers, standard examination techniques, and asymptomatic healthy subjects. Nitschke et al[33] also measured intra- and inter-rater reliability of the dual inclinometer method for lumbar ROM and the long-arm goniometer method for thoracic ROM, respectively. A repeated measures design was applied using 34 subjects measured by two examiners on one occasion and one examiner on two occasions one week apart. Their results showed poor intra- and inter-rater reliability for both instruments, with impairment rating estimates varying by as much as 18% for the same individual measured by two different examiners on the same day. Such findings would appear to undermine expectations that clinicians performing impairment ratings in normal clinical settings can reliably apply such measurement techniques.

5.2 Validity of spinal goniometry and inclinometry

The content and predictive validity of ROM-based impairment ratings is a key concern for their application to disability systems in general, and to impairment rating systems in particular.[34] In order to properly examine this issue for the spine, one must first give consideration to the relationship between ROM-based impairment ratings and associated functional losses in general.

Gloss and Wardle[35] examined the content validity of impairment ratings according to the *AMA Guides* in relation to specific functional losses associated with a variety of hand and

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[32] Rondinelli R, Murphy J, Esler A, Marciano A, Cholmakjian C, Estimation of normal lumbar flexion with surface inclinometry: a comparison of three methods. *Am J Phys Med Rehabil.* 1992;71(4):219-24.

[33] Nitschke JE, Nattrass CL, Disler PB, Chou MJ, OOI KT. Reliability of the American Medical Association *Guides'* model for measuring spinal range of motion; its implications for whole-person impairment rating. *Spine*. 1999;24(3):262-268.

[34] Spieler EA, Barth PS, Burton JF, et al. Recommendations to guide revision of the Guides to the Evaluation of Permanent Impairment. *JAMA.* 2000;283(4):519-23.

[35] Gloss DS, Wardle MG. Reliability and validity of American Medical Association's guides to ratings of permanent impairment. *JAMA.* 1982;248:2292-2296.

upper extremity impairments of different levels of severity, and using impairment criteria based on amputation level and goniometric determined loss of ROM. Approximately two thirds of the correlations obtained were statistically significant suggesting some degree of content validity. However, the key point overlooked by that study was that less than 8% of all of their correlations showed sufficiently large R^2 values (>.5) to suggest any real predictive validity (amount of "explained variance" in functional outcome predicted by the impairment ratings themselves) according to the *AMA Guides*' approach[36]. Another related study[37] examined the correlation between measures of lower extremity impairment determined according to the *AMA Guides*, using criteria of fractures, strength deficits, and goniometric determined loss of ROM, in relation to functional outcomes based upon self-reported functional loss and also on the Sickness Impact Profile (SIP). Significant correlations were again obtained for impairment vs. performance of functional tasks (r=0.57) and impairment vs. activity limitations according to the SIP (r=0.55) respectively. Correlations were highest when measures of impairment were based upon strength rather than ROM. However, the R^2 values of that study were again insufficiently large (R^2 = .32 and .30, respectively) to suggest any meaningful predictive validity of their goniometric-based results. More recently, Rondinelli et al[38] examined the relationship between simulated hand impairment ratings based upon goniometric determined loss of ROM and loss of hand function according to standard objective measures of same. Twenty healthy adult volunteers had a simulated "fusion" of the carpometacarpal joint of the thumb of their dominant extremity achieved by immobilization in an individually fabricated splint. Impairment ratings ("baseline" vs. splinted) were determined according to ROM criteria of the *AMA* Guides and standard measures of upper limb and hand function were obtained using industrial (i.e. Valpar Small Tools test) and non-industrial (i.e. Jebsen hand Function test) in splinted vs. unsplinted testing in randomized order for each subject. In all of the comparisons made, the degree of simulated hand impairment (restricted range of motion) failed to predict the degree of concomitant functional loss of the hand.

A second general concern in evaluating spinal impairment is the precise association expected between physical findings on examination, objective measures of condition severity, and functional capabilities of adults with painful back conditions. A number of studies have reported conflicting associations between condition severity and functional capabilities for both acute LBP[39] and chronic LBP[40] conditions. This may, in part, be

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[36] Rondinelli RD, Dunn W, Hassanein KM, et al. A simulation of hand impairments: effects on upper extremity function and implications toward medical impairment rating and disability determination. *Arch Phys Med Rehabil.* 1997;78:1358-1363.

[37] McCarthy ML, McAndrew MP, MacKenzie EJ, et al. Correlation between the measures of impairment according to the modified system of the American Medical Association, and function. *J Bone Joint Surg Am*. 1998;80:1034-1042.

[38] *Supra* note 39.

[39] Michel A, Kohlmann T, Raspe H. The association between clinical findings on physical examination and self-reported severity in back pain: results of a population –based study. Spine. 1997;22:296-304. See also:

explained by methodological confounders; for example, inclusion of subjects with varying age ranges increases the heterogeneity of the pathology thereby weakening these associations for any examination procedure whose sensitivity and specificity differs for each particular condition giving rise to LBP. Furthermore, differences in precision, reliability, and reference standards for the various measures used and procedures followed often makes comparative interpretation of the literature difficult. To clarify and demonstrate this issue, Lyle et al[41] examined the relationship of specific physical examination findings sensitive to degenerative changes in the spine that may give rise to LBP, and measures of self-reported symptom severity and physical function, respectively, in an aged cohort of chronic LBP sufferers. Although several of the physical examination measures of that study (provocation tests which narrowed the foraminal space) were reflective of self-reported symptom severity (as measured by the Lumbar Spinal Stenosis – LSS questionnaire), they were not discriminative of functional losses according to the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) questionnaire.

Researchers[42] have investigated the effects of age and gender on sagittal ROM of the lumbar spine in 1126 healthy subjects using the dual inclinometer approach. Distinct differences between gender were seen in the flexion and extension angles whereas little differences were seen between these groups in total lumbar sagittal ROM. Furthermore, total sagittal ROM, flexion angle and extension angle decreased significantly with increasing age. Normative values have generally failed to take these differences into account.

The relevance of loss of spinal ROM to loss of joint function is hardly self-evident and the respective content and predictive validity of such losses remains questionable as well. To

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McGregor AH, Dore CJ, McCarthy ID, et al. Are subjective clinical findings and objective clinical tests related to the motion characteristics of low back pain subjects? *J Orthop Sports Phys Ther.* 1998;28:370-377.

[40] Waddell G, Main CJ. Assessment of severity in low back disorders. Spine. 1984;9:204-208.

Waddell G, Somerville D, Henderson J, et al. Objective clinical evaluation of physical impairment in chronic low back pain. *Spine.* 1992;17:617-628.

Hazard RG, Haugh LD, Green PA, et al. Chronic low back pain: the relationship between patient satisfaction and pain, impairment, and disability outcomes. *Spine.* 1994;19:881-887.

Gronblad M, Hurri H, Kouri JP. Relationships between spinal mobility, physical performance tests, pain intensity and disability assessments in chronic low back pain patients. *Scand J Rehabil Med.* 1997;29:17-24.

Nattrass CL, Nitschke JE, Disler PB, Chou MJ, OOI KT. Lumbar spine range of motion as a measure of physical and functional impairment: an investigation of validity. *Clin Rehabil***.** 1999;13(3):211-218.

Cox ME, Asselin S, Gracovetscky SA, et al. Relationship between functional evaluation measures and self-assessment in nonacute low back pain. *Spine.* 2000;25:1817-1826.

[41] Lyle MA, Manes S, McGuinness M, Ziaei S, Iversen MD. Relationship of physical examination findings and self-reported symptom severity and physical function in patients with degenerative lumbar conditions. *Phys Ther*. 2005;85(2):120-33.

[42] Sullivan MS, Dickinson CE, Troup JD. The influence of age and gender on lumbar spine sagittal plane range of motion: a study of 1126 healthy subjects. *Spine.* 1994;19(6):682-686.

illustrate, Lowery et al[43] examined impairment ratings for the cervical and lumbar spine based upon the dual inclinometer method of assessing spinal range of motion in 85 normal healthy (i.e., asymptomatic) subjects. Thirty-six measurements of sagittal and coronal motion were taken by two highly trained observers on each subject. Their findings indicated that some degree of ratable "impairment" was obtained on all subjects (ranging from 2% WPI to 38.5% WPI) with the average spinal impairment calculated to be 10.8% WPI. The level of impairment increased with age ($p < 0.0001$) reflecting age-related differences in spinal ROM as opposed to detectable differences in cervical or lumbar functioning.

The relationship between spinal flexibility and disability due to painful back conditions has also been examined. Parks et al[44] compared lumbar ROM in the cardinal planes with a variety of functional ability scores relating to fitness and work-related material handling abilities in patients with chronic LBP. Their results were notable for a lack of significant correlations (only 9 of 144 possible correlations were significant) between functional test score and lumbar ROM. Another study[45] paradoxically showed that the greatest functional improvement in idiopathic LBP sufferers occurs in those patients who continued to have restricted ROM. The authors hypothesized that functional improvement in that population was the result of stabilization of their unstable motion segment. Other studies have paradoxically shown that reduced spinal mobility is a negative predictor for successful rehabilitation in post-surgical LBP sufferers. For example, Froning et al[46] described better functional outcomes in patients with reduced spinal mobility whereas Frymoyer et al[47] showed that better results were associated with restoration of normal spinal flexibility.

A more recent study[48] specifically examined the convergent and discriminant validity of lumbar range of motion tests for healthy individuals vs. patients with low back injuries. They analyzed published results of studies applying goniometric assessments of lumbar ROM according to the inclinometric methods advocated by the *AMA Guides*. The convergent validity was assessed by examining lumbar inclinometric range of motion

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[43] Lowery WD Jr, Horn TJ, Boden SD, Wiesel SW. Impairment evaluation based on spinal range of motion in normal subjects. *J Spinal Disord.* 1992:5(4):398-402.

[44] Parks KA, Crichton KS, Goldford RJ, McGill SM. A comparison of lumbar range of motion and functional ability scores in patients with low back pain: assessment for range of motion validity. *Spine.* 2003;28(4):380-384.

[45] Lankhorst GJ, Van de Stadt RJ, Van der Korst JK. The natural history of idiopathic low back pain. *Scand J Rehabil Med* 17:1-4, 1985.

[46] Froning EC, Frohman B. Motion of the lumbosacral spine after laminectomy and spine fusion. J Bone Joint Surg. 1968;50A:897.

[47] Frymoyer JW, Hanley E, Howe J, et al. A comparison of radiographic findings in fusion and nonfusion patients, ten or more years following lumbar disc surgery. *Spine*. 1979;4:435. See also: Frymoyer JW, Cats-Baril W. Predictors of low back pain disability. *Clin ortho Rel Res* 221:89-98, 1987.

[48] Zuberbier OA, Kozlowski AJ, Hunt DG, et al. Analysis of the convergent and discriminant validity of published lumbar flexion, extension, and lateral flexion scores.. *Spine*. 2001;26(20):472-478.

(LROM) in comparison to radiographic assessments of lumbar spine mobility (the "gold standard") and they also examined correlations between LROM and patient self-reported severity of impairment or clinically observed impairment. Discriminant validity was assessed by direct comparison of LROM test scores for persons with low back injuries relative to those with healthy backs. Their results showed the following: "Convergent validity research showed inconsistent relations between inclinometric and radiographic lumbar range of motion measurements. Some studies showed strong relation, whereas others showed essentially no relation between the two techniques. Correlations between lumbar range of motion scores and spinal disability and function were similarly inconclusive. Studies reporting mean scores and standard deviations for lumbar range of motion measurements showed a high degree of overlap between the scores of participants with low back injuries and those without such injuries".[49]

Finally, Nattrass et al[50] investigated the validity of lumbar spine ROM for assessing percentage impairment in chronic low back pain patients. Thirty-four subjects with chronic LBP were examined using a long-arm goniometer and dual inclinometer techniques, and scores were obtained from each subject on the Waddell Physical Impairment Scale, Waddell Disability Index, and the Oswestry Disability Index, respectively. Their results demonstrated poor validity for both ROM methods which bear no consistent relationship to the level of physical or functional impairment in their subjects with chronic LBP. Their conclusion was that there was "…..no evidence for a relationship between low back range of motion and impairment, and thus it would appear illogical to evaluate impairment in chronic low back pain patients using a spinal range of motion model when aiming to compensate disability".[51]

5.3 Feasibility and ease of application

A final methodological concern relates to feasibility and ease of application of goniometry and inclinometry procedures in the physician's office. For example, the *AMA Guides* standard procedure to assess lumbar ROM using surface inclinometry offers two separate validity checks. The first of these, measures reproducibility of lumbar ROM scores and requires sufficient consistency (defined as having three consecutive measurement scores falling within the larger of +/- 5^0 or +/-10% of their mean score). The second validity check requires that hip flexion plus extension angle compares favorably with the straight leg raise (SLR) angle (i.e. the tightest SLR angle minus the sum of hip flexion and extension

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[49] *Ibid* at pg. E472.

[50] Nattrass CL, Nitschke JE, Disler PB, Chou MJ, OOI KT. Lumbar spine range of motion as a measure of physical and functional impairment: an investigation of validity. *Clin Rehabil*. 1999;13(3):211-218.

[51] Nattrass CL, Nitschke JE, Disler PB, Chou MJ, OOI KT. Lumbar spine range of motion as a measure of physical and functional impairment: an investigation of validity. *Clin Rehabil*. 1999;13(3):211-218 at pg. 211.

angles is within +/- 15^0.) In their commentary, Zuberbier et al[52] reviewed data from published studies approximating *AMA Guides*' specifications for measuring lumbar ROM. They found that 33% of three consecutive lumbar flexion measurements and 27% of lumbar extension measurements fail the first LROM validity check. Furthermore, across three different experimental settings each of which required more than three consecutive LROM measurements to be taken, only 33% of participants had valid flexion scores and only 53% had valid extension scores across all three sessions. They concluded that "…..the ROM-based impairment rating calculations, as described in the *AMA Guides*, may not be feasible for use in clinical settings because of technical demands exceeding clinicians' performance capacity".[53] The implications of their work point toward the need for revision of the ROM model to improve feasibility of its correct clinical application, or more rigorous training of clinicians who apply these techniques, or both.

5.4 Spinal ROM – Should it remain the "gold standard" for PIR?

At present, Spinal ROM enjoys historical precedent and traditional acceptance as the conceptual and operational lynch-pin of the BC WCB PFI rating system. It would appear that the major attractions of a ROM-based system for PIR include the objectivity of the measures themselves, and what appears to be their inherent functional base (validity), and their high levels of precision, reliability, and reproducibility. We have now reviewed the relevant body of available scientific evidence as summarized above to assess the adequacy of spinal ROM according to these essential qualities of basic measurement theory. Based upon the above analysis one must conclude the following:

- **Lack of Validity:** Spinal ROM has been shown to lack validity as an indicator of spinal function for purposes of impairment rating. No clear-cut association between loss of spinal ROM and associated loss of functioning in terms of basic mobility and self-care activities can be shown to exist. The numerous confounders that potentially obscure any such relationship as might exist include, but are not limited to: lack of norms measured in terms of functional ROM as opposed to anatomical ROM (these are not equivalent entities); lack of accountability to the natural effects of aging on spinal ROM; lack of a consistent relationship between pain and ROM for acute and chronic LBP patients, respectively; and lack of predictive associations between loss of spinal ROM and loss of ADLs when such associations have been carefully examined.

- **Lack of Reliability and Reproducibility:** Spinal ROM determined according to

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[52] Zuberbier OA, Hunt DG, Kozlowski AJ, et al. Commentary on the American Medical Association *Guides*' lumbar impairment validity checks. *Spine*. 2001;26(24):2735-2737.
[53] *Ibid* at pg. 2737.

commonly accepted procedures and using surface goniometry and inclinometry measurement techniques, has been shown to lack the necessary and desired levels of reliability and reproducibility to reflect clinically significant differences in flexibility of the spine, even in the hands of highly trained raters following standard rating measurement procedures and using healthy, compliant subjects. The magnitude of potential measurement error is sufficient to raise doubts as to the credibility of any examiner's ability to correctly rate the impairment in a normal clinical setting. The potential confounders are numerous including (but not limited to) errors in identification of correct surface landmarks on repeated trials over time; errors in measurement due to choice of examination equipment and technique; errors in measurement due to lack of examiner proficiency; and response bias on the part of claimant or examiner.

- **Inadequate Feasibility and Ease of Application:** Spinal ROM is problematic in terms of feasibility and ease of application. Standard procedures are technically difficult and time-consuming to apply correctly in a clinical setting, and frequently require multiple repetitions to satisfy "validation" methodology. As a result of time and energy constraints, these methodological requirements are typically bypassed and results are, therefore, being obtained incorrectly.

For the above reasons, spinal ROM should be abandoned in favor of other criteria of disablement which have demonstrated better sensitivity to functional loss; play more to the strengths of the physician examiner in terms of their diagnostic skill set; and which are methodologically transparent, efficient and easy to perform.

6 Alternative Criteria of Disablement

6.1 Diagnosis-based

Any physician-driven system for evaluating and reporting of medical impairment ratings should maintain a focus upon and inclusion of the four essential elements of physician evaluation and reporting about their patients including:

- What is the clinical problem (diagnosis)?
- What difficulty does the patient report (symptoms, functional loss)?
- What are the examination findings?
- What are the results of clinical studies?[54]

[54] *Supra* note 15.

One example of a diagnosis-based approach to impairment rating is the Diagnosis-Based Impairment (DBI) system espoused by the most recent (sixth) edition of the *AMA Guides*[55] and an outgrowth of the earlier "diagnosis-related estimates" of the 5th and earlier editions. This approach represents one attempt to capture medical impairment from both a diagnostic and functional perspective simultaneously, and has a number of potential advantages worth consideration here.

First, it uses a nominal-ordinal system of measurement which has inherent simplicity and transparency, and plays to the physician's strength as a diagnostician. It uses a standard, uniform template (impairment grid) of 5 columns listing mutually-exclusive functionally-based potential impairment classes (classes 0-4) from least severe to most severe, respectively, and patterned after the ICF. Whereas all organ systems can potentially be organized within this scheme, not all conditions within a given organ system will qualify for all 5 levels of functional impairment. Accordingly, and using the musculoskeletal organ systems as an example, all diagnostically ratable conditions are hierarchically arranged according to rows with the least severe (disabling) conditions at the top and the more severe ratable conditions at the bottom (e.g., soft tissue "sprains & strains" at the top; followed by muscle and tendon traumas; followed by ligament, bone and joint destructive conditions at the bottom). The order of magnitude of ratings increases from left to right for the columns of impairment classes 0-4 respectively, and for conditions listed from the top to the bottom rows, respectively.

It is also evidence based insofar as the most recent strength of evidence can be used to develop and codify diagnostic criteria of impairment used to define the impairment classes.

It also has a functional basis, insofar as the physician examiner is asked to classify the functional severity of the given condition at maximum medical improvement (MMI) according to a table of appropriate functionally-based (i.e. ADL-driven) grade modifiers. This information is then used in conjunction with similar grade modifiers for impairment severity according to physical examination findings and clinical test results, respectively, in order to determine the final impairment number within the available range for the specific diagnosis-based impairment class[56] (See Figure 6).

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[55] *Supra* note 5.
[56] *Supra* note 15.

Sixth Edition: Summary

Diagnosis-Based Impairment

	Grid	Class 0	Class 1	Class 2	Class 3	Class 4
Diagnosis / Criteria	Table 17-6	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem

Adjustment Factors – Grade Modifiers

Non-Key Factor	Grid	Grade Modifier 0	Grade Modifier 1	Grade Modifier 2	Grade Modifier 3	Grade Modifier 4
Functional History	Table 17-6	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
Physical Exam	Table 17-7	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem
Clinical Studies	Table 17-8	No problem	Mild problem	Moderate problem	Severe problem	Very severe problem

Figure 6

This approach allows the rater to capture important and useful information regarding clinical and functional severity of any given ratable diagnosis and individual case. Once the examiner masters this uniform and consistent methodology he/she can quickly and efficiently obtain the appropriate rating, and the methodology is highly transparent and reproducible, and thereby gaining favor within the trained physician examiner community familiar with its use[57].

Finally, the DBI approach has abandoned use of spinal ROM as an impairment criterion altogether, and has retained goniometric ROM of the extremities only to a limited degree for several of the same reasons cited above[58].

Although the DBI approach of the *AMA Guides* 6th edition has given rise to reliability and

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[57] *Ibid.*

[58] *Supra* note 5.

agreement[59] concerns of its own, a careful comparative examination of the respective methodologies of the 6th edition vs. earlier editions of the *AMA Guides* would suggest that the relative impact of these changes on inter-rater reliability and agreement has been a positive one, but that further research in this area is also needed.[60]

6.2 IOM Considerations

As was seen earlier in reference to Figure 2, a medical impairment rating which, in part, takes into account functional losses in terms of ADLs, is a necessary component of any disability determination but not the sole (nor necessarily adequate) determinant[61]. The BC system, as currently defined, is based almost entirely upon estimated loss of earning capacity (actual or potential). This system overlooks the financial implications of non-work losses such as burden-of-care in terms of medications, lifestyle modifications, and caregiver support to maintain optimal functioning both within and outside of the workplace. This does not take into account life satisfaction and quality of life considerations from a financial perspective. Suitable metrics exist[62] to measure these non-economic factors although rating these factors may be outside the zone of comfort and familiarity of most physicians.

6.3 Other possible functionally-based approaches

A new methodology for rapid, reproducible, and reliable functional assessment is currently under investigation by the U.S. Social Security Administration (SSA), in collaboration with researchers at the NIH and Boston University School of Public Health. This project uses Item Response Theory (IRT) and Computerized Adaptive Testing (CAT) methodology to generate a functional profile for any potentially disabled individual with respect to the functional domains of mobility, self-care (ADL) and applied cognition[63]. This approach has been shown to adequately quantify disablement following stroke[64] with a high degree of patient and proxy rating agreement between scores obtained from patient self-report and those simultaneously obtained by physician raters. Consequently, it holds promise for producing a highly valid and reliable global metric of functionality which may be tailored to

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[59] *Supra* note 15. See also: Forst L, Friedman L, Chukwu A. Reliability of the *AMA Guides* to the Evaluation of Permanent Impairment. *J Occup Environ Med.* 2010;52(12):1201-3.

[60] *Supra* note 15. See also: Rondinelli RD. Commentary on Reliability of the *AMA Guides* to the Evaluation of Permanent Impairment. *J Occup Environ Med.* 2010;52(12):1204-5.

[61] *Supra* note 6.

[62] Murphy PA, Williams JM. *Assessment of Rehabilitative and Quality of Life Issues in Litigation.* Boca Raton, CRC Press, 1999.

[63] Jette AM, Haley SM. Contemporary measurement techniques for rehabilitation outcomes assessment. *J Rehabil Med* 2005;37:339-345.

[64] Jette AM, Ni P, Rasch EK, et al. Evaluation of patient and proxy responses on the Activity Measure for Postacute Care. *Stroke* 2012;43(3):824-829.

the assessment of work ability for purposes of disability compensation in the near future.

7 Recommendations

Based upon the review of scientific literature cited above, the evidence overwhelmingly suggests that spinal ROM fails commonly accepted validity criteria as an indicator of spinal function and, furthermore fails to demonstrate adequate reliability and reproducibility even when performed by highly trained raters following standard rating procedures and using the most commonly accepted goniometric and inclinometric equipment. As such, I make the following recommendations:

1) Spinal ROM should be abandoned as the principal measure of spinal function for purposes of the BC WCB Permanent Functional Impairment (PFI) rating system within the *Permanent Disability Evaluation Schedule* (*PDES*).

2) Any revision to the *PDES* should give due consideration to an alternative rating system which plays to the diagnostic strengths of the rating physician and also lends itself fully to the evidence-based scientific underpinnings upon which medical diagnoses are based.

3) Any revision to the *PDES* should also give due consideration to alternative metrics to better assess the functional consequences of illness or injury which accompany the medical diagnosis in any particular case. Ideally, such metrics must be available in the public domain, be easy to administer and cross-validate by the physician rater, and must be linked in a meaningful way to any computations whereby estimates of work loss are derived.

4) It may be feasible and expedient to consider an approach similar to the Diagnosis-based Impairment (DBI) approach currently adopted by the *AMA Guides* 6th edition to simultaneously achieve the objectives listed above.

8 FIGURES

Figure 1: **International Classification of Functioning, Disability and Health Model of Disablement**.

From *AMA Guides Newsletter*. Nov/Dec 2012, page 2. Reproduced with permission from Rondinelli RD, Eskay-Auerback M., et al. AMA Guides to the Evaluation of Permanent Impairment, Sixth Edition: A Response to the NCCI Study. Chicago, IL;American Medical Association. All rights reserved. Note: This figure also was redrawn and modified from a figure that originally appeared in: WHO. International Classification of Functioning, Disabilities and Health: ICF. Geneva, World Health Organization, 2001, page 18.

Figure 2: **Disabling Consequences of Illness or Injury**.
Reprinted with permission from A 21st Century System for Evaluating Veterans for Disability Benefits 2007 by National Academy of Sciences, page117. Courtesy of the National Academies Press, Washington, D.C.

Figure 3: **Validity Conceptualized as the Ability to Hit the Target** by Hinderer SR, Rondinelli RD, Katz RT. From "Measurement Issues in Impairment Rating and Disability Evaluation" in Rondinelli RD, Katz RT (eds), Impairment Rating and Disability Evaluation. Philadelphia, W.B. Saunders Co., 2000, page 42.

Figure 4: **Reliability Conceptualized as Shots on a Target**: **Figure 4A:** A tight cluster indicates high reliability. **Figure 4B:** Failure to cluster indicates poor reliability. by Hinderer SR, Rondinelli RD, Katz RT.

From "Measurement Issues in Impairment Rating and Disability Evaluation" in Rondinelli RD, Katz RT (eds), Impairment Rating and Disability Evaluation. Philadelphia, W.B. Saunders Co., 2000, page 37.

Figure 5: **Causes of Variance in Impairment Ratings**.
From *AMA Guides Newsletter*. Nov/Dec 2012, page 5. Reproduced with permission from Rondinelli RD, Eskay-Auerback M., et al. AMA Guides to the Evaluation of Permanent Impairment, Sixth Edition: A Response to the NCCI Study. Chicago, IL;American Medical Association. All rights reserved.

Figure 6: **Methodology used in determining Diagnosis-based Impairment (DBI) for the musculoskeletal organ systems according to the AMA Guides, sixth edition**.
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10 Appendix A

Historical Preferences and Methods of the BC Workers' Compensation System for Permanent Impairment Rating – Permanent Disability Evaluation Schedule[65]

Introduction

The Permanent Disability Evaluation Schedule (PDES) was originally derived from a report presented to the Association of Workmen's Compensation Boards by Dr. D.E. Bell in 1960. By a resolution of the Association, Dr. Bell was tasked with surveying the permanent disability rating schedules in each of the ten provinces and then presenting recommendations for changes. Dr. Bell presented comprehensive recommendations. Some of the key comments in his August 22, 1960 report include,

> *"The schedule presented here is considered to be an improvement on existing schedules but should in no sense be considered to represent the ultimate. Usage will no doubt bring to light inconsistencies not immediately evident which will lead to further revision from time to time. Indeed an on-going study of this important concept of compensation work would be highly desirable."*[66]
>
> *"The schedule which is to be applied is to be used solely as a guide, is designed to show in percentage, the approximate impairment in earning capacity of an average unskilled workman."*[67]
>
> *"In applying the schedule regard should always be had to whether the award adequately compensates the workman for his loss of earning capacity failing for which upward revision may be considered."*[68]
>
> *"In off-schedule or judgment ratings awards should be proportionate to listed items."*[69]

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[65] Summary by J. Parker, B.C. Nurses Union, June 2013

[66] Bell, D.E., Report of D.E. Bell to The Association of Workmen's Compensation Boards of Canada, Subject: Permanent Disability Evaluation: Toronto, Ontario, August 22, 1960 at page 3.

[67] *Ibid* at pg 4.

[68] *Ibid*..

[69] *Ibid*.

Application of the Schedule

According to Dr. Bell, the PDES, or any schedule, "is at best only a guide, to be departed from if and when the occasion demands. It must always be regarded as a servant; never a master."[70]

Updates to the PDES

The PDES in its current form has been largely unchanged since 1966 with the following exceptions:

- 1990: a section on the spine was included;
- 1991: the style and format of the PDES was revised;
- 1993: the hand charts were revised;
- 2001: a section on psychological disability was included;
- 2003: the PDES was reviewed to reflect current medical/scientific knowledge and current practices regarding the assessment of permanent partial disabilities. Specifically, changes were made to percentages of disability involving amputation of digits of the hand, loss of range of motion in the thoracic spine, and pronation and supination of the elbow; and
- 2007: a section on asthma and dermatitis was included.

Loss of Function versus Loss of Earnings

Prior to 1973, the Workers' Compensation Board of BC (WCB) used only the loss of function method to calculate a permanently disabled worker's pension award. The WCB first began to use the loss of earnings method in 1973 but, only for injuries involving the spinal column. In October 1977, the former Commissioners of the WCB raised the question as to whether it would be appropriate to extend the application of the loss of earnings method to non-spinal column injuries. As a result, a Committee was established to determine whether, in the case of an injury unrelated to the spinal column, a loss of earnings pension award would be more equitable.

This review led the Commissioners to reach the conclusion to apply a loss of earnings system to non-spinal injuries.[71]

The use by the WCB of these two methods of calculating pension awards has been referred to as the "Dual System". The application of the Dual System was described by the former Commissioners as applicable in any case where it is felt that the worker may have suffered

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[70] *Ibid* at pg 15.

[71] Decision No. 297 (1979) 5 WCR 11.

a loss of earnings because of his compensable disability which is greater than that allowed for by the physical impairment method of assessment.[72]

Under the dual system, awards are calculated as follows:

1. The degree of physical impairment is calculated pursuant to Section 23(1) using the method described above and a functional pension is calculated accordingly.
2. A loss of earnings pension is calculated pursuant to Section 23(3) according to the projected loss of earnings method described below.
3. The higher of these two results is then used as the pension award.

In January 1996, the Gill Royal Commission on Workers' Compensation in British Columbia found that compensation under the Workers' Compensation Act is often not paid consistently or equitably. The result is that injured workers with similar disabilities may receive markedly different benefits. The Royal Commission recommended abolishing the overly simplistic schedule of presumed loss of earnings based on the extent of injury and found that the system should pay compensation for actual loss of earning capacity where it arises and should provide separate compensation for functional impairment, even in the absence of earnings loss.

The majority of the Royal Commission recommendations, including the recommendation on pensions were not acted on legislatively. They were, however, referenced in a Core Services Review conducted by Alan Winter dated March 11, 2002. In that review, the following recommendations were made in regards to permanent disability benefits:

- The dual system of calculating pensions on a functional (scheduled) and a loss of earnings basis should be retained; however, emphasis should be placed on utilizing the functional method when determining the pension entitlement;
- The loss of earnings method should be used in "special instances" when the pension award calculated pursuant to the loss of function method is considered to be significantly inadequate insofar as the individual worker's particular circumstances are concerned; and

[72] Decision No. 394 (1985) 6 WCR 23 at pg 24.

- The WCB should conduct a review of the PDES to ensure it is reflective of current medical/scientific knowledge, and can be readily understood by the decision-makers who must utilize it.

In 2002, section 23(3.1) was added to the BC Workers' Compensation Act and provided that a loss of earnings pension would only be paid where WCB determines that the combined effect of the worker's occupation and the worker's injury is "so exceptional" that an amount determined via the functional method does not appropriately compensate the worker for the injury. WCB's application of Policy related to the "so exceptional" clause in the legislation resulted in more than a 95% reduction in the number of loss of earnings pensions awarded. Subsequently, several challenges to the WCB's Policy have resulted in a modest increase of the number of pensions awarded on a loss of earnings basis.

Some have noted the PDES to be outdated and argued that if the functional method were to be relied upon in all but the most exceptional awards, then the PDES should have been updated prior to the almost exclusive reliance on the functional method.

2003 WCB Consultation Paper

On April 1, 2013, WCB released a Consultation Paper on the PDES. This Consultation Paper was based upon a review of the PDES by a group composed of two senior Disability Awards Medical Advisors (DAMAs) and one senior Disability Awards Officer. This group analyzed the following sources in consideration of potential changes:

- Current medical literature on medical/diagnostic criteria for permanent impairment assessments;
- American Medical Association's *Guides to the Evaluation of Permanent Impairment,* each edition ("AMA *Guides*");
- The various schedules used in other Canadian, the United States, and other international jurisdictions; and
- Practices and procedures in the Disability Awards and Clinical Services Departments of the WCB with respect to section 23(1) assessments and evaluations.

Based on this research and analysis, together with input from other DAMAs, DAOs, and various medical specialists from the WCB's Visiting Specialists Clinic, proposed changes were identified.

An Additional Factors Outline to be used as guidance for DAMAs was developed as a result of this research but no Policy or PDES changes were brought forth.

The PDES remained on WCB's Compensation Policy Priorities Workplan from 2004 to 2012. In each Workplan the comment attributed to revising the PDES was that the issue was complex and would require considerable research and analysis including significant cross-jurisdictional analysis of schedules, methods of application, and scientific basis.

2012 WCB Consultation Paper

In December 2012, WCB released a Consultation paper on the PDES which proposes the following:

- To incorporate the Additional Factors Outline into the PDES;
- To maintain the use of loss of range of motion (functional assessment) as the primary method of assessing impairment for the spine and limbs;
- Limit the ability of the assessor to apply judgment to depart from the schedule when considered appropriate;
- To make minor adjustments regarding the techniques for measuring upper extremity ROM;
- Not to adopt methods of assessments used in the AMA *Guides*; and
- To develop a process for ongoing review that relies almost exclusively on advice and recommendation from DAMAs.

11 APPENDIX B

Qualifications for Robert D. Rondinelli, MD, PhD

Education:
M.D. Degree - University of Illinois Medical Center at Chicago, Illinois 1980
Board Certified in PM&R - American Board of Physical Medicine and Rehabilitation 1984
M.S. Degree - Physical Medicine and Rehabilitation- University of Washington, 1980
PhD Degree in Physical Anthropology - University of Illinois at Urbana-Champaign, 1977

Published peer-reviewed research on surface measurements and/or disability metrics and/or functional assessment:

Rondinelli, R., Murphy, J., Esler, A., Marciano, A., Cholmakjian, C., *Estimation of normal lumbarflexion with surface inclinometry: A comparison of three methods*. Am J Phys Med Rehabil, 71:219-24, 1992.

Rondinelli, R., Dunn, W., Hassanein, K., Keesling, K., Schulz, T., Lawrence, N., A *Simulation of hand impairments: Effects on upper extremity function and implications toward medical impairment rating and disability determination*, Arch Phys Med Rehabil, 1997: 78: 1358-63.

Goel, A., Rondinelli, R., Loudon, J., Hassanein, K., Nazare, A*., Joint moments inminor limb length discrepancy: A pilot study.* American Journal of Orthopedics, 1997:28(12) 852-56
Rondinelli, R., *Impairment and Disability Evaluation.* Spineline, January/February 2007, 8-13 (Invited Review)

Brigham, C., Rondinelli, R., Genovese E., et. al. Sixth Edition: The New Standard. The Guides Newsletter. Jan / Feb 2008

Rondinelli, R., Changes for the New AMA Guides to Impairment Rating 6th Edition. Implications and Applications for Physician Disability Evaluations, PM&R, 2009:1 (7) 643-656

Rondinelli, R., Commentary on "Reliability of the AMA Guides to the Evaluation of Permanent Impairment, Sixth Edition," JOEM, 2010:52(12) 1204-1205

Rondinelli, R., Brigham, C., Eskay-Auerbach, M., et. al. *Impact of AMA Guides 6th Edition.* The Guides Newsletter, Nov / Dec 2012.

Books, Theses and Book Chapters relating to surface measurements and/or disability metrics and/or functional assessment:

Doctoral thesis title: "*A multivariate morphometric study of cranio-vertebral shape changes*

in man and various nonhuman primates."

Rondinelli, R., *Practical Aspects of Impairment Rating and Disability Evaluation, In:* Physical Medicine & Rehabilitation, Braddom, R., et al., eds, Philadelphia, W.B Saunders, 1996 pp. 191-205.

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Novick, A., Rondinelli, R. *Impairment and disability under Workers' Compensation*. In: Impairment Rating and Disabilily Evaluation, Rondinelli, R., Katz, R., eds, Philadelphia: W.B. Saunders, 2000 pp 141-57.

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Rondinelli R., Katz R., eds. Disability Evaluation. PM&R Clinics of North America, 12:3. Philadelphia: W.B. Saunders, 2001.

Gerhardt J, Rondinelli R. *Goniometric Techniques for Range of Motion Assessment*. In:

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Rondinelli R, Katz R. *AMA 5th Edition – Merits and Shortcomings from a Physiatric Perspective.* In: Lacerte M, ed. Medical Legal Issues in Physical Medicine and Rehabilitation. PM&R Clinics of N. America, 13:2, 355-370, 2002.

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Katz R., Rondinelli R. *Impairment Evaluation and Disability Rating,* In: PM&RSecrets, Third Edition, Young, Mark A., ed.; Henley & Belfus, Inc., 167-172 2007.

Rondinelli, R. (ed) AMA Guides to the Evaluation of Permanent Impairment. 6th Edition, Chicago,: AMA Press, 2008.

Rondinelli, R., Ranavaya, M., Brigham, C., et al. *Chapter 1: Conceptual Foundations and Philosophy* In: AMA Guides to the Evaluation of Permanent Impairment. 6th Edition, Rondinelli, R., ed., Chicago: AMA Press, 1 – 18, 2008.

Rondinelli, R., Ranavaya, M., Brigham, C., *Chapter 2: Practical Applications of the AMA Guides*. In: AMA Guides to the Evaluation of Permanent Impairment. 6th Edition, Rondinelli, R., ed., Chicago: AMA Press, 19 – 30, 2008.

Rondinelli, R., Eskay-Auerbach, M., Transitioning to the AMA Guides, 6th Edition, Chicago: AMA Press, 2010.

Rondinelli, R., Katz, R., *Disability Evaluation.* In: Rehabilitation Medicine: Principles and Practice, Fifth Edition, Frontera, W., et al., eds. Philadelphia: JB Lippincott, 289-300, 2010.
Rondinelli, R., Ranavaya, M., *Disability Evaluation and Pain*. In: Raj's Practical Management of Pain, 5th Edition, Turk, D., et al., eds. 2013 (In press).

Rondinelli, R., Ranavaya, M. *Current American Medical Association Guidelines for Evaluating Musculoskeletal Impairment at Maximum Medical Improvement.* In: Handbook of Musculoskeletal Pain and Disability in the Workplace. Gatchel, R. ed. 2013 (In press)

Other Qualifications:

Board Member: American Board of Independent Medical Examiners (ABIME)
Certified Independent Medical Examiner (ABIME)
President and owner: International IME Services, LLC

Nationally and internationally recognized expert on impairment ratings and disability determinations.

Since 1992 Dr. Rondinelli has lectured extensively at more than 60 national and international venues including the Annual Assembly of the American Academy of PM&R; the Association of Academic Physiatrists; the ABIME; the American Academy of Disability Evaluating Physicians (AADEP); and the International Association of Bodily Impairment (AIDC, in Montreal 2012); He was co-director of the AAPM&R Disability Certification Program from 1996-2005, inclusively, and he continues to be a featured faculty member for the ABIME Training Program for the AMA Guides 6th edition since 2009. He has been a featured speaker for the American Association for Neuromuscular and Electrodiagnostic Medicine (AANEM) in 2012, and has presented to the Institute of Medicine (IOM) Task Force 2006, and to the Veterans Benefits Administration (VBA) in 2008 on the use of the AMA Guides 6th edition. In 2010 he was the recipient of the prestigious Walter Zeiter Award from the AAPM&R for his pioneering work in these areas, and in particular for adding functional assessment to the impairment rating process adopted for the AMA Guides 6th edition.

Appendix B

Historical Preferences and Methods of the BC Workers' Compensation System for Permanent Impairment Rating – Permanent Disability Evaluation Schedule[1]

Introduction

The Permanent Disability Evaluation Schedule (PDES) was originally derived from a report presented to the Association of Workmen's Compensation Boards by Dr. D.E. Bell in 1960. By a resolution of the Association, Dr. Bell was tasked with surveying the permanent disability rating schedules in each of the ten provinces and then presenting recommendations for changes. Dr. Bell presented comprehensive recommendations. Some of the key comments in his August 22, 1960 report include,

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[1] Summary by J. Parker, B.C. Nurses Union, June 2013

[2] Bell, D.E., Report of D.E. Bell to The Association of Workmen's Compensation Boards of Canada, Subject: Permanent Disability Evaluation: Toronto, Ontario, August 22, 1960 at page 3.

[3] *Ibid* at pg 4.

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[5] *Ibid*.

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Updates to the PDES

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[6] *Ibid* at pg 15.

[7] Decision No. 297 (1979) 5 WCR 11.

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[8] Decision No. 394 (1985) 6 WCR 23 at pg 24.

considered to be significantly inadequate insofar as the individual worker's particular circumstances are concerned; and

- The WCB should conduct a review of the PDES to ensure it is reflective of current medical/scientific knowledge, and can be readily understood by the decision-makers who must utilize it.

In 2002, section 23(3.1) was added to the BC Workers' Compensation Act and provided that a loss of earnings pension would only be paid where WCB determines that the combined effect of the worker's occupation and the worker's injury is "so exceptional" that an amount determined via the functional method does not appropriately compensate the worker for the injury. WCB's application of Policy related to the "so exceptional" clause in the legislation resulted in more than a 95% reduction in the number of loss of earnings pensions awarded. Subsequently, several challenges to the WCB's Policy have resulted in a modest increase of the number of pensions awarded on a loss of earnings basis.

Some have noted the PDES to be outdated and argued that if the functional method were to be relied upon in all but the most exceptional awards, then the PDES should have been updated prior to the almost exclusive reliance on the functional method.

2003 WCB Consultation Paper

On April 1, 2013, WCB released a Consultation Paper on the PDES. This Consultation Paper was based upon a review of the PDES by a group composed of two senior Disability Awards Medical Advisors (DAMAs) and one senior Disability Awards Officer. This group analyzed the following sources in consideration of potential changes:

- Current medical literature on medical/diagnostic criteria for permanent impairment assessments;
- American Medical Association's *Guides to the Evaluation of Permanent Impairment,* each edition ("AMA *Guides*");
- The various schedules used in other Canadian, the United States, and other international jurisdictions; and
- Practices and procedures in the Disability Awards and Clinical Services Departments of the WCB with respect to section 23(1) assessments and evaluations.

Based on this research and analysis, together with input from other DAMAs, DAOs, and various medical specialists from the WCB's Visiting Specialists Clinic, proposed changes were identified.

An Additional Factors Outline to be used as guidance for DAMAs was developed as a result of this research but no Policy or PDES changes were brought forth.

The PDES remained on WCB's Compensation Policy Priorities Workplan from 2004 to 2012. In each Workplan the comment attributed to revising the PDES was that the issue was complex and would require considerable research and analysis including significant cross-jurisdictional analysis of schedules, methods of application, and scientific basis.

2012 WCB Consultation Paper

In December 2012, WCB released a Consultation paper on the PDES which proposes the following:

- To incorporate the Additional Factors Outline into the PDES;
- To maintain the use of loss of range of motion (functional assessment) as the primary method of assessing impairment for the spine and limbs;
- Limit the ability of the assessor to apply judgment to depart from the schedule when considered appropriate;
- To make minor adjustments regarding the techniques for measuring upper extremity ROM;
- Not to adopt methods of assessments used in the AMA *Guides*; and
- To develop a process for ongoing review that relies almost exclusively on advice and recommendation from DAMAs.

Appendix C – Detailed History of the PDES

The Permanent Disability Evaluation Schedule (PDES) was originally derived from a report presented to the Association of Workmen's Compensation Boards by Dr. D.E. Bell in 1960. By a resolution of the Association, Dr. Bell was tasked with surveying the permanent disability rating schedules in each of the ten provinces and then presenting recommendations for changes. Dr. Bell presented comprehensive recommendations. Some of the key comments in his August 22, 1960 report include,

> *The schedule presented here is considered to be an improvement on existing schedules but should in no sense be considered to represent the ultimate. Usage will no doubt bring to light inconsistencies not immediately evident which will lead to further revision from time to time. Indeed an on-going study of this important concept of compensation work would be highly desirable."*[1]
>
> *"The schedule which is to be applied is to be used solely as a guide, is designed to show in percentage, the approximate impairment in earning capacity of an average unskilled workman."*[2]
>
> *"In applying the schedule regard should always be had to whether the award adequately compensates the workman for his loss of earning capacity failing for which upward revision may be considered."*[3]
>
> *"In off-schedule or judgment ratings awards should be proportionate to listed items."*[4]

1 Application of the Schedule

According to Dr. Bell, the PDES, or any schedule, "is at best only a guide, to be departed from if and when the occasion demands. It must always be regarded as a servant; never a master."[5]

While this concept of the PDES as guidelines rather than a fixed set of rules has been stated repeatedly and is in current policy[6] and the PDES[7] the Schedule has in fact been applied as a fixed set of rules. This key concept has become no more than lip service. In practice there is no

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[1] Bell, D.E., Report of D.E. Bell to The Association of Workmen's Compensation Boards of Canada, Subject: Permanent Disability Evaluation: Toronto, Ontario, August 22, 1960 at page 3.
[2] *Ibid* at pg 4.
[3] *Ibid*..
[4] *Ibid*.
[5] *Ibid* at pg 15.
[6] RS&CM #39.10 *Permanent Disability Evaluation Schedule,* Volume II 6-11 "The *Schedule* is a set of guide-rules, not a set of fixed rules"
[7] RS&CM Appendix 4 Permanent Disability Evaluation Schedule, Volume II A4-1 "The Schedule does not necessarily determine the final amount of the section 23(1) award. The Board is free to take other factors into account. Thus, the Schedule provides a guideline or starting point for the measurement rather than providing a fixed result."

manner in which the fixed rating of a scheduled item can be subjected to judgement on the part of the assessor. The PDES has become an inflexible master.

The ratings developed by Dr. Bell and incorporated in the PDES were based on awards being for the life of the worker. In 2002[8] pension awards were limited to age 65 unless there was objective evidence as of the time of the injury that the worker would work past age 65. This change resulted in a significant decrease in the value of the ratings that has not been adjusted for. Applying ratings based on what was considered appropriate for the average unskilled working man in 1966 for life is likely inaccurate to apply to permanently disabled workers to age 65 in 2013. Nevertheless the current proposals of WorkSafeBC would continue with this application of the schedule.

The PDES does not estimate impairment of earning capacity, although that is the purpose under section 23(2) of the Act. When Dr. Bell established his tables they were an estimate based on review of awards in all the provinces and the opinions of those who estimated impairment. There is no empirical data linking the ratings to earning capacity. The PDES is similar in operation to other schedules such as the AMA Guides that assess functional impairment of the whole person but there is no provision in the Act for a schedule for functional loss. Even if it were appropriate to apply a schedule that has no real connection to impairment of earning capacity the ratings for the spine have no scientific validity and the ratings for the limbs are as nearly as invalid.

There are sections of the PDES that are adapted from other schedules such as the sections on respiratory conditions and psychological conditions which would have some degree of validity in that they piggy back on the science and consensus that developed those ratings. That validity still only applies as a percentage of disability of the whole person and is still unconnected to impairment of earning capacity

2 Updates to the PDES

The PDES in its current form has been largely unchanged since 1966 with the following exceptions:

- 1990: a section on the spine was included;
- 1991: the style and format of the PDES was revised;
- 1993: the hand charts were revised;
- 2001: a section on psychological disability was included;
- 2003: the PDES was reviewed to reflect current medical/scientific knowledge and current practices regarding the assessment of permanent partial disabilities. Specifically, changes were made to percentages of disability involving amputation of digits of the hand, loss of range of motion in the thoracic spine, and pronation and supination of the elbow; and
- 2007: a section on asthma and dermatitis was included.

The Policy Regulation Division has stated that “the PDES, like many other schedules similar to it (including the AMA Guides), is a consensus based document that has evolved over time based on the expertise of doctors that are specialists in assessing permanent disability.” There is no

[8] Bill 49 -2002 Workers Compensation Amendment Act, 2002

doubt that in the development and evolution of the AMA Guides there has been comprehensive consultation with a wide field of eminent experts that is open and transparent. There is a massive body of literature relevant to the evolution of the AMA Guides. The references in Dr. Rondinelli's report on ROM as a measure of spinal impairment amply demonstrate the degree of open peer and public discussion even on the one filed of the spine.
As far as can be seen, the "consensus" in regards to the PDES has not gone beyond the internal Board DAMAs. I am not aware of any publication by anyone to support science based validation of the PDES either as a method to assess impairment of earning capacity or as a schedule to rate physical impairment. The technical underpinnings for updating the PDES have been comparatively opaque.
If the PDES is to be retained as a schedule there must be an open process for review of technical and scientific matters that includes experts external to the Board and stakeholders.

3 Loss of Function versus Loss of Earnings

Prior to 1973, the Workers' Compensation Board of BC (WCB) used only the loss of function method to calculate a permanently disabled worker's pension award. The WCB first began to use the loss of earnings method in 1973 but, only for injuries involving the spinal column. In October 1977, the former Commissioners of the WCB raised the question as to whether it would be appropriate to extend the application of the loss of earnings method to non-spinal column injuries. As a result, a Committee was established to determine whether, in the case of an injury unrelated to the spinal column, a loss of earnings pension award would be more equitable.

It is important to consider why the Commissioners brought in a dual system for injuries involving the spine in 1973 which was only seven years after the adoption of the PDES based on Dr. Bell's tables. It was apparent to the Commissioners by way of cases that were brought to them to consider that scheduled awards often did not properly reflect impairment of earning capacity. It is remarkable that this took only seven years to identify because for a claim to make its way from initial injury to a Disability Award can take 2-3 years and it takes a period of time for the individual claims to get to the Commissioners. It would need to be a fairly large problem for the Commissioners to determine an alternative to the PDES method was required. The first major problem with using the PDES for the spine is that there is no validity to ROM as a measure of impairment for the spine. The Commissioners would not have known this at the time. It has taken the science a few decades to clearly establish that ROM does not reflect disability but they would have seen the effect in the claims of workers who would be assessed under the PDES with very small ratings yet were clearly severely disabled from their employment.

The second major factor is the high variability to which a disability due to a spine injury may affect different individuals. For example two workers, one a stone mason and the other an salesman experience the same injury that limits them to lifting no more than 25 pounds on a occasional basis. This would leave the stone mason entirely unable to perform the pre-injury occupation while it would have little effect if any on the salesman.

Dr. Bell did an admirable job in gathering information on disabilities in compiling his tables. Unfortunately, they were bound to quickly fail in many cases for the spine and for similar problems for other body parts to be apparent soon after.

Decision No. 8 of the Commissioners dated October 2, 1973[9] clearly articulated the problems with universal application of the PDES to all disabilities. In considering the current review of the PDES it is necessary to understand the reasoning and success of the commissioners decisions beginning from Decision No. 8 in 1973 that addressed the spine through Decision No. 297 of March 30, 1979 that extended the dual system to injuries not related to the spinal column and culminating in Decision 394

This review led the Commissioners to reach the conclusion to apply a loss of earnings system to non-spinal injuries.[10]

The Commissioner's decisions did constitute Board Policy until they were retired. Even though they are no longer policy they are instructive on the reasoning for policy. The Commissioner's decisions provide detailed reasoning. We will examine here Decision No. 8 as this clearly identifies problems with the PDES and provided a solution that effectively addressed the problem up until 2002. The Commissioner's decisions are unfortunately no longer readily available. We have appended selected Commissioners decisions relevant to the PDES to this submission in Appendix XX for reference of the readers.

Decision No. 8 dealt with rather directly the incongruities of the PDES with the requirement under the legislation to compensate for impairment of earning capacity. The decision recognizes that permanent partial disability should not necessarily only apply when there has been an impairment of earning capacity. The example provided is,

> *There seems to be a generally accepted feeling that if a man has suffered say the loss of an arm at work, he ought to receive compensation whether or not there is any actual impairment of earning capacity; and this view seems to have prevailed under most systems no matter what the wording of the particular legislation.*[11]

So here then is one advantage of schedules; they allow for permanent partial disability benefits based on the general justice in that a significant permanent disability should not go uncompensated even when it does not in fact result in impairment of earning capacity.

The Introduction of Decision No. 8 does identify the problem with the PDES for spine injuries.

> *In the course of adjudication on a recent appeal involving a spinal column injury, we were disturbed to find that a permanent partial disability based on 7.5% of total disability had been awarded notwithstanding that the loss of earning capacity, on any view of the case, seemed to be at least 50%. We were assured that the award was in line with other pension awards in back injury cases. We felt, therefore, that the matter could not be approached simply by changing the particular award, but that we should consider the principles being applied to the measurement of partial disability. We are concerned now, therefore, with the practice being followed in other cases.*[12]

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[9] Decision No. 8, (1973) 1 WCR 27, dated October 2, 1973

[10] Decision No. 297 (1979) 5 WCR 11.

[11] Decision No. 8, (1973) 1 WCR 27, dated October 2, 1973 Page 29

[12] Ibid Page 27

The conclusions are plain. The PDES does not appropriately compensate for impairment of earning capacity in a good many cases for spine injury. The PDES is a positive tool in that it does compensate for non-economic loss. The decision looked at the physical impairment method, which is in essence what the PDES and other schedules essentially now are, and reached a conclusion that this would result in injustice in that each worker would be compensated to the same extent regardless of occupation or the effect of the injury on earning capacity. It was noted that schedules often invoke a theory of mass averages. They found the argument for mass averages unconvincing stating,

> *If one claimant is being grossly under-compensated in comparison with the actual loss of earning capacity, and if another claimant is being grossly over-compensated to the same extent, should we really take any comfort in the thought that the average claimant is being fairly treated, or that the right amount is being paid out in total? There is no such thing as justice on average.*

It is submitted though that what was being observed by the Commissioners in the spinal claims and what is again the case with the virtual elimination of LOE awards is that a significant number of workers are overcompensated a small amount if compared to what the individual impairment of earning capacity would be and a smaller but not insignificant number are severely undercompensated.

Most importantly Decision No. 8 stated,

> *It has long been recognized and objected that, except by coincidence that this method bears no relation to the real loss of earning power.* [13] *What less often recognized is that this method does not, except again by coincidence, bear any relation to the average loss of earning capacity. So far as we can discover from other Canadian Boards, it does not appear that* ***the percentages rates currently used for the measurement of physical impairment are based on any statistical research done within living memory, and there is really nothing to connect the percentage rates of physical impairment currently used with the impairment of earning capacity either in the individual case, or even on an average.*** [14]
> (emphasis added)

Decision No. 8 went on to consider updating the schedule by researching what percentage rates would reflect loss of earning capacity reaching this conclusion,

> *Suggestions are made from time to time that the permanent disability evaluation schedule should be brought up- to-date and extended. If the percentage rates are to be based, however, on the averages of actual earning capacity a major research project would be required.* ***We are skeptical about devoting such resources to improving the detail of this system when the use of this method at all is of doubtful validity****.* [15]

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[13] Report of the Royal Commission on the Workmen's Compensation Act and the Board, 1952, British Columbia p. 155

[14] Decision No. 8, (1973) 1 WCR 27, dated October 2, 1973Page 32

[15] Page 32

(emphasis added)

The dual system was introduced because it was recognized that the PDES had no real relationship to the impairment of earning capacity and it was considered an unwise use of resources to update the PDES due to its doubtful validity.
The PDES is basically a method of compensating for permanent injuries on a non-economic basis to alleviate the injustice that may result from the worker not having an economic loss but having a significant disability such as the example in Decision No. 8 of the loss of an arm. It is more than unfortunate that this invalid method is the method that is applied in compensating for permanent partial disability in all but a very few "so exceptional" cases.
The dual system was extended to injuries not involving the spinal column as of October 1, 1977 by Decision No. 297 dated March 30, 1977.

In January 1996, the Gill Royal Commission on Workers' Compensation in British Columbia found that compensation under the Workers' Compensation Act is often not paid consistently or equitably. The result is that injured workers with similar disabilities may receive markedly different benefits. The Royal Commission recommended abolishing the overly simplistic schedule of presumed loss of earnings based on the extent of injury and found that the system should pay compensation for actual loss of earning capacity where it arises and should provide separate compensation for functional impairment, even in the absence of earnings loss.

The majority of the Royal Commission recommendations, including the recommendation on pensions were not acted on legislatively. They were, however, referenced in a Core Services Review conducted by Alan Winter dated March 11, 2002. In that review, the following recommendations were made in regards to permanent disability benefits:

- The dual system of calculating pensions on a functional (scheduled) and a loss of earnings basis should be retained; however, emphasis should be placed on utilizing the functional method when determining the pension entitlement;
- The loss of earnings method should be used in "special instances" when the pension award calculated pursuant to the loss of function method is considered to be significantly inadequate insofar as the individual worker's particular circumstances are concerned; and
- The WCB should conduct a review of the PDES to ensure it is reflective of current medical/scientific knowledge, and can be readily understood by the decision-makers who must utilize it.

In 2002, section 23(3.1) was added to the BC Workers' Compensation Act and provided that a loss of earnings pension would only be paid where WCB determines that the combined effect of the worker's occupation and the worker's injury is "so exceptional" that an amount determined via the functional method does not appropriately compensate the worker for the injury. WCB's application of Policy related to the "so exceptional" clause in the legislation resulted in more than a 95% reduction in the number of loss of earnings pensions awarded. Subsequently, several challenges to the WCB's Policy have resulted in a modest increase of the number of pensions awarded on a loss of earnings basis.

Some have noted the PDES to be outdated and argued that if the functional method were to be relied upon in all but the most exceptional awards, and then the PDES should have been updated prior to the almost exclusive reliance on the functional method. No such updating of the PDES has been done nor is any comprehensive updating proposed, notwithstanding Alan Winter's recommendation and subsequent inclusion in policy review workplans.

4 2003 WCB Consultation Paper

On April 1, 2013, WCB released a Consultation Paper on the PDES. This Consultation Paper was based upon a review of the PDES by a group composed of two senior Disability Awards Medical Advisors (DAMAs) and one senior Disability Awards Officer. This group analyzed the following sources in consideration of potential changes:

- Current medical literature on medical/diagnostic criteria for permanent impairment assessments;
- American Medical Association's *Guides to the Evaluation of Permanent Impairment*, each edition ("AMA *Guides*");
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Based on this research and analysis, together with input from other DAMAs, DAOs, and various medical specialists from the WCB's Visiting Specialists Clinic, proposed changes were identified.

An Additional Factors Outline to be used as guidance for DAMAs was developed as a result of this research but no Policy or PDES changes were brought forth.

The PDES remained on WCB's Compensation Policy Priorities Workplan from 2004 to 2012. In each Workplan the comment attributed to revising the PDES was that the issue was complex and would require considerable research and analysis including significant cross-jurisdictional analysis of schedules, methods of application, and scientific basis.

5 2012 WCB Consultation Paper

In December 2012, WCB released a Consultation paper on the PDES which proposes the following:

- To incorporate the Additional Factors Outline into the PDES;
- To maintain the use of loss of range of motion (functional assessment) as the primary method of assessing impairment for the spine and limbs;
- Limit the ability of the assessor to apply judgment to depart from the schedule when considered appropriate;

- To make minor adjustments regarding the techniques for measuring upper extremity ROM;
- Not to adopt methods of assessments used in the AMA *Guides*; and
- To develop a process for ongoing review that relies almost exclusively on advice and recommendation from DAMAs.

6 Summary of the PDES History

To summarize this rather lengthy but in our view necessary history of the PDES:

- The intent of Justice Meredith and the Pineo Commission was that permanent disability awards should be for life and compensate for impairment of earning capacity
- The Workers' Compensation Act provides that the Board must estimate the impairment of earning capacity from the nature and degree of the injury[16]
- The Act permits the Board to compile a rating schedule of ratings of impairment of earning capacity for specific injuries which may be used as a guide in determining the compensation payable in permanent disability cases[17]
- the current PDES was adapted from Dr. Bell's 1960 report
- Dr. Bell's report was based on a review of permanent disability compensation in all Canadian jurisdictions
- Dr. Bell's ratings were a best guess on the approximate impairment of earning capacity of an unskilled average workman at that time
- Dr. Bell specifically stated that the schedule should be used solely as a guide and would need to be regularly updated
- The PDES based on Dr. Bell's ratings were adopted by the BC Workers' Compensation Board in 1966
- The system and ratings has remained largely unchanged since the adoption
- In 1973 The Board in Decision No. 8 recognized the PDES had no relationship to earning capacity and recommended a dual system for the spine
- In 1977 the dual system was applied to all injuries
- The 1996 Gill Royal Commission recommended abolishing the overly simplistic schedule of presumed loss of earnings based on the extent of injury and found that the system should pay compensation for actual loss of earning capacity where it arises and should provide separate compensation for functional impairment, even in the absence of earnings loss. No action was taken on this recommendation
- In the 2002 Core Review Alan Winter recommended an LOE should only be awarded in special instances when the functional award is considered to be significantly inadequate and WCB should conduct a review of the PDES to ensure it is reflective of current medical/scientific knowledge
- Bill 49 provided that that a LOE award may be made only if the combined effect of the worker's occupation at the time of the injury and the worker's disability resulting from the injury is so exceptional that an amount determined under subsection (1) does not appropriately compensate the worker for the injury.

[16] Workers Compensation Act section 23(1)(a)
[17] Workers Compensation Act section 23(2)

- Through successive editions the AMA Guides to the Evaluation of Permanent Impairment stop using ROM to assess disability for the spine and reduce the reliance on ROM in the limbs on the basis of the science indicate that ROM is not a reliable or valid measure of impairment
- Using LTD claims costs from the Board's consolidated balance sheets with the average of $700M per year pre legislative changes as a baseline permanent disability awards between 2004 and 2012 have been reduced by over $2.9 billion dollars
- The updating of the PDES remained on the Board's compensation policy workplan from 2003 to 2012 with no significant changes and each workplan stating, "*This issue is complex and will require considerable research and analysis including significant cross-jurisdictional analysis of schedules, methods of application and scientific bases*."
- The December 2012 Discussion Paper on updating the PDES proposes no changes to the system used or to the percentage ratings that have been in place since 1966 for the majority of the Schedule. Use of ROM is referenced as the "*Gold Standard*" for measuring functional impairment

The Meredith Report

Province Of Ontario
Final Report

Laws relating to the liability of employers to make compensation to their employees for injuries received in the course of their employment which are in force in other countries, and as to how far such laws are found to work satisfactorily.

By
The Hon. Sir William Ralph Meredith, C.J.O., Commissioner

To His Honour SIR JOHN MORISON GIBSON, K.C.M.G., K.C., LL.D., Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to report that I have concluded the enquiries which I was by Your Honour's Commission bearing date the 30th day of June, 1910, appointed to make "as to the laws relating to the liability of employers to make compensation to their employees for injuries received in the course of their employment which are in force in other countries, and as to how far such laws are found to work satisfactorily," and on the first day of April, 1913, I submitted to Your Honour a draft bill embodying such changes in the law as in my opinion should be adopted in this Province, and I now proceed to state my reasons for recommending that the draft bill should be passed into law.

At the outset of the enquiry it was contended by those who spoke on behalf of the workingmen: (1) That the law of Ontario is entirely inadequate in the conditions under which industries are now carried on to provide just compensation for those employed in them who meet with injuries, or suffer from industrial diseases contracted in the course of their employment; and (2) that under a just law the risks arising from these causes should be regarded as risks of the industries and that compensation for them should be paid by the industries.

With these two propositions those representing the employers expressed their agreement, though it is fair to say that it was probably not intended to agree that compensation should be paid in respect of industrial diseases.

Agreeing as I did with the contention of the workingmen there remained only to be considered in what form and by what means the compensation should be provided.

For the purpose of reaching a conclusion as to this, and in obedience to the directions of the Commission, I made enquiry as to the laws in force in the principal European countries, in the United States of America and in the Provinces of Canada. I also visited Belgium, England, France, and Germany, and consulted those concerned in administering the laws of those four countries, and others qualified to judge as to whether they have been found to work satisfactorily. Much evidence has been taken bearing upon the general question, all of which appears in the appendix to my first interim report, dated the 27th day of March, 1912, and the appendix to this report.

Before referring to the different systems in operation it may be proper to say that most of these laws, and perhaps all of them except the German, have not been in force long enough to enable a conclusive opinion to be formed as to their merits or demerits.

There are two main types of compensation laws. By one of them the employer is individually liable for the payment of it, and that is the British system. By the other, which may be called the German system, the liability is not individual but collective, the industries being divided into groups, and the employers in the industries in each group being collectively liable for the payment of the compensation to the workmen employed in those industries -- practically a system of compulsory mutual insurance under the management of the State. The laws of other countries are of one or other of these types, or modified forms of them, and in most, if not all of them, in which the principle of individual liability obtains, employers are required to insure against it.

Those representing the workingmen at the beginning of the enquiry appeared to favour the adoption of the British system. Mr. F.W. Wegenast, who represented the Canadian Manufacturers Association, strongly urged the adoption of the German system, and his view was supported by most of the other employers who appeared or were represented before me, and later on in the enquiry the representatives of the workingmen fell in with Mr. Wegenast's views.

There were, however, differences of opinion as to details. The employers insisted that a part of the assessments to provide for the payment of the compensation should be paid by the employees, and this was vigorously opposed by the representatives of the workingmen. The employers desired that no compensation should be payable where the injury to the workman did not disable him from earning full wages for at least seven days, and to this the representatives of the workingmen objected. The employers also desired that, as the British act provides, an employee should not be entitled to compensation if his injury was due to his

own serious and wilful misconduct, but the representatives of the workingmen objected to any such limitation to the right to compensation.

As stated in my first interim report, I had then come to no conclusion as to these matters, or as to what system of compensation I should recommend for adoption, nor had I reached a conclusion as to the industries to which the law should be made applicable, nor as to certain other details which I enumerated in my report.

After the best consideration I was able to give to the important matters as to which I was commissioned by Your Honour to make recommendations, I came to the conclusion, to which I still adhere, that a compensation law framed on the main lines of the German law with the modifications I have embodied in my draft bill is better suited to the circumstances and conditions of this Province than the British compensation law, or the compensation law of any other country.

I have had the benefit of hearing the opinions of Mr. Miles M. Dawson, Mr. S.H. Wolfe, Mr. P. Tecumseh Sherman, and Mr. F.W. Wegenast, all of whom have given special attention to the subject of compensation laws and industrial accident insurance, as to the operation of those laws, and as to the best form of compensation law to be adopted under the conditions which obtain in this Province, and also of hearing the opinions of Mr. James Harrington Boyd, who had a large part in framing the compensation law passed by the Legislature of the State of Ohio, and of Mr. F.W. Hinsdale, the chief auditor of the Industrial Insurance Board of the State of Washington, as to the operation of the compensation laws of those States, and also upon the general question as to the best form of compensation law for this Province.

These gentlemen differed widely in their opinions as to the best form of compensation law, as will be seen from their testimony and arguments which appear in the appendices to my report, and from the memoranda submitted by Mr. Wolfe and Mr. Sherman, although they are practically unanimous as to the industries bearing the burden of the compensation, and, with the exception of Mr. Wegenast, they are all of opinion that this burden should be borne equally by the employer and employed.

Mr. Sherman is opposed to the system of collective liability, which he characterizes as unjust because it imposes upon the individual employer the obligation of sharing the burden of accidents in other establishments than his own and, as he assumes, notwithstanding that by the introduction of the best machinery and appliances and safeguarding against accident he has reduced the number of accidents in his establishment to a minimum, he is placed as respects his liability to pay compensation on the same footing as an employer whose machinery and

appliances are defective and who takes little or no precaution to guard against accidents in his establishment.

If a uniform rate were payable by all the employers in a class or sub-class, regardless of these considerations, I agree that there would be the injustice which Mr. Sherman points out, but I have in the draft bill which I have submitted introduced provisions (sec. 71, s.s. 2 and 4) which, in my opinion, will provide against that happening.

The arguments presented by Mr. Dawson and Mr. Wegenast, and perhaps those of Mr. Wolfe, in favour of the collective system are, I think, unanswerable if, as I believe, the true aim of a compensation law is to provide for the injured workman and his dependants and to prevent their becoming a charge upon their relatives or friends, or upon the community at large.

It is in my opinion essential that as far as is practicable there should be certainty that the injured workman and his dependants shall receive the compensation to which they are entitled, and it is also important that the small employer should not be ruined by having to pay compensation, it might be, for the death or permanent disability of his workmen caused by no fault of his. It is, I think, a serious objection to the British act that there is no security afforded to the workman and his dependants that the deferred payments of the compensation will be met, and that objection would be still more serious in a comparatively new country such as this, where many of the industries are small and conditions are much less stable than they are in the British Isles.

This objection could, of course, be met by making it obligatory upon the employer to insure his workmen against accident to the maximum amount to which they or their dependants would be entitled under the act, but if insurance is to be compulsory I see no reason why the cheapest form of it -- mutual insurance -- should not be prescribed.

I agree also with Mr. Dawson that the ultimate burden of paying the compensation under such a law as is proposed falls upon the community and that whatever the employer has to pay, whether directly by way of compensation, or if he insures against his liability by paying insurance premiums, forms part of the cost of that which he produces and is added to the selling price.

Mr. Sherman's view is that insurance should be made compulsory "only if and when reasonably necessary in order to assure to the injured workmen the payment of their compensation," and that "in no event should those concerns that are amply able to carry their own insurance be required to buy insurance or contribute to a State scheme, for that," he says, "would be pure economic waste."

I do not understand the latter argument or how there can be said to be economic waste if the "concerns" he mentions are not required to do more than contribute with other employers to the payment of compensation according to the hazard of their respective businesses. I could understand that there might be economic waste if it were incumbent on such an employer to insure with a joint stock company which would require him to pay a premium sufficient to provide for the cost of securing the business and a reasonable dividend to its shareholders as well as to indemnify against the risk undertaken.

There was much discussion as to the basis on which the assessments to provide the compensation should be made. The German law provides for assessing only for the amounts required to meet the payments of compensation which fall due during the year next preceding that in which the assessments are made, with an added percentage to provide a reserve fund to meet deficiencies in the accident fund in the event of an unusual catastrophe or a depression in trade, but no assessment is made beyond that to meet the deferred payments of compensation, i.e., the payments which are to become due in future years. This plan, popularly called the current cost plan, is that proposed by the Canadian Manufacturers Association, and Mr. Dawson favours it as not only expedient because it does not involve making the heavy assessments which would have to be made at the outset if the capitalized value of the deferred payments had to be provided for by the assessments, but also as "not unfair to the employers in future years, or economically unsound."

On the other hand the current cost plan is vigorously denounced by Mr. Sherman, who contends that it is manifestly unfair to the employer of the future because it shifts upon his shoulders part of the burden of compensating for accidents which have happened before he became an employer, and that it results in low assessments in the early years of the operation of the law, and necessarily increases in the later years, until in a measurable period of time they become a burden too oppressive for the employer of the future to bear.

In support of his view Mr. Sherman referred to the rates in Germany, which he said, "now average about double what they were at the beginning," and he added that "it is calculated that they will not reach their stable maximum for some twenty years more. How much more they will then be no one knows, but the majority guess is they will then double."

Mr. Wolfe is equally emphatic in his condemnation of the current cost plan, and in addition to his oral testimony presented a table which appears on page 147 of the appendix to this report, and which he contended demonstrates the accuracy of his conclusions.

The views of Mr. Sherman and Mr. Wolfe were controverted by Mr. Wegenast, who contended that statistics prove that in some instances the stable maximum has already been reached and that there is nothing to justify the gloomy forebodings of Mr. Sherman as to the future.

Mr. Wegenast's contention is hardly supported by Mr. Dawson, whose opinion (page 452, appendix to first interim report) is that there will be an increasing rate "which is estimated to increase pretty rapidly for about ten years and then rather slowly and with increasing slowness for at least fifteen years longer, and if there is no improvement in the conditions relating to trade and industry, it will still very slowly increase for twenty-five years beyond that."

I am not convinced that the German plan affords an adequate safeguard against the dangers which Mr. Sherman anticipates, nor am I satisfied that it does not do so. I have, therefore, concluded that the act should not lay down any hard and fast rule as to the amount which shall be raised to provide a reserve fund and that it is better to leave that to be determined by the Board which is to have the collection and administration of the accident fund as experience and further investigations may dictate. I have therefore made provision in the draft bill to that end, by making it "the duty of the Board at all times to maintain the accident fund so that with the reserves it shall be sufficient to meet all the payments to be made out of the fund in respect of compensation as they become payable and so as not unduly or unfairly to burden the employers in any class in future years with payments which are to be made in those years in respect of accidents which have previously happened," (sec. 70), and by authorizing the Lieutenant-Governor in Council if in his opinion the Board has not performed that duty to require the Board to make a supplementary assessment of such sum as in his opinion is necessary to be added to the fund, (sec. 90), and these provisions I deem essential to the safety and adequacy of the scheme of compensation for which the draft bill provides.

I may here point out that the act of the State of Washington upon which the draft bill submitted by the Canadian Manufacturers Association, to which I shall afterwards refer, is modeled, requires that for every case of injury resulting in death or permanent total disability there shall be set apart out of the accident fund the estimated present value of the monthly payments to which the workman or his dependants are entitled, the total in no case to exceed $4,000.

Mr. Sherman also takes strong grounds against the administration of the act being committed to a Board appointed by the State, his view being that such a Board will be influenced by partisan political considerations in practically all its doings. I have no such fear. Whatever else may be doubtful as to the workings of the act there is no doubt, I think, that the members of the Board appointed by the Crown

will impartially and according to the best of their ability discharge the important duties which will devolve upon them in the event of the draft bill becoming law. Whatever may be the experience of other countries the experience of Canada does not justify the view which Mr. Sherman entertains. There are now two Provincial Commissions appointed by the Crown discharging very important duties -- the Ontario Railway and Municipal Board and the Hydro-Electric Power Commission -- and one appointed by the Governor-General also discharging very important duties -- the Railway Commission of Canada. Whatever criticisms there may have been of the action of these Boards, no one, as far as I have heard, has ever charged or even suggested that any member of them has been actuated or influenced by partisan political considerations in any action that has been taken by him and I know of no reason why the Board which is provided for by the draft bill may not be expected to be as free from political partisanship as either of the Boards I have mentioned.

I proceed now to state the general plan upon which the bill has been drafted. The bill is divided into Parts. In Part I the liability of employers to contribute to the accident fund or to pay the compensation individually is dealt with.

The bill does not provide for making all employers liable to pay compensation, but only those in the industries enumerated in schedules 1 and 2, and provision is made for industries enumerated in schedule 2 being added to schedule 1 whenever the Board deems it expedient to add them. Schedule 1 includes all the industries which it is proposed by the draft bill of the Canadian Manufacturers Association to bring within the scope of the act, except those enumerated in schedule 2.

The inclusion of railways in schedule 1 was opposed by the three principal steam railway companies and by some of the other railway companies, and I saw no reason why their wishes should not be met if by meeting them the act would not be rendered less beneficial to the employees and no injustice would be done to the employers in the industries included in the schedule. The draft bill has been framed so as, in my opinion, to work no injustice to anyone and not less beneficially to the employees owing to railways being excluded from the schedule.

The only difference between the operation of the act as to industries in schedule 1 and those in schedule 2 is that employers in the former contribute to the accident fund and in that way pay collectively the compensation, while employers in the latter do not contribute to the accident fund but are liable individually for the compensation payable to their employees. In other respects the operation of the act is the same in both cases. The Board determines the amount of the compensation in both cases and its orders when filed in a County or District Court become orders of the court and may be enforced as judgments of it.

The reasons for adopting the collective system have practically no application to railways, especially when, as has already been done in Ontario and will, I do not doubt, be done when the Parliament of Canada meets, provision is made that all sums payable for compensation shall form part of the working expenditure of the railway company, which is a first charge upon its revenues.

It is manifest, I think, that schedule 1 should not include industries of Municipal Corporations or Commissions, Public Utilities Commissions, Trustees of Police Villages and School Boards, and they have therefore been included in schedule 2.

Schedule 2 also includes the industries of telephone companies and navigation companies. These industries, like those of railway companies, are exceptional in their character, and the reasons for adopting the collective system have no application to them.

In order that additional security may be afforded that the compensation to which employees in the industries in schedule 2 and their dependants may become entitled will be paid, provisions are embodied in the draft bill enabling the Board to require an employer in any industry included in the schedule to commute the weekly or other periodical payments of compensation, (secs. 27 and 28), and also to insure his workmen and keep them insured against accidents in a company approved of by the Board for such sum as the Board may direct.

If it had been practicable to do so without impairing the efficiency of the collective system I should have preferred to include a larger number of industries in schedule 2 in order that with the two systems working side by side experience might demonstrate whether the collective system or that of individual liability was preferable, but I have not been able to satisfy myself that the exclusion from schedule 1 of any considerable number of the industries included in it would not impair the efficiency of the collective system, and I have therefore excluded from it only the industries enumerated in schedule 2. Although but a small number of industries are included in that schedule the operation of the two systems will afford some evidence as to which is the better.

Another reason why it is not expedient to bring these omitted industries within the scope of the act is that by doing so the initial work of the Board would be very greatly augmented and the risk would be run that it would be so overburdened as practically to paralyze its operations. It is, in my opinion, much better that if these industries are to be brought in that should be done later on.

As what I have said has indicated, I have not thought it advisable at the outset to bring within the scope of Part I all employments. The principal industries excluded

are the farming, wholesale and retail establishments, and domestic service. There is, I admit, no logical reason why, if any, all should not be included, but I greatly doubt whether the state of public opinion is such as to justify such a comprehensive scheme, and it is probable that when the question of bringing these industries within the scope of the act has to be considered, it will be found that provisions somewhat different from those which are applicable to the industries which it is proposed now to bring within it will be necessary.

I have however made provision for bringing any of these excluded industries within the scope of Part I if and when the Board deems it proper to do so, and its regulation or order bringing them in is approved by the Lieutenant-Governor in Council.

The bill would, in my opinion, fail to do justice to a large body of employees who will not be entitled to compensation under Part I, if it did not provide for a substantial modification of the common law as to the liability of the employer to answer in damages to an employee who is injured owing to the negligence of the employer or his servants.

According to the common law it is a term of the contract of service that the servant takes upon himself the risks incidental to his employment (popularly called the assumption of risk rule), and that this risk includes that of injury at the hands of fellow-servants, (popularly called the doctrine of common employment). The doctrine of common employment is an exception to the general rule that the master is responsible for the acts of his servants when engaged in his work, and has rightly, I think, often been declared unfair and inequitable. The reasoning upon which the exception was justified in the celebrated case of Priestley v Fowler does not commend itself to me as satisfactory, and I doubt whether if the question were to arise now for the first time the same conclusion would be reached. The case was decided at a time when very different views as to the respective rights and duties of employer and employed prevailed than are entertained at the present day, and at a time not far removed from that in which there was upon the Imperial statute book a law which made it a criminal offence punishable with imprisonment for "journeymen manufacturers or others" to agree together for obtaining an advance of the wages of themselves or of any one else, or for lessening or altering their usual hours or time of working.

The unfairness of this doctrine has been recognized by the Imperial Parliament and by the Legislature of this Province in the enactment of employers' liability acts which have modified it but to a very limited extent.

In referring to the legislation of this Province my reference is to the act called the Workmen's Compensation for Injuries Act, which is erroneously so styled, for it is really an employers' liability act.

In my opinion there is no reason why this objectionable doctrine should not, as one of the provisions of Part II of the draft bill provides, be entirely abrogated.

The draft bill also provides for the abrogation of the assumption of risk rule.

The rule is based upon the assumption that the wages which a workman receives include compensation for the risks incidental to his employment which he has to run. That is, in my judgment, a fallacy resting upon the erroneous assumption that the workman is free to work or not to work as he pleases and therefore to fix the wages for which he will work, and that in fixing them he will take into account the risk of being killed or injured which is incidental to the employment in which he engages.

Another rule of the common law is unfair to the workman. Although the employer has been guilty of negligence, if the workman has been guilty of what is called contributory negligence and his injury was occasioned by their joint negligence the employer is not liable. The injustice of this rule consists in this, that though the employer may have been guilty of the grossest negligence, if the workman has been guilty of contributory negligence, however slight it may have been, and his injury was occasioned by the joint negligence, the employer is not liable.

It is proposed by the draft bill to substitute for this rule that of comparative negligence as it is called, and provide that contributory negligence shall not be a bar to recovery by the workman or his dependants but shall be taken into account in the assessment of damages.

That in making these recommendations I am not advancing any novel proposition is shown by the fact that what I propose should be done in this Province has already been done in some of the States of the neighbouring Republic, and that the rules which it is proposed to abrogate or modify no longer meet the requirements of modern industrial conditions and are unjust as applied to the complex relations of master and servant as now existing, and to the use of complicated machinery and the great and dangerous forces of steam and electricity of to-day is the generally accepted view, and was the unanimous opinion of the Employers' Liability and Workmen's Compensation Commission of the United States (Report of Commission, Vol. I, pages 1,213 and 1,214).

Having outlined the provisions of the draft bill I have submitted to Your Honour and stated my reasons for recommending their adoption I proceed to a

consideration of those provisions of the draft bill submitted on behalf of the Canadian Manufacturers Association and which, I assume, embodies its views as to the form which a proper compensation law should take, which differ from those of my draft bill, omitting such of the points of difference as I have already discussed.

The compulsory provisions of the draft bill of the Association apply only to industries in which three or more persons are regularly employed, but the option is given to employers in industries in which less than three persons are employed to come under the provisions of the act. The application of the act is not so limited in my draft bill, but provision is made (sec. 73) that the Board may withdraw or exclude from a class industries in which not more than a stated number of workmen are employed, and that an employer in any industry so withdrawn or excluded may nevertheless elect to become a member of the class to which but for the withdrawal or exclusion he would have belonged.

In my opinion it is most undesirable that there should be any such limitation of the application of the act as the Association proposes. As I have already pointed out, it is to industries in which a small number of workmen are employed that the provisions of such an act are peculiarly applicable -- as to the small employer, to prevent his being ruined as the result of an accident in his establishment, and as to his workman to insure that he will be compensated if he meets with an accident.

I am very doubtful whether it is desirable to adopt the provisions of section 73 of my draft bill. My object in introducing them was to make easier the work of the Board at the outset, and not with any idea that the power would be exercised except as a temporary expedient to lessen the work of the Board in the early stages of the administration of the act.

The proposition advanced on behalf of the Association in the early stages of my enquiry, that employees should be required to contribute to the accident fund, has apparently been abandoned, as I do not find in its draft bill any provision of that kind. I find in it, however, a provision (sec. 43) that the Board, if satisfied that in any employment the workmen are "desirous of an increase in premiums, may by order sanction any such increased scale and may provide the method of collecting the increase in the premiums from the workmen in such employment."

In my opinion it is not desirable to complicate the act by the introduction of any such provision. It would not, I think, be taken advantage of by workmen, and it is difficult for me to understand exactly what it means. Is it intended that it shall be applicable to a single establishment or only to a class? Are the workmen to be unanimous, or can the power which the section confers be exercised if a majority of them desires an increase in the scale of compensation on the prescribed

condition? If the workmen must be unanimous, the section, I have no doubt, will be a dead letter. If it is intended that a majority shall suffice, the provision is, in my judgment, highly objectionable. Sub-section 2 of the section seems to be inconsistent with sub-section 1 or incomplete, in not providing that if the employer pays the increased premium he may deduct it from the wages of the workmen.

The mode in which the assessments are to be collected proposed by the Association differs somewhat from that provided for by my draft bill. The mode which I provide for is, I think, the simpler.

I do not like the term "premium" which is used in the Association's draft bill to designate the rate at which the employer is to be assessed. I prefer the terminology which I have used. What is levied by the Board is not a premium but an assessment.

The draft bill of the Association has but one schedule of industries to all of which the act applies, and it makes no provision for abrogating or modifying the rules of the common law as to employers who are not within the scope of the act. How my draft bill differs from this will be apparent from what I have said in dealing with the general plan upon which it has been drafted.

By my draft bill (sec. 60) the Board is given exclusive jurisdiction as to all matters and questions arising under Part I, and subject to its power to rescind, alter or amend any of its decisions or orders, its action or decision is final and is not subject to appeal.

It is difficult to understand from the Association's draft bill what the jurisdiction of the Board is intended to be. Section 21 provides that the Board shall have jurisdiction to enquire into, hear and determine all matters and questions of fact and law necessary to be determined in connection with compensation payments and the administration thereof and the collection and management of the funds thereof.

This language would confer on the Board a rather limited jurisdiction and probably, judging from the provisions of section 22, less than the draftsman intended it should have. The decisions and findings of the Board upon questions of fact are made final and conclusive, but on questions of law an appeal is allowed.

In my opinion it is most undesirable that there should be the appeal for which the draft bill provides. A compensation law should, in my opinion, render it impossible for a wealthy employer to harass an employee by compelling him to litigate his claim in a court of law after he has established it to the satisfaction of a Board such as that which is to be constituted, and which will be probably quite as

competent to reach a proper conclusion as to the matters involved, whether of fact or law, as a court of law.

I may point out that section 23, which allows an appeal from the decision of the Board on "questions of law," appears to be inconsistent with section 22, for in the determination of the questions enumerated in that section which are to be deemed questions of fact it may be necessary to decide questions of law, and I confess that I do not quite understand what kind of questions, if those enumerated in section 22 are eliminated, it is intended to make appealable.

In a note to section 22 it is stated that "it is submitted that it would not be wise to entirely shut out appeals and place in the hands of the Board the sole right to interpret the act .... and the right to define its own jurisdiction." What danger is to be apprehended from conferring these rights I do not understand, nor do I see what questions as to the construction of the act are likely to arise other than those enumerated in section 22.

In my judgment the furthest the Legislature should go in allowing the intervention of the courts should be to provide that the Lieutenant-Governor in Council may state a case for the opinion of a Divisional Court of the Appellate Division of the Supreme Court of Ontario, if any question of law of general importance arises and he deems it expedient it should be settled by a decision of a Divisional Court. Although I say this my judgment is against the introduction of any such provision, as it is probable that if any form of appeal to an appellate court is allowed, a defeated litigant will have the right to take his case to the Judicial Committee of His Majesty's Privy Council.

Section 10 of my draft bill, which deals with the case of sub-contractors and is applicable only to industries mentioned in schedule 2, is taken from the British Compensation Act. As the Association's draft bill does not provide for individual liability in any case, no provision corresponding to section 10 is found in it.

Sections 66, 67, and 68 of the Association's draft bill deal with the case of sub-contractors. They are, in my opinion, unnecessary and undesirable.

The draft bill of the Association is made to apply to the Crown. My draft bill is not. Apart from the question of the jurisdiction of a Provincial Legislature to affect the Crown as represented by the Dominion, it is in my opinion inexpedient that the act should apply to the Crown. It would be quite anomalous to group the Crown in respect of road-making, for instance, with other road-makers, and to make assessments upon the Crown as in the case of private persons.

I have no doubt that in case of injury to an employee of the Crown, for which if his employer were a private person he would be entitled to compensation, the Crown would make the like compensation to him and avail itself of the services of the Board for the determination of the amount and nature of the compensation.

The Association's draft bill (sec. 4) disentitles the workman and his dependants to compensation if his injury was, in the opinion of the Board, intentionally caused by the workman, or was due wholly or principally to intoxication or serious and wilful misconduct on the part of the workman. My draft bill provides that compensation shall not be payable where the injury is attributable solely to the serious and wilful misconduct of the workman unless the injury results in death or serious disablement.

The provisions of section 4 of the Association's bill are, in my opinion, objectionable. There is no need for the provision as to intentional injury as an injury purposely caused to himself by a workman is not an accident, and compensation is payable only in cases of accident and industrial diseases. In addition to this the definition of "accident" in the interpretation section of my draft bill (sec. 2) makes this abundantly clear; nor is there any reason for introducing a reference to intoxication, the provision as to serious and wilful misconduct being sufficient to cover any case in which drunkenness ought to bar the right to compensation. Section 4 applies whatever may be the result of the injury. The corresponding provision of my draft bill, following the British Compensation Act, does not apply where the injury results in death or serious disablement.

By my draft bill, following in this respect the British act, industrial diseases are put on the same footing as to the right of compensation as accidents. The Association's bill applies only to accidents. The diseases to which the act is to be made applicable are six in number and are enumerated in schedule 3 to my draft bill, but power is given to the Board by its regulations to add to the schedule. It would, in my opinion, be a blot on the act if a workman who suffers from an industrial disease contracted in the course of his employment is not to be entitled to compensation. The risk of contracting disease is inherent in the occupation he follows and he is practically powerless to guard against it. A workman may to some extent guard against accidents, and it would seem not only illogical but unreasonable to compensate him in the one case and to deny him the right to compensation in the other.

The last point of difference between the two draft bills to which I shall make any detailed reference is that as to the scale of compensation.

The scale of compensation proposed by the Association is in my opinion based upon a wrong principle and will not afford reasonable compensation to the injured

workman and his dependants; and indeed I doubt whether, if it were adopted, the workingmen would upon the whole be in a much better position than they would be in without the act, especially if the changes in the common law which I recommend are made.

A just compensation law based upon a division between the employer and the workman of the loss occasioned by industrial accidents ought to provide that the compensation should continue to be paid as long as the disability caused by the accident lasts, and the amount of compensation should have relation to the earning power of the injured workman.

To limit the period during which the compensation is to be paid regardless of the duration of the disability, as is done by the laws of some countries, is, in my opinion, not only inconsistent with the principle upon which a true compensation law is based, but unjust to the injured workman for the reason that if the disability continues beyond the prescribed period he will be left with his impaired earning power or, if he is totally disabled without any earning power at a time when his need of receiving compensation will presumably be greater than at the time he was injured, to become a burden upon his relatives or friends or upon the community.

A uniform rate of compensation which has no relation to the earning power of the workman, except as the Association's bill provides, for the purpose of reducing the rate of 50 per cent of his wages is, in my opinion, also inconsistent with the principle upon which a just compensation law is based, and unfair, and a most undesirable mode of fixing the amount of compensation.

Not only is the scale of compensation proposed by the Association open to these objections, but the amount of the compensation is so small that only the lowest paid workman would be compensated to the extent of 50 per cent of the loss of his earning power.

The case of an unmarried locomotive engineer earning $150 a month, not an unusual wage for the engineer of a passenger train, may be taken to illustrate the effect of the Association's proposition. All that he would be entitled to if permanent disability resulted from his injury would be $20 a month, or less than 14 per cent of the loss of his earning power, except in the rare case of his being rendered completely helpless and requiring constant personal attendance, and in that case his compensation would be double that amount.

There are other provisions which in my judgment are still more objectionable. The limitation to $1,500 of the amount of compensation in case of permanent partial disability is, I think, unreasonable, as is manifest from the illustration just given.

The payment of lump sums is contrary to the principle upon which compensation acts are based and is calculated to defeat one of the main purposes of such laws -- the prevention of the injured workman becoming a burden on his relatives or friends or on the community -- and has been generally deprecated by judges in working out the provisions of the British act, and was condemned by the Association itself in the memorandum which it submitted, and which appears in the appendix to my first interim report (pp. 67-69).

The proposition that the maximum compensation in case of the loss of a major arm shall be $1,500 besides being open to the objection I have just mentioned would be most unfair in the case of a labourer, to say nothing of the skilled artisan.

A more unjust and, as it appears to me, extraordinary proposition is that contained in clause (c) of section 31, which provides that in the case of temporary disability no compensation shall be payable unless it results "in the diminution of daily earnings to the extent of at least fifty per cent"; and as far as I am aware and as I should expect, there is no precedent for it in the legislation of any country. As far as I have been able to ascertain, the furthest that any country has gone in that direction is to provide, as do the Washington act (s. 5, clause d) and the law of Norway of July 23rd, 1894, amended by acts of December 23rd, 1899, and June 12th, 1906 (art. 4, par. 2b), that no compensation shall be payable unless the loss of earning exceeds five per cent. In my opinion there is no justification for any such exception even if it is limited as in the Washington and Norway laws.

The scale of compensation which I propose was strongly objected to by the Association as being unfair to the manufacturer, and as imposing upon him a burden that would handicap him in his competition with the manufacturers of the other Provinces and of other countries, and would tend to divert manufacturing from this Province to other Provinces in which less onerous laws are in force. It was also urged that the scale of compensation is higher than that of any other country. The last objection, if a valid one, means that there can be no progress beyond the point which has now been reached by the country which has provided the highest scale of compensation, for if the objection is valid as to the proposed legislation it would be an equally valid objection to any increase in the compensation proposed for the country which now provides for the highest scale. The question, in my opinion, is not what other countries have done, but what does justice demand should be done. I have no fear that if the bill should become law it will handicap the manufacturers of this Province as the Association appears to think that it will, or that it will divert manufacturing from the Province. There has been in force for some years in the adjoining Province of Quebec a compensation law which imposes upon employers greater burdens that they are subjected to by the law of this Province, and yet it has not been suggested that any such results as

are prophesied by the Association have followed from the enactment of the Quebec law.

In order that it may be seen whether the division of the burden between the employer and workman is unfair, it may be well to point out how it will be divided under the provisions of the proposed law. The workman will bear (1) the loss of all his wages for seven days if his disability does not last longer than that, (2) the pain and suffering consequent upon his injury, (3) his outlay for medical or surgical treatment, nursing and other necessaries, (4) the loss of 45 per cent of his wages while his disability lasts; and if his injury results in his being maimed or disfigured he must go through life bearing that burden also, while all that the employer will bear will be the payment of 55 per cent of the injured workman's wages while the disability lasts.

The burden of which the workman is required to bear he cannot shift upon the shoulders of any one else, but the employer may and no doubt will shift his burden upon the shoulders of the community, or if he has any difficulty in doing that will by reducing the wages of his workmen compel them to bear part of it.

It is contended that it is unfair to require the employer to pay compensation during the lifetime of the workman because in many cases it will mean that the workman will receive compensation for a period during which if he had not been injured he would have been unable to earn wages. No doubt that will be the result in some cases, but on the other hand the workman loses any advantage he would have derived had he not been injured from an increase in his wages owing to an improvement in his position, or to an increase of his earning power, or to a rise in wages from any other cause because, except in the one case of a workman who is under the age of twenty-one years when injured, the compensation is based on the wages the workman was earning at the time of his injury.

It must also be borne in mind that the workman is required, as the price of the compensation he is to receive, to surrender his right to damages under the common law, if his injury happens under circumstances entitling him by the common law to recover or, if he would be entitled to recover only under the Workmen's Compensation for Injuries Act, his right to the like damages as he would be entitled to at common law limited, however, to an amount not exceeding three years' wages or $1,500, whichever is the larger sum.

According to the testimony of Mr. Wolfe (page 141), and there is no reason to doubt the accuracy of his statement, in Germany no less than 84 per cent of the accidents incapacitate the workmen for less than fourteen weeks.

The nineteenth report of the Minister of Labour of France shows that the number of declared accidents in that country in the year 1910, after deducting those which occasioned an incapacity of four days or less, and omitting those which happened in mines, mining and quarries, was 412,278, and that of these 1,650, or a little more than one third of one per cent, were fatal; 5,452, or about one and one third per cent, resulted in permanent disability, and 399,769, or about 97 per cent, resulted in temporary incapacity lasting for more than four days, and that in the remaining 5,407 cases, or about one and one third per cent, the results of the accidents were unknown.

In Great Britain the duration of disability in the cases terminating in 1908 was as follows:

Less than two weeks .....

11.2 per cent

From two to three weeks .....

27.3 per cent

From three to four weeks .....

18.4 per cent

From four to thirteen weeks .....

37.7 per cent

From thirteen to twenty-six weeks .....

4.1 per cent

Over twenty-six weeks .....

1.3 per cent

(24th Annual Report of the United States Commissioner of Labour, Vol. II., pp. 1,525-6).

Similar statistics for Ontario are not available, but it may, I think, fairly be assumed that the great bulk of the accidents for which compensation would be payable under the proposed law will incapacitate the workman for short periods -- 84 per cent probably for less than fourteen weeks -- and that the fatal accidents and those causing permanent disability, total and partial, will be comparatively few. If this assumption is warranted there would appear to be not only no reasonable ground for the apprehension of the Association that the employers will be unduly burdened with payments for compensation continuing during the lives of permanently injured workmen, but it is certain that under the proposed law as to the vast majority of accidents in every case in which there could be recovery at common law or under the Workmen's Compensation for Injuries Act, the workman will be worse off than he is at present, and his loss will be a direct gain to the employer, amounting annually to a very large sum.

My conclusion is that for all these reasons there is no valid ground for the objections of the Association to the scale of compensation which I have proposed.

I have, however, upon further consideration come to the conclusion that as the purpose of the proposed law is to protect the wage earner there is no reason why highly paid managers and superintendents of establishments, to which Part I is applicable, should be entitled to compensation out of the accident fund to an amount greater than the highest paid wage earner would be entitled to receive, and I therefore recommend that the draft bill be amended by adding the following sub-section 1 of section 39:

"But not so as to exceed in any case the rate of $2,000 per annum."

If no such limit is prescribed the result would be that the small employer, in the case of an accident happening in another establishment to a highly paid official, would be unduly burdened. I propose $2,000 as the limit because that sum is probably the maximum amount earned in a year by the highest paid wage earner.

The only remaining provision of the draft bill to which I shall refer is section 68, which provides for a contribution by the Province to assist in defraying the expenses incurred in the administration of the act. I have not ventured to suggest what this contribution should be but, in my judgment, it should be a substantial one. The effect of the proposed law will be to relieve the community from the burden of maintaining injured workmen and their dependants in cases in which under the operation of the existing law they are without remedy, and by the transfer from the courts to the Board of the determination of claims for compensation, which will lessen very much the cost of the administration of justice.

There is one matter which should be provided for for which provision has not been made in my draft bill. No provision is made for contribution by employers in the industries mentioned in schedule 2 towards defraying the cost of administration. This was an oversight, and I recommend that a section be added to the bill providing that "the employers in industries for the time being embraced in schedule 2 shall pay the Board such proportion of the expenses of the Board in the administration of this part as the Board may deem just and determine, and the sum payable by them shall be apportioned between such employers and assessed and levied upon them in like manner as in the case of assessments for contributions to the accident fund, and all the provisions of this part as to assessments shall apply mutatis mutandis to assessments made under the authority of this section."

It is the purpose of my draft bill to empower the Board in determining the proportions of the contributions to be made to the accident fund by employers to have regard to the hazard of each industry, and to fix the proportions of the assessments to be borne by the employer accordingly, and not to require that the proportions for each class or sub-class should be uniform; and also to permit the Board, if in its opinion the character of any class of industry justifies that being done, to require a larger contribution to the reserve fund by the employers in any such class than is required from employers in other classes.

The bill as drafted will, I think, accomplish this purpose, but if any doubt is entertained as to it, the bill can be amended by the addition of a section expressly so declaring.

I may be permitted to say, in conclusion, as the United States Commissioners said with reference to the bill drafted by them, that I submit the proposed law "not

believing that it is the most perfect measure which could be devised nor the last word which can be said upon the subject, but as the result of careful investigation and the best thought of the Commission and as constituting at least a step in the direction of a just, reasonable, and practicable solution of the problem with which it deals."

I regret that some of its provisions do not commend themselves to the judgment of the Canadian Manufacturers Association, and on that account I have, since my last interim report, again carefully and anxiously considered those which are objected to and the objections that are urged against them, as well as the provisions of the Association's alternative proposition, but have seen no reason for doubting the correctness of the conclusion to which I had come, the results of which are embodied in the draft bill.

In these days of social and industrial unrest it is, in my judgment, of the gravest importance to the community that every proved injustice to any section or class resulting from bad or unfair laws should be promptly removed by the enactment of remedial legislation and I do not doubt that the country whose Legislature is quick to discern and prompt to remove injustice will enjoy, and that deservedly, the blessing of industrial peace and freedom from social unrest. Half measures which mitigate but do not remove injustice are, in my judgment, to be avoided. That the existing law inflicts injustice on the workingman is admitted by all. From that injustice he has long suffered, and it would, in my judgment, be the gravest mistake if questions as to the scope and character of the proposed remedial legislation were to be determined, not by a consideration of what is just to the workingman, but of what is the least he can be put off with; or if the Legislature were to be deterred from passing a law designed to do full justice owing to groundless fears that disaster to the industries of the Province would follow from the enactment of it.

All of which is respectfully submitted. W.R. MEREDITH, Commissioner.

Dated at Osgoode Hall, Toronto, the 31st day of October, 1913.

REPORT

of

D.E. BELL, M.D.

to

THE ASSOCIATION OF

WORKMEN'S COMPENSATION BOARDS

OF CANADA

SUBJECT:

PERMANENT DISABILITY EVALUATION

August 22, 1960

Toronto, Ontario

INDEX

APPLICATION OF THE SCHEDULE

MECHANICS OF RATING IN SPECIAL CASES

SOME PERSONAL OBSERVATIONS

THE RATING OF PERMANENT DISABILITY

Resolution Governing This Survey

Pursuant to the resolution adopted at the meeting of the Association of Workmen's Compensation Boards of Canada held in Vancouver in September, 1959, a survey of permanent disability rating schedules in each of the ten Provinces has been completed. Visits were made to each of the jurisdictions where all matters having to do with permanent disability evaluation were discussed with Board members and staff.

Suggestions for changes in existing schedules were freely discussed and recorded in the hope that a scale acceptable to all Provinces could be devised. The fact that some of these scales have been in use for as long as forty years with very little modification in spite of great changes both in the economy and in the compensation laws themselves indicates that there is clearly need for revision.

General Agreement On Principles

As was to be expected, some differences of opinion were encountered as to what should be the proper rating levels of some of the individual items however, these differences were not fundamental

and on all matters of principle general agreement was reached. Such matters included:

1. The rating for the whole hand and to some extent its components were felt to warrant some increase.

2. The lower limb ratings generally were felt to be too high and should be decreased somewhat.

3. The ratings in all limb amputations should be governed by the type of prosthesis to which the stump is adaptable.

With acceptance of these principles for limb amputations the lesser items were worked out on a proportionate basis. Where there were differences of opinion the rating levels suggested in the schedule have been reached by averaging the various suggestions or by accepting those of the majority.

The schedule here presented is considered to be an improvement on existing schedules but should in no sense be assumed to represent the ultimate. Usage will no doubt bring to light inconsistencies not immediately evident which will lead to further revision from time to time. Indeed an on-going study of this important facet of compensation work would be highly desirable.

PERMANENT PARTIAL DISABILITY

RATING SCHEDULE

The schedule which is to be used solely as a guide, is designed to show in percentage, the approximate impairment of earning capacity of an average unskilled workman.

In applying the schedule regard should always be had to whether the award adequately compensates the workman for his loss of earning capacity failing which upward revision may be considered.

In off-schedule or judgment ratings awards should be proportionate to listed items.

UPPER EXTREMITY

(A)
Amputations

		Percentage
1.	Arm, above middle of humerus.....	70
2.	Arm, middle of humerus to insertion of biceps.....	60
3.	Arm, insertion of biceps to wrist...	50
4.	Thumb.....	10
5.	Thumb, including metacarpal.....	20
6.	Thumb, one phalanx.....	4
7.	Fingers, all four.....	30
8.	Fingers, four at P.I.P.....	18
9.	Fingers, four at distal.....	6
10.	Finger, index.....	4
11.	Finger, index at P.I.P.....	2.4

Amputations Cont'd (Upper Extremity)		Percentage
12.	Finger, index at distal.....	.8
13.	Finger, middle.....	4
14.	Finger, middle at P.I.P.....	2.4
15.	Finger, middle at distal.....	.8
16.	Finger, ring.....	2.5
17.	Finger, ring at P.I.P.....	1.5
18.	Finger, ring at distal.....	.5
19.	Finger, little.....	2.5
20.	Finger, little at P.I.P.....	1.5
21.	Finger, little at distal.....	.5
22.	Metacarpals (except thumb).....	Add value of finger
23.	Fingers, index, middle and ring.....	22
24.	Fingers, index, middle and little.....	22
25.	Fingers, index ring and little.....	19
26.	Fingers, middle, ring and little.....	19
27.	Fingers, index and middle.....	14
28.	Fingers, index and ring.....	11
29.	Fingers, index and little.....	11
30.	Fingers, middle and ring.....	11
31.	Fingers, middle and little.....	11
32.	Fingers, ring and little.....	8
33.	Fingers, two or more at P.I.P.....	3/5 combined value
34.	Fingers, two or more at distal.....	1/5 combined value

Amputations Cont'd. (Upper Extremity) — Percentage

35. In amputation or impairment of all or part of thumb and amputation or impairment of all or parts of one or more fingers, add the lesser rating as an enhancement factor.

(B)
Immobility of Joints

36.	Shoulder, complete with no scapular movement.....	35
37.	Shoulder, gleno-humeral fusion, scapula free.....	15
38.	Shoulder, limited to 90°.....	5
39.	Elbow.....	20
40.	Wrist.....	12.5
41.	Pronation and supination complete in mid position.....	10
42.	Pronation alone.....	3
43.	Supination alone.....	5
44.	Thumb, both joints.....	5
45.	Thumb, distal joint.....	2
46.	Finger, all joints.....	Up to value of finger
47.	Finger, P.I.P. and distal joints.....	Up to 3/5 value of finger
48.	Finger, distal joint.....	Up to 1/5 value of finger

LOWER EXTREMITY

(A)
Amputations

49.	Leg, hip disarticulation or short stump (5" or less).....	65

Amputations Cont'd (Lower Extremity)		Percentage
50.	Leg, between short stump and 3" below tibial plateau.....	50
51.	Leg, region of knee, end bearing...	40
52.	Leg, 3" below tibial plateau to ankle.....	35
53.	Leg, at ankle, end bearing.....	25
54.	Foot, mid tarsal.....	20
55.	All toes.....	5
56.	Toe, great.....	2.5
57.	Toe, great at distal.....	.5
58.	Toes, other than great, if more than one, each.....	.5

(B)
Immobility of Joints

59.	Hip.....	30
60.	Knee.....	20
61.	Knee, limitation to 90°.....	5
62.	Ankle.....	12
63.	Great toe, both joints.....	2.5

(C)
Shortening of Leg

63.	1".....	1.5
64.	2".....	6
65.	3".....	15

(D)
Denervation

66.	Drop foot.....	9

(E)

Impairment of Vision		Percentage
67.	Enucleation	18
68.	Sight of one eye	16
69.	Cataract or aphakia	12
70.	Double aphakia	20
71.	Hemianopia, right field	25
72.	Hemianopia, left field	20
73.	Diplopia, all fields	10
74.	Scotomata, depending on location and extent	Up to 16%

NOTE: In rating a cataract at 12% it should be reasonably certain there is no fundus pathology.

Partial Visual Loss		Percentage
75.	20/30	0
76.	20/40	1
77.	20/50	2
78.	20/60	4
79.	20/80	6
80.	20/100	8
81.	20/200	12
82.	20/400	14

NOTE: Snellen test for distance after correction with conventional lenses.

(F)

Impairment of Hearing		Percentage
83.	Deafness, complete in one ear	3
84.	Deafness, complete in both ears	30

Partial Hearing Loss in BOTH Ears		Percentage
85.	25 decibels in single ear	.2
86.	30 decibels in single ear	.3
87.	35 decibels in single ear	.5
88.	40 decibels in single ear	.7
89.	45 decibels in single ear	1.0
90.	50 decibels in single ear	1.3
91.	55 decibels in single ear	1.7
92.	60 decibels in single ear	2.1
93.	65 decibels in single ear	2.6
94.	70 decibels in single ear	3.0

NOTE: See Mechanics of Rating for application of the schedule.

DISCUSSION OF THE SCHEDULE

Amputations in General

In assigning a rating level to any amputation it is to be assumed that the stump is structurally perfect, that it is well-padded, the scars are properly placed and there is no undue tenderness. In major limb amputations the stump must be adaptable to the type of prosthesis for which it was designed. If, for example, a Gritti-Stokes stump is incapable of end-bearing and a conventional above-knee prosthesis has to be resorted to, the rating should be that for a thigh amputation.

Amputations of the Upper Limb

Upper limb prostheses have limited value despite which the rating levels for wrist amputations range from 38% to 46% as compared with 70% to 76% for amputations at the shoulder. The consensus was that the disparity between the two is far too great. For purposes of rating, arm amputations have been given three different classifications, depending on the type of prosthesis to which each is adaptable; as follows:

1. Amputations above the middle of the humerus to which no prosthesis is adaptable to be of practical use.

2. Amputations between the middle of the humerus and the insertion of the biceps tendon adaptable to a standard above elbow prosthesis. Such a stump has no elbow control.

3. Amputations between the biceps insertion and the wrist joint.

Amputation of the Hand

The hand is without doubt the most essential part of a workman's extremities compared to which it is generally accepted the leg is merely a means of support and locomotion.

With increase in the hand value some upward revision was necessary in the minor ratings. The thumb with or without its metacarpal was felt to deserve a higher rating and some upward adjustment was also made in the individual and multiple finger values.

Amputation of Fingers

It will be noted that the index and middle fingers have been given equal rating as have the ring and little fingers. The middle was felt to warrant an equal valuation to the index as it is the longest and strongest finger on the hand and readily takes over the functions of the index if the latter is lost.

The little finger is rated equally with the ring because it maintains the width of the grip if the latter is lost.

Amputations of the Leg

In the case of the lower limb there are five types of stump adaptable to as many types of prosthesis, as follows:

1. Hip disarticulation or short stump (five inches or less) adaptable to a tilting table prosthesis.

2. Any amputation between the short femoral stump and a point three inches below the tibial plateau suitable for a conventional above knee prosthesis, but not end-bearing.

3. Any end-bearing stump in the region of the knee.

4. Three inches below tibial plateau to ankle, but not end-bearing.

5. End-bearing ankle (Symes).

Amputations Through the Foot

Mid-tarsal amputations while often as disabling as the Symes may receive a lesser rating providing there is a good stump and a functional ankle.

Amputations between the mid-tarsal joint and the bases of the toes have not been given classified ratings. Each case must be rated individually depending on the functional characteristics of the stump.

Immobility Of Joints

Whereas schedule ratings in amputations are contingent upon the stumps being structurally perfect, in the case of immobilized joints, the position of fixation must be functionally optimal. A great toe ankylosed at both joints is a useless impediment but a finger even though fixed at all joints might retain half its normal usefulness if fixation is in a good functional position, as for example, when its tip can be opposed to the tip of the thumb. The same could be said for the thumb if it can oppose the tips of one or more fingers.

Immobility Of The Shoulder

It will be noted there are three items referring to loss of movement in the shoulder; one where abduction of the arm is limited

to 90 degrees; one where the shoulder joint proper is ankylosed, but where the scapula moves freely; and finally one in which there is complete fixation, the so-called "frozen shoulder".

The position of optimal fixation in other joints requires no comment.

Nerve Lesions

It is felt that with the exception of "drop foot" these cases are unsuitable for a standard classification, therefore, with the exception of anterior tibial they have been left out of the schedule. When requiring to be rated they must be dealt with individually and the rating must be in proportion to the value of the part involved.

Impairment of Vision

No suggestion was received that the basic ratings, i.e. 16% for complete loss of vision in one eye and 18% for enucleation, be revised.

The lesser ratings have been discussed with and approved by the leading ophthalmological consultants of the Ontario Board.

Impairment of Hearing

No change was suggested or is recommended in the present ratings for unilateral or bilateral deafness although one or two expressions of opinion were that 30% is low for total deafness.

While this degree of impairment is undeniably a serious handicap if of sudden onset, such a condition is rarely seen. If,

however, such a case did arise as a result of trauma a 50% rating might be warranted.

Unilateral Deafness

This is usually traumatic, the result of being in close proximity to a blast; it may, however, result from fracture of the temporal bone.

Bilateral Deafness

The usual cause of bilateral deafness compensation-wise is that of many years exposure to high level noise conditions in the employment. The onset is so gradual that these individuals adjust to their hearing loss and seldom if ever experience impairment of earning capacity as their deafness progresses. Indeed they usually elect to go on working until normal retirement age.

DEAFNESS AS A DISABILITY

Unilateral Deafness

In unilateral deafness whether conductive, perceptive or mixed, if the level of hearing in the affected ear is 30 decibels or more below that in the uninjured ear, serious impairment or complete loss of stereophonic or directional sound appreciation results and the effect is little, if any, less than complete deafness in one ear.

Bilateral Deafness

The schedule for bilateral deafness, which is applicable whether the condition is traumatic or the result of long exposure to injurious noise levels, is predicated on the following principles:

1. Deafness unless fairly severe is a social handicap, rather than a disability, in the sense that it causes loss of earning capacity.

2. It is assumed to be a disability only when an individual becomes incapable of hearing and discriminating spoken words and phrases of ordinary intensity at a distance of eight feet or more.

3. The percentage of disability increases by geometric progression from that point to the level of total deafness.

4. Any improvement in hearing possible of attainment through the medium of hearing aids SHALL NOT affect the level of rating, as these appliances are only of use in quiet surroundings.

These principles and the schedule of bilateral deafness itself have been approved by leading consultants of the Ontario Board.

APPLICATION OF THE SCHEDULE

The Schedule Is A Guide

This or any schedule is at best only a guide, to be departed from if and when the occasion demands. It must always be regarded as a servant; never a master.

Cases of Special Hardship

While intended to apply to an average individual there will be cases when the rating level provides inadequate compensation to cover the economic hardship occasioned by an injury. This happens mainly in the skilled trades where certain injuries impose particular hardship; for example, a plasterer unable to elevate his arm above shoulder level, or a railroad engineer who loses an eye. In such cases a special hardship allowance over and above the schedule rating must be considered.

Variable Factors

There are many factors that affect the rehabilitation prospects of handicapped people. Among these are age, nationality, mentality, education, physical and social environment, etc. With the exception of age these factors are difficult to evaluate. Men in the older age groups seldom become adept in the use of limb prostheses and no doubt some such cases should receive special consideration in the way of an increased rating of from ten to twenty percent for periods up to five years.

Major and Minor Arm

In discussion with the various Boards the consensus was that both arms should be treated equally, though some felt, that in the case of severe impairment of the major hand or arm in older men, it would not be unreasonable to augment the pension slightly on a purely temporary basis.

Timing Of Awards

Generally speaking awards may be made in amputation cases as soon as the workman is considered fit to work.

Joints immobilized by disuse should be given plenty of time to improve or return to normal. In severe injuries involving joints adjustments often have to be made later in the event of the development of arthropathy.

Corneal scars should be allowed plenty of time, often a year, to thin out before attempting to assess permanent visual impairment.

In industrial noise deafness six months should be allowed to elapse after last exposure.

In certain cases of neurosis, hysteria, neurodermatitis and disinclination to bestir, early settlement often possesses therapeutic value.

Judgement Ratings

A sizeable proportion of all cases do not fall directly under the schedule in which case the latter can only be used as a guide. Multiple finger amputations have been allotted values, but where there is scarring, impairment of joint movement and/or loss of sensation, the functional value remaining must be determined more or less arbitrarily and the percentage of disability so arrived at. Where several digits are impaired disability should be assessed in terms of the whole hand. In extensive injuried affecting several parts of the body the remaining functional faculty must be determined in terms of the whole man.

Digital Amputations

Removal of a phalangeal head adds nothing to the disability; indeed a better stump is usually thereby obtained. If more then the head is lost a good rule is to allow nothing for loss of less than half the phalanx, one third the value if half is lost and one half if two thirds are gone.

Amputation of metacarpal heads, except through surgical necessity, should be discouraged and for the most part allowed to go unrewarded, unless it is felt poor judgement on the surgeon's part would impose a hardship on the patient. Bevelling the heads of the second and fifth metacarpals for the purpose of streamlining the hand adds nothing to the disability, providing the procedure is carried out conservatively.

Disfigurement

Disfigurement deserves consideration only when treatment has nothing further to offer and when it is sufficiently serious to be a handicap in obtaining or holding employment. Ordinarily, facial, arm and even leg deformities, or scarring, are a greater handicap in women than in men and should receive added recognition.

Enhancement In Multiple Injuries

This is something to be considered when injuries involve parts of the body which perform identical function; e.g., both arms, both legs or both eyes. Ordinarily there would be no enhancement factor as between a hand and a foot, a foot and an eye, and etc. An enhancement of up to 50 percent might be warranted in injuries to

both hands or both feet, but regard must always be had that the sum of the two individual ratings plus an added percentage for enhancement is not disproportionate when applied to the whole man.

Second Injury Funds

Most Boards have set up Second Injury Funds to take care of cases in which the disability resulting from an accident is greater by reason of some pre-existing injury or disease. The prime purpose of these funds is to help overcome employer reluctance to employ handicapped people by spreading any added liability that might accrue thinly over all of industry. The actual cost of any enhancement that may occur is charged directly to the fund.

In the case of amputation following more or less minor injuries in workmen previously suffering from vascular disease, e.g., diabetes or Buerger's disease, half the award is properly chargeable to the fund.

The same would apply to the residual effects in heart cases.

MECHANICS OF RATING IN SPECIAL CASES

Multiple Finger Amputations

The computation of awards in multiple finger amputations often presents a problem. The schedule gives values for complete loss of two or more fingers, but where unequal parts of fingers are involved, a method of calculating the disability becomes necessary.

A formula is presented by the use of which a quick and convenient means of reaching the objective is afforded. It is based on the premise that while each individual finger has a fixed value, when two or more fingers are lost, an enhancement factor has to be considered over and above the sum of the individual losses. For example, if the index and middle fingers each have a value of 4%, but a combined value of 14%, it follows that the enhancement factor if both are lost is 6% - i.e., 4% + 4% + 6% = 14%. If, for example, the index finger is off at its proximal joint and the middle at the p.i.p. joint, the combined disability would be 4% + 3/5 x 10% = 10%.

The formula involves the use of twelve charts numbered #1 to #12 inc. Chart #1 shows single finger component values, charts #2 to #7 inc. two finger combinations, charts #8 to #11 inc., three finger combinations and chart #12 four fingers.

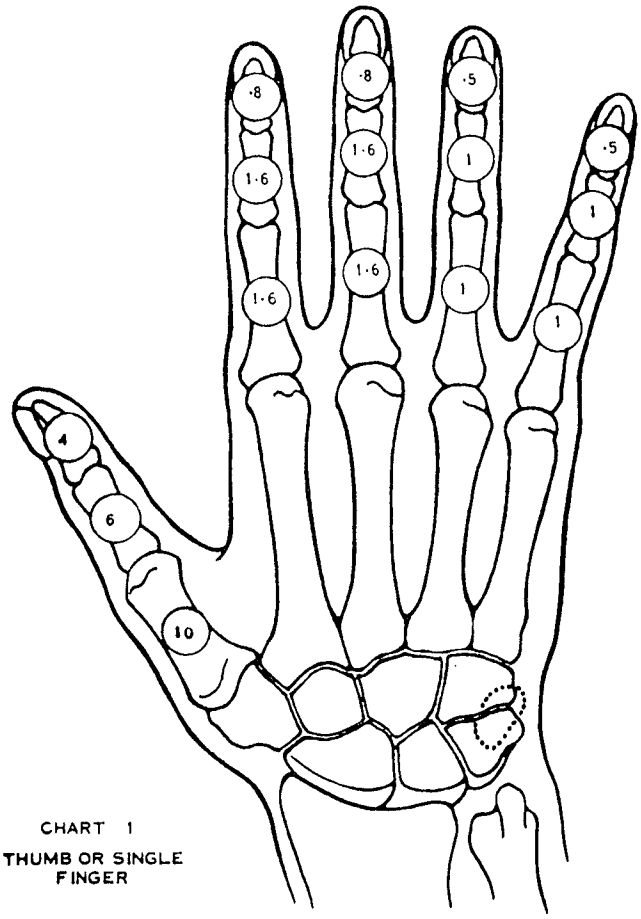


CHART 1
THUMB OR SINGLE FINGER

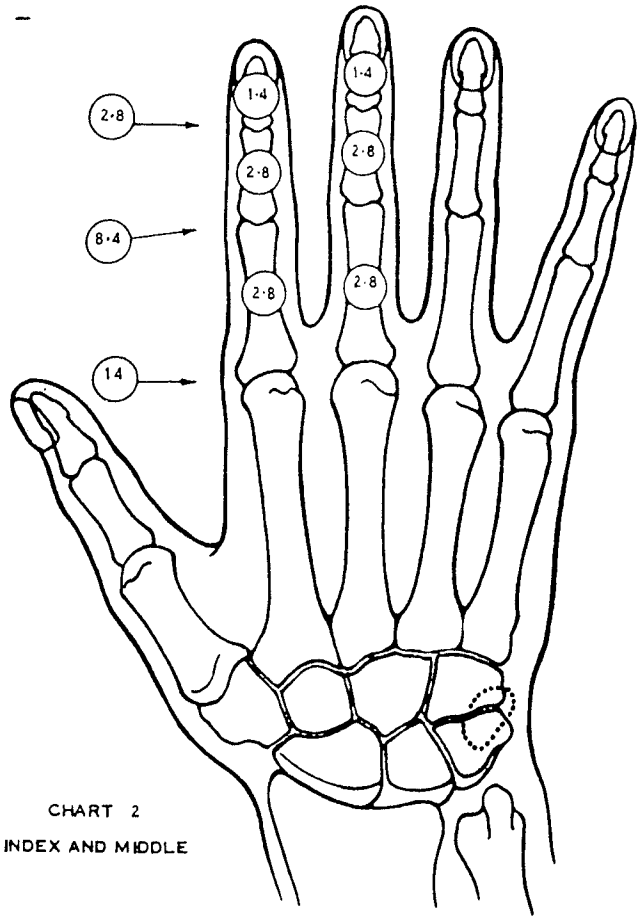


CHART 2
INDEX AND MIDDLE

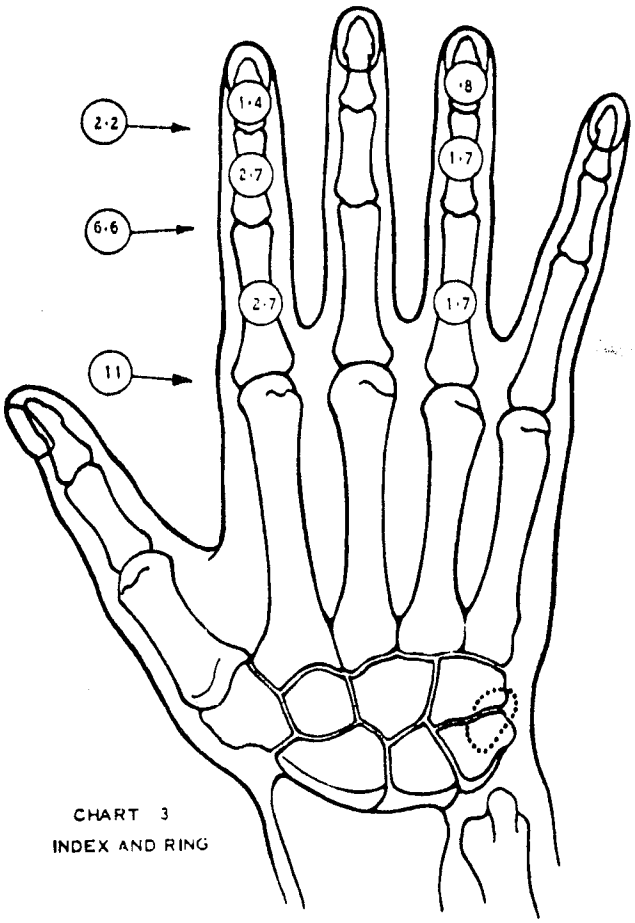


CHART 3
INDEX AND RING

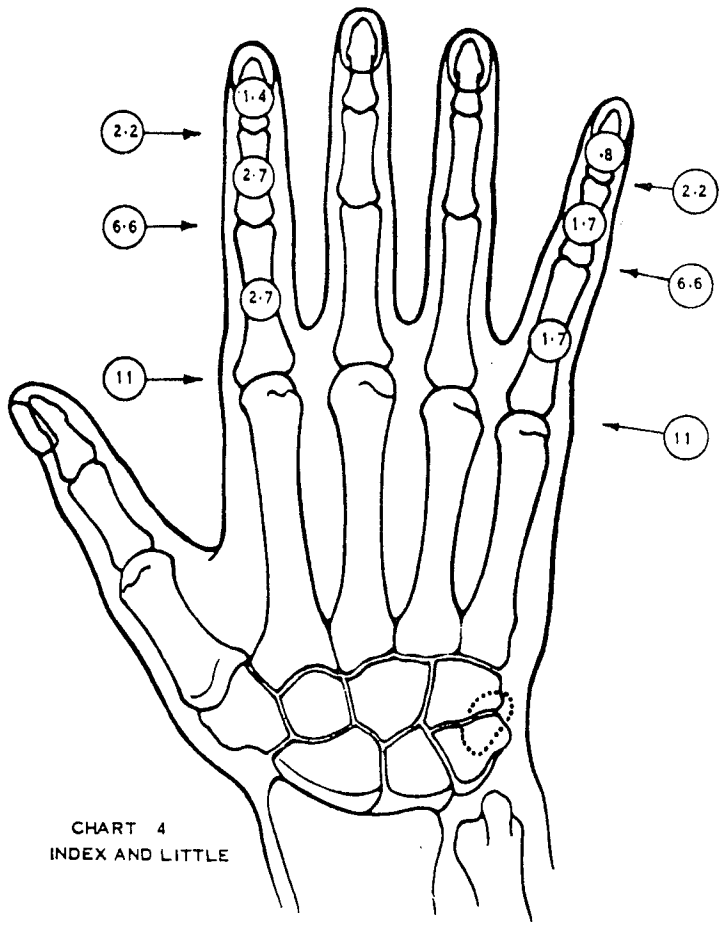


CHART 4
INDEX AND LITTLE

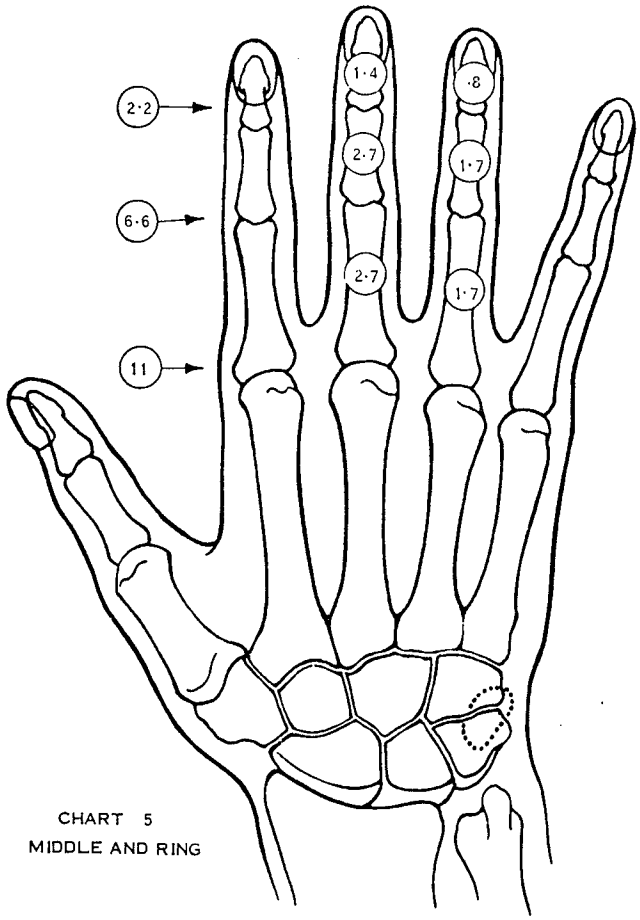


CHART 5
MIDDLE AND RING

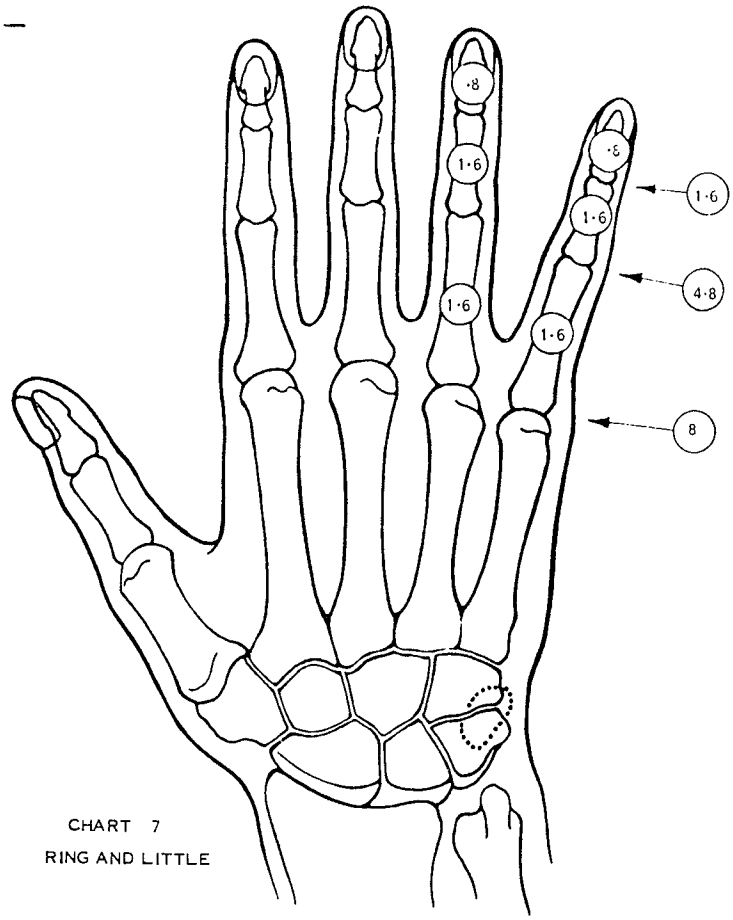


CHART 7
RING AND LITTLE

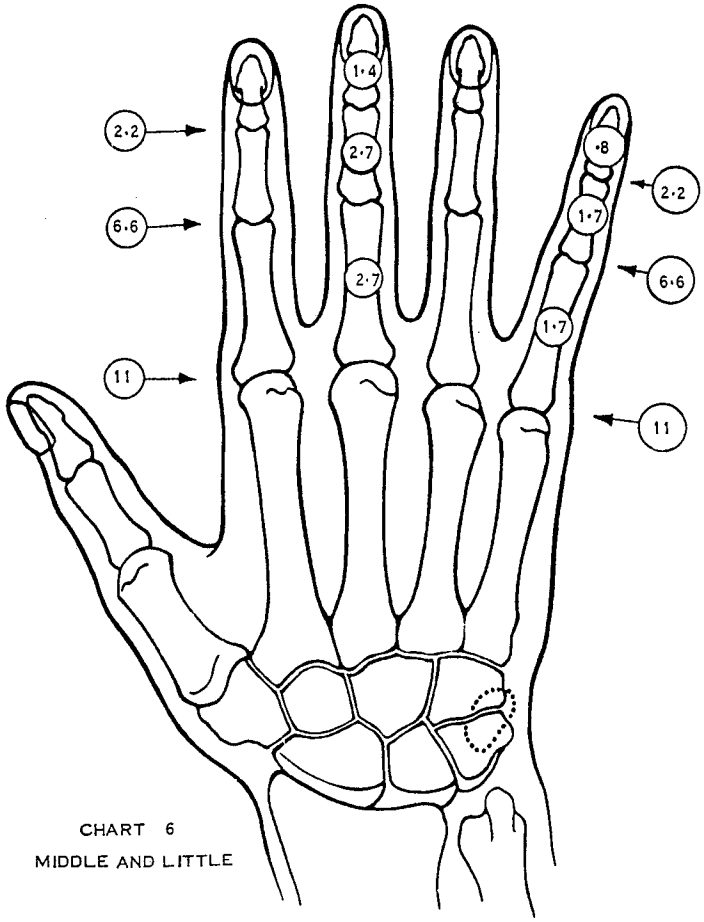


CHART 6
MIDDLE AND LITTLE

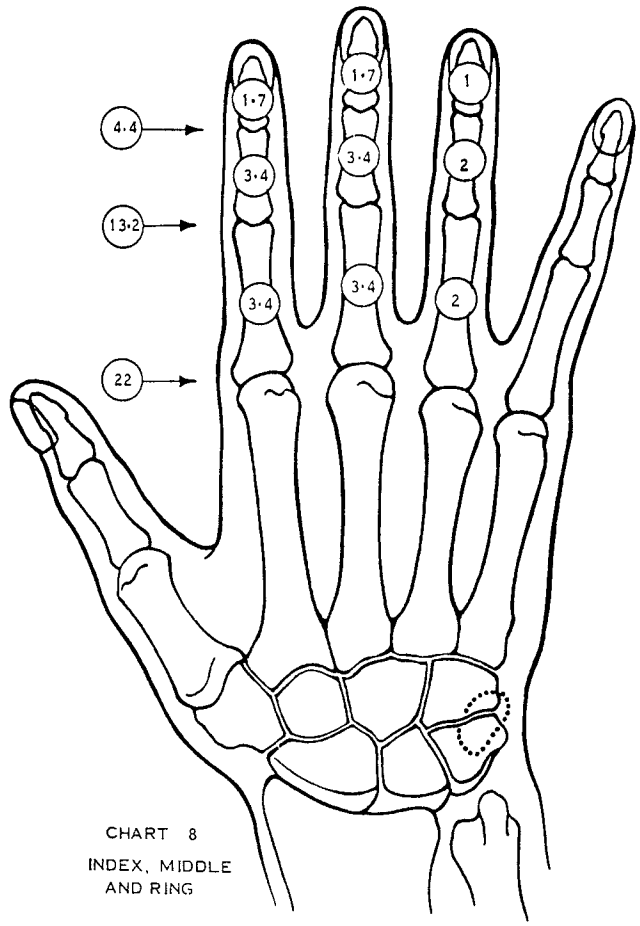


CHART 8
INDEX, MIDDLE
AND RING

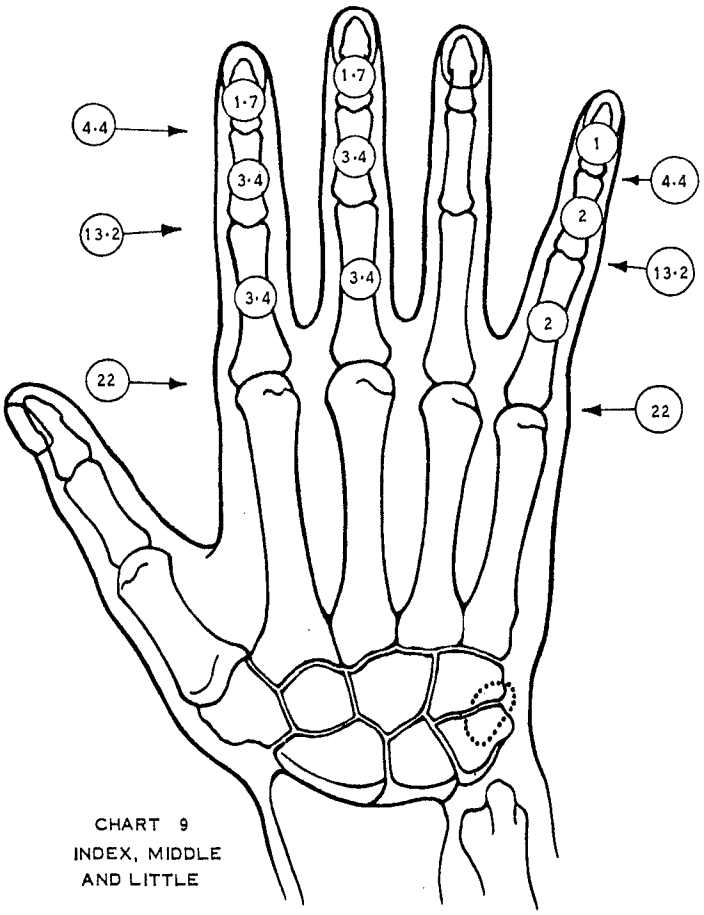


CHART 9
INDEX, MIDDLE
AND LITTLE

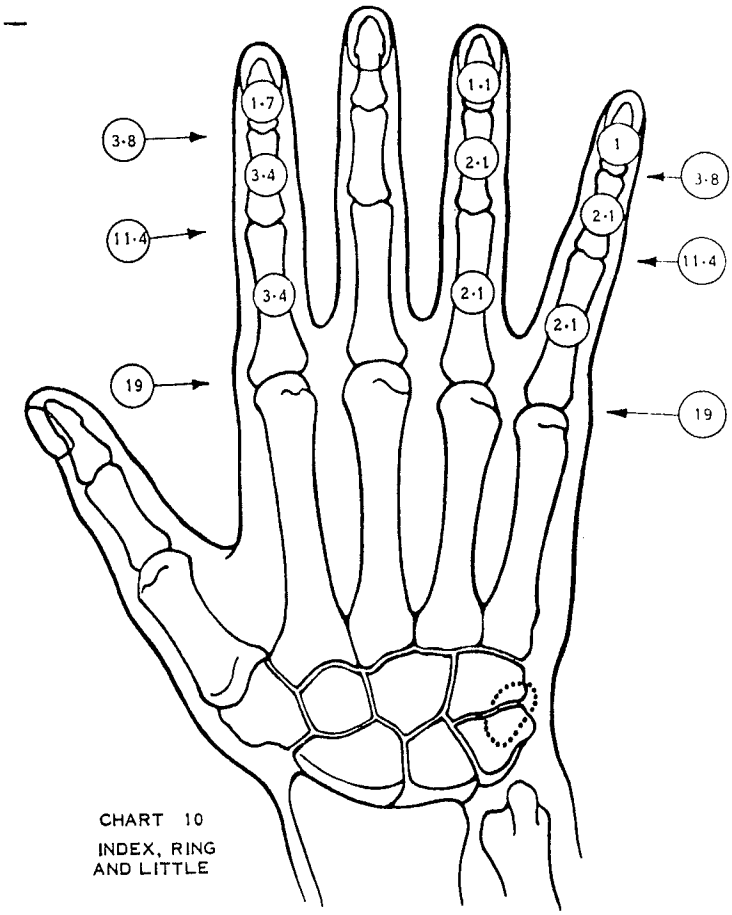


CHART 10
INDEX, RING
AND LITTLE

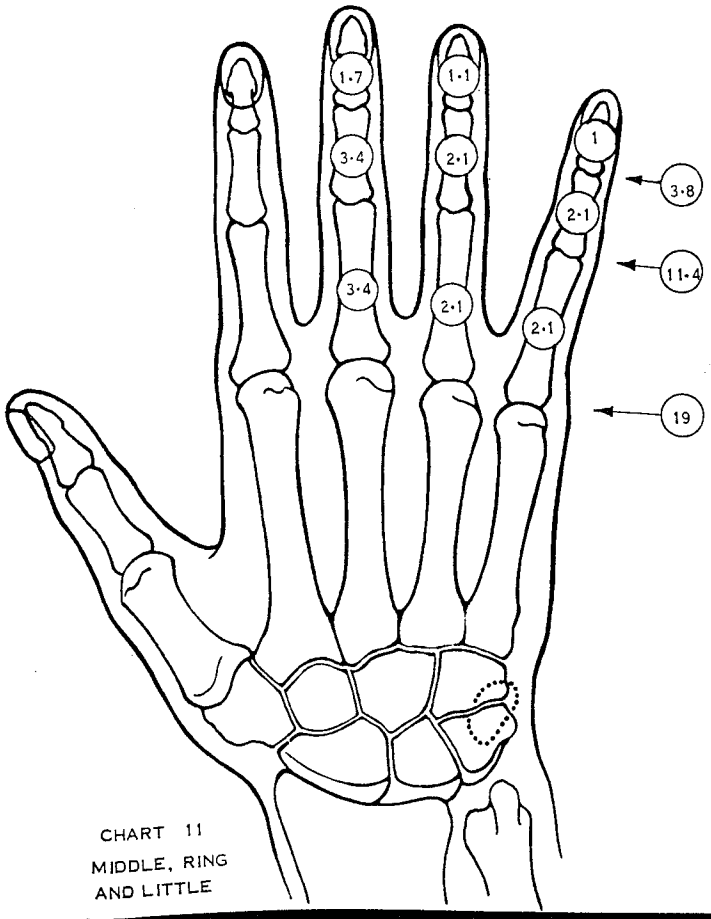


CHART 11
MIDDLE, RING
AND LITTLE

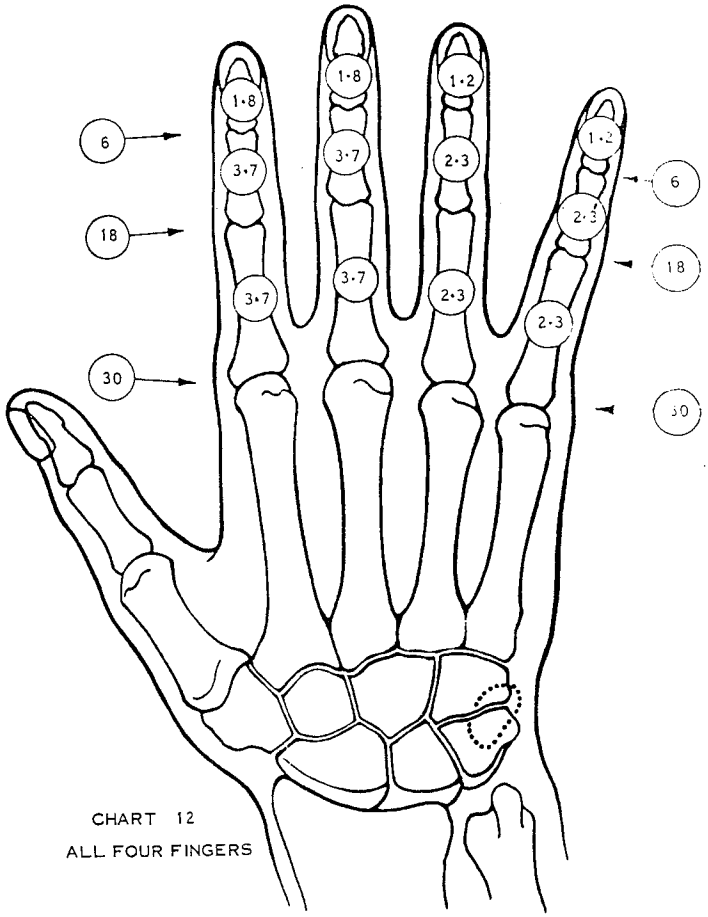


CHART 12
ALL FOUR FINGERS

Examples showing the method of calculating the disability in various two, three and four finger combinations follows:

EXAMPLES

1. Index at proximal, middle at distal.

TAKE CHART #2

Distal of index	1.4%
Distal of middle	1.4%

TAKE CHART #1

Proximal of index	1.6%
Second of index	1.6%
Combined rating =	6.0%

2. Index at proximal, middle at p.i.p., ring at distal.

TAKE CHART #8

Distal of index	1.7%
Distal of middle	1.7%
Distal of ring	1.0%

TAKE CHART #2

Second of index	2.8%
Second of middle	2.8%

TAKE CHART #1

Proximal of index	1.6%
Combined rating =	11.6%

3. Index at proximal, middle at p.i.p., ring at distal, little at distal.

TAKE CHART #12

Distal of index	1.8%
Distal of middle	1.8%
Distal of ring	1.2%
Distal of little	1.2%

TAKE CHART #2

Second of index	2.8%
Second of middle	2.8%

TAKE CHART #1

Proximal of index	1.6%
Combined rating	13.2%

At first sight the formula may seem complicated, but after a little trial and experimentation, little difficulty should be experienced in working out the rating in any combination of finger amputations. Simply remember to use the four finger chart if four fingers are involved, the three finger chart if three fingers are involved, etc. Having done so, check off the distal-most components of the four fingers or three fingers as the case may be, then turn to the lesser finger combination and do likewise. Finally add all together. The values of all components conform with the finger ratings in the schedule.

Impairment Of Vision

In rating visual impairment the percentage of disability should be based on the best distant vision obtainable after correction with conventional lenses using the standard Snellen test card at a distance of 20 feet with minimum illumination of five foot candles. The one exception is monocular aphakia where, although it may be possible to restore vision to 20/20 using a heavy correction, the two eyes cannot be used together to provide binocular vision. It is true that in these cases a contact lens, if it can be tolerated, may restore stereoscopic vision without too much difference in the size of the retinal images, but there being no accommodation, a lens capable of correcting near vision would be of no use for distant vision and vice versa. For the present at least, it is suggested that cases of monocular aphakia should be rated according to the schedule whether a contact lens is used or not. In the case of double aphakia conventional bi-focul lenses should provide binocular vision for both near and distance. In these cases, providing full correction is possible, a 20% rating is suggested.

In bilateral visual loss, each eye should be rated separately, then to the percentage loss in the poorer eye should be added $\frac{84}{16}$ times the percentage loss in the better eye to arrive at the combined disability.

Diplopia or double vision may result from injury to or paralysis of one or more of the extra-ocular muscles. Those of minor degree usually correct themselves as the muscles regain their strength;

others require the use of prismatic lenses, while still others need surgery to shorten or lengthen the muscles themselves. If the condition is irremediable, the divergent eye is useless for the time being, though invaluable to hold in reserve.

Sometimes diplopia is evident in only part of the visual field, or possibly only in one quadrant. These cases, providing the visual axes are unaffected, are of minor significance.

Diplopia below the horizonal is a greater handicap than one above.

There are several varieties of field defects. The most striking, hemianopia, produces blindness in half the visual fields of both eyes, the nasal half in one eye and the temporal half in the other. Often the fixation points are not involved. A right field hemianopia would merit a rating of 25 percent compared with 20 percent for one involving the left fields, as the former is a somewhat greater handicap.

The importance of limited blind areas (scotomata) depends on their size and location. A central scotoma (one in the line of direct vision) might rate 75 percent visual loss in the affected eye. Small defectselsewhere in the visual fields are of relatively minor inportance.

Impairment Of Hearing

Unilateral deafness is usually traumatic from concussion, penetrating injuries of the tympanum or fractures of the temporal bone.

It may be conductive, perceptive or mixed. It is practically always irreversible and its effect is to lessen or destroy stereophonic appreciation.

Disparity of 30 decibels or more in the average hearing threshold in the three frequencies, 500 cps., 1,000cps., and 2,000 cps., is usually sufficient to produce loss of directional sense and to warrant an award equivalent to unilateral deafness.

Industrial or noise deafness is usually perceptive and always bilateral though the two ears may be unequally affected. It is reversible to a limited degree and assessment should be deferred until six months have elapsed after the workman leaves hazardous noise exposure. Compensation in a compensable case would commence on the date the workman left noise exposure.

As pointed out previously, ability to comprehend speech is the determining factor in assessing hearing efficiency. Unfortunately, testing by live voice may lead to inaccuracy in assessment and often to lack of uniformity, for which reason the Committee on the Conservation of Hearing of the American Academy of Oto-Laryngology has recommended that hearing efficiency be determined through the medium of pure tone audiometry, using only the frequencies 500 cps., 1,000 cps., and 2,000 cps., which comprise most of the sounds in the average speech range.

A rather important factor, this method does not take into consideration is speech discrimination. This may be evident where

there seems to be a lack of correlation between the audiogram and the workman's ability to comprehend speech. However, the formula is considered to work with reasonable fairness in the majority of cases, and until a better method of hearing evaluation is evolved, it is felt for the present, to be the method of choice.

When the time arises to rate a case of bilateral noise deafness, six months having elapsed since last exposure to hazardous noise levels, (100 dbs. or over), the steps to be taken are:

1. Obtain a complete report together with an audiogram from a competent otologist.

2. Average the hearing threshold in the three frequencies, i.e., 500 cps., 1,000 cps. and 2,000 cps.

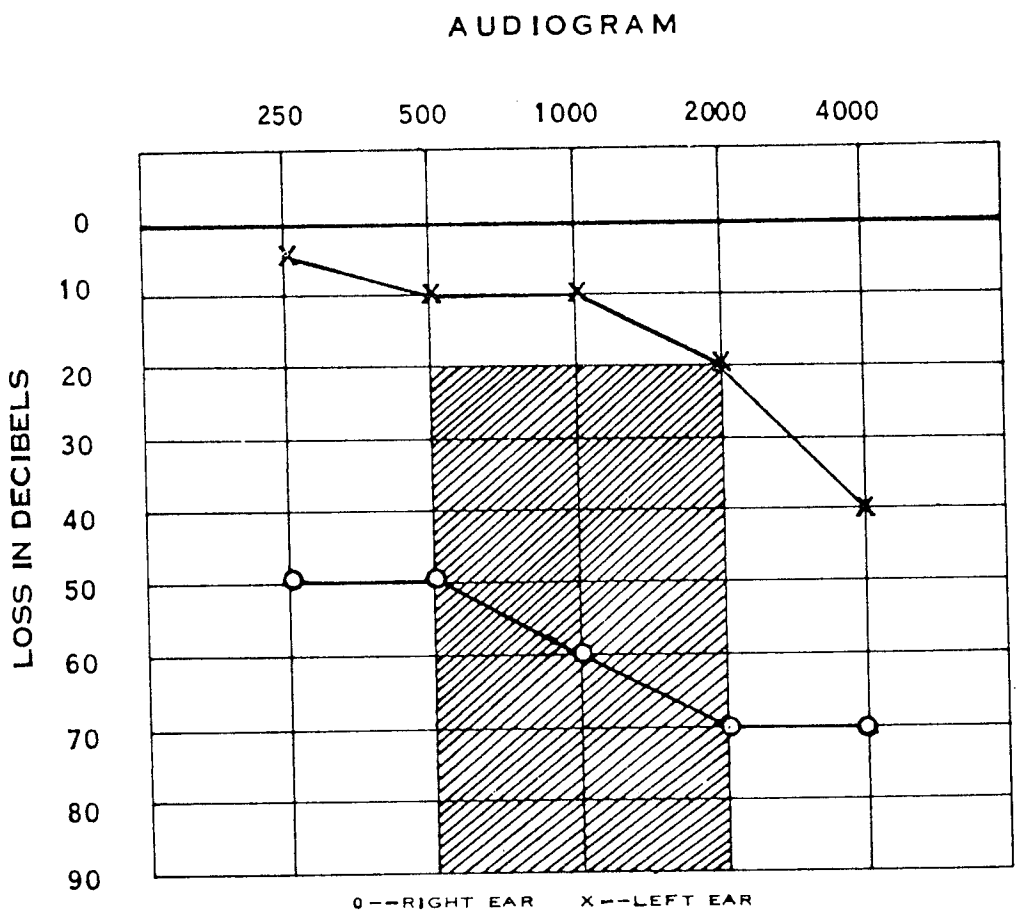
3. If the claimant is over fifty years of age, deduct from the average .5 dbs. for each year age exceeds fifty.

4. Translate hearing loss in decibels into percentage of disability in accordance with the schedule.

5. To the percentage of disability in the poorer ear add nine times the percentage of disability in the better ear. This will give the combined disability in the two ears.

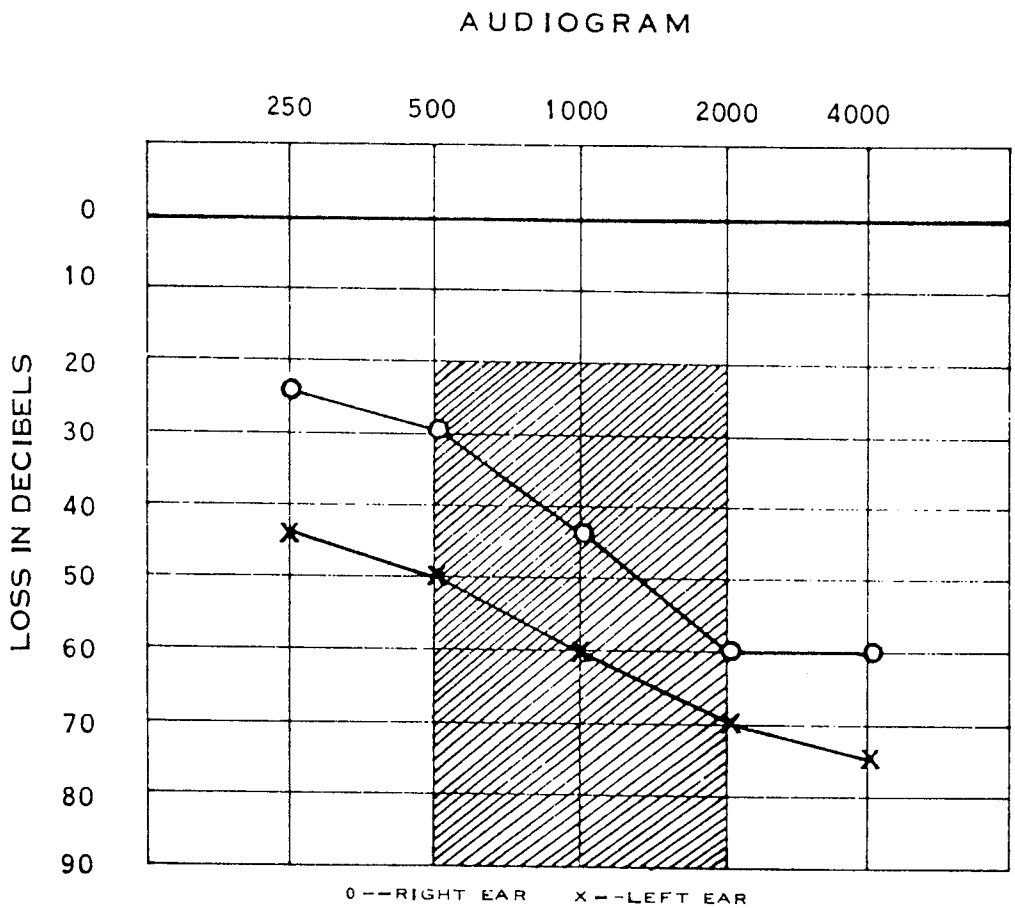
EXAMPLES

1. A forty year old miner suffered an injury to his right ear from a dynamite blast. His audiogram is as follows:



His hearing is substantially normal in the left ear, but 40 decibels lower in the average of the three frequencies in the right. He would be entitled to an award for unilateral deafness as his stereophonic function would be practically lost.

2. A sixty-six year old boiler-maker who has worked thirty-five years at his trade has marked hearing loss in both ears. More than six months have elapsed since he retired and his audiogram is as follows:



On page 32 will be found the method of calculating the percentage of disability in this case of bilateral deafness.

Right Ear

Hearing loss at 500 cps.	=	30 dbs.
" " " 1,000 cps.	=	45 dbs.
" " " 2,000 cps.	=	60 dbs.
Total =		135 dbs.
Average = 135 divided by 3 =		45 dbs.
For age over 50 deduct 16 x .5 =		8 dbs.
Compensable hearing loss =		37 dbs.

NOTE:

If average decible loss falls between two levels in the schedule (in this case it is between 35 and 40) take the lower, i.e. 40 dbs.

PERCENTAGE OF DISABILITY (40 dbs.) .7%

Left Ear

Hearing loss at 500 cps.	=	50 dbs.
" " " 1,000 cps.	=	60 dbs.
" " " 2,000 cps.	=	70 dbs.
Total =		180 dbs.
Average = 180 divided by 3 =		60 dbs.
For age over 50 deduct 16 x .5 =		8 dbs.
Compensable hearing loss =		52 dbs.

PERCENTAGE OF DISABILITY (55 dbs.) 1.7%

COMBINED DISABILITY IN THE TWO EARS

1.7 + .7 x 9 = 8.0%

SOME PERSONAL OBSERVATIONS

While uniformity in disability evaluation between the different Provinces is a very worthy objective, some concern should also be felt as to whether rating schedules currently in use, or that proposed, come close in fulfilment of the spirit and purpose of Workmen's Compensation, which was to partially compensate a workman injured in an industrial accident for his loss of earning capacity. Has there been a tendency to lose sight of the original concept in favour of a system of state insurance or damages? Compared with damages in tort cases however, compensation is well out in front.

When Sir William Meredith drafted the first Canadian compensation law he stipulated that, when permanent loss of earning capacity resulted from an accident, the injured workman should receive for the balance of his lifetime an award based on a percentage of his loss in earnings. While the impracticability of strict adherence to this principle soon became apparent, loss of earning capacity remains the criterion on which awards are to be based. If, therefore, the system of schedule rating is considered to be best fitted to assist in dispensing prompt and average justice, some thought should be given to the correctness of the various items in the schedule, as to whether they fairly represent the loss of earning capacity, if not in an individual case, at least on the average.

Earnings and earning capacity should not be confused as they are not synonymous terms. Earning capacity may be lost without any diminution in productivity and hence loss of earnings. While this at first may seem paradoxical, it must be remembered that the human body is possessed with an overabundance of physical faculty, much of which is held in reserve and seldom called into use. Ten digits are not needed to carry out the most intricate manipulations; a long distance runner puts ten times as much strain on his heart as the average workman; one can live in relative comfort with one lung and half the functional tissue of one kidney is sufficient to maintain normal blood chemistry. Reserve physical faculty lessens normally and gradually between maturity and old age and any additional loss occasioned by an injury must be assumed to represent loss of earning capacity whether its effect is immediate or delayed and hence to provide a basis for compensation.

In addition to accepting this as a fundamental concept, humanitarian consideration dictates that the award should also include something for mere loss of body integrity and inability to participate in the normal activities of life apart from actually earning a living.

The schedules adopted by the Canadian Provinces were offshoots of American schedules, noneof which had any scientific background. A study of the early history of schedules in the United States show that the first in existence was compiled by the New Jersey Industrial Commission about 1910. Figures given the various items were said to have been determined by a study of European schedules,

court judgements and insurance settlements. As State after State enacted compensation laws, schedules were copied one from another without any serious concern as to their soundness in any case.

In 1922, a committee appointed by the I. A. I. A. B. C. to try and decide on a schedule that would be fair and equitable and suitable for general adoption presented its report. The committee indicated that in setting up the schedule the percentages assigned to the various items were based on what in their opinion the disability would amount to as applied to an untrained common labourer aged 30. They also suggested that, while a great many factors such as age, mentality, education, etc. affect the ability of a workman to adjust to a physical handicap, age is the only one capable of measurement and the only one that should be used in determining the amount of the award.

The schedule itself placed a valuation of 50 percent on both an arm at the shoulder and a leg at the hip. These seemed like such round figures that a good deal of curiosity was aroused as to their source. The committee had to admit that their figures were entirely lacking in scientific foundation, no factual knowledge being available at that time as to the late effects of injury on earning ability; but they were considered fair and equitable in all the circumstances. Having decided on a suitable allowance for the arm and leg, the other items were added in what was assumed to be proper proportion. Although a resolution endorsing the report was approved

unanimously, the schedule was never adopted by any State. Indeed, even as of today, not more than half the States pay life pensions at all and of those that do many have maximum limits as to the amount of the award.

It is from such fabric as this that Canadian rating schedules originated. The first in existence, compiled in 1915, was patterned after that of California, which at that time provided for only 500 weeks compensation (based on a percentage of earnings) for permanent total disability. Considering the fact that in Canada life awards have been the rule from the beginning, it can probably be assumed that even if identical scales were used in both cases, Canadian awards would, on the average, amount to double what they did in California. It would be interesting to know whether the percentages in the California scale were struck having regard to the fact that awards could be computed on no more than a ten year basis.

Since the inception of Workmen's Compensation in Canada some forty-five years ago rating schedules have changed little despite:

1. Vast increase in work opportunities for handicapped people through the elimination of heavy work in many industries.

2. Availability of such rehabilitation measures as vocational training and job placement.

3. An awakening sense of responsibility on the part of industry for the welfare of their workers who have been injured and are handicapped.

4. Increased versatility of prosthetic apparatus of all kinds.

5. An increase of more than 300 percent in compensation benefits.

6. Unemployment insurance; family allowances, old age pensions, etc.

One wonders if it is not high time to take a long and critical look at some of the present-day policies and practices for dealing with permanent injury. Are many of these conditions as permanently disabling as we have been accustomed to believe? Is too much being allowed for bits and pieces of fingers? Is it reasonable, for example, to sit down with an annuity table to calculate what a .5 percent award would amount to over a lifetime for loss of the tip of the little finger?

There are many facets of the matter that warrant thoughtful consideration such as the proportion the cost of permanent disability bears to the cost of temporary disability; considering other measures of social security, is compensation making a disproportionate contribution toward the attainment of the welfare state?

A recent survey of fifty above-elbow amputations in Ontario showed that less than 20 percent were earning less than 50 percent of their former wages though all had received awards of from 60 percent to 70 percent. Some of these were recent immigrants with little or no knowledge of English; others lived in remote areas and refused to move to urban centres where work could no doubt have been arranged; still others were so poorly motivated they were content to live on their pensions.

In comparing wage levels before these accidents with present earnings the equivalent of present-day rates was taken, so that increases in wage levels due to inflation would not have effect.

If the Association decides to adopt the proposed schedule either with or without amendment, it is suggested that a cooperative effort be made over the next few years to test the soundness of at least some of the key items. As well, it is suggested that all policies and practices having to do with permanent disability evaluation and payment be reviewed and brought up to date.

To accomplish this important work it is suggested that a standing committee consisting possibly of a Board member, a rehabilitation officer and a doctor be appointed whose commission might include:

1. The allotment of specific research projects to the various Boards.

2. Consideration of the interrelation of pensions and various forms of rehabilitation.

3. A study as to what, if any, bearing other social security measures may have on Workmen's Compensation.

4. The question of whether awards should take into consideration such factors as age, education, etc.

There are no doubt many other avenues which the committee itself would find it profitable to explore.

Any opinions here expressed are purely personal and are in no way to be interpreted as those of the Ontario Board or its staff.

In conclusion, I wish to express to the Association my appreciation for the confidence reposed in me in asking me to make this survey. It has been a distinct pleasure, and to all who contributed with comment and advice, I am deeply grateful.

Respectfully submitted.

D.E. Bell, M.D.

Toronto, Ontario.
August 22, 1960.

Mr. Eades

REPORT

of

The Committee on Permanent Disability Evaluation

to

THE ASSOCIATION OF

WORKMEN'S COMPENSATION BOARDS OF CANADA

September 1, 1964.

Romeo Depeyre, M.D.
Quebec Workmen's Compensation Board

C. R. Salsbury, M.D.
B. C. Workmen's Compensation Board

D. Lees, M.D. C.M.O.
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DISCUSSION OF THE SCHEDULE

APPLICATION OF THE SCHEDULE

MECHANICS OF RATING IN SPECIAL CASES

PERMANENT PARTIAL DISABILITY

RATING SCHEDULE

The schedule is designed to show in percentage the approximate impairment of earning capacity in an average unskilled workman.

It should be used only as a guide always having regard to whether the award adequately compensates the workman for his loss of earning capacity either at his own or some other suitable occupation.

In off-schedule or "judgment" ratings awards should be proportionate to listed items.

UPPER EXTREMITY

(A)
Amputations

		Percentage
1.	Proximal third of humerus or disarticulation at shoulder	70 ✓
2.	Middle third of humerus	65 ✓
3.	Distal third of humerus to biceps insertion ..	60 ✓
4.	Biceps insertion to wrist (depending on usefulness of stump)	50-60 X 50-55
5.	Thumb	10 ✓
6.	Thumb, including metacarpal	20 ✓
7.	Thumb, one phalanx	5 X 4
8.	Fingers, all four	30 ✓
9.	Fingers, four at P.I.P.	18 ✓
10.	Fingers, four at distal	9 X 6
11.	Finger, index	4 ✓
12.	Finger, index at P.I.P.	2.4 ✓

Amputations Cont'd (Upper Extremity)

		Percentage
13.	Finger, index at distal	1.2 ✗ .8
14.	Finger, middle	4 ✓
15.	Finger, middle at P.I.P.	2.4 ✓
16.	Finger, middle at distal	1.2 ✗ .8
17.	Finger, ring	2.5 ✓
18.	Finger, ring at P.I.P.	1.5 ✓
19.	Finger, ring at distal	.8 ✗ .5
20.	Finger, little	2.5 ✓
21.	Finger, little at P.I.P.	1.5 ✓
22.	Finger, little at distal	.8 ✗ .5
23.	Metacarpals (except thumb)	Add value of finger
24.	Fingers, index, middle and ring	22 ✓
25.	Fingers, index, middle and little	22 ✓
26.	Fingers, index, ring and little	19 ✓
27.	Fingers, middle, ring and little	19 ✓
28.	Fingers, index and middle	14 ✓
29.	Fingers, index and ring	11 ✓
30.	Fingers, index and little	11 ✓
31.	Fingers, middle and ring	11 ✓
32.	Fingers, middle and little	11 ✓
33.	Fingers, ring and little	8 ✓
34.	Fingers, two or more at P.I.P.	6/10 combined value ✓
35.	Fingers, two or more at distal	3/10 combined value ✗
36.	In amputation or impairment of all or part of thumb and amputation or impairment of all or parts of one or more fingers, add the lesser rating as an enhancement factor.	1/5

(B)
Immobility of Joints

		Percentage
37.	Shoulder, without either articular or scapular movement (the so-called "frozen shoulder") .	35 ✓
38.	Shoulder joint (gleno-humeral) ankylosed but with full scapular movement	15 X 20
39.	Shoulder, abduction limited to 90° but with good rotation and pivotal movement	5 ✓
40.	Elbow	20 ✓
41.	Wrist	12.5 ✓
42.	Pronation and supination, complete in mid-position	10 ✓
43.	Pronation alone	3 ✓
44.	Supination alone	5 ✓
45.	Thumb, both joints	5 ~~X 6~~ 5
46.	Thumb, distal joint	2 X
47.	Finger, all joints	Up to value of finger ✓
48.	Finger, P.I.P. and distal joints	Up to 6/10 value of finger ✓
49.	Finger, distal joint	Up to 3/10 value of finger X 1/5

LOWER EXTREMITY

(A)
Amputations

50.	Hip disarticulation or short stump requiring an ischeal bearing prosthesis	65 ✓ 75
51.	Thigh, seat of election	50 ✓
52.	End bearing knee or short below knee stump not suitable for a conventional B.K. prosthesis .	45 ✓ 40
53.	Leg, suitable for B.K. prosthesis	35 ✓ 40

Amputations Cont'd (Lower Extremity)

		Percentage		
54.	Leg, at ankle, end bearing	25	✓	30
55.	Through foot	10-25	✓	23
56.	All toes	5	✓	6
57.	Toe, great	2.5	✓	3
58.	Toe, great at distal	1	✓	
59.	Toes, other than great, each	.5	✓	

(B)
Immobility of Joints

60.	Hip	30	✓	35
61.	Knee	25	✓	22.5
62.	Knee, flexion limited to 90°.....	5	✓	
63.	Ankle	12	✓	15
64.	Great toe, both joints	2.5	✓	
65.	Great toe, distal joint	.5	✓	

(C)
Shortening of Leg

66.	1"	1.5	✓	
67.	2"	6	✓	
68.	3"	15	✓	

(D)
Denervation

69.	Peroneal, complete	12	✗	10
70.	Median, complete at elbow	40	✓	
71.	Median, complete at wrist	20	✓	
72.	Ulnar, complete at elbow	10	✓	

Denervation Cont'd

		Percentage
73.	Ulnar, complete at wrist	8 ✓

(E)
Impairment of Vision

74.	Enucleation	18 ✓
75.	Sight of one eye	16 ✓
76.	Cataract or aphakia	12 ✓
77.	Double aphakia	20 ✓
78.	Hemianopia, right field	25 ✓
79.	Hemianopia, left field	20 x 25' 20
80.	Diplopia, all fields	10 ✓
81.	Scotomata, depending on location and extent ..	Up to 16 ✓

NOTE: In rating a cataract at 12% it should be reasonably certain there is no fundus pathology.

Partial Visual Loss

		Percentage
82.	20/30	0 ✓
83.	20/40	1 ✓
84.	20/50	2 ✓
85.	20/60	4 ✓
86.	20/80	6 ✓
87.	20/100	8 ✓
88.	20/200	12 x 16
89.	20/400	14 x 16

NOTE: Snellen test for distance after correction with conventional lenses.

For bilateral visual impairment see page 21.

Impairment Of Hearing		Percentage
90.	Deafness, complete in one ear	3 ✓
91.	Deafness, complete in both ears	30 ✓

Partial Hearing Loss Where Both Ears Are Affected		
92.	25 decibels in single ear	.2 ✓
93.	30 decibels in single ear	.3 ✓
94.	35 decibels in single ear	.5 ✓
95.	40 decibels in single ear	.7 ✓
96.	45 decibels in single ear	1.0 ✓
97.	50 decibels in single ear	1.3 ✓
98.	55 decibels in single ear	1.7 ✓
99.	60 decibels in single ear	2.1 ✓
100.	65 decibels in single ear	2.6 ✓
101.	70 decibels in single ear	3.0 ✓

NOTE: In bilateral deafness the poorer ear is rated according to the above scale; the better ear according to the scale multiplied by nine. The sum of the two gives the combined rating. See pages 22 to 26 inclusive.

102.	Loss of one kidney	10 ✓	15

DISCUSSION OF THE SCHEDULE INCLUDING PROPOSED AMENDMENTS

Amputations In General

In assigning a rating level to any amputation it must be possible to assume that the stump is structurally perfect, that it is well padded, that the scar is properly placed and that there is no undue tenderness on areas which are subject to pressure. Irremediable defects may warrant a rating level above schedule. In the case of major limb amputations rating levels assigned have regard to the type and probable usefulness of the prosthesis to which they are adaptable.

Upper Limb Amputations

Major arm amputations have been re-classified into four rather than three categories. It is felt that amputation through the middle of the humerus deserves a somewhat higher rating than one in the lower third or with a more or less useless below elbow stump. Therefore, item #2 at 65% was added.

It was felt also that amputations between the biceps insertion and the wrist should be rated between 50% and 60% depending on the amount of leverage afforded by the length of the stump. For example, a 50% case would be represented by an amputation at the seat of election or at least not above the middle of the forearm. A 60% rating would be given if the stump is too short to afford any elbow control at all and a half way level where the leverage is only fair.

Finger Amputations

It will be noted that although amputations at the proximal interphalangeal joints of the four fingers remain unchanged, the distal phalanges have been given ratings equal to that of the second phalanges; viz. 3/10 of the value of the whole finger. This is because it is felt that the tactile function of the tips of the fingers has been insufficiently recognized. For a similar reason the distal phalanx of the thumb has been increased so that both phalanges rate equally though that of the whole thumb remains unchanged.

Immobility Of Joints (Upper Extremity)

In the case of immobility of any joint the assigned rating pre-supposes that the position of fixation is optimal, e.g. the elbow at approximately 90° flexion, the distal joint of the thumb 40° to 45°, etc. A finger capable of touching the tip of the thumb might be considered not more than 50% disabled.

Items 37, 38 and 39 covering limited movement of the shoulder have been clarified providing a range of from 5% for simple fibrosis limiting abduction to 90° without interfering with rotation to 35% for a completely "frozen shoulder".

Lower Limb Amputations

Short below-knee amputations unsuitable for a conventional B.K. prostheses and end bearing amputations at the knee have been given equal rating, viz. 45% and amputations through the foot are shown

with a range of from 10% to 25% depending on the amputation level and the degree of ankle function. Amputation of any toe other than the great toe has been given a rating of .5%.

Immobility Of Joints (Lower Extremity)

The only change here is an increase of 5% i.e. from 20% to 25% for ankylosis of the knee. This increase was felt to be warranted to bring it into closer relationship to ankylosis of the hip.

Nerve Lesions

In the late schedule these cases, with the exception of peroneal paralysis (foot drop), were felt to be unsuitable for standard classification, however, in the hope they may be of some help as a guide, rating levels have also been assigned to complete lesions of the median and ulnar nerves.

Impairment Of Vision

No change is recommended for the present in any of the eye ratings despite the fact that some lack of uniformity still appears to exist with regard to some of the items, such as what constitutes an "industrially blind" eye and why aphakia should be rated lower than complete blindness. As to the former it should be recognized that retention of "form sense" of almost any degree is better than inability to see at all and there is plenty of evidence available that many workmen with no better than 20/200 vision in either eye carry on at

work that does not require high visual acuity. Apart from the fact that a cataractous or aphakic eye that is otherwise normal is of great value to hold in reserve, the present excellence of contact lenses enables an individual with an aphakic eye to obtain relatively good binocular vision. With the exception of aphakia, eye ratings should be based on the best distant vision obtainable with conventional lenses.

Impairment Of Hearing

As it becomes better known that noise induced hearing loss is a compensable industrial disease in most Provinces more and more claims for this condition can be anticipated. While ability to hear and discriminate speech sounds is the most important function of the human ear, until it is possible to devise a uniformly satisfactory method of measuring speech reception it is recommended that we continue to follow the method of predicting the extent of hearing loss by having regard to the hearing threshold in the principle speech frequencies, viz. 500 cps., 1000 cps., and 2000 cps. as recommended by the Committee on the Evaluation of Hearing Defects of the A. M. A.

Nephrectomy And Splenectomy

Considerable discussion took place in committee as to the desirability of scheduling loss of a kidney or spleen. Some Boards allow 10%, others 15% for loss of either organ and there was one suggestion that nephrectomy should rate as high as 20%. In spite of

the fact that loss of one kidney, providing the other is normal is not in any sense a physical handicap, the consensus of opinion was that the reserve value of a second kidney would warrant an award of not more than 10%. Until proof is forthcoming that loss of the spleen constitutes a physical handicap, either real or potential, no award is suggested.

APPLICATION OF THE SCHEDULE

The Schedule Is A Guide

This or any schedule is at best only a guide, to be departed from if and when the occasion demands. It must always be regarded as a servant; never a master.

Cases of Special Hardship

While intended to apply to an average individual there will be cases where the rating level provides inadequate compensation to cover the economic hardship occasioned by an injury. This happens mainly in the skilled trades where certain injuries impose particular hardship; for example, a plasterer unable to elevate his arm above shoulder level, or a railroad engineer who loses an eye. In such cases a special hardship allowance over and above the schedule rating must be considered.

Variable Factors

There are many factors that affect the rehabilitation prospects of handicapped people. Among these are age, nationality, mentality, education, physical and social environment, etc. With the exception of age these factors are difficult to evaluate. Men in the older age groups seldom become adept in the use of limb prostheses and no doubt some such cases should receive special consideration in the way of an increased rating of from ten to twenty percent for periods up to five years.

Timing Of Awards

Generally speaking awards may be made in amputation cases as soon as the workman is considered fit to work.

Joints immobilized by disuse should be given plenty of time to improve or return to normal. In severe injuries involving joints adjustments often have to be made later in the event of the development of arthropathy.

Corneal scars should be allowed plenty of time, often a year, to thin out before attempting to assess permanent visual impairment.

In cases of industrial noise deafness six months should be allowed to elapse after last exposure before assessing disability.

In certain cases of neurosis, hysteria, neurodermatitis and disinclination to bestir, early settlement often possesses therapeutic value.

Judgement Ratings

A sizeable proportion of all cases do not fall directly under the schedule in which case the latter can only be used as a guide. Multiple finger amputations have been allotted values, but where there is scarring, impairment of joint movement and/or loss of sensation, the functional value remaining must be determined more or less arbitrarily and the percentage of disability so arrived at. Where several digits are impaired disability should be assessed in terms of the whole hand. In extensive injuries affecting several parts of the body the remaining functional faculty must be determined in terms of the whole man.

Digital Amputations

Removal of a phalangeal head adds nothing to the disability; indeed a better stump is usually thereby obtained. If more than the head is lost a good rule is to allow nothing for loss of less than half the phalanx, one third the value if half is lost and one half if two thirds are gone.

Amputation of metacarpal heads, except through surgical necessity, should be discouraged and for the most part allowed to go unrewarded, unless it is felt poor judgement on the surgeon's part would impose a hardship on the patient. Bevelling the heads of the second and fifth metacarpals for the purpose of streamlining the hand adds nothing to the disability, providing the procedure is carried out conservatively.

Disfigurement

Disfigurement deserves consideration only when treatment has nothing further to offer and when it is sufficiently serious to be a handicap in obtaining or holding employment. Ordinarily, facial, arm and even leg deformities, or scarring, are a greater handicap in women than in men and should receive added recognition.

Enhancement In Multiple Injuries

This is something to be considered where injuries involve parts of the body which perform identical functions; e.g. both arms, both legs or both eyes. Ordinarily there would be no enhancement factor as between a hand and a foot, a foot and an eye, etc. An enhancement of up to 50 percent might be warranted in injuries to both hands or both feet, but regard must always be had that the sum of the two individual ratings plus an added percentage for enhancement is not disproportionate when applied to the whole man.

Second Injury Funds

Most Boards have set up Second Injury Funds to take care of cases in which the disability resulting from an accident is greater by reason of some pre-existing injury or disease. The prime purpose of these funds is to help overcome employer reluctance to employ handicapped people, by spreading any added liability that might accrue thinly over all of industry. The actual cost of any enhancement is charged directly to the fund.

MECHANICS OF RATING IN SPECIAL CASES

Multiple Finger Amputations

The computation of awards in multiple finger amputations often presents a problem. The schedule gives values for complete loss of two or more fingers, but where unequal parts of fingers are involved, a method of calculating the disability becomes necessary.

A formula is presented by the use of which a quick and convenient means of reaching the objective is afforded. It is based on the premise that while each individual finger has a fixed value, when two or more fingers are lost, an enhancement factor has to be considered over and above the sum of the individual losses. For example, if the index and middle fingers each have a value of 4%, but a combined value of 14%, it follows that the enhancement factor if both are lost is 6% - i.e., 4% + 4% + 6% = 14%. If, for example, the index finger is off at its proximal joint and the middle at the p. i. p. joint, the combined disability would be 4% + 3/5 x 10% = 10%.

The formula involves the use of twelve charts numbered #1 to #12 inc. Chart #1 shows single finger component values, charts #2 to #7 inc. two finger combinations, charts #8 to #11 inc. three finger combinations and chart #12 four fingers.

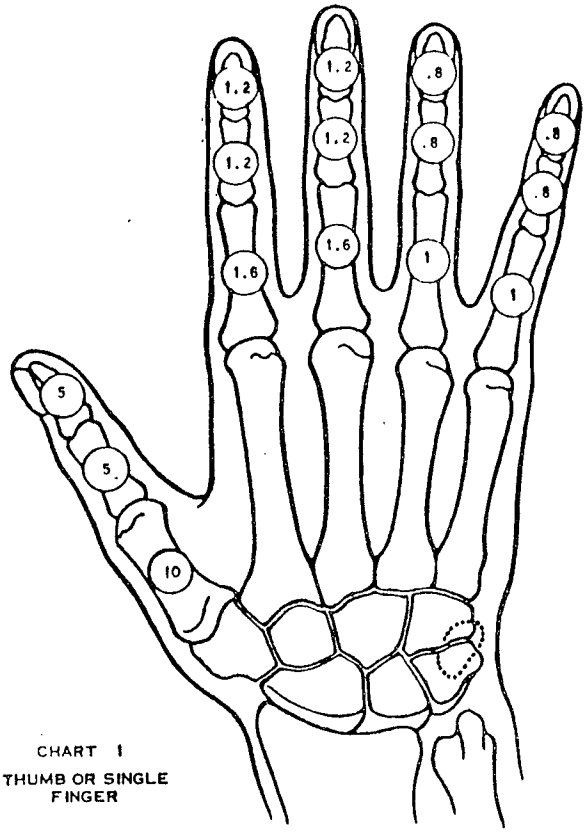


CHART 1
THUMB OR SINGLE FINGER

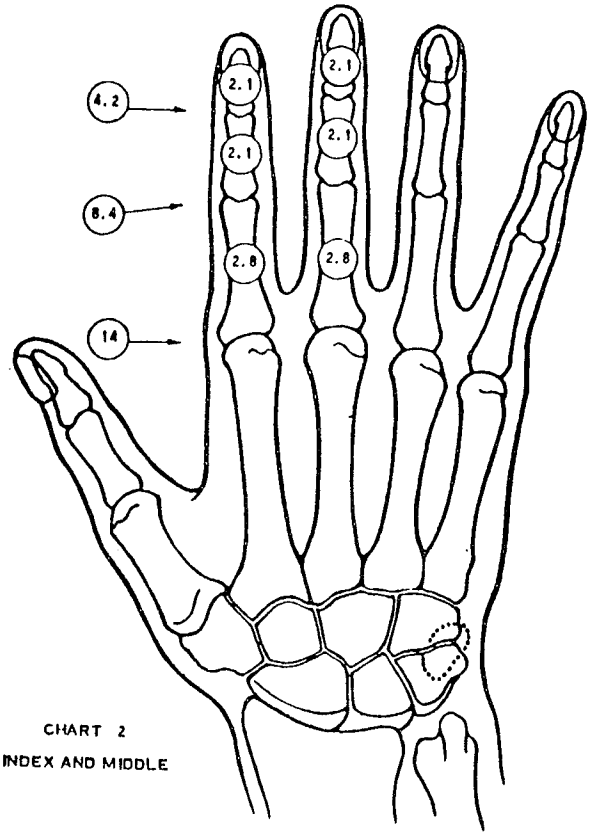


CHART 2
INDEX AND MIDDLE

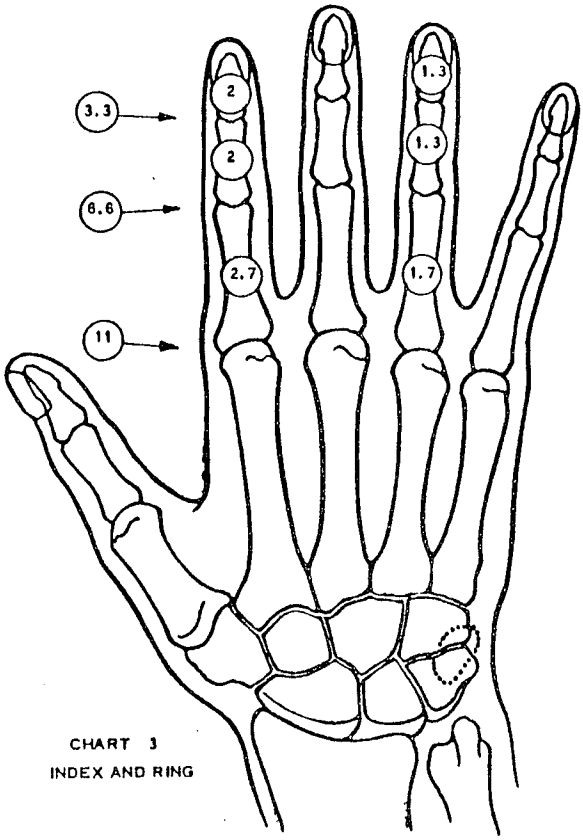


CHART 3
INDEX AND RING

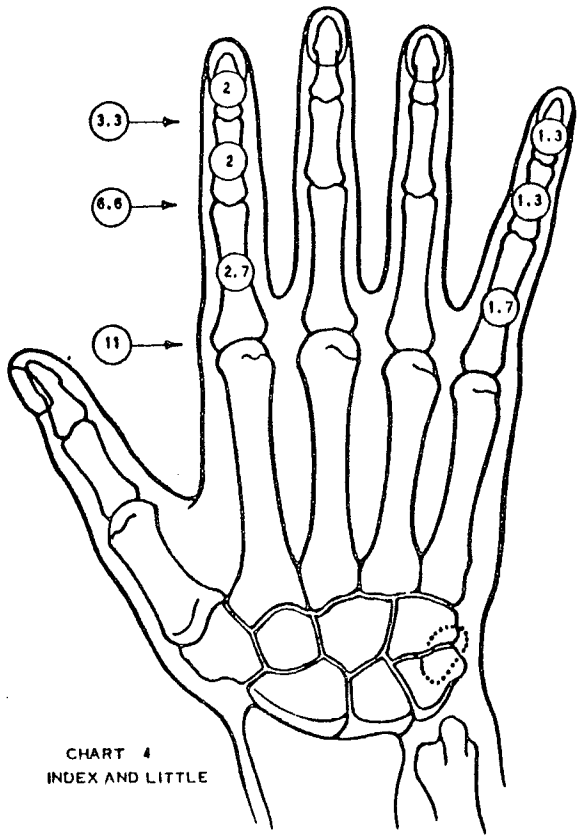


CHART 4
INDEX AND LITTLE

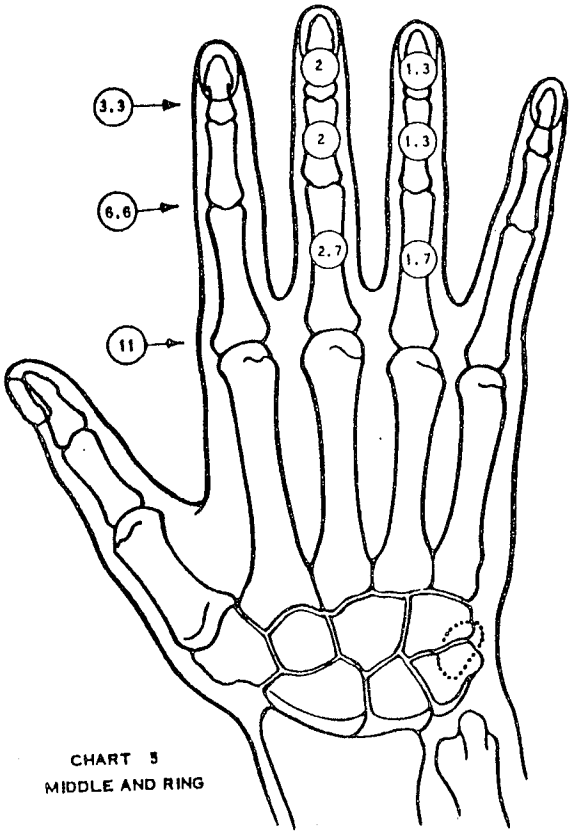


CHART 5
MIDDLE AND RING

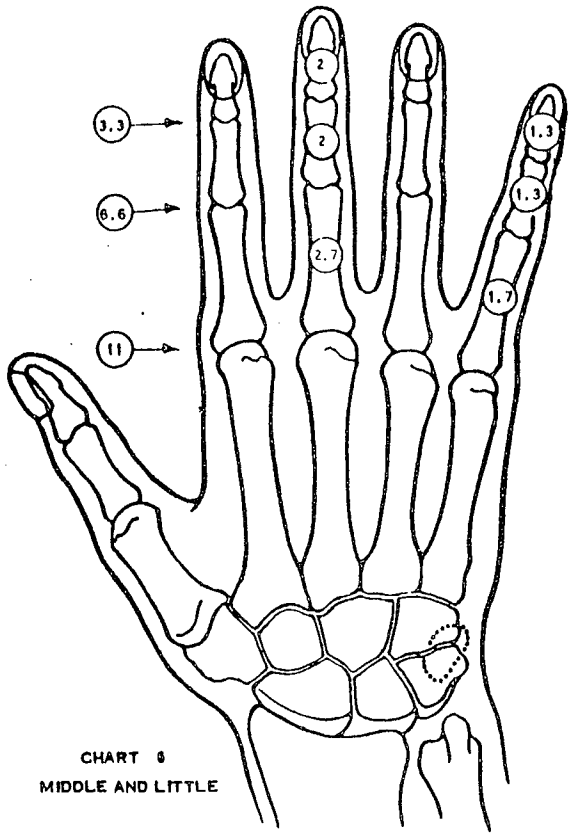


CHART 6
MIDDLE AND LITTLE

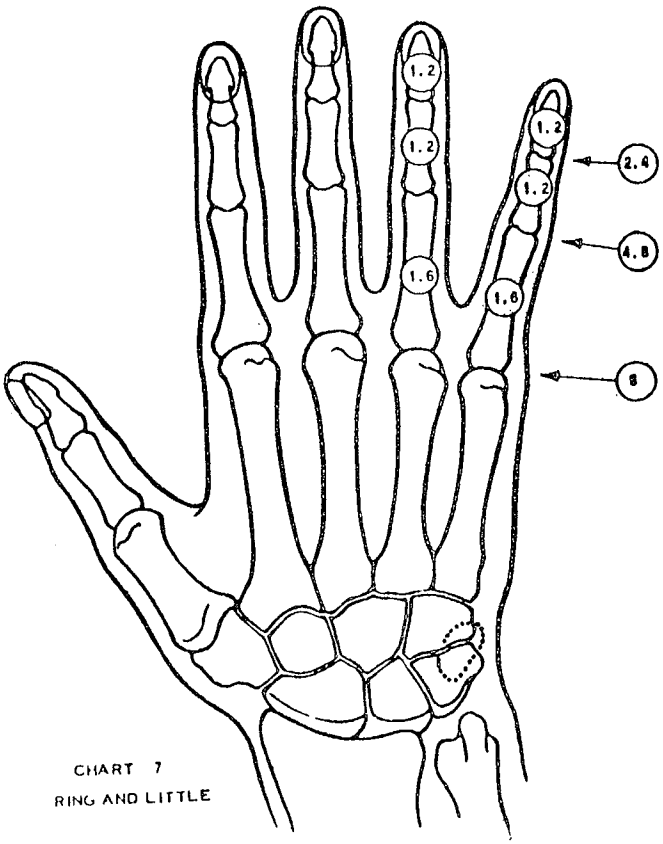


CHART 7
RING AND LITTLE

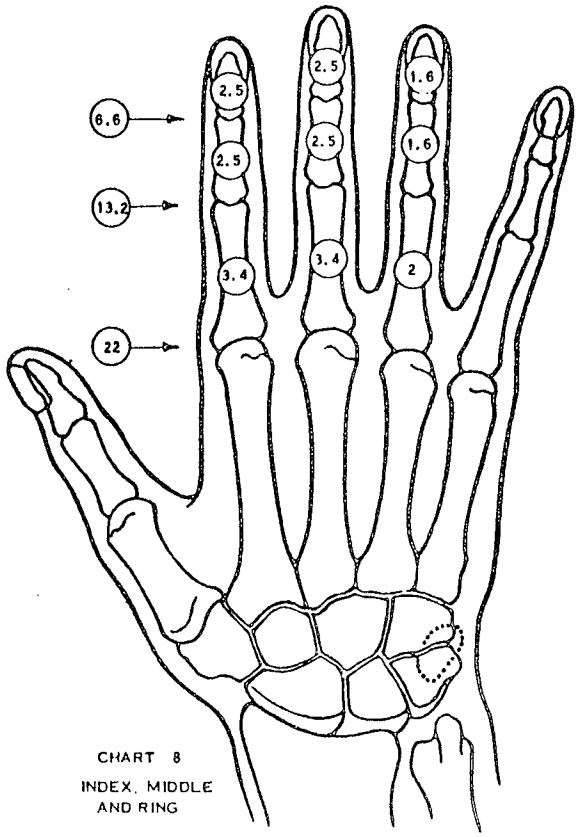


CHART 8
INDEX, MIDDLE
AND RING

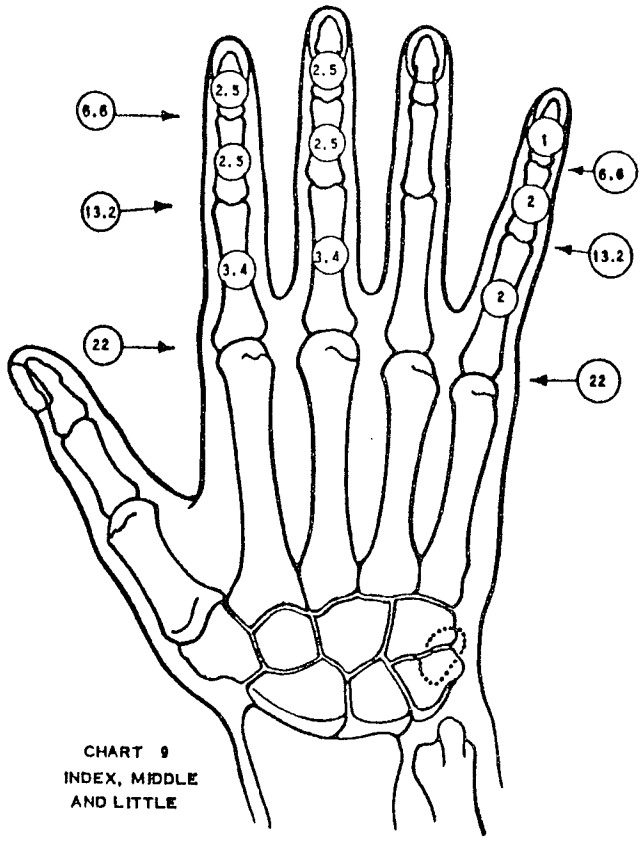


CHART 9
INDEX, MIDDLE
AND LITTLE

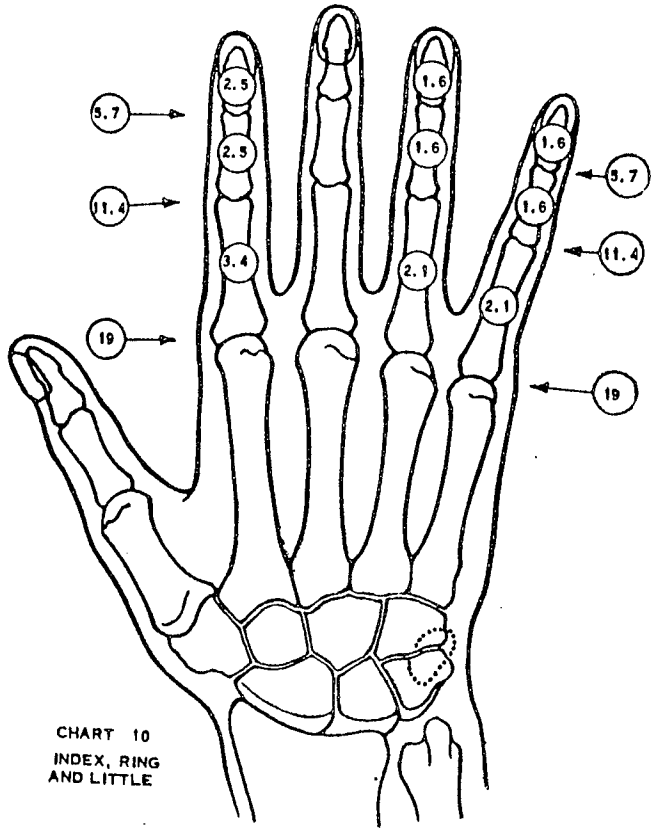


CHART 10
INDEX, RING
AND LITTLE

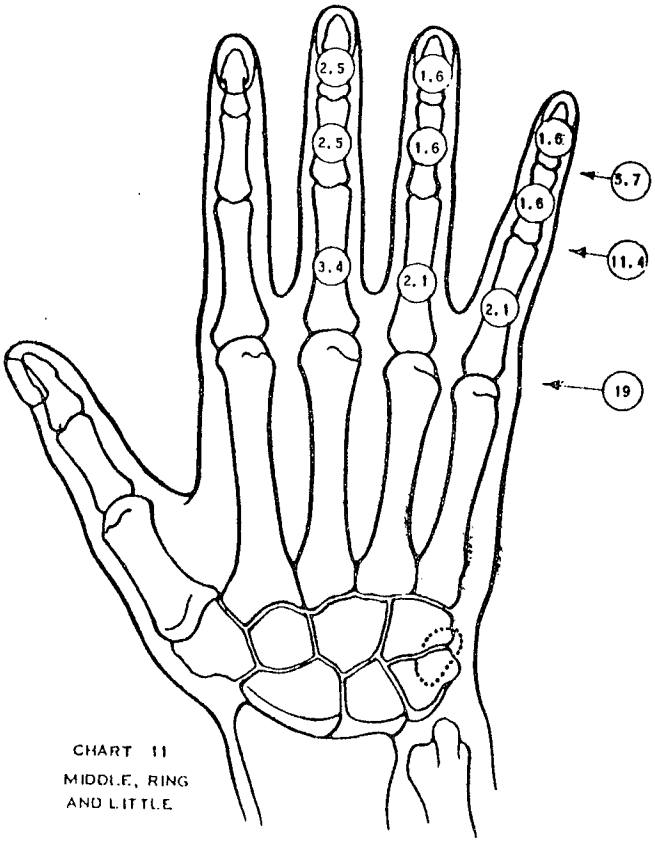


CHART 11
MIDDLE, RING
AND LITTLE

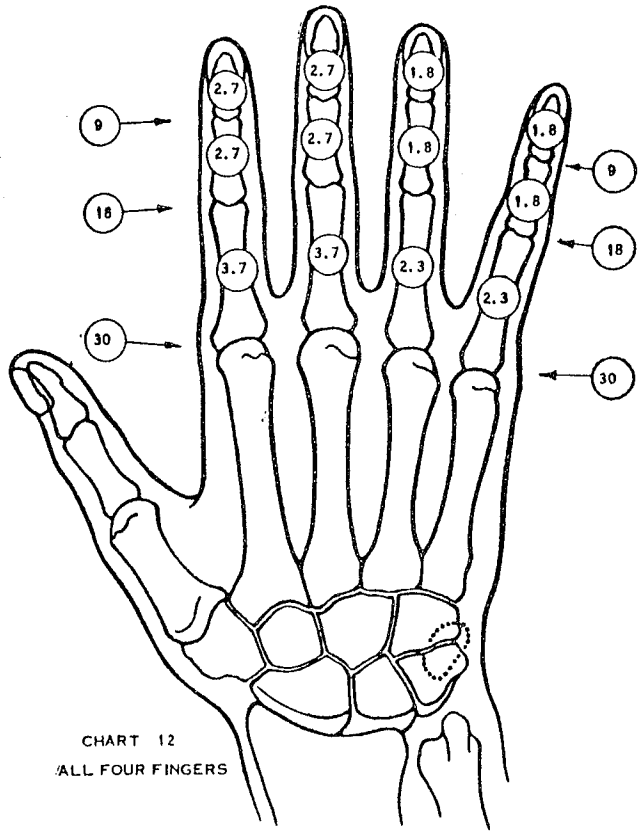


CHART 12
ALL FOUR FINGERS

Examples showing the method of calculating the disability in various two, three and four finger combinations follows:

EXAMPLES

1. Index at proximal, middle at distal.

TAKE CHART #2

Distal of index	2.1%
Distal of middle	2.1%

TAKE CHART #1

Proximal of index	1.6%
Second of index	1.6%
Combined rating =	7.4%

2. Index at proximal, middle at p. i. p., ring at distal.

TAKE CHART #8

Distal of index	2.5%
Distal of middle	2.5%
Distal of ring	1.6%

TAKE CHART #2

Second of index	2.1%
Second of middle	2.1%

TAKE CHART #1

Proximal of index	1.6%
Combined rating =	12.4%

3. Index at proximal, middle at p.i.p., ring at distal, little at distal.

TAKE CHART #12	
Distal of index	2.7%
Distal of middle	2.7%
Distal of ring	1.8%
Distal of little	1.8%
TAKE CHART #2	
Second of index	2.1%
Second of middle	2.1%
TAKE CHART #1	
Proximal of index	1.6%
Combined rating	14.8%

At first sight the formula may seem complicated, but after a little trial and experimentation, little difficulty should be experienced in working out the rating in any combination of finger amputations. Simply remember to use the four finger chart if four fingers are involved, the three finger chart if three fingers are involved, etc. Having done so, check off the distal-most components of the four fingers or three fingers as the case may be, then turn to the lesser finger combination and do likewise. Finally add all together. The values of all components conform with the finger ratings in the schedule.

Impairment Of Vision

In rating visual impairment the percentage of disability should be based on the best vision obtainable after correction with conventional lenses, using the standard Snellen test card at a distance of twenty feet with minimum illumination of five foot candles. The only exception is in monocular aphakia where even if fully correctible the eye lacks the power of accommodation and the image is different in size from that in the normal eye. In the case of bilateral aphakia on the other hand providing both eyes are otherwise normal, bi-focal lenses will give good visual acuity for both near and distance. For such cases a 20% rating is suggested.

In the case of bilateral visual impairment each eye should be rated separately and to the rating applicable to the poorer eye should be added 84/16 times the rating applicable to the better eye to arrive at the combined percentage of disability.

In cases of diplopia in all fields the rating is slightly less than in monocular aphakia because the eye, assuming it is otherwise normal, retains the power to accommodate for distance and hence is a valuable eye to hold in reserve. Diplopia is often present in only part of the field or even only in one quadrant. These cases, providing the visual axes are unaffected, are of comparatively minor importance and often right themselves or are correctible with prisms. Diplopia below the horizontal is a greater handicap that one above.

There are several varieties of field defects. The most striking is homogenous hemianopia which produces blindness in half the visual fields of both eyes, the nasal half of one eye and the temporal half of the other. Usually the fixation points are not involved. A right field hemianopia would merit a rating of 25% compared with 20% for one involving the left fields as it is a greater handicap in reading or driving a car.

The importance of limited field defects (scotomata) depends on their size and location. A central scotoma (in the line of direct vision) might warrant a rating of 75% loss of vision. Defects elsewhere in the visual fields unless quite large are of relatively minor importance.

Impairment Of Hearing

The schedule allows 3% for complete deafness in one ear and 30% for complete deafness in both ears. It follows, therefore, the hearing in the second ear is nine times as valuable as that in the first ear as the factor of enhancement has to be added.

In unilateral deafness the effect is a lessening or complete loss of stereophonic appreciation depending on the degree of impairment. If the difference in the two ears is as much as ~~30~~ 20 decibels in the average threshold shift in the principal speech frequencies (500 cps., 1000 cps., and 2000 cps.) a 1% award would be warranted; if 50 30 decibels 2%; and if more than ~~50~~ 40 decibels, the full 3% rating.

Items #92 to #101 inclusive of the schedule are only to be used in cases of bilateral deafness, whether it be conductive, from middle ear damage or perceptive from concussion or long noise exposure.

The method for arriving at the combined loss is as follows:

1. If due to injury the condition can be assumed to be irreversible and rating may be proceeded with as soon as the general condition becomes static.

2. If hearing loss is assumed to have been caused by long exposure to noise, rating should be deferred until six months shall have elapsed since last noise exposure.

3. Obtain a full report with a pure tone audiogram from a competent otologist.

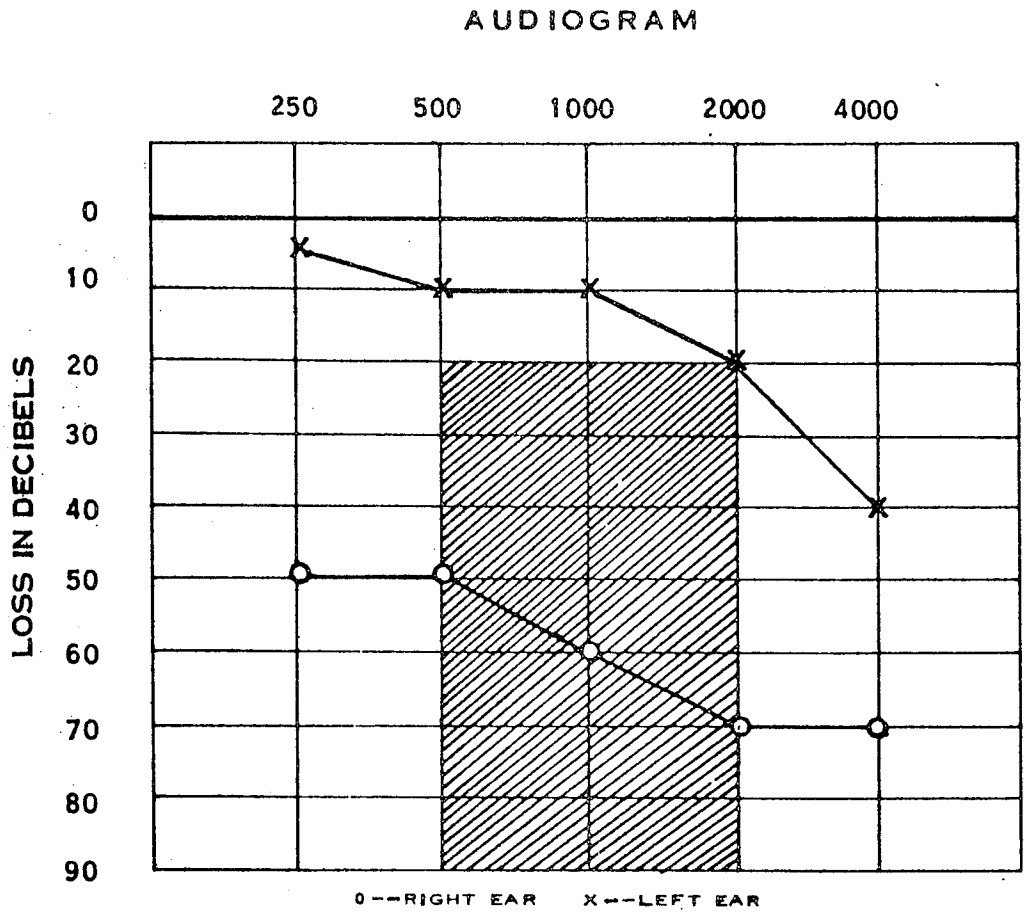
4. Calculate the average hearing threshold in the three frequencies of the speech range; i.e. 500 cps., 1000 cps., and 2000 cps., and deduct .5 decibels for each year the claimant's age exceeds 50. This is to allow for presbycusis. Do this for each ear.

5. Translate the net decibel loss in each case to percentage of disability by taking the nearest figure in items #92 to #101 of the schedule, e.g. if the net loss is 48 decibels take the disability figure for 50 decibels, i.e. 1.3%.

6. To the percentage of disability in the poorer ear add nine times the percentage of disability in the better ear. The sum of the two will give the combined disability.

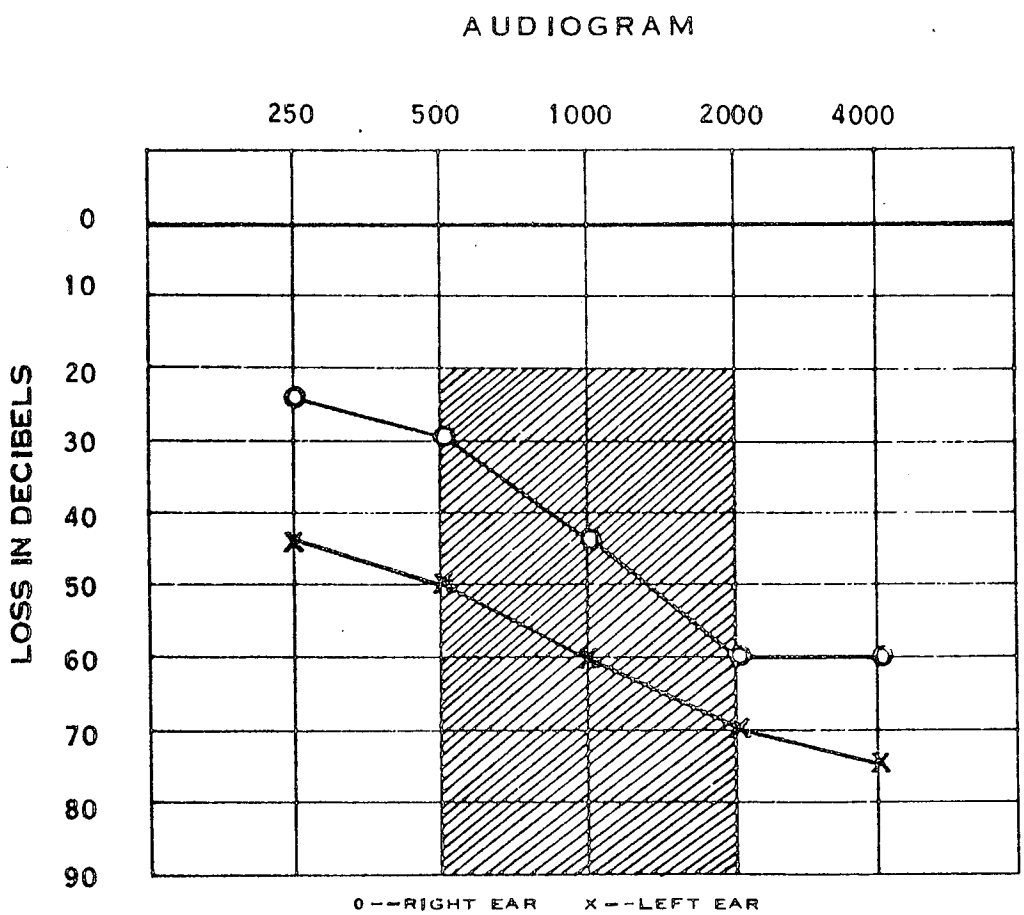
EXAMPLES

1. A forty year old miner suffered an injury to his right ear from a dynamite blast. His audiogram is as follows.



His hearing is essentially normal in the left ear, but 60 decibels below normal in the average of the three frequencies in the right. He would be entitled to a 3% award for unilateral deafness as his stereophonic function would be practically lost.

2. A sixty-six year old boiler-maker who has worked thirty-five years at his trade has marked hearing loss in both ears. More than six months have elapsed since he retired and his audiogram is as follows:



On page 26 will be found the method for calculating the percentage of disability in this case of bilateral deafness.

Right Ear

Hearing loss at 500 cps.	=	30 dbs.
" " 1,000 cps.	=	45 dbs.
" " 2,000 cps.	=	60 dbs.
Total =		135 dbs.
Average = 135 divided by 3	=	45 dbs.
For age over 50 deduct 16 x .5 =		8 dbs.
Compensable hearing loss =		37 dbs.

NOTE

If average decible loss falls between two levels in the schedule (in this case it is between 35 and 40) take the nearest rating level - i.e. 35 dbs.

PERCENTAGE OF DISABILITY (35 dbs) .5%

Left Ear

Hearing loss at 500 cps.	=	50 dbs.
" " 1,000 cps.	=	60 dbs.
" " 2,000 cps.	=	70 dbs.
Total =		180 dbs.
Average = 180 divided by 3	=	60 dbs.
For age over 50 deduct 16 x .5 =		8 dbs.
Compensable hearing loss =		52 dbs.

PERCENTAGE OF DISABILITY (50 dbs.) 1.3%

COMBINED DISABILITY IN THE TWO EARS

1.3 + .5 x 9 = 5.8%

PERMANENT DISABILITY EVALUATION

UNDER WORKMEN'S COMPENSATION

By D. E. Bell, M. D.
March 1966

FOREWORD

The writer in preparing this material has drawn on his experience as a Workmen's Compensation Medical Examiner over a period of almost half a century.

In recent years his interest has lain largely in permanent disability evaluation especially in cases involving defective vision and hearing. For this reason special attention and more space have been given to injuries to the eyes and ears. The origin of rating schedules is also discussed and attention is drawn to the confused thinking that prevails regarding the meaning of and interrelationship between the terms physical impairment and physical disability as related to Workmen's Compensation.

While no clear-cut recommendations are made, it is hoped that discussion of possible means of providing better individualization of awards may receive thoughtful consideration.

DEB.

Workmen's compensation laws began to appear in Europe about the middle of the nineteenth century. They were an outgrowth of the industrial revolution when the advent of the machine resulted in a marked increase in the number of industrial injuries. Under employers' liability an injured workman might fare handsomely provided, and only provided, he could show negligence on the part of his employer. Such arguments as contributory negligence, assumed risk and other loopholes resulted in the unfortunate workman being able to collect in less than fifty per cent. of cases; moreover, litigation was expensive and time-consuming. Workmen's compensation was welcomed by both labour and industry because it ensured that a man injured at his work would receive at least some financial assistance no matter what the cause of the accident might be; moreover, lengthy and expensive litigation would be avoided.

Many of the early laws called for the payment of fifty per cent. of wages during the period of convalescence together with something additional if the accident should result in permanent disablement of some sort. The percentage of wages lost during the healing period was easy to calculate, but how to determine what would be a suitable amount to cover the permanent disablement proved to be a problem. How could future wage loss possibly be predicted? Nevertheless, in order to quote premiums on industrial liability casualty companies required to have guide lines of some kind. The logical solution seemed to be rating schedules and these were found in many European countries

before being adopted in America. The origin of these old schedules is shrouded in mystery. One was no doubt copied from another, but none appears to have had any scientific background.

The first American schedule was that adopted by the New Jersey State Legislature in 1911. It was said to have been based on European scales existing at that time and partly on insurance settlements and court judgements. The probability is, however, that it was based purely on guesswork, for certainly no scientific data was available at that time as to the effect of physical handicap on ability to earn. The schedule listed a number of specific disabling conditions including the various amputations and impairment of sight and hearing and showed the number of weeks compensation (at 50 per cent. of former wages) that would be allowed in each case. For each percentage the allowance was four weeks. It is to be noted that in the early years none of the State laws provided for life pensions; the more liberal limited the allowance for permanent total disability to 1000 weeks. Even today of 54 U. S. compensation laws only 28 make allowance for life pensions and of those that do 23 are limited as to the maximum amount. California, for example, which only awards life pensions if the disability is 70 per cent. or over pays up to a maximum of $52.50 a week for 400 weeks at which time the pension drops to $32.50 a month for the balance of the claimant's life. The assumption seems to be therefore that in all except the very serious disabilities complete rehabilitation takes place within a specific period of time.

With the exception of California the various State laws do not provide the

the administrative bodies with any discretionary power. The schedules are statutory and can only be amended by the Legislature. In the case of California while the schedule is fixed by statute and is supposed to apply to an untrained labourer aged 39, the Board is permitted to vary the award either up or down depending on the age and previous occupation of the individual. Approximately 1800 different occupations are listed in all and the award is varied according to how it is assumed the handicap will affect an individual in each particular occupation. The age variant in a 50 per cent. disability would range from 43 per cent. at age 21 to 60 per cent. at age 64 or over.

The first Canadian law was that of Ontario which went into effect on January 1, 1915. It was based on the report of the late Chief Justice, Sir William Meredith, who a few years earlier had been commissioned by the Provincial Legislature to make a study of compensation laws already in existence in Europe and the United States and to draft an act suitable for this Province. During the course of his commission Judge Meredith visited several European countries and States of the Union and as well received representations from labour, industry and the casualty companies. The Ontario law which was finally enacted became the pattern for similar laws subsequently adopted by the other Provinces. The guiding principle laid down by Judge Meredith was that compensation for both temporary and permanent disability should be based on actual wage loss. For temporary disability the rate of payment was to be 55 per cent. of the wages the worker was receiving at the time of the accident and for permanent disability a similar percentage

of the difference between the pre-accident wages and those the workman was able to earn after the accident either at his own or at some other suitable occupation. For permanent disablement the award was to be computed on a weekly basis and paid throughout the workman's lifetime. The Act did not state what would happen if there was no wage loss or if the former wage level was restored over a period of a few weeks or months. It would not be unreasonable to assume that the intention was that payment would continue for life provided wage loss continued this long, but not otherwise. It is noteworthy that the European and American laws studied by Judge Meredith all had rating schedules for permanent disability, providing for the payment of a stipulated number of weeks' compensation, and that none provided for life pensions. The idea that a rating schedule was capable of predicting wage loss far into the future did not apparently appeal to Judge Meredith and he dismissed it in favour of awards based purely on wage loss.

Despite the fact that the original Ontario Act called for awards to be based purely on wage loss, the first annual report published by the Ontario Board indicated that a system of schedule rating had been adopted while at the same time the principle of lifetime awards had been retained. Whether or not the Board exceeded its prerogative in plotting such a course is debatable but in any case later amendments validated the practice and schedule rating and lifetime awards have continued to prevail, even for the loss of bits and pieces of fingers which cannot possibly cause more than temporary inconvenience. The tragedy is that the many are probably receiving far more than their just

needs while the few are being grossly underpaid. The system has indeed ceased to be workmen's compensation in its original sense and become one of state insurance with scant concern for the needs of the individual and for the burden it places on industry. Awards are in fact far in excess of those paid under public liability where consideration is given to the working life of the individual rather than to whole life expectancy.

Rating Schedules in Relation to Present Day Conditions

Even if it could be assumed that it is possible to predict future loss of earning capacity from the nature of the physical impairment, some thought should be given to the revolutionary changes that have taken place in industry in the last three or four decades and how the impact of physical disability is felt today as compared with forty or fifty years ago. At that time physical perfection was of prime importance as a high percentage of jobs would have to be classified as heavy manual labour. Since then there has been a steady increase in the number of jobs that can be adequately handled by people with all kinds of physical handicaps. A few years ago one of the large automobile companies made an inventory of the job requirements in their various plants. With a total work force of 30,000 they found there were in all 7,882 separate job classifications. Of these only 949 were considered to require complete physical capability, 3,338 called for men of average physical development, while 3,595 called for little physical exertion and could be performed by women or older children. As many as 670 operations could be performed by men without legs, while 2,637 by men with one leg, two by men without arms, and ten by blind men. The time required for training in the various occupations requiring less

than physical perfection was estimated to be as follows: 43 per cent. one day or less; 36 per cent. one day to one week; six per cent. one to two weeks; 14 per cent. one month to one year; and one per cent. one to six years. The last group comprised skilled work such as tool and die making. While these figures cannot be considered representative of industry generally, they do suggest that the plight of handicapped people is far less grim today than it was only a few years ago. Not only is this the case but other forms of social security have come into being; for example, unemployment insurance to bridge periods when work is difficult to obtain, family allowances to ease the burden of raising a family, and old age pensions to help out during the declining years for which through misfortune or ill health it has been impossible to make provision.

Thanks to a co-operative effort on the part of the ten Canadian Compensation Boards the rating schedules in the various Provinces are relatively uniform. Thanks also to the wording of the various Provincial laws the administrative bodies are empowered to amend their rating schedules at any time in the light of experience and current conditions. In contrast, the disparity in rating schedules and in the provisions governing compensation for permanent disablement of the various American States has long been rather appalling. In fact as long ago as 1921 the I. A. I. A. B. C. appointed a committee to make a broad study of permanent disability and draft a schedule that all States might accept and so end the lack of uniformity that then existed.

After an intensive study extending over two years the committee reported their conclusions. Among general recommendations was one calling for life

pensions. The schedule itself proved to be quite an interesting document. Among the various items was one calling for an award of 500 weeks for amputation of an arm at the shoulder and a similar one for loss of a leg at the hip. In explaining such round numbers which naturally aroused some curiosity, the committee had to admit that although they had examined schedules then in use in several American States and Canadian Provinces, they could find no scientific evidence to support any of them. They stated they considered a shoulder amputation the most serious short of total disability and so used this more lor less as a yardstick to fix all the other items in proportion. The figures shown, they explained, were what they considered should apply to an untrained labourer aged 30. For all its faults the committee's report did advocate a uniform schedule for all States, but it fell on barren ground and lack of uniformity continued to prevail.

This lack of uniformity has been such a source of concern not only to State Boards but also to insurance underwriters and the medical profession that in 1956 the American Medical Association appointed a committee of "eminent surgeons and rehabilitation experts" to endeavour to establish guides for disability evaluation. Their first report covering amputation of all or parts of limbs and injuries to the back was published in the Association's Journal of February 1958. Since then other reports covering visual impairment, deafness and associated ear conditions, cardiac and cardiovascular conditions, and finally conditions affecting the nervous system have come out. In presenting these reports the committee emphasized the distinction between permanent

impairment of physical faculty and permanent disability as it affects ability to work. The former they defined as a purely medical assessment of anatomical or physical loss and the latter as a measurement of the actual or presumed effect the handicap would have on future capacity to earn. This concept that disability evaluation is not entirely a medical responsibility is noteworthy as there is nothing in the training of the average doctor that fits him to be the sole adjudicator in a case of industrial handicap. Indeed a layman familiar with the requirements of industry and with experience in the problems of rehabilitation has much to contribute. The ideal arrangement is that both approach the problem as a team effort.

While these several reports of the A. M. A. committee can be of significant value to lay administrators, they should not and were never intended to be used as rating schedules. For example, a shoulder amputation is shown as resulting in 60 per cent. physical impairment, whereas a fore-quarter amputation is shown as 70 per cent. Surely there would be no difference between the two from the standpoint of working disability.

Another feature that is questionable is the manner in which multiple physical losses should be assessed. According to the plan advocated, one loss, presumably the more serious, should be determined from the schedule in terms of percentage of the whole man, whereas the second should be rated in terms of the whole man less the percentage represented by the former. For example, let us assume that both arms are considered to be 20 per cent. impaired; the combined rating would then be 20% x 100 + 20% x 80 or 36% in all.

It is doubtful if this reasoning would be valid in many cases, at least in the assessment of disability. It might be perhaps when dissimilar parts or body functions are involved but certainly it would not in the case of two parts performing the same function; e.g. both arms, both legs, or both eyes. In such cases the disability must necessarily be the sum total of two separate disabilities with an enhancement factor added to the second. Physical impairment and physical disability while related have entirely different connotations.

Meanwhile the search for some ideal system for disability evaluation continues. The difficulties are compounded by several factors such as:

1. The fact that rating schedules cover no more than 20 per cent. of all disabilities, the remaining 80 per cent. having to be arrived at arbitrarily having some regard to the listed items.

2. The effect of such variants as the age, education, mentality and motivation of the individual. The I. A. I. A. B. C. committee in their report stated they had considered how the award might be affected by these variants, in the course of which they had considered the California system but their conclusion was that apart from the age the other factors would be difficult or impossible to evaluate.

3. Little data is presently available as to the early and late effects of physical impairment on the ability of an individual to earn and much less on the part individual characteristics play in rehabilitation.

It would be impossible to individualize every award but on the other hand should all men be looked upon as average? The fact that many men with a more or less serious handicap return to their former job without loss of earnings may be ascribed to high motivation, superior intelligence, ability to adjust or the co-operative attitude of the employer. All men are not so fortunate, for

example, an untrained labourer more or less illiterate who cannot return to his former heavy job and is incapable of being trained for some work within his capabilities. The latter group comprises less than 10% of all cases but their plight certainly deserves special consideration. Whether or not standard awards to the readily adjustable group places an unfair burden on industry is something to consider but the poor unfortunate whose compensation still leaves a gap to be filled surely deserves some special consideration. In any case the award should never be such as to stifle initiative or on the other hand to foster indolence.

A few years ago the Ontario Board conducted a survey of fifty above elbow amputees all of whom had been on pension for at least ten years. While this survey was carried out by subjective approach alone through the medium of questionnaires, some interesting information was obtained. For example; at the end of 10 years 40% were earning more and some a great deal more than before their accident despite adjustment for spiraling wage levels. A similar percentage were earning approximately the same or up to 50% less than before their accident while 20% were either doing casual work or were unemployed. In all these cases pensions were being paid based on 60% of total disability. The younger men showed a definitely higher degree of adaptability than those in the older age groups and relatively high mentality and education were distinct advantages. The 20% who adjusted poorly or not at all consisted mainly of new Canadians with poor educational background and little knowledge of the English language. The rest either refused to relocate in large centres where better employment opportunities existed or were by nature lacking in initiative who were content to struggle along on their pensions without seriously attempting to find work.

To say that 60% represents the average disability in this group is meaningless. For some it was too much and for others far too little. What then is the alternative? In the writer's opinion the problem of meeting individual needs could be solved in either or both of two ways. The first would be to facilitate the employment of handicapped people by offering industry an incentive to employ them, and the second by ceasing to regard the rehabilitative powers of all men as equal. Any limited studies that have been made have shown that wage loss among those who return to their former employment either at their own or some alternative job is less than in those who go to work for a different employer. Therefore, why not create incentive among employers who are able to do so to re-employ their own workmen by way of a reduction in their annual assessment. This could be a percentage reduction in proportion to the percentage of handicapped people they rehire. Such a plan would certainly have as much merit as the incentive now offered by many Boards to reduce the incidence of accidents. A survey carried out in California a few years ago showed markedly less loss of earnings among those who became rehabilitated with their former employer than those who sought employment elsewhere. There would no doubt be many employers who by the nature of their operations would be unable to re-employ some of their handicapped workers but in such cases vocational rehabilitation would have to be made available. An alternative would be to make the employment of a percentage of handicapped personnel mandatory.

Secondly, an attempt might be made to better meet the individual needs of the handicapped worker by having some regard to his age, his mental and physical characteristics and the role they play in his rehabilitation. Needless to say such consideration should apply to the more serious injuries such as cases of major amputation. The writer has seen a man in his fifties who in

his twenties suffered a mid-thigh amputation driving a team of horses in the bush, yet it is seldom that men past fifty when injured ever become adept in the use of limb prostheses. Age is not all important in the case of most injuries but it certainly is so in major amputations. Both age and educational attainment are crucial factors when a handicapped workman has to go out and seek employment on the open labour market. The certainty or at least the probability that a disabled workman can be rehabilitated either with his former or an alternative employer should be reasonably well established before his final award is determined.

Contrary to the original concept of Workmen's Compensation awards are made today for the loss of bits and pieces of fingers and other minor physical abnormalities where no loss of earning capacity can either be established or predicted. This is no doubt a hold-over from earlier times when under employers' liability pain and anatomical imperfections resulting from injury were among the factors upon which the decision was based.

Few will deny that a workman who suffers some permanent loss of physical faculty is entitled to compensation even though he is able to return to his former work or to obtain other employment without wage loss, yet under present legislation an award would not be warranted unless there is either an immediate wage loss or likely to be one in the future. The solution to the problem would seem to be to amend the various laws to permit awards to be made for permanent physical impairment irrespective of real or potential loss of wage earning ability. It should then be possible to assume that the percentages shown opposite the various items in the schedule used represent the percentage of physical impairment rather than that of physical disability. Therefore, the minimum award would be based on the impairment rating where there is no immediate loss of earning ability or likely to be one in the forseeable future. Higher awards should be made if the reverse should be true.

Disability in a compensation sense implies impairment of ability to obtain and hold gainful employment, in good times and bad, in competition with able-bodied individuals. It may be immediate or potential; immediate if it impairs functional activity; potential if it depletes reserves that may later be called upon owing to the erosion of age or at any time to meet an emergency. The human body is normally endowed with a super-abundance of physical faculty much of which is rarely called into use. Ten digits are not needed to carry out the most intricate manipulations; a long distance runner puts ten times as much strain on his heart as the average workman; one can live in relative comfort with only one lung; and half the functional tissue of one kidney is sufficient to maintain normal blood chemistry. Nevertheless, the loss of any of this reserve of physical function may, if later called upon, result in decreased physical capacity and in turn lessened capacity for work. It has been said that if the reserve physical function of a healthy young adult of 30 is represented at a figure of 100%, by the time he reaches 70 physiological erosion alone will have reduced that reserve to 10%. One might say that the loss of one or two fingers in the majority of cases is of little immediate concern yet as a workman grows older or during times of economic recession it may be the means of his failure to obtain employment. The argument therefore in favour of awards for physical impairment even without wage loss is probably not open to too much question.

When devised, most rating schedules were assumed to predict the percentage of disability in the case of the average worker. For example, the I. A. I. A. B. C. disability committee indicated that their schedule would apply to an untrained labourer aged 30. The California Industrial Commission assumes the average workman to be an untrained labourer aged 39. As time

has passed the concept that rating levels in disability schedules represent the percentage handicap of working ability in the average case has changed to mean they represent the minimum from which the only deviation should be upward. Whether the disability levels in rating schedules are assumed to represent either the predicted minimum or the average loss of earning capacity for specific injuries the percentage figures should be capable of standing up under scientific research. A survey is now under way across Canada to test the accuracy of disability percentages assigned to forearm and below knee amputations and to ascertain how restoration of earning ability is affected by age and other factors and it is hoped that out of this some valuable information will accrue. If this survey is successful other types of disability may be studied e.g. the relative handicap imposed by a hip fusion as compared with one of the knee.

The Use of Schedules in Disability Evaluation

Inasmuch as rating schedules show disability levels only for loss of all or parts of limbs, immobilization of joints, affections of the eyes and ears and a few other items , they are capable of being used only as guides. An arm, for example, may have some of its musculature destroyed and replaced by scar tissue with limitation of movement in neighbouring joints, with or without some injury to the nerves causing impairment of sensation or muscle control. In such a case comparison must be made between the usefulness of the disabled member and that of an amputation above the level of the trauma. If then the schedule rating for an amputation through the middle third of the forearm is 50% and if the disabling condition is distal to that level, the usefulness retained might be say two-thirds that of a normal arm. The disability would then be one-third of 50%. If the elbow were involved comparison would have to be with an above elbow amputation. In extensive injuries such as those affecting several functions of the body, determination sometimes has to be arrived at in terms of the whole man.

The Timing of Disability Evaluation

Generally speaking consideration of permanent disability rating should be left until there is no hope of further improvement and until treatment has nothing further to offer. While this should be regarded as a general rule, there are a few exceptions as for example in cases where neurosis becomes superimposed on a physical condition in which case early settlement even on a tentative basis is often of therapeutic benefit. Otherwise continued acceptance of dependancy can be demoralizing and lead to permanent invalidity.

In some cases deterioration may later occur, for example in fractures involving joint surfaces, especially in the case of weight bearing joints, dislocation of the hip and fracture or dislocation of the carpal bones. In these cases it is not desirable to pay the award in a lump sum.

It is also desirable that rehabilitation has fulfilled its mission and that the claimant has resumed gainful employment, preferably with his old employer, or if this is not possible then at some other occupation that has been arranged for him or for which he has been trained.

The Mechanics of Disability Rating

Determination of a suitable rating must depend largely on personal examination although a report from the employer as to the claimant's physical capability is helpful in most cases. As referred to before, disability rating is seldom entirely a medical problem. The exceptions are eye and ear conditions, cranio-cerebral injuries, et cetera, where dependence must rest largely on the opinions of medical specialists. A team made up of a medical man with a great deal of experience in the examination of the physically handicapped, and application of the schedule, a better than average grasp of psychology and with plenty of common sense, together with a layman who has preferably had some experience in rehabilitation of the handicapped, together with a broad knowledge

of the requirements of industry can best assess permanent disability. Disability rating is a specialized occupation and the more of it examiners have to do the more uniform their judgement is likely to be. To make a proper examination is both time-consuming and rewarding. The workman is often possessed with a certain amount of apprehension and distrust and he must first of all be impressed that the examiners are interested in him and that their attitude will be fair and impartial. Plenty of time spent in reviewing the medical reports in the file and in the subjective examination will generally show the type of individual one is dealing with and prove helpful in evaluating subjective symptoms, pain tolerance and motivation. Straight malingering is rare and in most cases is easily recognized, conscious exaggeration is much more common and may be due to a desire to impress the examiners in the hope of increasing the award though usually it stems from a feeling of insecurity which should be easily dispelled by a proper attitude on the part of the examiners. Most workmen accept reassurance if it is explained to them that any remaining symptoms they may have are not unusual, that in all probability they will improve or disappear after they have been back at work for a few weeks or months, but if by any chance that hope is not realized their claim is always subject to review. Even after a fairly prolonged course of physical and occupational therapy residual symptoms may be slow in clearing up. Fractures even when soundly healed may be painful on weather changes and injured joints at the end of a day's work. Back injuries are prone to cause some painful discomfort for a long time and until muscles and ligaments regain their tone. A year or two is often required before these symptoms completely disappear. Therefore, reassurance at the time of examination will do much to promote recovery.

The Physical Examination

The physical examination should be complete and with the exception of finger injuries, the claimant should be completely undressed. Close observation during dressing and undressing usually demonstrates the true range of joint movement and the existence of real discomfort. Pain should not be taken at face value unless supported by clinical signs. Tolerance to pain differs greatly in different individuals but is usually capable of measurement by the reaction to various stimuli. A grunt, for example, is more impressive than an exaggerated contortion and real pain does not as a rule shift about from place to place. There should be close inspection to demonstrate any pre-existing conditions the result of injury or disease. Shortening or wasted musculature of a leg may be the result of old polio. The girth of the upper arm, forearm, calf, and the thigh should be carefully ascertained and compared with that of the opposite limb. A leg that is being favoured will show a difference in the amount of wear in the soles of the two shoes. The integument should be carefully examined especially that of the palms. A hand that is being used will be thick and calloused and often toil stained. The grip of the two hands can be measured and compared with a dyneometer or by a double hand grip, right to right and left to left simultaneously. Areas of anaesthesia should be mapped out, checked and rechecked and should, of course, conform to the normal anatomical pattern. The tone of muscle is important and to the experienced examiner is an indication of the extent to which the part is being used.

Disabilities of the back are most difficult to evaluate. After first determining that the legs are of equal length as measured from the anterior

iliac space to the tip of the internal malleolus, the back is inspected in the standing position for evidence of scoliosis or kyphosis. The muscular development and any difference in the two sides should be noted. Then the trunk is put through flexion, hyper-extension and rotation. In carrying out these movements, any limitation of the normal range will be apparent as well as any evidence of pain. It is sometimes a good idea to "accidentally" drop an article of the claimant's clothing on the floor and watch carefully the way he picks it up. Then the prone position should be assumed on the table when superficial and deep palpation can be undertaken for evidence of tenderness and localized muscle spasm. Tenderness without muscle spasm can usually be discounted.

Examination of the eyes and ears must necessarily be left largely to the specialists in these fields but the retinoscope and otoscope should be freely used.

Application of the Schedule

Amputations

The percentage ratings for the various amputations presuppose that the stump is structurally perfect in every way, that it is not abnormally tender, that it is well padded and that the scar is properly placed and away from weight-bearing surfaces. If the stump is imperfect, it should either be revised surgically or else the rating should be that of the next higher level. The various ratings for limb amputations are designed to have regard to the type and functional value of the prosthesis that will be worn.

Ankylosis of Joints

The position of fixation is of the utmost importance. The percentages shown in the schedule are applicable in the case of either bony or fibrous

ankylosis providing the position of flexion is optimal for physical function. A finger, for example, is useless if fixed in full extension but if the joints are partly flexed, for example, if the tip of the finger will oppose the tip of the thumb, the digit may be assumed to retain half its normal value.

The optimal position in a wrist fusion is in slight dorsiflexion as when the closed fist and forearm lie in full pronation on the table.

The optimal positions in other joints are: gleno-humeral 45° abduction, elbow 90° flexion, hip 15° flexion and abduction, knee 15° flexion, ankle 20° plantar flexion.

Spinal fusions are unsuitable for schedule classification. Rating levels depend on the completeness of fusion as shown by x-rays taken in both flexion and extension together with the level of the lesion and the amount of wear and tear it will occasion to neighbouring joints. Fusion in the thoracic region, providing there is minimal kyphosis, is not of great significance and seldom calls for an award. Fusion in the more flexible parts of the spine, i.e. the lumbar or thoraco-lumbar segments is a more serious matter and calls for awards ranging from 10% to 20% as most of these cases require external support to limit excessive movement which is liable to cause spondylitis in the neighbouring joints both above and below. The commonest sites of meniscectomy are at the T12 - L1 level or the joints immediately above or below. Providing the nerve root is not irreparably damaged, these cases do not routinely call for any award but there are no doubt a few cases, especially in older men, where a 5% award would be in order. Fusion of the sacro-lumbar joint for congenital spondylisthesis allegedly aggravated by injury does not, as a rule, call for any

award as stabilization of the joint more than compensates for any loss of movement. It should always be explained to the claimant before the operation that there will be no award for permanent disablement. There is no established proof that muscular or ligamentous strain of the back ever results in permanent disablement and to make an award on subjective symptoms alone is usually based on fallacious evidence. If the examiner is convinced that the symptoms are genuine, he might suggest a limited lump sum to cover partial disability for a period of from six months to one year.

Disfigurement

Disfigurement deserves consideration only when it affects exposed parts, especially the head, and when it is serious enough to be a handicap in obtaining or holding employment, or is sufficient to lower the morale of the individual and so affect his ability to work along with other workmen. Plastic surgery has much to offer in these cases and should be provided when necessary.

Epilepsy

Jacksonian epilepsy sometimes follows severe brain injuries and, as such, presents problems in disability rating. Assuming that the relation of cause and effect have been established and the authenticity, frequency and severity of the seizures have been proven, the size of award will depend on whether the attacks are nocturnal or diurnal, and the amount of sedation necessary to control them. A history of two to four nocturnal attacks a year can usually be ignored. Diurnal attacks two to four times a year in spite of sedation might warrant an award up to 20%; if four to eight a year, up to 50%. The disability in these cases is due to the difficulty these people experience in obtaining and holding employment, the fact

that for their own safety, protected employment is necessary, the depressive effect of the required sedation and the possibility of mental deterioration.

Heart Conditions

Coronary occlusion is not an industrial disease, but not infrequently it is attributed to severe muscular effort and, at times, accepted by compensation boards as injury by accident. The condition develops in outwardly healthy people under all sorts of conditions, in fact in at least 50% of cases it occurs during periods of rest. To qualify for allowance as a compensable injury, the exertion must be unusual and extreme and the onset closely associated with the incident, not necessarily immediately but within a few hours at the outside. While it is agreed that in all cases there is pre-existing athero-sclerosis of the coronary arteries, it is seldom possible to get any evidence of previous embarrassment of heart circulation such as anginal pain on effort (intermittent claudication). If, therefore, no such history is obtainable, full responsibility for any resulting disability should be assumed. A mild attack involving only a minimal amount of heart muscle usually recovers in three or four months, and the resulting scar is of no consequence. Normal activity should be resumed and there should be nothing to warrant a permanent disability award. To do otherwise may easily make cardiac neurotics of these people. In more severe cases convalescence may take up to one year and the ultimate result will depend on amount of heart wall involved and hence on response to exercise. After convalescence and re-conditioning cardiac capacity should be determined by various types of exercise such as the Harvard Step test. Disability rating should be set in multiples of 10, e.g., 10%, 20%, 30%, et cetera.

It is interesting to note that considerable diversity exists among compensation boards on the manner in which they deal with heart conditions. For example, heart cases comprise 4% of all awards in New York State but only 1.4% in California. The American Heart Association feel that heart cases not clearly and specifically related to well defined accidents on the job should be covered by a sickness insurance program. Another item of interest is that the Los Angeles Heart Association found that 88% of 311 routine cases of coronary occlusion were able to return to work with few or no restrictions.

Circulatory Diseases of the Lower Extremities

Comparatively minor injuries to the feet in the presence of advanced arteriosclerosis of the vessels of the lower limbs sometimes seen in diabetes and arterial narrowing as in Buerger's disease sometimes have catastrophic effects often leading to amputation of a limb. If a history of pre-existing intermittent claudication or inability to work outside in cold weather is obtainable the award should be appropriately discounted; otherwise full responsibility should be assumed.

Nephrectomy and Splenectomy

Removal of the spleen or of one kidney providing the opposite one is healthy, does not affect general health or impair working capacity in any way. When the spleen is lost, other tissues of the body take over its function and the remaining kidney does the same. However in the case of a lost kidney, there is loss of renal reserve that might later be called upon so a 10% award might be considered.

Testicles

Loss of one testicle at any age affects neither the libido nor the procreative function of the organ. Loss of both testicles after puberty reduces the libido and, of course, prevents fertilization of the ovum. It usually has no other effect on an adult except to cause a tendency to lay on fat. Castration, partial or complete, is often a potential cause of neurosis.

Fibrosis of the Lungs

Whether the result of the inhalation of dusts, organic or inorganic, or of gases, fibrosis of the lungs causes diminution of respiratory function resulting in decreased ability to oxygenate the blood. In effect, there is shortness of breath on exertion and a tendency of the muscles to tire quickly because of lack of sufficient oxygenated blood. The degree of disability therefore must be determined by the response to exercise. The x-ray alone cannot decide the extent of physical impairment. Some chests will show what appears to be a snowstorm of silicotic nodules yet lung capacity may be good. Others will show comparatively little and yet the disability may be considerable. The x-ray is essential for diagnosis when coupled with a history of exposure, but when it comes to assessment of disability other tests are necessary, e.g., the volume of tidal air and the heart rate following prescribed exercise routines. The actual percentage of disability should be fixed in multiples of ten, that is, 10%, 20%, 30%, et cetera. It is impossible to pinpoint the actual percentage any closer. In the case of silicosis, fibrosis tends to be progressive even long after exposure has ceased, requiring re-examination of these people every two or three years. Victims of silicosis are prone to develop tuberculous infection

so that if and when this eventuates, the individual automatically becomes, at least for the time being, totally disabled. Other forms of pneumoconiosis result from inhalation of coal dust, hair, cotton and asbestos fibre and beryllium. The last mentioned is the most serious of all and frequently results fatally in a relatively short time. Coal dust is the least dangerous and seldom results in permanent disablement.

Neuroses

Some space will be devoted to this subject as it is far from uncommon in compensation work and failure to recognize it early may result in a great deal of unhappiness for both the claimant and the Board.

By compensation neurosis we understand a functional state assumed by the patient where no definable pathology exists, or one marked by the persistence of symptoms or the adoption of new ones after anatomical recovery has taken place. The determining factors are an injury, often a very minor one, an unstable personality plus a conscious or subconscious desire for gain or for the attainment of an end, not necessarily money. Quite often the objective is revenge, sympathy or possibly nothing more than a change of occupation. The escape motive is often predominant.

In classifying the neuroses, one might liken them to the visible spectrum with at one extreme the true hysteric, an essentially honest individual who has succumbed to the power of suggestion and self-delusion and has allowed to be built up about himself a state which he sincerely believes to have an organic basis but which, having no regard to anatomical laws, cannot possibly exist in the image he has created. At the other extreme is the unadulterated malingerer,

the plain liar and cheat who deserves neither sympathy nor consideration. In between these extremes, as in the spectrum, one colour blends with another. We have various degrees of admixture of the two from those mainly hysterical but with slight but definite conscious motivation to those predominantly motivated with just a suggestion of honest delusion.

To understand desire neurosis one should endeavour to understand the psychology of these people. Without question, a workman eligible for compensation, or who is likely to obtain damages for an accident, is handicapped in his recovery from the start. The desire to get something for nothing is instinctive in the human race. The monotony of mass production is prone to produce boredom and subconscious desire to escape. When, therefore, an opportunity comes along, whether it be in the form of a legacy, the winning of a sweepstake or a compensable injury, it can be pounced on with eagerness.

After an accident, pain and discomfort occupy the attention, but as time goes on and the details have been explained over and over again to sympathetic friends, and particularly if responsibility for the occurrence can be shifted to other shoulders, there is sometimes a tendency to add colour to the story here and there. Once inagination holds free sway, slight discomfort may become definite pain and slight weakness severe weakness or even actual paralysis. At this stage, the mind is in a very receptive state and suggestion is liable to become conviction. The introvert is more likely to become an hysteric, the extrovert a malingerer, but there is no definite general rule.

Neurosis is more likely to follow a minor than a severe injury. It is more common after a back strain or an avulsed transverse process than after a

compression fracture. Again, many cases are seen after accidents happening under terrifying circumstances even though the injury is slight.

Symptoms which persist an unreasonably long time or become worse for no good reason should be viewed with suspicion, especially if they spread to distant parts. True pain following a back strain does not go up the back of the neck and perhaps to the top of the head. In other words, real pain extends in a centrifugal rather than a centripetal manner.

It is often difficult to sort out the organic from the functional symptoms when a neurosis fastens itself on an anatomical injury, but even then, we have our experience to tell us when a fracture should cease to be painful on weight bearing or a finger stump free from undue tenderness. Phantom pain after limb amputations without evidence of trophic signs is usually hysterical as shown often by the aggravation or persistence of symptoms after repeated resection of nerve endings.

Treatment is 90% preventive. Rehabilitation should be both physical and mental. As Watson-Jones once said, rehabilitation should start in the ambulance. One should never add to a patient's anxiety by telling him he had a narrow escape. If a transverse process has been avulsed, he should never be told his spine has been fractured. To him all fractures are serious. A careless remark as to what might have happened may be interpreted to mean what might still happen or finally what actually has happened.

If convinced that a condition is functional, the claim should be settled without delay. Prolonged uncertainty delays recovery. It is always difficult to cure a neurosis if it remains profitable to be neurotic. A malingerer should be told

flatly that examination fails to show any evidence of disability and that he should get back to work without delay. If it is felt that there is an element of true hysteria, a single lump sum of moderate proportions would be reasonable. The amount of this award might be calculated on the basis of the time that should reasonably be required to effect reconditioning. The offer of a job is also likely to have a disarming effect.

One must always anticipate appeals from well-intentioned but misguided friends on the ground that the Board has acted in a calloused manner in closing the case or in the amount of the award. The general public, however wise they may be about many things, are entirely ignorant about these conditions. Repeated examinations are liable to do more harm than good. One should first be sure the condition is functional beyond reasonable doubt and then for the general good, including that of the claimant, stick to it.

Skin Disease

The skin of all individuals possesses a certain amount of resistance to local irritants. The degree of resistance varies in different people. Fair people as a rule have less resistance than dark people. Some irritants, such as strong acids or alkalies, will break down the resistance of any skin and if they do not cause actual burns, they may set up a localized dermatitis in the part affected. These leions soon heal under bland applications. Other substances like chrome have the effect of sensitizing the skin setting up a dermatitis in the area exposed that is very stubborn to heal and often recurs after infinitesimal exposure to the same irritant.

Skin sensitized to one irritant may then show sensitivity to other substances which ordinarily cause no trouble such as mild detergents or even ordinary toilet soap. Dyes used in the printing, textile or fur trade are frequent sensitizers necessitating a change of occupation. Provided such people are rehabilitated in another occupation, no permanent disability award is indicated as a rule. In some cases, an ordinary contact dermatitis is complicated by neuro-dermatitis in which the joy of scratching becomes an absorbing pastime. These cases may persist interminably as long as compensation continues. In these cases, early settlement with a moderately-sized lump sum is usually in the best interest of the claimant and more often than not effects a cure. It should be only on rare occasions that a pension award is called for. There are many cases in which allergy induced by such substances as chrome will prevent a workman from returning to his former occupation. This often happens in cement workers. In these cases, vocational training to fit the workman for alternative employment may be necessary.

Impairment of Vision

Owing to the fact that recognition of eye injuries and evaluation of visual deficiency is rather a complicated subject, considerable space will be devoted to the anatomy of the eye and the physiology of vision as well as to the rating of visual defects.

Visual efficiency depends upon the integrity and co-ordination of many elements which make up the eye itself and the mechanics by which visual impulses are received and carried to the brain to be there interpreted as form and colour. To understand this complete mechanism, a brief discussion of the anatomy of the eye and physiology of vision is necessary.

The eye itself is a roughly spherical body set in a bony depression of the skull known as the orbit. It rotates in the orbit under the control of six extra-ocular muscles. The anterior part of the eye comprises the transparent cornea, the white sclera surrounding it, the iris (coloured portion), the anterior chamber and the pupil. The posterior part comprises the crystalline lens and its suspensory ligament, the ciliary body, the vitreous, the choroid, and the retina. The eyeball is completely surrounded by a fibrous envelope, the sclerotic coat which is continuous with the white sclera in front and the transparent cornea. Inside the fibrous coat with the exception of the corneal portion, is a vascular coat, the choroid, and inside that again behind the lens and ciliary body is the retina, a network of nerve filaments continuous with the optic nerve. The anterior chamber of the eye is the space in the front of the eye between the cornea in front and the iris and lens behind. It is filled with a transparent fluid, the aqueous humor, secreted by the ciliary body which nourishes the cornea and lens, and then is discharged into the circulation at the limbus (where cornea and sclera meet). The lens is elliptical in shape and at rest is relatively flat but assumes a more spherical shape when the muscles of the ciliary body contract, as they do when the eye focuses on a near object.

The nerve head where the optic nerve enters the eye is slightly central to the antero-posterior axis and is the site of the physiological blind spot. The nerve filaments of the retina are most plentiful at the posterior extremity of the visual axis, the macula, and this is the most sensitive part of the retina and the area on which light rays focus. This part of the retina is concerned with central or direct vision. The remainder of the retina is less sensitive and is concerned with indirect or peripheral vision. As in a camera, parallel

rays of light passing through the cornea, the anterior chamber, lens and vitreous, form an inverted image on the retina. This explains why if a portion of the upper part of the retina is non-functioning, visual perception will be lost in the lower part of the visual field. Non-functioning of the centre of the macula will produce a blind spot (scotoma) in the line of direct vision.

The retina is only loosely attached to the vascular choroid coat depending largely for its support upon a jelly-like structure, the vitreous which fills the back of the eye behind the lens.

In their pathway to the brain, some of the fibres of the optic nerve cross to the opposite side at the optic chiasma so that some from the right optic nerve enter the brain through the left optic tract and vice-versa. This explains why injury to one or other optic tract may produce blind areas in similar parts of the visual fields of both eyes.

The exposed part of the eye is protected by the upper and lower lids which together with a clear fluid, the lacrymal secretion or tears, sweep the cornea clear at intervals of a few seconds. The tears are secreted by the lacrymal glands and after fulfilling its function of washing the exposed part of the eye clean, discharges into the lacrymal duct and then into the nose.

Injury or disease may affect any one or several parts of the eye or its adenexa and lead to the loss of visual efficiency. The commonest injury is that resulting from a superficial foreign body. Unless the latter becomes imbedded, it is washed away by the tears with no more harm than a superficial abrasion which closes over in a few hours. If slightly imbedded, it can usually be wiped off by gently stroking with a pledget of cotton. If deeply imbedded, skill is

required to remove it to minimize further injury to the cornea and to avoid infection. Injuries to the deeper layers of the cornea leave scar tissue in healing and this is particularly true when infection takes place. Scars are classified as to their density into nebulae, maculae and leucomata. In cases of infection, the infecting agent is usually one of the common pyogenic organisms, staphlococcus, streptococcus or pneumococcus, but occasionally the virus of herpes simplex may gain a foothold and run a course that is usually not only protracted but likely to recur leading to serious scar tissue formation and loss of vision.

Any injury or inflammatory condition affecting the anterior segment of the eye is prone to give rise to a foreign body sensation. This is of great significance when a virus infection of the cornea is present with a vague history of a foreign body in the eye, as unless a foreign body is or has been evident, it is quite impossible to relate the infection to trauma. Virus ulcers of the cornea from injury by a foreign body are rare as in the great majority of cases of this type of infection, no history of trauma is given.

Penetrating Foreign Bodies and Cataract

Foreign bodies, especially if metallic, that penetrate the cornea or sclera are always serious and call for localization by x-ray and immediate removal if serious damage is to be avoided. If the foreign body traverses or lodges in the lens, cataract, (opacification of the lens) usually results and if the foreign body penetrates still more deeply, it may injure the retina and produce a haemorrhage into the vitreous or behind the retina itself, a sequence of events that often leads to retinal detachment from contraction of cicatricial bands. The commonest cause

of a deep penetration by a fragment of steel is the breaking off of a fragment when steel is being pounded on steel. Fragments of this sort are usually magnetic and can usually be removed with the help of an electro-magnet through an incision in the sclera. A fragment of steel if allowed to remain in the eye disintegrates in time producing a condition known as siderosis which usually results in destruction of vision, if not of the eye itself. Occasionally a fragment of steel will penetrate the eye completely and lodge in the orbit behind the globe. These are often impossible to remove, but fortunately do no harm as a rule if left alone, except, of course, for the damage they do in traversing the globe. A tiny fragment of steel travelling at high velocity may penetrate the eye without giving rise to more than momentary pain and frequently such injuries are only suspected when the lens begins to cloud up through development of a cataract.

A through and through laceration of the cornea, if at all extensive, permits the aqueous humor to escape and often the iris to prolapse into the wound. Usually the portion of extruded iris has to be excised to close the wound, thus leaving an iris defect or coloboma (keyhole pupil). Often the iris becomes adherent in the scar (anterior synechia).

In penetrating injuries of the eye, infection is a dreaded complication as the iris may become involved (iritis) or the ciliary body (iridocyclitis). When this happens, a serous exudate into the anterior chamber takes place and even pus may form. Sometimes the whole eye becomes infected (panophthalmitis) and has to be enucleated. Another possible complication is interference with the exit of the aqueous humor leading to increased intra-ocular pressure (glaucoma) which, unless relieved, leads to pressure on the nerve head, optic

atrophy and blindness. Chronic iridocyclitis (uveitis) may lead to involvement of the other eye (sympathetic ophthalmia) to avoid which the chronically infected eye is removed as a precautionary measure, especially if it is sightless.

Another dreaded complication of penetrating eye injuries is retinal separation. This is usually due to contraction of cicatricial bands in the vitreous consequent upon vitreous haemorrhage, or the foreign body may tear a hole in the retina resulting in fluid and/or blood collecting between the retina and choroid. When the retina is deprived of its blood supply, it ceases to function and blind areas in the visual field result. Various operations have been devised to restore the retina to its proper place and fix it in position.

Thus far, we have confined ourselves to a discussion of superficial injuries and deep penetrating wounds. There are many other ways in which the eye may be injured. A severe contusion from in front may cause the lens to dislocate into the vitreous or so injure it that over a period of weeks, months or even years, it may become opaque. It is seldom possible to remove a lens which has dislocated into the vitreous and in addition to causing the eye to be permanently aphakic there is always the possibility that glaucoma will develop. Strong light, such as direct sunlight, either direct or reflected from snow or from a welding flash may produce inflammation of the surface of the eye (conjunctivitis) or if more intense or prolonged, set up inflammation in the retina (retinitis) and lead to permanent impairment of vision. A relatively common injury in masons and cement workers is caustic burn of the cornea from lime or cement. Such burns commonly result in slow healing ulcers of the cornea with vascularization and dense scarring. Superficial corneal scars

have a tendency to thin out in time and usually a year must elapse before the extent of permanent damage can be assessed.

Corneal Grafting

Corneal grafting has reached a state of perfection that lends itself to the replacement of scar tissues with healthy tissue taken from a cadaver within a few hours of death. Donor eyes may be kept under refrigeration for several days. Corneal tissue from the donor eye is then applied to the cornea after removal of the scar, with reasonable hope of success. Corneal grafts are of two kinds; split thickness (lamellar) and full thickness. The former are used when the scar is not more than half the thickness of the cornea. It is important in all cases of corneal grafting that the area to be grafted be free of blood vessels as such vessels have a tendency to spread into the graft and cause it to become opaque. Owing to the vascularization that commonly follows caustic burns, this type of plastic procedure, in a high percentage of cases, is doomed to failure. At times, a split thickness graft is undertaken first to be followed by a full thickness graft later.

Cataract Extraction and Aphakia

What to do when a lens becomes opaque is a much debated question. If the lens is removed or made to absorb by dicission (needling through the pupil) the eye, although it may be otherwise perfect, will be unable to accommodate, that is focus on objects at various distances. It would be like exposing the film in a camera from which the lens has been removed; distant objects will be shown with some clarity, but objects nearby will be blurred. It is true that a thick spectacle lens before such an eye may permit it to see nearby objects clearly, but then distant objects will be blurred unless a bifocal lens is used. Worst of

all, however, objects seen through such a lens will be of a different size from those seen by the normal eye. It is, therefore, impossible to use a conventional lens with such an eye to produce binocular or stereoscopic vision. There are two possible benefits of cataract extraction where the other eye is normal. One is that if the individual can accustom himself to the confusion resulting from trying to use an eye which accommodates (the normal eye) with one which does not, the advantage of being able to see shadows with the aphakic eye may afford a degree of protection, as when crossing a street through traffic. The other possible benefit is that which would result if a contact lens could be tolerated. A contact lens is a small round plastic lens placed directly on the cornea where it floats on the tears, but has to be removed, cleaned and replaced. Comparatively few people, unless well motivated, can tolerate wearing these lenses for an eight hour day. If, however, such a lens can be worn, it may afford a high degree of stereoscopic vision for close work, but cannot accommodate for distance, moreover the size of the images is usually slightly dissimilar, with the result that the outline of objects lacks clarity. Plastic inserts to replace an extracted lens have generally passed out of use owing to their tendency to cause glaucoma. The experience at the Ontario Board has been that not more than 10% of claimants with monocular aphakia to whom contact lenses have been supplied, have reported being able to wear them throughout an eight hour day, and most have discarded them altogether particularly if the other eye is normal. The type most likely to use them successfully are young individuals of above average intelligence to whom binocular vision for close work is important, or those who use them mainly for cosmetic reasons. Opinions differ as to the wisdom of the operation. Most ophthalmologists favour retention of the cataractous eye for its reserve value

in case vision in the good eye becomes impaired at some future time. Visual efficiency will not deteriorate if the cataractous eye is left intact indefinitely. Another fact to consider is that without the lens, the aqueous in the anterior chamber is in direct contact with the vitreous through the pupil with the result that the latter becomes more fluid than jelly-like and as such, is of less support to the retina so that retinal separation is always a complication to be feared. Everything considered, it is probably wise in the case of a workman with monocular cataract, providing the other eye is normal, to discourage cataract extraction and advise holding the injured eye in reserve in case at some time in the future the good eye becomes impaired.

Keratitis, Iritis and Iridocyclitis

Keratitis (inflammation of the cornea) may result from superficial breaking of the integrity of the cornea with resulting infection, but when the surface of the cornea is intact, the condition is always due to systemic disease of some kind, such as focal infection, rheumatism, syphilis, et cetera. Iritis and iridocyclitis (inflammation of the iris or iris and ciliary body) may also be due to systemic disease, but as well may arise from penetrating injuries involving these structures or very rarely from severe contusion.

Diplopia

Diplopia or double vision is a condition in which for some reason the visual axes of the two eyes are not parallel. The effect is to produce squint or strabismus. Very rarely the eyes are used alternately (alternating strabismus) in which case both eyes retain normal or near normal visual acuity. As a rule, however, the better eye takes over and the vision in the poorer eye deteriorates

from disuse (amblyopia exanopsia). Diplopia may be congenital, toxic, or due to injury to some of the extra-ocular muscles or deformity of the orbit, the result of fracture. The aberrant eye often retains a visual acuity of 20/200 and occasionally, if the vision in the good eye is lost or becomes seriously impaired, the amblyopic eye has to be pressed into use. It sometimes happens that putting such an eye to use results in its visual acuity improving slightly.

Diplopia may not be evident in looking straight ahead, but only when looking up, down or to either side. Slight degrees of double vision in such a case are not of great significance. Only if it is present in all parts of the visual field is the full schedule rating applicable. Where the deviation is only a few degrees, recovery is the rule as a weakened muscle increases in strength. If the condition does not correct itself within a few weeks, prismatic lenses may bring the visual axes into line. If this is not sufficient, an operation to lengthen one of the extra-ocular muscles and shorten the opposing one is usually undertaken.

Coloboma

Coloboma or notching of the iris (key-hole pupil) may be due to extrusion of the iris through a penetrating wound of the cornea when it cannot be replaced and has to be excised, or it may be the result of surgical intervention for glaucoma, to permit extraction of the lens in cataract or to permit light to enter the eye to one side of a corneal scar. When iridectomy is undertaken deliberately, it is usually done as near 6 o'clock or 12 o'clock as possible so that the lids will protect the interior of the eye from excessive light, but when undertaken to produce an artificial pupil, its position must depend on the best available location of clear cornea. A coloboma in an area unprotected by the lids may

admit excessive light and cause photophobia (dazzling). In people of fair complexion, this may be genuinely troublesome and justify a small award, in the neighbourhood of 3%.

Enucleation

Irreparable damage to the eye usually demands immediate removal. Removal is also indicated if the eye degenerates and becomes soft or if though sightless it remains irritable. The danger in retaining an irritable sightless eye is that sympathetic inflammation may develop in the other eye and result in total blindness. This complication usually results from a penetrating injury involving the iris and ciliary body when inflammation does not subside in a few weeks. When an eye is removed, a glass ball is placed in the socket and the extra-ocular muscles and conjunctiva are joined together over it. This leaves a good bed for the prosthesis to rest upon, to which it usually imparts natural movement.

Hyperopia and Myopia

A hyperopic or long-sighted eye is one in which parallel rays of light converge at a focal point behind the retina and requires a convex lens to bring the focal point forward. A myopic or short sighted eye is one in which the rays come together in front of the retina and requires a concave lens to project them backward. An eye that is highly myopic is somewhat prone to retinal detachment.

Presbyopia

Presbyopia is a physiological change that takes place in all eyes beginning between the ages of 40 and 45. It is due to lack of ability of the lens to assume enough spherical conformation to enable the eye to focus on near objects. For

reading and other close work, spherical lenses similar to those used in hyperopia have to be employed.

Astigmatism

Astigmatism is a condition where the curvature of the cornea in one meridian differs from that in another. In regular astigmatism the refraction differs in different meridians. In irregular astigmatism refraction differs in different parts of the same meridian. This sort of thing happens when the cornea is scarred and explains why in many cases glasses do not help.

Testing of Vision

Acuity for distant vision is determined by use of the Snellen test card. The latter contains a series of black letters of different sizes on a white ground and the card is placed in good light 20 feet or 6 m from the patient. The large letter at the top of the card should be capable of being identified at a distance of 200 feet by a normal eye. The next smaller letters should be recognized at 100 feet and so on down the card until the smallest letters are reached that the normal eye should identify at 10 feet. Visual acuity is then expressed in the form of a fraction the numerator of which is represented by the distance of the patient from the card; i.e. 20 feet or 6 m. The denominator of the fraction is the size of the smallest type the subject can identify at the testing distance. If for example the smallest type the subject can identify is the 100 foot line, the vision is expressed as 20/100. This must not be construed as meaning he has only 20% normal vision. To all intents and purposes, testing for distant vision is all that is required to determine visual efficiency; however, small type known as Jaeger test type may be used to test visual acuity at ordinary reading distance.

Compensation agencies base awards on the best corrected vision for distance. The only exception is in the case of aphakia.

Visual Field

While direct vision is of utmost importance, peripheral or indirect vision is important too. Normal field extends outwards about 90°, inwards 60°, upwards 55° and downwards 70°. Testing is carried out with a small white object and the perimeter of the field is outlined on a chart. Any blind areas there may be (scotomata) are then similarly outlined on the chart. Scotomata involving central vision is seriously disabling, but those elsewhere in the visual field are relatively much less so, unless half the field, nasal or temporal is lost; a condition known as hemianopia. In such cases, either the nasal or temporal field is involved (the nasal half of one eye and temporal half of the other) (homonomous hemianopia). This occurs usually with sparing of central vision. The condition results from destruction of one or other of the optic tracts. A rare condition in which both nasal or both temporal fields of both eyes are lost may result from injury to the optic chiasma where some of the nerve fibres from both eyes cross to form the optic tracts.

Retinal Separation

As previously mentioned, the retina is loosely attached to the vascular choroid coat of the eye from which it receives its nourishment. If for any reason part or all of the retina becomes detached, the part involved is deprived of its blood supply and ceases to function. Many cases arise without known pre-existing pathology, but myopia is present in approximately 50% of cases and is recognized as a predisposing cause. Other causes include retinal degeneration, uveitis

(chronic iridocyclitis) resulting in contraction of vitreous exudate, injuries, such as contusion of the eyeball producing vitreous haemorrhage which in organizing and contracting pull the retina off the choroid and penetrating injuries allowing vitreous fluid or blood to collect between the retina and choroid. Whether effort strain ever precipitates retinal detachment is doubtful. The only way it could do so would be by producing a post-retinal haemorrhage. That it has ever done so has never been satisfactorily proven. If this sort of thing were possible, retinal separation would probably be a lot more common than it is. Prodromal symptoms of flashes of light are sometimes witnessed but often the first sign is an increasing blind area in one segment of the visual field like a curtain being raised or lowered. The macular area is seldon detached but the fold of retina may extend enough to obscure it and result in loss of central vision. Treatment consists of withdrawing the fluid that forms between the retina and choroid and anchoring the retina in place by utilizing diathermy to set up an adhesive choroiditis over the site of the separation. Occasionally a tuck is made in the sclera (outer fibrous coat of the eye). This operation is usually reserved for cases that recur.

Compensation for Visual Impairment

While average vision in normal eyes is 20/20 visual acuity may vary from 20/15 to 20/30. Vision that is less than 20/30 may be classed as impaired. Except in cases of aphakia, awards should be based on the best vision obtainable after correction with conventional lenses. The reason for this is that only errors in refraction antedating the injury are in most cases capable of correction. Under the schedule adopted by the Association of Compensation Boards of Canada in 1960,

blindness in one eye is given an evaluation of 16% (of the whole man) and enucleation 18%. Cataract or aphakia is rated at 12%, the same as an accommodating eye with 20/200 vision. The reason for this is that an aphakic eye that is otherwise normal is usually capable of 20/200 vision at distance and, in addition, if fully correctable, is a valuable eye to hold in reserve should the vision in the good eye be subsequently lost. Loss of an only eye or of both eyes is rated at 100%. If both eyes are impaired, the worse eye is rated according to the schedule and the better eye at the schedule rate multiplied by 84/16. This is on the basis that if one eye is valued at 16% and both at 100%, the second must have a value of 84%.

Example: Right eye 20/60 = 5%

Left eye 20/80 = 8%

i.e. 8 + 5/16 x 84 = 31.25%

Contact Lenses in Aphakia

It is not felt that ability of an individual with monocular aphakia to wear a contact lens successfully should disentitle a workman from receiving the full 12% rating. The reason for this is that the wearing of a contact lens requires a great deal of fortitude in most cases as well as scrupulous care of the eye and the lens, moreover, sizes of the images are often not exactly similar and, of course, the eye does not accommodate for distance.

In double aphakia the situation is entirely different since an individual so affected can wear bifocal conventional glasses usually with complete satisfaction, or if he prefers contact lenses. For fully correctable double aphakia, a rating of 25% is considered adequate.

As mentioned previously, the retina of an aphakic eye is more prone to

become detached than is that of a normal eye. Spontaneous detachment in an aphakic eye should, therefore, be considered to be a complication of the original injury no matter when it occurs.

Deafness

There are three varieties of deafness - conductive, perceptive and mixed (a combination of the former two). Conductive deafness is due to anything that interferes with the transmission of sound to the organ of hearing in the inner ear; perceptive to something that interferes with the normal functioning of organ of hearing, the nerve pathway to the brain or the hearing centre in the brain itself. The mechanism of hearing comprises the auricle or external ear which collects sound waves (vibrations of air pressure) and directs them through the external auditory canal to the eardrum or tympanum. The drum is then set in motion and the mechanical vibrations so produced are conveyed through the middle ear, an air filled cavity in the temporal bone, by a series of three tiny articulating bones, to a second membrane covering what is known as the oval window which separates the middle from the inner ear. The vibrations received at the oval window are in turn transmitted to a spiral fluid-filled tube, the cochlea. The movement of this fluid activates a series of hair cells connected with filaments of the nerve of hearing (the auditory nerve) which conveys the message to the brain where it is interpreted as sound. The inner ear has a second function, that of keeping an individual aware of his position in space; in other words, it control equilibrium.

The middle ear, as before mentioned, is an air-filled cavity and is connected with the naso-pharynx by a hollow tube the eustachian. This tube

normally remains closed, but opens momentarily with each act of swallowing, thus maintaining a state of equilibrium between the air pressure in the inner ear and that outside the body. Impairment of any of the components of the external, middle or inner ear may give rise to loss of hearing.

Conductive deafness may arise from loss or deformity of the external ear, narrowing of the auditory canal, destruction or an unhealed perforation of the drum, fracture or dislocation of the bones of the middle ear or their fixation by adhesions or scar tissue. Any of these conditions can be brought about by either a direct or concussion injury, although the commonest cause of middle ear involvement is infection extending up the eustachian from the nasopharynx. Another condition that might be mentioned as a cause of conductive deafness, although unassociated with injury, is oto-sclerosis. This is a fibrotic condition of the structures of the middle ear that develops in some people, the cause of which is unknown. These people derive great benefit by wearing hearing aids or by operation as their perceptive apparatus may be entirely normal. Still another condition sometimes encountered in compensation work is barotrauma or aerotitis. This condition results from marked changes in air pressure when the eustachian tube is not functioning properly as during a head cold. If then a person goes from ground pressure to an altitude where atmospheric pressure is low, the air in the middle ear expands and may even cause the drum to rupture. Conversely if one goes into a caisson where the pressure is high, the drum may be forced inward. In either case, there is an outpouring of serous fluid into the middle ear which, unless removed by aspiration, may result in the formation of adhesions and a form of conductive deafness.

There are many causes of perceptive or nerve deafness. It may be congenital or it may arise from many of the diseases of childhood, especially measles and mumps; indeed mumps is believed to be the commonest cause of unilateral nerve deafness. Again, it may arise from prolonged administration of certain drugs such as streptomycin or even ordinary aspirin. The commonest cause of all is a condition known as presbycusis that begins to affect most people after the age of forty and is slowly progressive. It is due to degenerative changes in the cochlea. Average rate of deterioration is .5 decibels per year.

Perceptive deafness from injury or acoustic trauma as it is sometimes called may come about suddenly through injury to the cochlea, the auditory nerve or the hearing centre in the brain. The commonest cause is concussion as from gunfire or a dynamite blast which actually disrupts the nerve elements of the cochlea, often without even rupturing the drum, or fractures of the skull causing injury to the auditory nerve as it traverses the temporal bone. Least common of all is injury to the hearing centre in the brain. These types of hearing loss seldom impose difficulty in adjudication.

On the other hand, the gradual onset of deafness allegedly due to noise exposure presents many difficulties. This is so for two reasons - one, that it is impossible to say from clinical examination alone that any case of perceptive deafness was noise induced, the other is to satisfy oneself that the individual was exposed to a type of noise likely to cause nerve deafness over a period of time. Apart from individual noise tolerance, which varies considerably in different people, about 10% of whom are hypersensitive, the effect of noise depends on several factors. Among these are the overall noise intensity as measured in decibels (dbs.), the frequency expressed in cycles per second (cps.), whether

the exposure was continuous or interrupted and if the latter, the ratio between exposure time and that intervening, and finally the total length of exposure in terms of months or years.

Sound may be pure tone and of musical quality as when composed of vibrations of one frequency or mixed as when made up of several frequencies. Middle C on the piano keyboard has a frequency of about 250 cps. The next higher key of C has a frequency of 500 cps., the next 1,000 cps. et cetera. All sounds between one note and a similar note one octave higher comprise an octave band. Sounds in the 1,000 - 2,000 and 2,000 - 4,000 bands are the most damaging. These sounds are high in pitch and are the type produced by pneumatic drills, high-speed looms and the suction couches of paper machines. If, therefore, the noise intensity is in the order of 100 dbs. and if the frequency falls within these two bands and if the exposure is fairly continuous throughout the working day, unprotected ears will suffer permanent damage in one to five years depending on the tolerance of the individual. A short exposure at a sound intensity as high as 130 dbs., as from a whistle blast, usually does no permanent harm, as the ear possesses considerable recuperative ability, but impact noise as from a drop forge will, over a period of years, permanently affect most ears.

Mixed noise, that is one composed of many frequencies, such as one finds in most manufacturing plants, is not harmful unless the overall intensity is over 90 dbs. and then even sensitive ears are unlikely to be affected within a space of twenty years.

Before recognizing a claim, all these factors must be taken into consideration as well as the degree of deafness itself. Slight to moderate deafness should not be considered disabling in a compensation sense. The individual should have

difficulty discriminating voice sounds at a greater distance than eight feet. A distance of about twenty feet would be considered normal. Voice sounds are mixed in frequency, but fall mainly in the 500 - 1,000 and 1,000 - 2,000 octave bands. So, therefore, if the average hearing threshold is increased an average of 25 dbs. (using the A.S.A. standard reference level) in the frequencies 500 cps., 1,000 cps., and 2,000 cps. in the better ear, deafness should be considered rateable.

While speech reception might be considered measurable by testing with live voice, there are so many variables in this type of test that compensation agencies have adopted a system of depending on audiometric testing of hearing threshold as a means of measuring impairment of speech reception. While far from perfect, this method achieves reasonable uniformity.

In noise induced hearing loss, the hearing threshold is increased first in the higher frequencies most usually at the 4,000 cps. level. In fact, a higher threshold shift at this level than at 8,000 cps. is suggestive of noise. Air conduction should be better than bone conduction. The reverse is the case in conductive deafness. The examination should not be undertaken until the claimant has been away from noise exposure for at least sixteen hours, and preferably should be repeated after twenty-four hours, in which case the audiometric readings should not vary more than 5 dbs. in any frequency. While the examination is subjective, there are several tests, e.g., delayed feed-back for detecting malingering. Until recently, the zero reference level on all standard audiometers has been that fixed by the American Standard's Association. It is in the process of being changed so that audiometers will, in future, be calibrated to conform to the standards set by the International Standards Association. The difference will

be 10 dbs. in each frequency, e.g. 20 dbs. A.S.A. will become 30 dbs. I.S.A., et cetera. It will, therefore, be necessary to know when considering awards for hearing loss whether the audiometer was calibrated according to A.S.A. or I.S.A. standards.

Provided the clinical examination and the work history favour a diagnosis of noise deafness and provided the degree of hearing loss meets the minimal requirements, entitlement should be granted and if recommended a hearing aid supplied. Final assessment of the disability for compensation purposes should be delayed until the claimant has ceased to work in a noisy environment for at least six months as during this period hearing may improve. In almost all cases deafness is a social handicap rather than a working disability at least at the job where it was contracted. For this reason most workmen carry on until they reach retirement age.

The procedure for assessing the disability in deafness cases is as follows: (Testing is done without the wearing of a hearing aid)

1. Average the threshold increase in each of the three frequencies, i.e., 500 cps., 1,000 cps. and 2,000 cps. in each ear.

2. To the disability percentage shown in the schedule for the worse ear add nine times that for the better ear, or five times if the schedule rates unilateral deafness at five per cent.

3. The sum of the two will be the combined rating.

In unilateral deafness, the effect is a lessening or complete loss of stereophonic appreciation depending on the degree of impairment. If the difference in the two ears is as much as 20 dbs., one-third of the percentage allowed for total

deafness would be reasonable; if 30 dbs. two-thirds; and if 40 dbs. or more, the full rating for one ear.

Multiple Injuries

In the case of injury to different parts of the body that perform similar function such as both eyes, both arms, two or more fingers of one hand, et cetera, an enhancement factor over and above the sum total of the separate injuries must be considered.

As a matter of fact, the schedule actually does take this into consideration in the rating of multiple finger amputations. Most schedules allow four per cent. for loss of the index or middle fingers of one hand, but in the case of a combined loss the allowance is 14 per cent. Therefore, to the sum of the two individual losses, six per cent. is added as an enhancement factor. In other words, with the index finger lost, the middle finger takes on a value of 10 per cent. Difficulty arises when unequal portions of two or more fingers are lost. Suppose, for example, the index is amputated completely but the middle finger has lost only the distal phalanx. To arrive at the combined rating we would allow four per cent. for the index and three-tenths the enhanced value of the middle, i.e., 3/10 X 10% = 3%. The combined rating would then be 4% + 3% = 7%. For the sake of simplicity other plans have been suggested, for example, that of adding to the sum of the individual losses a fraction of the total, e.g., one-third in the case of two fingers, two-thirds in the case of three, and double in the case of four. To apply such a plan in the hypothetical case mentioned above, the result would be four per cent. for the index, three-tenths of four per cent. for the middle,

plus one-third of the total, i.e., 4 + 3/10 x 4 = 5.2 + 1/3 x 5.2 = 6.9%, which is reasonably close to the figure reached under the former plan. Difficulty would arise in applying this method to the loss of two or more whole fingers and necessitate a rather drastic marking down of the figures now shown in the schedule. Assuming that the index and middle fingers each have a value of four per cent., combination of the two would give a value of 4% + 4% = 8% + 1/3 = 10.6% instead of 14%. Index, middle and ring would work out 4% + 4% + 2.5% = 10.5 + 2/3 = 17.5% instead of 20%, and for all four fingers it would be 4% + 4% + 2.5% + 2.5% = 13% x 2 + 26% instead of 30%. Whether such a drastic marking down of the combined values of fingers would be warranted is questionable. Assuming that the valuation of two or more fingers as shown in the schedule is reasonably correct, the only alternative that could be taken would be to increase the values of the individual fingers. It might be recalled that the early schedules allowed 27.5% and later 28% for the loss of four fingers at a time when amputation through the forearm rated 40% instead of 50% as it does now.

Aggravation of Pre-existing Disability and the Second Injury Fund

Some years ago the Compensation Boards in Canada set up second injury funds financed by a small percentage added to the assessment of industry at large. The prime purpose of these funds was to lessen the impact of an award which is greater than it would otherwise have been because of the existence of pre-existing disability. For example, if a one-eyed man should lose the vision of his only eye, his award would be one hundred per cent. but only sixteen per cent. would be chargeable to the employer's class. The remaining eighty-four per cent. would be charged to the second injury fund. The same principle is

applied in various types of injury, e.g., amputation of a finger where one or more were already missing from the same hand. It would also apply in a case where a leg has to be amputated following a minor injury because of the presence of advanced diabetes; also in cases of coronary occlusion where it can be assumed that advanced atherosclerosis always exists. In such cases anywhere from 50 per cent. to 75 per cent. might be charged to the second injury fund. The knowledge that such a fund exists to facilitate the employment of handicapped people and the purpose of its existence should be widely known throughout industry.

Physical Impairment versus Physical Disability

Considerable confusion prevails today among compensation administrators as to the true significance of the terms physical impairment as against physical disability. A limitation of five degrees in the flexion of a knee might be considered a physical impairment, but by no means a physical disability either real or potential. The original intent of compensation laws was to restore part of any reduction in wages that might result from some permanent physical abnormality brought about by an industrial injury. Rating schedules came into use purporting to show in percentage the average reduction in earning capacity which might normally be expected to result from each specific condition. Figures that may have been appropriate 50 years ago would certainly not be so today when job opportunities for the physically handicapped are vastly increased in numbers. Assuming, therefore, that physical impairment should be compensated for irrespective of whether it does now or ever will affect ability to obtain and hold

gainful employment at current wage levels, it would seem that present so-called disability schedules should be scrapped and replaced by physical impairment scales which would show the minimum percentage to be awarded for each specific injury with provision for escalation due to advancing age, limited educational attainment, et cetera. Such a scale might average slightly lower than the present one, but its application would permit awards to be made in many cases of physical impairment that are not at present considered to warrant an award at all because they are not felt to be disabling. In addition, the use of age and other variable factors would enable cases where rehabilitation is difficult and/or incomplete to be dealt with more generously.

Standard and Sub-standard Classification

Classification of cases deemed to warrant special consideration would present a problem, but not an insurmountable one. Cases which at the time of rating show no wage loss or are not considered likely to show one in the forseeable future would receive the minimum standard award based on the physical impairment schedule. There might then be, say, four rating levels above standard at perhaps 10 per cent. intervals, for example, 110%, 120%, 130% and 140%, depending on how rehabilitation to former earning capability is likely to be affected by such factors as age, low educational accomplishment, etc. These various levels might be designated S1, S2 up to S5, S1 representing the lowest or physical impairment rating. To this category would be assigned cases of young individuals without immediate or potential wage loss and cases having had the advantage of job training to fit them for work they are capable of doing in spite of their physical handicap and having relatively high wage earning

potential. S5 would apply to an older workman with no acquired skills and little education, e.g., a 60-year-old manual labourer who has lost a leg or an arm. No doubt a routine comparable to the PULHEMS system used in the Canadian Army during the later years of World War II could be devised to assist in determining suitable rating levels for cases meriting special consideration. The probability is that with increased availability of work suitable for handicapped people together with modern methods of physical and functional rehabilitation, special consideration would not be required in more than 20 per cent. of all cases at most.

Little data is presently available and a great deal of research work requires to be done before it would be possible to determine the extent to which various kinds of physical handicap affect the earning capability of different kinds of people. Present rating schedules are assumed to show the average percentage of disability for each condition listed, but if such is the case 50 per cent. are receiving more and 50 per cent. less than enough to meet their needs. In all fairness, especially to the latter group, an effort to correct this disparity would certainly be worthwhile.

doubt make the arrangements. Full time-loss benefits will be continued, and a pension can be assessed later.

4. If the claimant accepts the treatment program that has been recommended for him, conduct of the claim will be restored to the Claims Department. If, for any reason, the claimant should not wish to accept that treatment, the Commissioners will receive his views before arriving at any further decision.

Decision No. 8

RE THE MEASUREMENT OF PARTIAL DISABILITY

Discussion and Practice Direction considered by:

T. G. Ison, Chairman
R. B. Carpenter, Commissioner
G. Kowbel, Commissioner

2nd October 1973

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1. *Introduction*

In the course of adjudication on a recent appeal involving a spinal column injury, we were disturbed to find that a permanent partial disability pension based on 7.5% of total disability had been awarded notwithstanding that the loss of earning capacity, on any view of the case, seemed to be at least 50%. We were assured that the award was in line with other pension awards in back injury cases. We felt, therefore, that the matter could not be approached simply by changing the particular award, but that we should reconsider the principles being applied to the measurement of partial disability. In the particular case, further medical evidence led to the conclusion that the condition should be classified as a temporary total disability. We are concerned now, therefore, with the practice being followed in other cases.

The measurement of partial disability is probably the most difficult topic in the whole area of disability compensation. There is no method known to us in use anywhere that is entirely satisfactory. Some compensation systems and some private insurance plans avoid the issue by not compensating for partial disability at all.

2. *The Objectives of the Measurement*

The traditional theory has been that workmen's compensation is essentially a system of income insurance. In British Columbia, this is reflected in Section 24 of the Act in the requirement that (except with regard to compensation for disfigurement) compensation for partial

disability shall be calculated by estimating loss of earnings or loss of earning capacity. But as in most systems of compensation, the formulae used for the measurement have not been characterized by unswerving fidelity to clearly articulated goals. It is doubtful whether this Board, or any Board in Canada, or the public at large, have ever really accepted the view that if a work injury does not result in some impairment of earning capacity, nothing should be paid. There seems to be a generally accepted feeling that if a man has suffered say the loss of an arm at work, he ought to receive compensation whether or not there is any actual impairment of earning capacity; and this view seems to have prevailed under most systems no matter what the wording of the particular legislation.

In British Columbia, this ambivalence appears in the language of the Act itself. Thus under Section 24 (1) the Board is required to estimate the impairment of earning capacity, but it is permitted to do it by reference to the nature and degree of the injury with or without an enquiry into the actual impact of the injury on earning capacity in the particular case.

Where there is no apparent loss of earnings, and no apparent or immediate loss of earning capacity, resulting from an injury the payment of compensation might be explained on two grounds.

First, it has been suggested that a serious injury does result in an impairment of earning capacity notwithstanding that no loss of earnings is obvious, and that no impairment of earning capacity is immediately apparent. It has been suggested that the existence of a physical handicap in such cases may still involve reduced prospects of promotion, restriction in the scope of future employment, and a reduced capacity to compete in the open labour market in the event of the present job being terminated. Moreover it has been argued, though not necessarily correctly, that men with physical disabilities tend to become static, that they seek security in low-paying jobs and lose the opportunities formerly open to them to advance in their own work and in other fields.[1] Compensation paid for these reasons might be labelled as being for "presumed loss of earning capacity".

Secondly, it might be suggested that compensation should be paid for the other consequences of a disablement, apart from the impact on earning capacity, such as the pain, suffering, limitations on family and social activities, inconvenience, and in some cases a shortened expectation of life. Compensation for these non-monetary consequences has not been part of the theory of workmen's compensation, but it may well have been part of the feeling and part of the practice. Any compensation paid on this ground might be labelled as being for "non-monetary losses".

1. *Report of the Royal Commission on The Workmen's Compensation Act and Board*, 1952, British Columbia, p. 156.

Paradoxically, there seems to be a tendency for the demand for compensation for non-monetary losses to be inversely proportionate to the actual effect on earning capacity. For example, if someone loses an arm in a work accident but the actual loss of earnings is zero, there seems to be a general feeling that he ought still to receive compensation. But if the effect on earning capacity is carefully measured and calculated, and if substantial compensation is paid based on the estimated effect on earning capacity, there does not seem to be the same feeling that the claimant ought to receive compensation for the non-monetary losses in addition.

3. *The Actual Wage Loss Method*

A possible method of calculating compensation for partial disability is to look at actual wage loss, not only immediately at the time of the initial assessment, but on a continuing basis. If the system is perceived as being one of income insurance designed to compensate for actual loss of wages, this method might be seen as doing exactly that. There are, however, two major difficulties. The first is that compensation by reference to actual wage loss without consideration of any other variables would create a substantial disincentive to vocational rehabilitation. Unless a claimant could expect to earn more than his pre-accident earnings, there would be no monetary reward for work. A claimant who made a praiseworthy effort to recover and restore himself to an earning function could find that he was financially no better off than one who made no effort at all. Secondly, a substantial administrative cost would be involved in keeping track of claimants over time to adjust their compensation in response to changes in their employment situations.

Attempts have been made under some systems to avoid the first problem by deducting from compensation not only actual earnings but also the amount which a claimant could with reasonable diligence have earned. But this would aggravate the second objection. The Board would be required to enquire on a continuing basis not only into actual earnings but also into earning opportunities, and on a continuing basis would be required to match the fitness and capacity of the claimant with conditions in the employment market. It seems to be generally accepted nowadays that this method is not administratively feasible.

A possible modification of this method would be to eliminate the distinction between total and partial disability and pay each disabled claimant the same compensation as would be payable for a total disability, but with a deduction of part, say 50%, of actual earnings. This would create an incentive to vocational rehabilitation, but it would only be achieved by over-compensation in cases where the disablement is not severe, and these are the majority.

4. *The Simple Physical Impairment Method*

This method was described by Commissioner G. M. Sloan in the following terms.

> "One [method of measuring partial disability] is to evaluate the loss of function or capacity on a purely physical basis calculated on a percentage of total disability. For instance, the loss of an arm at the shoulder is regarded as a loss equal to 76 per cent of total disability. The claimant's average wage at the time of the injury having been calculated, he receives the ascertained percentage thereof, less the statutory deduction of [three-quarters]. His future earnings do not affect his pension, notwithstanding the fact that he might receive a higher wage after the accident than he was receiving at the time of the accident. In other words, under this method of calculating the amount of the award an individual claimant, in many instances, is paid compensation when he has no immediate wage-loss. The reasoning back of this method is that the average wage-loss suffered in many thousands of cases over a life period will closely approximate the amount of an award based on what the relationship of a percentage of incapacity bears to total disability. For example, in the case of a loss of arm at the shoulder the average wage-loss suffered by many thousands of such injured men will work out at approximately 76 per cent of total loss of wages over the average life-span."[2]

The use of this method can be facilitated by the production and use of a disability rating schedule attributing percentages of impairment to specified disabilities.

In British Columbia the Act, as amended in 1954, authorizes though it does not require the use of this method.

One virtue of the method, and of any other method that involves a fixed pension, i.e. a pension that is not subject to adjustment by reference to actual earnings, is that it creates a maximum incentive to rehabilitation by enabling a claimant to keep the benefit of his disability award while at the same time keeping the full benefit of earnings from any employment that he is able to obtain. The determination of a fixed pension is also helpful for actuarial purposes in that it enables a capital sum to be calculated and charged to a class fund.

Other advantages claimed for the simple physical impairment method are administrative efficiency, avoiding any risk of the abuse of administrative discretion, and producing uniformity, at least measured in one dimension, by applying the same percentage rate to those with similar injuries.

The method is, however, open to serious objections. First, it is difficult to see how the use of standard percentage rates for specified injuries can possibly contribute much to the measurement of impairment of earning capacity unless it is at least supplemented by the application of an occupational variable. For example, suppose a stonemason

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2. *Report of the Royal Commission on The Workmen's Compensation Act and Board*, 1952, British Columbia, p. 151.

and a salesman both suffer the loss of a hand. Why should they receive the same percentage of pre-accident earnings as compensation, or the same cash figure? If it is impairment of earning capacity that we are trying to measure it could well be that the loss of a hand is extremely detrimental to a stonemason, but it could have no significant effect on the earnings of a salesman. Conversely, an injury that produced a speech impediment may have little or no effect on the earning capacity of the stonemason but may compel the salesman to take a lower-paid job. Commissioner G. M. Sloan felt able to meet this objection with the following response:

> "The physical-impairment theory is based upon mass values and mass averages. Some injured men under this method get relatively more than they would under an individual valuation basis; others get less. Collectively, the long-term average takes care of the differences, and in the main the result is that the average injured workman receives a just recompense for loss of wages, real or potential, over a period of years."[3]

With respect, however, it is difficult to find this rationale convincing. If one claimant is being grossly under-compensated in comparison with actual loss of earning capacity, and if another claimant is being grossly over-compensated to the same extent, should we really take comfort in the thought that the average claimant is being fairly treated, or that the right amount is being paid out in total? There is no such thing as justice on the average.

It has long been recognized and objected that, except by coincidence, this method bears no relation to the real loss of earning power.[4] What is less often recognized is that this method does not, except again by coincidence, bear any relation even to the average loss of earning capacity. So far as we can discover from discussion with other Canadian Boards, it does not appear that the percentage rates currently used for the measurement of physical impairment are based on any statistical research done within living memory, and there is really nothing to connect the percentage rates of physical impairment currently used with the impairment of earning capacity either in the individual case, or even on an average.

Another objection to the simple physical impairment method is that it may approximate too closely to compensation for anatomical loss. The theory of the physical impairment method is that the degree of incapacity is measured not by reference to anatomical loss but by reference to the loss of body function. Observation on the actual use of the method, however, both in British Columbia and elsewhere, suggests that reflections of anatomical loss still creep into the practice. Thus although it cannot be precisely measured, there seems to be a

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3. *Report of the Royal Commission on The Workmen's Compensation Act and Board*, 1952, British Columbia, p. 155.
4. See e.g. *The Evaluation of Permanent Incapacity for Work in Social Insurance*, 1937, I.L.O., p. 111.

tendency to compensate fairly generously for visible dismemberment but to under-compensate for disabilities involving disturbances of body function that are more subtle in their operation.

Finally, it can be objected that the comparability that is ostensibly achieved by the physical impairment method is largely illusory. Work accidents often involve multiple injuries, and even single-injury accidents can have varying side effects and complications. Relatively few serious disabilities are sufficiently simple that they can be described in terms sufficiently precise to compare one with another; and if comparison by verbal description is impossible there can be little assurance that the same percentage rate is being applied to the same condition.

Suggestions are made from time to time that the permanent disability evaluation schedule should be brought up-to-date and extended. If the percentage rates are to be based, however, on the averages of actual impairment of earning capacity a major research project would be required. We are skeptical about devoting such resources to improving the detail of this system when the use of this method at all is of doubtful validity.

5. *A Modified Physical Impairment Method*

The method now in use at the Board, and which has been in use for as long as the present staff can remember, is a modified physical impairment method. The percentage rate derived by use of the simple physical impairment method is modified by the application of an age variable. This age adaptability factor is used for claimants over the age of 45 where the disability is calculated in accordance with the schedule. The disability is increased by 1% of the assessed disability for each year over 45 up to a maximum of 20% of the assessed disability.

Example:

Injury at age 55
Scheduled disability 50% of total
Age adaptability 10% of 50%—making overall disability 55% of total.

Commissioner C. W. Tysoe seems to have felt that although it was satisfactory for the Board to start with a percentage rate based on simple physical impairment, it should then apply other variables to arrive at the final percentage of impairment of earning capacity that would constitute the award. He approved of the age variable, but seems to have been inclined to the view that an occupational variable should also be applied.[5]

One suggestion made to us is that the simple physical impairment rating could be modified by reference to hazard classifications, or to

5. *Report of the Royal Commission on The Workmen's Compensation Act*, 1966, British Columbia, pp. 276-284.

assessment classifications. A complicated three-dimensional schedule on these lines is in use in California. We are apprehensive, however, that the administrative difficulties would be enormous, and we have grave doubts about the feasibility of introducing an occupational variable by reference to general categories or classifications. If an occupational variable is to be introduced, our inclination is to the view that it must be done by enquiry into the circumstances of the individual case and not by reference to pre-determined classifications.

In this connection, it should be borne in mind that one occupational classification adjustment cannot be used with respect to all injuries. A scheduled occupational variable would require a pre-determination matching each potential injury with each occupational category (whether that category be a hazard classification, an assessment classification, or a trade classification). The total permutation involved in matching all disabilities that can occur against all occupational categories to stipulate in advance what percentage rate would be payable for each disability in each occupational category would be a tremendous task, the more so because the injury experience of this province would not be large enough to provide a sufficient data base for that purpose.

The same conclusion has been reached when this possibility has previously been studied elsewhere.

> "Owing to the very large number of individual cases that have to be observed, the multiplicity of the observations to be made, and the length of the period that has to be considered before any generally applicable conclusion can be drawn from the reduction in wages observed under all the circumstances covered, the difficulty of correcting the data obtained when they are not sufficiently representative, and in general the scope and detail of the investigations necessary in order to take account of age and former occupation in establishing invalidity schedules, attempts to draw up schedules of this type have hitherto been limited to a minimum."[6]

It is therefore our feeling that if an occupational variable is to be applied to the percentage rate derived from the medical examination, it must be done by reference to evidence in the particular case rather than by attaching a pre-determined significance to an occupational classification.

6. *The Projected Loss of Earnings Method*

Instead of attempting to keep track of the actual earnings of a claimant indefinitely into the future, a forward projection could be made of the impact of the disability on future earnings, and by reference to that projection, a conclusion reached about the impairment of earning capacity.[7] Where a disability appears to have stabilized, then, absent any evidence on which to make a different projection, it could

6. *The Evaluation of Permanent Incapacity for Work in Social Insurance*, 1937, I.L.O., p. 103.
7. A version of this method was mentioned in the Report of the *Royal Commission on The Workmen's Compensation Board*, 1942, British Columbia, p. 108.

be assumed that the claimant will continue to earn indefinitely into the future at a level equivalent to what he is able to earn at the time of the evaluation. Of course this will always be different from actual earnings. Shifts in the condition of the labour market, improvements of skill on the part of the claimant, subsequent sickness for other reasons, and a whole range of other variables may result in actual future earnings being different from the projection. But this loss of accuracy might be considered a price worth paying to avoid the intrusion into the private lives of claimants that might be required in measuring actual earnings or earning capacity on a continuing basis, to keep administrative costs to an acceptable level, and perhaps most important of all, to avoid creating a disincentive to vocational rehabilitation.

This method might be viewed either as a modified physical impairment method, or as a species of wage-loss method.

A relevant factor is that the occupations available to people with disabilities tend to be those in which demand is more constant, and we are advised that in the processes of vocational rehabilitation swings in the economic cycle are much less significant than the personal variables relating to individual claimants.

If this method is adopted, then bearing in mind current rates of inflation and the time interval that usually elapses between the injury and the determination of a pension, the comparison of pre-accident earnings with earning capacity at the time of the evaluation must allow for inflation. Since a pension so assessed would be subject to upward revision by reference to the Consumer Price Index pursuant to Section 25, the adjustment for inflation should be backwards rather than forwards. In other words, the impact on earning capacity would be measured by taking pre-accident average earnings in comparison with what the claimant is able to earn after the injury in the same or some other suitable occupation, taking the earnings in the suitable occupations as being those applicable at the time of injury. The development of the Rehabilitation Services Department at the Board offers a facility for data input about earning capacity that may make the adoption of this method more feasible than in the past.

The projected loss of earnings method is a difficult one to blend with the application of the statutory ceiling. This blending could easily be accomplished if the ceiling related to the amount of compensation payable, but it is much more difficult when the ceiling relates to the average earnings to be used in the calculation. Section 24 refers to the "loss of average earnings", and Section 31 indicates that average earnings must only be calculated up to the ceiling. But suppose, taking the current ceiling of $8,600, a man is injured with the result that his earnings drop from $15,000 to $10,000. If, following the wording of Section 24 (1) (a), compensation is to be calculated by estimating the impairment of earning capacity "from the nature and degree of the in-

jury", he should obviously receive compensation. Under current practice, he does receive compensation based on the application of the estimated degree of disability to the statutory ceiling and the statutory percentage rate. For example, if the physical impairment of a claimant is assessed at 20% of total disability, he would receive 20% of 75% of $8,600, which is $1,290 per annum.

But if compensation is to be based on the estimated loss of "average earnings", then using that term literally as it is defined in Section 31, he should receive nothing. In other words, no compensation would be payable for partial disability unless it reduces actual loss of earnings to a point below the ceiling. But that is not a view that has ever been taken by this Board, nor by any Royal Commission studying workmen's compensation in British Columbia, nor as far as we know by any other Board in Canada. It is not a conclusion required by the terms of the Act, and we do not feel that it is a conclusion that should be reached now.

It seems to us that the only way out of this dilemma is to look at the percentage by which actual average earnings have been reduced by the ceiling, and then reduce the post-injury earning capacity for the purpose of comparison by the same percentage. This would treat earnings above the ceiling in the same manner as they are now treated by the physical impairment method. The formula for applying this principle will be illustrated below.

If this method is used, the calculation would be made as follows.

(a) Average earnings prior to the injury would be determined in the same manner as at present.

(b) Having regard to the evidence, including the medical evidence, of the limitations imposed by the disability and the fitness of the claimant for different types of work, and having regard to the evidence of the Rehabilitation Consultant about the suitability of the claimant for available jobs, the Disability Awards Officer would arrive at a conclusion about suitable occupations that the claimant could be expected to undertake.

(c) Earnings in those occupations would then be determined as at the time of the injury.

(d) It should then be considered whether any evidence has been produced or is available in the particular case on which to predict that future earning capacity is likely to be different from what it is at the date of the award for reasons other than a change in the medical condition of the claimant. If so, an adjustment should be made having regard to that evidence.

(e) If average earnings have been reduced by the ceiling, the estimated post-injury earning capacity would be reduced in the same ratio.

(f) The pension would then be 75% of the amount by which the earnings level thus established is less than the average earnings prior to injury.

(g) Any increase that may be due to the claimant under Section 25 by reference to the Consumer Price Index would then be added.

A pension established under this method would be permanent to the same extent as at present, that is, it would not be reviewable by reference to changes in economic conditions, but it would be reviewable by reference to any change in the medical condition of the claimant.

Although this method involves an obvious margin of error as a way of measuring actual loss of earnings, it is still at least arguable that the margin of error would be narrower than with a physical impairment method.

A difficulty with this method, if used exclusively, is that it would not provide a formula for dealing adequately with situations in which there is no immediate wage loss but there is still a loss of earning capacity. Cases of this type commonly occur where the victim of a partial disability returns to his former employment. The employer may be motivated by a feeling of loyalty or some other special consideration that would not be present if the claimant was seeking employment on the open market, which he may well be doing at some time in the future. Hence in cases where a claimant is able to return to his former occupation, earnings at the time of evaluation may be less reliable as a guide to the impairment of earning capacity than in other cases.

7. *A Dual System*

Some of the problems involved in the measurement of partial disability have arisen from the attempt to encompass too much in one calculation. There may be much to be said for the view that disability compensation should be awarded under two headings.

(a) *Compensation for the injury itself*

This could be by way of lump sum or pension. This award would cover presumed loss of earning capacity (without enquiry into actual loss of earning capacity) and would also cover non-monetary losses.

(b) *Compensation for loss of earning capacity*

This would be based on the projected loss of earnings method.

A problem that has featured in the discussion of dual systems has been whether compensation awarded under heading (a) should be deducted from that awarded under heading (b), or should be additional.[8]

8. See e.g. *The Report of the Task Force on Workmen's Compensation*, 1973, Saskatchewan, pp. 15-19.

The Saskatchewan Task Force recommended that it should be deductible.[9] But this means that up to the level of the compensation awarded under heading (a), the person who is suffering an actual loss of earnings will receive only the same compensation as someone who is suffering no loss of earnings at all. Moreover if compensation is to be awarded for non-monetary losses, it is difficult to see why this type of compensation should be awarded to those who have suffered no loss of earning capacity but denied to those whose impairment of earning capacity has been substantial. Bearing in mind the two purposes of the compensation suggested under heading (a), the better approach might be to say that half of the compensation awarded under heading (a) would be deductible under heading (b).

Although a dual system of this type may be attractive, it does not seem to us at first impression that the Board has authority under the terms of the Act to adopt a system that includes to this extent compensation for non-monetary losses.

8. *The Permanence of Pension Assessments*

A possibility that has sometimes been discussed is that disability awards should be made in the first instance for a trial period, say one year, following which the permanent pension should be assessed having regard to the experience of the claimant in working with his residual disability.[10] The advantage claimed for this proposal is of course that the experience of the claimant in working with his disability provides a better guide to the impairment of earning capacity than a medical assessment and discussion prior to his return to work. At present, there is often a return to work prior to the assessment of a pension, but there is no fixed trial period.

We are apprehensive about the introduction of a fixed trial period. It would prolong the time during which a claimant may feel a disincentive to succeed in vocational rehabilitation. This is relevant in two respects. First, if a claimant recognizes a disincentive to try this during the trial period, this could have a distorting effect on the result and undermine the value of the trial period as evidence of actual impairment of earning capacity. Secondly, if the claimant has any propensity to compensation neurosis, the trial period would tend to make it more entrenched.

On the other hand, we do not propose that pensions should always be determined prior to a return to work. There is too much individual variation. One man may be anxious to return to work, so much so that unless persuaded otherwise he may take a job that will clearly be too much for him. Another may be poorly motivated and difficult to place in

9. *Ibid.* p. 19.
10. See e.g. *The Report of the Royal Commission on The Workmen's Compensation Act*, 1966, British Columbia, p. 307.

employment until a pension has been assessed. For the time being at least, we feel that the exact timing of pension assessments should be left to the discretion of those responsible for disability awards and not prescribed by any general rule.

9. *General Conclusion*

We do not plan to introduce immediately any change across the board in the method of measuring partial disability. We would like more time for reflection, and for considering any further comments. We feel, therefore, that the right course at the moment is simply to publish this discussion of the possibilities.

With regard to back injuries, however, the matter is too urgent and a decision must be reached now.

10. *Injuries Involving the Spinal Column*

As we mentioned at the beginning, it appears that current rates of compensation for spinal injuries are, in many cases, grossly inadequate as compensation for the impairment of earning capacity. For example, our rates for cases involving laminectomy and fusion are in the range of 5% to 10% of total disability.

A spinal injury of this type might result in an impairment of earning capacity of 50% or more in one case, though there may be little or no loss of earning capacity in another. With this type of injury one would obviously expect the impairment of earning capacity to be greater for someone who has to withdraw from a skilled manual trade than for someone who was already in a sedentary occupation that he is able to continue.

We feel, therefore, that a solution ought not to be found simply in raising the percentage rates. If changes are to be made in the measurement of partial disability, the aim must be fair compensation. That is not the same thing as more for all.

Our conclusion with regard to injuries to the spinal column is that we should introduce a type of dual system. Permanent partial disability awards in these cases will be calculated as follows:

(a) The degree of physical impairment will be calculated as at present, modified by age as at present, and a pension estimated according to present routines.

(b) A pension will be calculated according to the projected loss of earnings method described under heading 6 above.

(c) The higher of these two results will then be used as the pension.

We feel that this formula is justified in the back injury cases because the percentage rates currently in use are so low as to constitute the minimum for a presumed impairment of earning capacity under a

dual system. This is so even allowing nothing for non-monetary losses. It is a different matter with regard to current percentage rates for other disabilities. For example, our current percentage rates for amputations may be at or above the average impairment of earning capacity. We do not think it would be right, therefore, to adopt this type of dual system with regard to those cases if present percentage rates were used as the base.

An aggravating factor in the back injury cases is the difficulty of distinguishing in the first instance between disabilities resulting from work activity and those resulting from the degenerative process. That problem must, however, be treated as a collateral issue. Many of these cases are arguable both ways. A judgment must be made on whether the present disablement results entirely from a work injury, partly from a work injury and partly from a pre-existing disability, or entirely from a pre-existing disability or other causes. But once the decision has been made that the disability results from a work injury, a claimant is then entitled to compensation benefits, and the level of the benefits awarded must not be reduced by reference to any lingering doubt on the issue of whether the injury is compensable at all. If there is any doubt about whether a disability is one arising out of and in the course of the employment, we have no authority to compromise on that issue by paying less than adequate compensation.

It may be helpful to illustrate how this formula will work. Consider the example of a skilled tradesman in a trade that involves manual labour. He was earning an average of $10,000 per annum when, in 1971, he suffered a back injury as a result of being crushed under a load dropped from an over-head crane. In the same trade he would now be earning an average of $12,500 per annum. He had spinal surgery, following which he was unfit to return to his former occupation. Having regard to his age and educational background, he is not considered suitable for re-training. But he is able to take an unskilled clerical job. He can now earn $6,250, but average earnings in 1971 for that occupation would be approximately $5,000. His pension is now being assessed in 1973. The way it might work out is as follows:

Method 1

Medical assessment estimates the degree of physical impairment, measured according to present standards, at 10% of total disability	10%	
Average actual earnings prior to injury	$10,000	
Statutory ceiling applicable in 1971	$ 7,600	
Amount that would be payable for total disability (75% of $7,600)	$ 5,700	
Compensation payable as partial disability pension (10% of total disability)		$ 570
Plus increases payable according to increases in the Consumer Price Index, 4.04%		$ 23
TOTAL pension payable in 1973		$ 593

Method 2

Actual average earnings in 1971	$10,000	
Statutory ceiling in 1971	$ 7,600	
Percentage by which the ceiling has reduced average earnings	24%	
Average earnings obtainable in unskilled clerical work in 1971	$ 5,000	
Less reduction of 24%	$ 3,800	
Compensable loss of projected earnings ($7,600 less $3,800)	$ 3,800	
75% thereof	$ 2,850	
Pension payable as at 1971		$ 2,850
Plus increases payable according to increases in the Consumer Price Index, 4.04%		$ 115
TOTAL pension payable in 1973		$ 2,965

Being entitled, in a back injury case, to the greater of the two amounts, the claimant will now receive a pension of $2,965 per annum. It may seem that this is still inadequate as compensation for an actual wage loss in 1973 of $6,250. But it is the combined effect of the statutory ceiling and the statutory percentage rate that produce this divergence, and these are requirements of the Act. Also the difference between the actual loss of earnings and the level of compensation is mitigated by the facts that the pension is tax-free, and that it is payable for life.

RESOLVED that:

1. Permanent disability pensions for injuries involving the spinal column will be calculated in the manner prescribed above.

2. There will be no immediate change in the measurement of partial disability in other cases.

Decision No. 9

RE PUBLICATION OF THE PERMANENT DISABILITY EVALUATION SCHEDULE

Practice Direction considered by:

T. G. Ison, Chairman
R. B. Carpenter, Commissioner
G. Kowbel, Commissioner

2nd October 1973

The Board has been considering whether it should make public its Permanent Disability Evaluation Schedule. This is the rating schedule currently used in the measurement of partial disability. Consideration of this matter came about at the initiative of the Board.

The practice has been to treat the rating schedule as a confidential document.

Consideration of publication did not come about in response to any perceived need, or to any assessment of the extent to which people will find it useful. It was simply a feeling that it is wrong in principle that documents having regulatory significance, or used as reference material in arriving at governmental decisions, should be treated as secret documents.

One objection to publication has been that the document is likely to be misunderstood. No doubt that is true. But if that was acceptable as

a ground for secrecy not much of our statute law would be published. Secondly, it has been pointed out that the schedule is not regulatory in that it does not prescribe the percentage rate to be used in a particular case. It simply provides guidance by indicating a standard percentage rate for certain injuries. The adjudicator is still free to apply other variables in arriving at a final pension. For this reason, publication of the schedule without any explanation of its use would no doubt cause confusion. We regard this, however, as a reason for publishing an explanation along with the schedule rather than as a legitimate ground for secrecy. Thirdly, most pension awards are not adjudicated by reference to the schedule. For the most part, the schedule only covers injuries to limbs, hearing, and vision. Thus the majority of claimants are not likely to find the schedule informative. But again, we cannot see that as any reason for secrecy.

We start with the general proposition that in any democratic society, documents used as source material in the decision-making process should be open to public inspection unless there is special reason for secrecy. We see no such reason in this case.

The schedule has not actually been a total secret. In 1952, the schedule in use at that time was published in the Royal Commission Report[1], and we are not aware of any dire consequences. During the Royal Commission enquiry conducted by Commissioner C. W. Tysoe, a complaint was considered relating to the secrecy of the schedule. The Chairman of the Board at that time assured the Commissioner that "it is available to genuinely interested persons and has been so for the past six or seven years".[2] In our view, however, the distinction between those who are "genuinely interested" and others is one that can neither be justified nor effectively administered. A document used as reference material for making decisions that govern the lives of many ought not to be reserved for the gaze of a privileged few.

Apart from the issue of principle, we think there are practical advantages to be gained by publication. First, we feel that greater openness in the decision-making process is more likely to inspire the confidence of those affected by the decisions. It must be very difficult for anyone to have confidence in the justice of a decision if he is told simply that he has been fairly treated according to invisible criteria.

Secondly, the Board has under consideration the possibility of reform in its methods of measuring partial disability. In attempting to improve the system, we often benefit from the comments of those who see it from a different perspective. But the quality of critical comment is bound to be lower if those who express their views are not fully informed about the present system and its workings.

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1. *Report of the Royal Commission on the Workmen's Compensation Act and Board*, 1952, British Columbia, p. 153.
2. *Report of the Royal Commission on The Workmen's Compensation Act*, 1966, British Columbia, p. 277.

RESOLVED that:

1. The Permanent Disability Evaluation Schedule shall be treated henceforth as a public document.

2. A copy of the Schedule will be available at the front counter, and at the counter of every area office, and will be shown to any person upon request.

3. The Disability Awards Officer when making a pension assessment will, upon request, show the claimant a copy of the Schedule.

4. A copy of the Schedule will be sent to any person in response to a request in writing addressed to the Information Services Department of the Board.

Decision No. 22

RE THE MEASUREMENT OF PARTIAL DISABILITY

Practice Directive considered by:

T. G. Ison, Chairman
R. B. Carpenter, Commissioner
G. Kowbel, Commissioner

9th January, 1974

The Claims Officer in charge of Disability Awards has requested further direction on the implementation of Decision No. 8 relating to the measurement of disability in cases involving injury to the spinal column.

The question is: When a pension has been assessed by the projected loss of earnings method (Method 2 on p. 40), should that pension be payable for life, or should that level of pension be payable to age 65, with a pension assessed by the physical impairment method (Method 1 on p. 40) payable for the remainder of the life of the claimant?

The point of the question of course is that most people who live long enough retire from earning at sometime, and 65 is commonly accepted as a standard retirement age. It might be suggested, therefore, that the portion of the pension which is based on the projected loss of earnings method, and which is in excess of what would be calculated by the physical impairment method, should be terminable at age 65.

There are probably two basic approaches that might be made in the connection between disability insurance systems and the provision of retirement income. One approach would be to ensure that those disabled prior to the age of 65 would be placed in the same income position in which they would have been had they been able to continue working without disablement until that age. This could be done by providing that the disability insurance system should pay into retirement income plans the same contributions that would have been paid by or on behalf of the worker. This approach is part of contemporary thinking in social insurance matters, largely because with advancing years, the distinction between disablement and deterioration through aging becomes increasingly blurred. This is particularly so with regard to injuries involving the spinal column. This approach has not been adopted with regard to workmen's compensation, however, partly no doubt because provisions for retirement income have generally been considered inadequate, particularly for industrial workers.

The second approach is not to provide for any transfer of money

from the disability insurance system to the retirement income system, but rather to continue the disability insurance benefits after retirement age. This is the approach that has been taken in workmen's compensation. Thus under the terms of the Act, the level of compensation is measured only by reference to loss of current earnings. The calculation of compensation does not include loss of fringe benefits such as contributions to retirement pension plans. On the other hand, the Board is authorized to pay pensions for life notwithstanding that the worker, had he not been disabled, would probably have retired at some stage.

The problem might be considered by reference to two examples. First, take a worker who suffers a disabling back injury at the age of 63. He is in an industry in which the normal retirement age is 65. He will have already accumulated most of his entitlement to retirement benefits and may be eligible under both government and private plans. In this case, for the Board to pay him a disability pension for life based on the projected loss of earnings method without considering the short period during which he would actually suffer any loss of earnings would surely be open to the objection of over-compensation.

Secondly, take an industrial worker who suffers a disabling back injury at the age of 43. With current rates of inflation, any eligibility to retirement benefits that he has accumulated by that age may be of trivial significance by the time he is 65. Thus in addition to his loss of current earnings during the years from age 43 to 65, he will be suffering a total or partial loss of opportunity to establish his eligibility for a retirement income. In that case, to continue his pension for life based on the projected loss of earnings method would seem to be reasonable compensation. If there appears to be over-compensation through the payment of a disability pension for a longer period than loss of "earnings" would be sustained, this is off-set (although not exactly) by the absence of compensation for loss of opportunity to accumulate an entitlement to retirement income.

If compensation is to be kept roughly proportionate to actual loss, the solution should be a sliding scale that will result in disability pension benefits after retirement age being a higher proportion of the wage-loss rate for those who were disabled earlier in life than for those disabled in their later years.

Of course not everyone retires at 65. Some retire earlier, some later, some never. But it would not be feasible to base the decisions in these cases on evidence (which would often be of a speculative nature) of when the particular individual would have retired but for the disability. Moreover we do not feel that decisions based on an attempt to determine when a particular claimant would have retired would be likely to result in any higher level of justice than could be achieved by using a standard formula.

RESOLVED THAT:

1. Where the injury occurred at or below the age of 50 years, a pension will be established based on the higher of the two formulae described in Decision No. 8, and the pension so established will be payable for life.

2. Where the injury occurred at or above the age of 65 years, a pension will be established by the physical impairment method, and that pension will be payable for life.

3. Where the injury occurred in the age range of 51 to 64 years, and where a pension calculated by the projected loss of earnings method is payable, the pension so calculated will continue until the age of 65 years. From the age of 65, the pension will be at the rate calculated by the physical impairment method, plus a proportion of the difference between the two methods, according to the following table.

At the age of 65, the pension payable in respect of injury involving the spinal column will be the amount payable under Method 1 in Decision No. 8, plus:

Where the injury occurred at age	51	14/15ths	of the difference between Method 1 and Method 2 in Decision No. 8
"	52	13/15ths	"
"	53	12/15ths	"
"	54	11/15ths	"
"	55	10/15ths	"
"	56	9/15ths	"
"	57	8/15ths	"
"	58	7/15ths	"
"	59	6/15ths	"
"	60	5/15ths	"
"	61	4/15ths	"
"	62	3/15ths	"
"	63	2/15ths	"
"	64	1/15th	"

4. This decision relates only to injuries involving the spinal column.

Decision No. 33

RE THE MEASUREMENT OF PARTIAL DISABILITY AND PROPORTIONATE ENTITLEMENT

Practice Directive considered by:

T. G. Ison, Chairman 29th March, 1974
R. B. Carpenter, Commissioner
G. Kowbel, Commissioner

A question has been raised with regard to the projected loss of earnings method used in the measurement of partial disability pursuant to Decision No. 8. The question is whether any variation should be made in the formula in a case where, prior to disablement by the back injury, the worker already had a disablement to another part of the body.

The doctrine of proportionate entitlement under Section 6 (5) only applies where an injury is "superimposed" on an already existing disability. It has no application when there are separate disabilities relating to different parts of the body. This has long been the accepted view when partial disability is being measured by the physical impairment method, and we see no ground for taking a different view when it is being measured by the projected loss of earnings method.

The effect of the first disability on earnings has already been determined by the state of the market. If that disability had no effect on earnings, there is surely no reason why compensation should be any the less because of its existence. Conversely, if the first disability did have an effect on earnings, then that effect is already reflected in the level of compensation. This is so because the "average earnings" used as a starting point in the measurement of compensation is the earnings of the worker at the time of the second disability. Thus to take those average earnings as a starting point in the calculation and then to make a further deduction because of the first disability would involve making a downward adjustment for the existence of that disability twice over.

RESOLVED that where compensation is being assessed pursuant to Decision No. 8 for a disability involving the spinal column and in respect of a worker suffering from an earlier disability in a different part of the body, the compensation will be determined by the formula in Decision No. 8 without regard to the earlier disability. Where both injuries are compensable, however, the total compensation payable is limited to 75% of the maximum prescribed in Section 31 (5).

Minority Report.

Commissioner R. B. Carpenter.

As indicated in the above heading, this matter was discussed by all of the Commissioners, but I regret my inability to concur with the conclusion.

It is unfortunate that reference to a specific claim is made in this memorandum, but this was in fact the case from which generalizations were drawn.

The relevant claim which was the basis of this discussion involved a hospital orderly with 27 years' service, who had three back operations performed in 1966, 1967 and 1968. At the outset, the application of limited entitlement was explained to the claimant, because of the pre-existing degenerative changes in his spine. This was in conformity with the Act in 1966—i.e., a "pre-existing condition" was properly recognized. In addition, the claimant had a left hip disability from childhood, which resulted in fusion in that area during adolescence.

The claimant worked until 8 January 1971, when he had further back trouble. Without consultation with the Board, a fourth back operation was performed in Kamloops on 5 March 1971. In a copy of a letter on file, the claimant states that the surgeon told him before this operation was performed, that it was not authorized by the Board. Thus this paramedical workman, who had three previous Board approved operations, and prior consultations during which he was informed that further surgery was contra-indicated, knew that this surgery would proceed contrary to Section 53 (2) of the Act. On appeals, the Board of Review and Commissioners declined Board responsibility for this surgery on the above basis. However, the Commissioners increased the P.P.D. from 10% to 20% of total because his back condition had deteriorated.

We are now advised that the workman is totally disabled. If this be the case, he may well qualify for a different disability award under the new schedule for back injuries. However, he did have a pre-existing disability resulting from a fused left hip and the Disability Awards Medical Officer very clearly indicates that he has a definite spinal tilt due to the pelvic tilt (resulting from the fused left hip) which he later evaluates as a disability equivalent to 35% of total.

Mr. Justice Tysoe, on Page 219 (last paragraph) of the Royal Commission Report, states: "Finally, in plain fairness, a condition which would not be productive of compensation benefits if work-caused, and otherwise qualifying under the Act, should not be treated as disabling so as to be put in the category of a pre-existing disability". Surely the converse must be equally true; a fused hip, which would definitely qualify for a permanent disability award, and which definitely causes a tilt to the disabled spine, should certainly be taken into consideration when assessing the extent of the present back disability. As the two conditions are demonstrably additive, the pre-existing degree of disability from childhood should be deducted from the total, in my opinion.

File information indicates that apart from any disability pension paid by the Board, the claimant's current income from other pension sources is approximately $400.00 per month, whereas his 1971 salary, during employment, was $389.00 per month. It would appear that a disability pension approximating 65% of total (100% reduced by 35% pre-existing disability) would be quite adequate in these circumstances, added, as it would be, to other current income.

Decision No. 34

RE THE ACCIDENT PREVENTION REGULATIONS AND THE PROSECUTION OF WORKERS

Policy Statement considered by:

T. G. Ison, Chairman
R. B. Carpenter, Commissioner
G. Kowbel, Commissioner

10th April, 1974

A claim was recently considered in which a worker suffered crushing injuries to his fingers through having his hand drawn into moving machinery. Subsequent investigation showed that the employer had followed proper lock-out procedures, and was complying with the Accident Prevention Regulations, and that the injuries resulted from the carelessness of the worker. The claim was allowed in the Claims Department and the employer appealed to a board of review, arguing that compensation should be denied under Section 6 (3). The board of review concluded that:

> "Although it is almost impossible to formulate a generalization of the definition of 'serious and wilful misconduct', it is probably quite reasonable to say that such conduct or, more properly, misconduct must go beyond mere carelessness or mere negligence, and that some element of intent with respect to the conduct in question must be present. In addition, for compensaion to be denied under that Section, the injury must be *solely* attributable to such serious and wilful misconduct."

The board of review rejected the appeal and concurred in the decision that the injuries were compensable. However, the board of review went on to suggest that the Board might consider a prosecution of the worker for violation of the Accident Prevention Regulations. This statement relates to that issue.

From time to time, the Board receives complaints from employers that insufficient attention is paid to violations of the Accident Prevention Regulations by workers. Accidents can come about through carelessness or neglect

Decision No. 95

RE THE MEASUREMENT OF PARTIAL DISABILITY

Appeal to the Commissioners considered by:

T. G. Ison, Chairman
G. Kowbel, Commissioner
T. R. Watt, Commissioner

6th February, 1975

A claimant with a compensable injury was awarded a pension for permanent partial disability. The pension was calculated by reference to the Permanent Disability Evaluation Schedule produced by the Board under Section 24 (1) (b). The claimant appealed to a board of review which, by a majority, affirmed the decision of the disability awards officer. The claimant now appeals to the Commissioners, seeking a higher level of pension.

The first argument raised for the claimant is that the pension is low having regard to evidence of the actual impact of the injury on earnings. Whether this is a factor that should be considered in establishing a disability award is something that we examined in *Decision No. 8*.[1] We concluded that the estimated impact of the disability on actual earnings should be considered with regard to injuries involving the spinal column, and a dual system of measurement was prescribed for those cases. With regard to all other disabilities, however, the decision was that, at least for the time being, the Board would not attempt any measurement by reference to the actual or projected loss of earnings, but would adhere to the modified physical impairment method there described, and which is still used.

Whether there should be any further departure from the modified physical impairment method is something that may well be considered in the future by the Commissioners, or by the Legislature. Indeed some further application of the projected loss of earnings method has been provided for by the Legislature in the enactment of Section 7A.[2] But the question is too complicated for further consideration in the limited context of an appeal on a particular claim.[3]

The second argument raised was that the particular item in the Permanent Disability Evaluation Schedule is low compared with similar items in similar schedules in use in some other jurisdictions. (Incidentally it could well be high in comparison with others). This again, however, is an argument for system change; not an argument showing any error in the decision of the

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1. (1974) 1 W.C.R. 27.
2. Not yet proclaimed.
3. In the particular case, it would not seem to make a great deal of difference which method is used. Under the physical impairment method, the claimant is receiving a pension of $65 a month. Using the claimant's own statement as to his actual earnings, a pension calculated by reference to actual loss of earnings would work out at $67.50 per month.

particular case. It may well be that the Permanent Disability Evaluation Schedule could be revised. But there are cogent arguments against the view that the process of revision should be continuous, and the most serious anomalies would result if any revision of the Schedule were attempted through appeal decisions in individual cases. Any revision of the Schedule must be undertaken by procedures that are appropriate to changes of a legislative nature.

It has been argued that in arriving at a disability award, reference can be made to schedules established elsewhere, as well as the Schedule established by the Board. That is certainly not so. The very purpose of the Schedule is to achieve at least one kind of consistency, i.e., that people suffering a similar disability should be assessed a pension based on the same percentage of total disability. Chaotic inconsistencies would result if each disability awards officer, each board of review member, and each Commissioner, felt free to browse through an array of disability award schedules in use in other jurisdictions in Canada and elsewhere and then to select among them whichever percentage rate seemed to him most appropriate in deciding a particular case. Also the practical result of that would be to repeal the statutory authority of the Board to establish one rating schedule for use in this Province. The schedules in use elsewhere are part of the material that the Board will look at in any revision of the Schedule here. But they are not part of the material relevant in the decision of any individual claim.[4]

Of course the Permanent Disability Evaluation Schedule is a set of guide-rules, not a set of fixed rules. As we pointed out in *Decision No. 9*,[5] the adjudicator is still free to apply other variables in arriving at a final pension. But the "other variables" there referred to means other variables relating to the degree of physical impairment, not other variables relating to social or economic factors, nor rules (including schedules and guide-rules) established in other jurisdictions.

For example, suppose a worker suffers an injury causing total immobility in his right ankle. That would be assessed pursuant to the Schedule at 12% of total disability. There may be an adjustment for age. But suppose it appeared that, at the time of the work injury, the worker was already suffering from a serious disability involving total immobility in his left knee. The disability awards officer may well conclude that having regard to the impaired mobility that he was already suffering through the disability in his left leg, the compensable disability in the right ankle results in a greater degree of physical impairment than it would for a person with a normal left leg. This is sometimes known as an enhancement factor. It is on this theory that a worker who suffers the loss of a first eye receives a pension calculated at 16% of total disability while the loss of both eyes is calculated at 100%. It is

4. Cases sometimes arise in which our Schedule provides no guidance whatever. Where that is so, it is sometimes the practice to look at the *Guides to the Evaluation of Permanent Impairment* published by the American Medical Association.
5. (1974) 1 W.C.R. 41, 42.

"other variables" of that kind that the disability awards officer may take into account, i.e., other variables relevant to the degree of physical impairment.

Another point that arose in this case is whether it is relevant, particularly in the case of a hand or arm injury, to consider whether the worker was left- or right-handed. Where a worker suffers say an injury to his right hand, and he is right-handed, the fact that he is unaccustomed to using his left hand to the same extent is not treated in the same way as a disability in the left hand. It is usually a temporary handicap rather than a permanent problem. Whether the worker was left or right-handed is, therefore, not a relevant factor in establishing a pension for a permanent partial disability. It is, however, a factor that may sometimes be relevant in establishing temporary benefits, or in the provision of rehabilitation services. For example, it might be relevant in deciding exactly when he is fit to return to work, whether more exercise is needed, or whether re-training may be needed.

Finally, we have been urged "to assure that individual justice is done in this case". The phrase "individual justice" sounds laudable; but it is an emotive phrase that serves more to blur the vision than to define the objective. It is, of course, possible to establish a system of decision by intuitive judgment in each case. But that is the system that workers' compensation was designed to get away from. While some discretion and intuitive judgment can be built into the system on some issues, it is still generally true that any system of social insurance, including workers' compensation, must operate by administration through rules; and these inevitably involve a level of generalization that treats as irrelevant factors that a system of intuitive judgment might permit to be influential. In setting up any system of compensation it is possible to consider more variables per case at a higher administrative cost per case. As the operational rules of the system are established, a judgment has to be made in this respect about where the point of diminishing returns is reached; and the Workers' Compensation Act was certainly not passed to emulate systems in which more money is absorbed in the administrative process than goes to the victims of injury. The objective is not Cadillac justice for one claimant regardless of the consequences for others: it is to achieve an optimum level of justice that can be applied to all. This requires rules to be established and followed, and this is bound to produce a result in each case that may differ to some extent from what the result would be if the adjudicator in each case sought to achieve the goals of the system as he perceives them by a totally intuitive judgment on the facts as they appear. If it is alleged that any of the prevailing rules are less than optimum, that is a matter that may be considered by the Legislature, or by the Board in the exercise of its legislative responsibilities. But it is not a ground of appeal in any particular claim.

RESOLVED that there be no change in the level of pension benefits in this case.

Decision No. 109

RE THE DUAL SYSTEM OF MEASUREMENT FOR INJURIES INVOLVING THE SPINAL COLUMN

Board resolution considered by:

T. G. Ison, Chairman
G. Kowbel, Commissioner
T. R. Watt, Commissioner

9th May, 1975

WHEREAS in Decisions Nos. 8 and 22 in the Workers' Compensation Reporter the Board established a dual system of measurement for injuries involving the spinal column,

AND WHEREAS the Board has, using the said method of assessment, reviewed cases of workers currently in receipt of pension benefits for an injury involving the spinal column,

AND WHEREAS no Board decision has yet been made with regard to the application of the said dual method of assessment on any application for re-opening of a claim involving injury to the spinal column,

RESOLVED THAT upon any application for re-opening of entitlement to pension benefits in case of an injury involving the spinal column the said dual method of assessment shall be applied if the worker is under the age of 64 years and a pension has not previously been calculated or considered for him under the dual method.

This resolution applies regardless of the date of injury, but the effective date for any readjustment pursuant to this resolution shall be the date of the application for re-opening.

Where the claimant was in receipt of a term pension that has expired or has commuted a life pension, the pension so expired or commuted shall be recalculated as a notional life amount. If the projected loss of earnings method produces a pension in excess of that notional life amount, a new pension will be instituted, but only to the extent of the excess.

Section No.	July 1, 1975 Dollar Amount	Changed to	January 1, 1976 New Dollar Amount
18(1)	101.39		107.41
	31.46		33.33
23(2)	378.71		401.19
27(2)	87.39		92.58
31(5)	378.71		401.19
33(5)	52.21		55.31
60(8)	5,826.31		6,172.09
61(2)	11,652.62		12,344.17
62(3)	58,263.13		61,720.88
63(2)	11,652.62		12,344.17
63(3)	1,165.26		1,234.41
65(2)	1,165.26		1,234.41
Schedule C	244.70		259.22

And pursuant to Section 25 (4), all sections containing such dollar amounts are deemed to be amended accordingly.

Decision No. 160

RE THE CALCULATION OF PROJECTED LOSS OF EARNINGS

Directive considered by:

T. G. Ison, Chairman 20th November, 1975
G. Kowbel, Commissioner
T. R. Watt, Commissioner

There appears to be a need for further clarification of the formula applicable for the calculation of a projected loss of earnings under *Decision No. 8.* That decision relates to the calculation of permanent disability pensions for injuries involving the spinal column, though it is usually only relevant where a worker is unable to return to his pre-injury job, or to another position at or above the same level of earnings.

The item in the formula to which this decision relates is as follows:

> "(b) Having regard to the evidence, including the medical evidence, of the limitations imposed by the disability and the fitness of the claimant for different types of work, and having regard to the evidence of the Rehabilitation Consultant about the suitability of the claimant for available jobs, the Disability Awards

Officer would arrive at a conclusion about suitable occupations that the claimant could be expected to undertake."[1]

The purpose of this item in the formula is to arrive at a long-term projection of the earning capacity of the worker. The evidence of the rehabilitation consultant should therefore relate to jobs that are available to the claimant in the long run, and the conclusion of the disability awards officer should be about suitable occupations that the claimant could be expected to undertake in the long run, though not necessarily immediately.

It would not be satisfactory simply to take the wage rate in a job to which the claimant actually returns. There may be cases, for example, where a claimant, perhaps for reasons of personal preference, takes a position at a lower rate of pay than one which he could reasonably be expected to take. If so, the difference between the two wage rates should not be treated as a compensable cost of the disability. Again, there may be cases where a claimant elects not to work as a matter of preference notwithstanding that he is fit for jobs that are or would be available to him. Here again, the wage rates in those jobs should be considered notwithstanding that the claimant may be unlikely to undertake such employment.

In other cases, it could be that a high paying job is available to the claimant temporarily, but is unlikely to be available to him in the long run. Here again, it is earnings in jobs that are available to him in the long run that should be taken, rather than his immediate earning capacity.

For a variety of reasons, the long-term employment prospects of a claimant may be different from the most immediate job opportunities.

There is also another policy consideration. If the formula were limited to taking the wage rate in a job to which the claimant actually returns, it could generate an incentive to accept immediately a job opportunity paying a lower rate, and then, after the pension had been assessed, move to a better-paying position.

On the other hand, the phrase "available jobs" in *Decision No. 8* does not mean any job position in which there are vacancies. An available job means one available to the claimant in the long run. For example, a city may have several cinemas, and there may be constant job vacancies for the position of cinema commissionaire. But if there are always numerous applicants and the realities are that a worker with the particular disability is not likely to obtain such a job, that is not an available job for him.

In advising on the suitability of the claimant for available jobs, the rehabilitation consultant must assess the residual abilities of the claimant and his earnings potential, having considered all possible rehabilitation measures that might be of assistance, including the possibility of re-training or other measures that may be appropriate to the particular worker.

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[1] *Decision No. 8* (1973) 1 W.C.R. 27, 35.

These guidelines should be followed:

1. Where the worker is doing his best to maximize his earnings, and is following the advice of the rehabilitation consultant, and is presenting himself in good faith to obtain a job at the highest level of earnings among the jobs that he is fit to undertake, then the earnings level in the job that he actually obtains is generally the earnings level that should be taken; unless there is evidence that this position is transitory, and that jobs at another level of earnings will be available to the worker in the near future.

2. An available job must be one that the worker is fit to undertake, and which would not involve adverse consequences for his health either immediately or in the long run compared with other jobs.

3. In deciding whether it is reasonable for a worker to refuse a job, regard should be had to the long-term as well as the immediate position. For example, job A may have an earnings rate of $6.00 an hour, and job B may have an earnings rate of $5.00 an hour. But if job A is subject to fluctuations in the economy and job B appears more stable in the long run, then job B may be the better-paying job in the long run. Therefore the wage rate in job B should be used in the calculation of projected loss of earnings.

4. An available job must be one that is within a reasonable commuting distance of the worker's home. Where there is no available job within that commuting distance that the worker could reasonably be expected to undertake, he might in some cases be expected to re-locate, depending on his age, the availability of a suitable job elsewhere, and other factors. But he should not be expected to re-locate unless he is offered the expenses of re-location, either by Canada Manpower or by the Board or by some other Government agency.

5. If the worker declines the best-paying available job because of a personal preference for a lower-paying occupation or for an alternative life style, the wage rate in the best-paying available job should be used in the formula.

Decision No. 202

RE DUAL SYSTEM OF MEASURING DISABILITY

Directive considered by:

J. P. Berry, Vice-Chairman 8th September, 1976

G. Kowbel, Commissioner

T. R. Watt, Commissioner

Direction has been requested on the implementation of *Decision No. 22*[1] relating to the measurement of disability in cases involving injury to the spinal column.

The question is: where an injury occurs in the age range of 51 to 64 years, and the claimant receives full wage loss payments for the period up to his 65th birthday, should a permanent partial disability pension be assessed according to Resolution 2 of *Decision 22* or Resolution 3 of that decision?

In favour of Resolution 3 it may be argued that the claimant's injury has deprived him of some ability to accumulate retirement benefits for the period of his total disability. On the other hand, the payment of wage loss during this period will to some extent, if not completely, compensate the claimant for his loss.

There are administrative difficulties to making a dual award after the age of 65. To project the claimant's loss of earnings requires that the Board determine suitable occupations that the claimant could be expected to undertake.[2] To determine this when the claimant is past retirement age is both a difficult and hypothetical process.

The wording of Resolution 3 is inappropriate for the case being considered. Although the injury occurred in the age range 51-64 years, the payment of full wage loss until the worker is 65 years of age means that no pension can be paid in that period.

For the reasons set out above the Board considers that Resolution 2 of *Decision 22* is applicable in these cases.

RESOLVED THAT where an injury occurs in the age range 51-64 years, and the worker receives full wage loss payments from the date of injury up to his 65th birthday, a pension will be established by the physical impairment method, and that pension will be payable for life.

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[1] *Decision 22*, (1974) 1 W.C.R. 96, 98.
[2] *Decision 8*, (1973) 1 W.C.R. 27, 35.

Decision No. 297

RE THE DUAL SYSTEM AND NON-SPINAL INJURIES

Directive considered by:

Dr. Adam S. Little, Chairman
Mr. J. B. Paradis, Vice-Chairman
Mr. Sam H. Brown, Commissioner
Mr. Dennis Davis, Commissioner

30th March, 1979

In *Decision No. 8*[1], the Board reviewed the process by which Permanent Disability Awards are made and concluded that, in the case of spinal injuries, awards based on loss of function appeared to generally undercompensate injured workers. On the other hand, evidence available did not indicate that there was any general inequity in awards made in accordance with the *Disability Awards Evaluation Schedule* established under Section 24 (1) (b) for injuries unrelated to the spine. Section 24(1) (c) is inapplicable unless it is determined, in the judgment of the Disability Awards Officer, that it would be more equitable to forgo the Schedule and to make a permanent award for disability in an individual case based upon the difference between pre-injury and projected post-injury earnings. It was generally felt that awards for non-spinal injuries based upon the percentages set out in the Schedule tended to adequately reflect the potential future loss of average earnings of workers and it was therefore concluded that Section 24 (1) (c) would be generally inapplicable. Since that time, of course, the Board has continued to assess permanent disabilities in the spinal column in accordance with *Decision No. 8.*

In October of 1977, we considered it would be appropriate to explore further the question whether other permanent disabilities are indeed adequately dealt with by use of the functional impairment method. We felt it was necessary to establish, by reference to actual claims, whether the conclusions reached at the time of *Decision No. 8* were correct.

Accordingly, a Disability Awards Committee was established composed of the Director of Medical Services, the Director of Claims, the Director of Vocational Rehabilitation and the Disability Awards Manager. Each Disability Awards Officer was charged with the responsibility to determine in the first instance whether, in the case of an injury unrelated to the spinal column, an award under Section 24 (1) (c) would be more equitable; and, if so, to recommend with reasons that such an award be made. The file was then forwarded for review to the Disability Awards Committee. During the same period, the Disability Awards Committee reviewed those awards which were being made for spinal injuries and recommendations for such awards were also forwarded.

In the case of non-spinal injuries, the evidence overwhelmingly supports the conclusion that awards based upon the functional impairment method, with the use of the

1. *Decision No. 8,* 1 W.C.R. (1973), p. 27.

Disability Awards Evaluation Schedule as a guide, adequately represent the likely future loss of earnings of the worker. From October 1, 1977 to January 31, 1979, 4,180 cash and life, first and subsequent awards for permanent-partial disabilities not related to the spinal column were processed. Of these, 13 were referred to the Committee by Disability Awards Officers with reasons and recommendation for an award under Section 24 (1) (c). The Committee agreed with the Disability Awards Officer in 7 of those cases.

All other awards were granted on the basis of functional impairment alone, using the *Disability Awards Evaluation Schedule* as a guide. We are satisfied that that system operates to the advantage of claimants and the vast majority of cases should be dealt with on that basis. Nevertheless, the exercise has pointed out those few exceptional cases where, in spite of the effectiveness of the percentages set out in the Schedule, some workers will lose earnings in the future in excess of the amounts yielded by application of the Schedule. We feel that Disability Awards Officers, and the Disability Awards Committee, should have the power in such exceptional cases to investigate, consider, and where appropriate, implement a pension based on the potential loss of earnings of the worker.

We have therefore concluded that, in those cases where it is clearly warranted, injuries not related to the spinal column should be investigated and assessed in accordance with the procedures set out in *Decision No. 8.* The Disability Awards Committee will continue to perform the role it has performed during the survey. This policy will be effective as of October 1, 1977, and those awards already recommended by Disability Awards Officers for non-spinal injuries and agreed to by the Committee will be implemented.

Decision No. 383

RE APPLICATION OF DUAL SYSTEM

Board of review decision considered by:

A.P. Devine, Chairman 12 March, 1984

A.W. Read, Member

L.A. Kingman, Member

The employer's appeal is from a decision of the Disability Awards Officer of the Workers' Compensation Board dated July 28, 1982. For the reasons explained in that letter, the employer was informed that the worker's permanent partial disability award had been reviewed. As a result of that review, it was concluded a loss of earnings pension equivalent to total disability would be paid. The award was based upon maximum earnings on the date of the reassessment.

The employer duly filed an appeal with respect to that decision. The reasons for the appeal were set out at a hearing held on September 21, 1983.

It was established at the outset that the employer does not contest reassessment of the worker's functional award to 55% of total disability.

The employer contests the payment of the pension based on the worker's loss of earnings. The employer's representative did not contest the conclusion that the worker was unemployable but rather contested the basis for his unemployability. It was noted that the worker is an alcoholic who spends most of his pension benefits on drink. As this was the substantive reason for his unemployability, it was felt a pension should not be paid to reward the habit. Re-opening of the claim at maximum earnings was also questioned with respect to the application of *Decision No. 249.*[1]

The claim was established for severe head injuries which the worker suffered while employed as a faller on May 18, 1970. The worker had been employed only since March 5th. He suffered an extradural hematoma which required a craniotomy to repair. The injury damaged the sixth cranial nerve and resulted in a reduction of intellectual function, hearing loss, loss of smell and taste and weakness of the left shoulder.

Following treatment for the injury, he was able to resume working but was unable to return to his previous employment as a faller. Following some persistence, he was able to successfully return to work at a relatively simple job of box car loading.

In July 1972, a pension of 35% of total disability was assessed. There was no initial history of alcohol abuse recorded on the claim file at this time. However, the worker had lost his driving license prior to the compensable injury as a result of a conviction for impaired driving. In September 1974, a doctor noted nystagmus and ataxia due to alcohol abuse. At the same time, the worker was assessed by a psychologist and his intelligence quotient had improved four points overall from the previously recorded 86 to 90. The worker was still employed as a mill worker at that time.

Apparently, he lost his job in 1975 due to economic cut backs. Nothing was heard

1. (1977) 3 W.C.R. 137.

from the worker until his physician requested that his pension be assessed in 1981 because he was unable to be gainfully employed.

The psychologist reviewed the worker's case once again. By this time, his full function intelligence quotient had dropped 11 points to about 79. The psychologist recognized that other factors apart from the injury might be responsible for this deterioration in performance. He did not feel that the worker could be gainfully employed on a regular basis in view of economic factors as well as the demonstrated impairment.

Following that review, the Disability Awards Medical Adviser recommended that the permanent partial disability award be increased to 55% of total disability. She recognized that it would be difficult to employ the worker in suitable employment.

Subsequent reports from the attending physician refer only to the worker's excessive drinking as a limiting factor in his case. It is obvious from reading the claim file that the Rehabilitation Consultant has spent a good deal of time attempting to assess the worker's potential for re-employment and has concluded quite correctly that he is unemployable, having settled into his lifestyle of excessive drinking and associating with others who pursue the same avocation.

From all of this, it was concluded that a loss of earnings pension should be payable in this case.

The Disability Awards Officer was given the unfortunate task of trying to differentiate between the worker's known alcohol abuse and his cognitive dysfunction. The evidence was of a continued mental deterioration since the injury with evidence of impairment of adaptive abilities dependent upon organic brain function. It is also noted that the psychologist report did make reference to the possibility of alcohol abuse on the worker's cognitive disability. For that reason, alcohol abuse was not considered as a feature of the worker's disability.

With that conclusion, the Panel respectfully disagrees. It is obvious from the evidence that the worker is literally drinking himself to death. To ignore his lifestyle effectively ignores one of the primary reasons for the worker's present unemployment. A loss of earnings pension is paid to recognize a greater impact on a worker's earnings than is compensated for on a functional loss basis. It is the impact of the disability alone that must be looked at. The conclusion of the Disability Awards Officer in this case effectively means that anyone with a cognitive disability equivalent to that demonstrated by this worker is unemployable, a fact which is not supported by medical evidence or opinion. In our view, the loss of earnings aspect of this claim should be reconsidered only on the basis of whether or not the cognitive disability renders the worker unemployable or diminishes his employability. While the worker is, in fact, unemployable at this time, it appears to be largely due to indulgence in alcohol, which is a matter of personal preference, and which should not form the basis for an increased pension.

We have also considered the recalculation of the worker's earnings under *Decision No. 249* at maximum when the claim was re-opened. A Disability Awards Officer exercised discretion in concluding that the worker had been a maximum earner prior to the compensable injury and felt that his lack of earnings over the period 1975 to 1981 was due to the effects of the compensable injury. For that reason, the claim was

re-opened at maximum as well.

The Panel is of the opinion that *Decision No. 249* does not authorize a re-opening on the basis outlined on the claim file. Section 32 of the *Workers' Compensation Act* regarding recurrence of disability permits a re-opening of a claim after three years on the basis of the worker's earnings at the time of the re-opening. *Decision No. 249* allows the Claims Adjudicator to use the earnings which the worker made at the time of the original injury in certain cases if the worker's earnings are less at the time of re-opening. It also permits the Claims Adjudicator to estimate the worker's earnings *at the time of his injury* if for some reason those earnings are unknown when the re-calculation is made (emphasis added).

In the present case, the worker's earnings were based on the statistical wage rate for a faller in July 1981 and not the date of the worker's original injury. This is clearly not contemplated in *Decision No. 249* and is not permitted in Section 32 of the *Workers' Compensation Act.* Further, the worker's average earnings at the time of his original injury are well known. It is documented on file that his earnings were in excess of maximum at the time of the injury. Therefore, the re-opening is to be calculated on the earnings at the time of injury together with appropriate C.P.I. increases to the date of re-opening.

DECISION

It is the unanimous decision of this Board of Review that the employer's appeal be allowed as previously outlined.

Decision No. 384

RE INTEREST PAYMENTS ON RETROACTIVE PENSIONS

Board Resolution considered by:

W.R. Flesher, Chairman 1 May, 1984
R.B. Bucher, Commissioner
G.W. Hall, Commissioner
M.L. Parr, Commissioner
H.E. Scollan, Commissioner

The Board has decided that, effective May 7, 1984, interest shall be paid on retroactive wage loss and pension lump sum payments subject to the following conditions:

1. The decision to award interest shall be made by the Claims Adjudicator or Disability Awards Officer, as the case may be.

2. Interest will be paid when the wage loss or pension if for a condition which was previously overlooked or for which it was previously decided that no payment was due.

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Part 2 – Fees for Disclosure of Files

THE BOARD HAS RESOLVED that

1. A fee of $10.00 be paid to the Board by a person requesting disclosure of a file for the first time before copies of documents on the file are provided to that person.

2. The $10.00 fee also be payable before copies of file documents are provided where there has been a previous request for disclosure by the same person or his representative and the present request relates to a different appeal or proceeding from the previous request or is a request for duplicates of copies previously provided which have been lost.

3. The $10.00 fee be paid by way of money order or certified cheque payable to the Workers' Compensation Board and that uncertified cheques not be accepted.

4. This directive applies to requests for disclosure made in connection with appeals or other proceedings commenced on or after January 1, 1985. It is dealing with the payment of fees only and makes no change in the eligibility of persons to receive disclosure.

Decision No. 394

RE THE DUAL SYSTEM OF MEASURING DISABILITY

Board Directive considered by:

W.R. Flesher, Chairman
G.W. Hall, Commissioner
J.M. Nutter, Commissioner
M.L. Parr, Commissioner

18th April, 1985

1. INTRODUCTION

Section 23(1) and (3) of the *Workers' Compensation Act* provide as follows:

"(1) Where permanent partial disability results from the injury, the impairment of earning capacity shall be estimated from the nature and degree of the injury, and the compensation shall be a periodic payment to the injured worker of a sum equal to 75% of the estimated loss of average earnings resulting from the impairment, and shall be payable during the lifetime of the worker or in another manner the board determines."

"(3) Where the board considers it more equitable, it may award compensation for permanent disability having regard to the difference between the average weekly earnings of the worker before the injury and the average amount which he is earning or is able to earn in some suitable occupation after the injury, and the compensation shall be a periodic payment of 75% of the difference, and regard shall be had to the worker's fitness to continue in the occupation in which he was injured or to adapt himself to some other suitable employment or business."

Prior to October 2, 1973, the Board had only one basic method of assessing permanent partial disability awards under these provisions or their forerunners. This was known as the physical impairment or loss of function method and is still in use.

Under this method, the Board does not attempt to measure the individual worker's actual loss of earnings resulting from his permanent disability. It concentrates rather on the worker's physical condition, and results in a percentage of disability being allocated. Although this percentage can be modified in respect of the worker's individual circumstances, it is primarily a measure of the loss which on average is expected to result from his particular type of disability.

The physical impairment method can be criticized on the ground that it calculates only the average loss resulting from a disability and is, therefore, prejudicial to workers whose loss from their disability is above average. In recognition of this criticism, the Board, on October 2, 1973, introduced a dual system for assessing permanent disability pensions involving the spinal column and, on October 1, 1977, this was extended to non-spinal injuries. The dual system applies in any case where it is felt that the worker may have suffered a loss of earnings because of his compensable disability which is greater than that allowed for by the physical impairment method of assessment. Under the dual system, awards are calculated as follows:

1. The degree of physical impairment is calculated pursuant to Section 23(1) using the method described above and a possible pension is calculated in accordance with this.

2. A possible pension is calculated pursuant to Section 23(3) according to the projected loss of earnings method described below.

3. The higher of these two results is then used as the pension.

It is not the intention of the dual system to grant automatically an award on a projected loss of earnings basis without regard to the nature of the condition or disability causing the unemployability or loss of earnings. The worker must not only have a disability accepted by the Board, but the disability accepted by the Board must be a significant factor in the reduced employability or loss of earnings potential.

The dual system outlined above will continue in effect.

The purpose of this decision is to review and consolidate the practices followed by the Board in applying the dual system in light of criticisms that have been made of the system and the Board's experience over the past 10 or 11 years.

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2. ASSESSMENT FORMULA FOR PROJECTED LOSS OF EARNINGS METHOD

The projected loss of earnings method adopted by the Board under Section 23(3) for the measurement of permanent disability will from the date of this decision be as set out below:

A. Average earnings prior to the injury will be determined in accordance with established policies and procedures.

B. Having regard to the evidence, including the medical evidence, of the limitations imposed by the compensable disability and the fitness of the claimant for different types of work, and having regard to the evidence of the Rehabilitation Consultant about the suitability of the claimant for jobs that could reasonably become available, the Disability Awards Officer will arrive at a conclusion about suitable occupations that the claimant could be expected to undertake over the long-term future.

C. Earnings that maximize the claimant's long-term potential will be selected from the jobs that are suitable and reasonably available. Earnings in those occupations will be determined as at the time of the injury.

D. The possible pension will then be 75% of the amount by which the earnings level thus established is less than the average earnings prior to the injury.

E. Any increase that may be due to the claimant because of an increase in the Consumer Price Index will then be added.

Further comment is required on A to C above which is set out below.

A. Average Earnings Prior to Injury

Section 23(3) of the *Workers' Compensation Act* requires the Board to have regard to the "average weekly earnings of the worker before the injury". This is generally in line with the other sections of the Act which govern the payment of temporary or permanent disability benefits, namely Sections 22, 23(1), 29 and 30. All of these provisions base compensation on the worker's earnings, but use the slightly different term "average earnings".

It has been argued that the use of the term "average weekly earnings" in Section 23(3), as opposed to the term "average earnings" is significant. This argument arises in relation to the provisions of Section 33(1) which give the Board a wide authority to determine the "average earnings and earning capacity of a worker", but place a limit on the earnings that can be used in the form of the maximum wage rate. It is contended that since it specifically refers to "average earnings", Section 33(1) is not relevant to determining "average weekly earnings" under Section 23(3) with the result that the maximum wage rate does not limit those earnings. Rather, the maximum limits only the ultimate pension that can be awarded under that section.

While the Commissioners note the slight difference in terminology, they do not consider this difference to be significant. Section 23(3) clearly requires the Board to determine a worker's earnings prior to the injury and Section 33 is the only section in the Act which provides for how this is to be done. The Commissioners have considered the suggestion that instead of applying to the worker's pre-injury earnings, the maximum should limit the amount of the pension, but do not feel that this suggestion is supported by the provisions of the Act. They concluded that "average weekly earnings" prior to the injury must be determined under the projected loss of earnings method in the same manner as "average earnings" are determined for the purpose of pensions assessed under Section 23(1) and the maximum wage rate must apply to limit those earnings. This will continue the existing practice of the Board.

B. Suitable and Available Occupations for the Claimant

The purpose of direction B in the assessment formula is to arrive at a long-term projection of the earning capacity of the worker. The evidence of the Rehabilitation Consultant should relate to jobs that are suitable and reasonably available to the claimant in the long run and the conclusion of the Disability Awards Officer should be concerned with such of those jobs as will maximize the claimant's long-term earnings potential.

It would not be satisfactory simply to take the wage rate in a job to which the claimant actually returns. For a variety of reasons, the long-term employment prospects of a claimant may be different from the most immediate job opportunities. On the other hand, the phrase "available jobs" does not mean any job position in which there are vacancies. An available job means one reasonably available to the claimant in the long run. For example, a city may have several theatres, and there may be occasional job vacancies for the position of theatre usher; but if there are always numerous better qualified applicants and the realities are that a worker with the particular disability is not likely to obtain such a job, that is not a reasonably available job for him.

In advising on the suitability of the claimant for reasonably available jobs, the Rehabilitation Consultant must have regard to the limitations imposed by the residual compensable disabilities of the claimant and assess his earnings potential in light of all possible rehabilitation measures that might be of assistance, including the possibility of retraining or other measures that may be appropriate to the particular worker.

The guidelines set out below are to be followed in determining suitable and reasonably available jobs for a claimant:

1. Where the worker is doing his best to maximize his earnings, and is following the advice of the Rehabilitation Consultant, and is presenting himself in good faith to obtain a job at the highest level of earnings among the jobs that he is fit to undertake, then the earnings level in the job that he actually obtains is generally the earnings level that should be taken, unless there is evidence that this position is transitory and that jobs at another level of earnings will be available to the worker in the near future.

2. Regard may be had to other jobs than the worker's present one with the same employer to which he might in future progress and this is not limited to jobs which the claimant has a right to because of seniority. The fact that there is a formal or informal competition for a higher job is not a bar to its being considered. On the other hand, it would not be fair to assume that a claimant will receive all possible promotions that might theoretically be open to him. The Board is only concerned with jobs that are, in practice, reasonably available. Thus, the Board will, in general, only have regard to higher paying jobs which a person in the claimant's present job would ordinarily be expected to obtain.

3. A reasonably available job must be one that the worker is fit to undertake, and which would not involve adverse consequences for his health either immediately or in the long run compared with other jobs.

4. Where a suitable job is reasonably available over the long term, it is taken into consideration even though it is not reasonably available at the time of assessment because of general economic conditions.

5. In deciding whether it is reasonable for a worker to refuse a job, regard should be had to the long term as well as the immediate position. For example, job A may have an earnings rate of $6.00 an hour, and job B may have an earnings rate of $5.00 an hour; but if job A is subject to fluctuations in the economy and job B appears more stable in the long run, then job B may be the better-paying job in the long run. Therefore, the wage rate in job B should be used in the calculation of projected loss of earnings.

6. A reasonably available job must be one that is within a reasonable commuting distance of the worker's home. Where there is no available job within that commuting distance that the worker could reasonably be expected to undertake, he might be expected to relocate, depending on his age, the availability of a suitable job elsewhere, and other factors; but he will not normally be expected to relocate unless he is offered the expenses of relocation, either by Employment and Immigration Canada or by the Board or by some other government agency.

7. If the worker declines the best-paying reasonably available job because of a personal preference for a lower-paying occupation or for an alternative lifestyle, the wage rate in the best-paying reasonably available job should be used in the formula.

The above guidelines are with some modifications basically the same as those which the Board has followed in the past.

C. Measurement of Earnings Loss

Section 23(3) requires the Board to compare the average weekly earnings of the worker before the injury with "the average amount which he is earning or is able to earn in some suitable occupation after the injury". The latter figure is obtained by ascertaining

the earnings in the occupations which have been found to be suitable and reasonably available according to the criteria set out in B above and determining the earnings figure which will maximize the claimant's long-term earnings potential.

Prior to this decision, a further step was taken in relation to those earnings before they were used in calculating the pension. In cases where the pre-injury average earnings were reduced by the application of the maximum wage rate, the earnings which it was estimated the claimant could earn after the injury were reduced by the same ratio. The explanation for this was that, otherwise, a claimant who was still able to earn the maximum wage rate after the injury could not receive a pension assessed on a projected loss of earnings basis even though, because of his disability, his actual earnings were less than before.

The Commissioners appreciate the reasons for establishing this practice, but on reviewing the Act cannot find that this practice is authorized by its provisions or consistent with its overall intent and purpose. The practice, in fact, contradicts the words from Section 23(3) quoted above which require the actual earnings in the jobs in question to be used and do not authorize any adjustment of these earnings to reflect the fact that the pre-injury earnings were reduced by the maximum wage rate.

The Commissioners consider that the intention of the Act is to protect workers' earnings only up to the maximum wage rate. This is shown by Section 33(1) which results in payments for total disability being limited to 75% of the maximum and by Section 31 which ensures that, where a worker is already receiving payments for a disability, he can receive additional payments for any further disability only to the extent that they do not take his total payments above the maximum. The provisions of the Act governing the Board's assessing of employers for the purpose of obtaining the money used to pay compensation benefits are to the same effect. Section 38(3) provides that, where a worker's earnings exceed the maximum wage rate, the amount of the excess is deducted from the employer's payroll on which the assessments are paid. It seems to the Commissioners that, on general insurance principles, coverage under the Act should not extend to earnings on which assessments have not been paid.

The Commissioners have, therefore, decided, as of the date of this decision, to halt the practice of adjusting the earnings which it is estimated the claimant can earn after the injury by reference to any reduction in his pre-injury earnings because of the maximum wage rate. The effect of this decision is that no pension can be awarded on a projected loss of earnings basis where, following the injury, the claimant is earning or is able to earn at or above the maximum wage rate. Where a claimant was earning at or above the maximum prior to the injury and it is projected that because of the injury his earnings will be less than the maximum, a projected loss of earnings pension can be awarded but only to the extent of the difference between the maximum and the projected earnings.

The question remains as to the date at which earnings in the jobs the worker can do after the injury should be taken. Although the assessment of the pension will often be made some time after the original injury, it would not be fair to compare directly the worker's actual pre-injury earnings with the earnings he might now earn in the jobs

available to him. The effect of inflation upon earnings levels would mean that his real loss would not be properly determined in that way. To allow for this, the practice of the Board has been to use the earnings in the jobs available after the injury as they stood at the date of the injury, and this practice will continue. It occasionally happens that earnings in jobs at the time of the injury are not available. If this occurs, it may be necessary to use the earnings in those jobs as they were at another date and bring the pre-injury earnings into line by applying Consumer Price Index adjustments.

3. DURATION OF PROJECTED LOSS OF EARNINGS PENSION

Pensions assessed on a physical impairment basis are, under the terms of Section 23(1), payable for life. The suggestion has been made that projected loss of earnings pensions should also be payable for life in every case, but the Board has not accepted this. Section 23(3) does not specifically require this, but rather gives the Board a discretion in the matter. Compensation is only payable under Section 23(3) "where the Board considers it more equitable". Since the section authorizes the Board to calculate a worker's actual loss of earnings resulting from his injury, it is reasonable for the Board to have authority to terminate benefits payable under the section at a time when, even if he were not disabled because of his compensable injury, the worker would not have been working.

The situation where this issue arises is where the worker reaches retirement age. Any direct loss of earnings which the claimant suffers because of his compensable disability will normally cease at that time. However, the Board has not in practice felt that this in itself was an automatic reason for terminating a projected loss of earnings pension. Rather, it has recognized that, because of his compensable disability, the claimant may have been less able to accumulate retirement benefits. The Board has, therefore, allowed the projected loss of earnings pension to continue in whole or part past the age of retirement when the worker was 65 years of age or younger at the time of the injury. The portion of the pension so continued depended on how close the worker was to the age of 65 years, it being assumed that the older the worker, the less his ability to build up retirement benefits would be affected by the injury. The age of 65 years was set as the age of retirement to be used in all cases. It was realized that this was, in some degree, an arbitrary figure, but it was felt to be preferable to the Board's having to decide in each case what the date of a person's retirement was. This would often be a difficult and speculative process.

The Commissioners feel that the reasoning previously adopted by the Board on this question remains valid and that the rules then adopted should continue in effect.

The following principles are, therefore, adopted as of the date of this decision.

1. Where, at the date of injury, the worker is at or below the age of 50 years, the pension is established on the higher of the physical impairment and projected loss of earnings assessment, and the pension so established, unless modified on a review, is payable for life.

2. Where, at the date of injury, the worker is at or above the age of 65 years, the pension is established by the physical impairment method, and that pension is payable for life. No projected loss of earnings pension is awarded.

3. Where, at the date of injury, the worker is in the age range of 51 to 64 years, and where a pension calculated by the projected loss of earnings method is payable, the pension so calculated, unless modified on a review, continues until the age of 65 years. From the age of 65, the pension is at a rate calculated by the physical impairment method, plus a proportion of the difference between the two methods according to the following table.

Age at Date of Injury	Proportion of Difference Between Two Methods
51	14/15ths
52	13/15ths
53	12/15ths
54	11/15ths
55	10/15ths
56	9/15ths
57	8/15ths
58	7/15ths
59	6/15ths
60	5/15ths
61	4/15ths
62	3/15ths
63	2/15ths
64	1/15th

The revised pension commences on the first day of the month following the claimant's 65th birthday.

Where the projected loss of earnings pension is assessed following a recurrence of disability, the age at the date of the recurrence is used for the purpose of the above principles.

4. REVIEWS OF PROJECTED LOSS OF EARNINGS PENSIONS

The basic rule established when the dual system was first introduced was that a pension assessed under the projected loss of earnings method would not be reviewable by reference to changes in economic conditions, but would be reviewable by reference to any change in the medical condition of the claimant. The effect of this policy was that a projected loss of earnings pension would not be reviewed simply because a worker's future earnings turned out to be greater or less than the amount projected. This would only be done if there was a change in his physical condition. That policy has been maintained until the present time.

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7/15ths
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There were several reasons for the reluctance of the Board to review projected loss of earnings pensions on economic grounds. It was felt that reviews would discourage a disabled worker from rehabilitating himself and increasing his earnings because any increase might result in a decrease in his pension. Reviews would also involve a continuing invasion of the worker's privacy and there would be an administrative cost in carrying out the reviews which would not necessarily result in more accurate projections of the disabled worker's future earnings loss.

After considering the matter carefully, the Commissioners have concluded that while there is some legitimacy in the reasons outlined above, reviews should be allowed for reasons other than a change in the worker's physical condition. They feel that such reviews could be carried out in a way that would increase the accuracy of pension assessments without excessively increasing costs and without unduly interfering with the worker's privacy or rehabilitation. It is not possible to have a system of review which does not in some degree have these disadvantages, but it is felt that, in the system proposed below, they would be outweighed by the benefits.

The Commissioners have decided that there should be an automatic review of an award made on a projected loss of earnings basis at two years from the date of assessment, or, if there is an appeal, two years from the date of the last decision resulting from the appeal process. Following that review, there will be no further automatic reviews, but the Disability Awards Officer will have a discretion to set up a claim for reviews at future dates which he determines. Apart from these reviews carried out by the Disability Awards Officer, there will be no change in the existing practice. Neither a worker nor an employer will have the right to apply for a review of a projected loss of earnings pension at any time unless there has been a change in the claimant's physical condition.

In exercising his discretion whether to set up a pension for later review, an important factor to be considered by the Disability Awards Officer is whether the review he has just conducted resulted in any change. He will normally set up a later review if there was a change in the pension. If a review results in no alteration in the pension, it may be reasonable to conclude that the long-term projection made at the time of the initial assessment was correct and that there is no need for further review. On the other hand, the Disability Awards Officer may feel that at least one further review is required to ensure that the correct result is obtained. If a further review is set up and that review again results in no change, then the Disability Awards Officer would not likely set up a further review. To minimize administrative costs and the adverse impact on a worker's privacy and rehabilitation, the Disability Awards Officer should not continue to set up a claim for future reviews where such reviews are not likely to result in any change in the pension.

To provide further encouragement to a worker's rehabilitation, the Commissioners feel that it is reasonable to allow a worker to earn a certain amount above the amount projected without his pension being affected. Allowance also should be made for the fact that in serious cases a disabled worker may work for small amounts for therapeutic reasons. The Commissioners feel that this concession is consistent with the overall concept of a projected loss of earnings system. Since the object of that system is to predict a worker's long-term earning capacity, it would not, in any event, be reasonable to alter

his pension simply because his earnings are marginally different from the predicted amount. There is likely to be a certain degree of fluctuation in a worker's earnings which does not alter the long-term picture. The Commissioners have concluded that, if at the time of a review a worker's earnings or projected earnings are 5% or less over the earnings previously projected for him, the excess amount will be ignored. Conversely, if it turns out that his earnings or projected earnings are 5% or less below what was previously projected, there will be no increase in his projected loss of earnings pension.

In carrying out the reviews and determining whether a worker's current earnings are 5% or less above the amount projected, allowance will be made for the effect of inflation.

5. PROPORTIONATE ENTITLEMENT

Section 5(5) of the *Workers' Compensation Act* provides as follows:

> "Where the personal injury or disease is superimposed on an already existing disability, compensation shall be allowed only for the proportion of the disability following the personal injury or disease that may reasonably be attributed to the personal injury or disease. The measure of the disability attributable to the personal injury or disease shall, unless it is otherwise shown, be the amount of the difference between the worker's disability before and disability after the occurrence of the personal injury or disease."

The effect of this section in relation to projected loss of earnings pensions has been considered under several previous Board decisions. Three possible interpretations of the section can be drawn from these decisions as follows:

A. There should be no reduction in the pension by virtue of Section 5(5) because, since the claimant was working prior to the injury, the effect of his pre-existing disability was already reflected in his pre-injury earnings. To make a reduction would be, in effect, to penalize the worker twice over for the effects of the pre-existing disability.

B. There should always be a reduction in the pension where there was a pre-existing disability because the section obliges the Board to do this. Furthermore, although the pre-injury earnings may not, in fact, have been reduced by the effect of the pre-existing disability, the combined effect of the pre-existing and compensable disabilities may produce a much greater loss of earnings than the compensable disability would itself have produced.

C. In every case where there was a pre-existing disability, the Board has to decide whether the loss of earnings experienced by the worker after the injury is wholly the result of the compensable disability or partly the result of the pre-existing disability. If it decides that the whole loss is the result of the compensable disability, no reduction in the pension is made under Section 5(5). If it decides that a portion of the loss is attributable to the pre-existing disability, a pension is only awarded for the portion attributable to the compensable disability.

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Having considered these alternative interpretations, the Commissioners feel that C, which represents the current practice, is the proper interpretation of Section 5(5) with regard to projected loss of earnings pensions. It is fair to claimants in that it allows for the fact that their pre-injury earnings may already have been reduced by the pre-existing disability. On the other hand, it ensures that the Board does not become responsible for losses of earnings which are really attributable to the delayed or progressive effect of non-compensable pre-existing disabilities. The Commissioners recognize that it is often difficult in practice to properly allocate the causes of a loss of earnings where there is pre-existing disability, but do not feel that it is any more difficult than other decisions that have to be made under the Act, or that this difficulty justifies a different interpretation of Section 5(5).

The Board's previous practice has been that, in applying proportionate entitlement, no account is taken of already existing disabilities in parts of the body other than the one affected by the work injury. This is a reasonable position when the pension is being assessed on a physical impairment basis under Section 23(1) since the concern is solely with the degree of loss of body function in the injured part. However, the same is not the case with pensions assessed on a projected loss of earnings basis under Section 23(3). The concern there is with the worker's capacity to obtain employment and this capacity can be affected by disabilities in other parts of the body. The Commissioners have concluded that, if a loss of earnings experienced by a worker after an injury is partly the result of a disability in another part of the body, Section 5(5) can be applied.

6. APPLICATION OF THIS DECISION

The rules set out in this decision will apply to assessments of new permanent disability awards carried out on or after the date of the decision.

These rules will not apply to existing projected loss of earnings awards unless those awards are reassessed on the basis of a change in the worker's physical impairment. Where, on such a reassessment, there is found to have been a deterioration in the worker's physical impairment and the rules laid down by this decision produce a lower pension than the projected loss of earnings pension the worker is currently receiving, his current pension will remain unchanged. The pension will, however, continue to be adjusted in the normal way in accordance with changes in the Consumer Price Index.

This decision replaces Decisions No. 8, 22, 33, 160, 184, 202, 220, 287, and 297.

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Decision No. 407

RE ASSESSMENT OF PERMANENT DISABILITIES

Board Decision considered by:

J.A. Nielsen, Chairman
A.P. Devine, Commissioner
B.M. Korman, Commissioner
J.M. Nutter, Commissioner

17th February, 1987

The Commissioners are concerned that a misunderstanding has developed regarding the assessment of a pension which consists of what are often referred to as a worker's "subjective complaints". In particular, *Decision No. 318* has been used to rationalize automatic granting of an award of up to 2.5% of total disability to recognize complaints of pain and discomfort which do not accompany an objective clinical impairment.

Decision No. 318 was issued to explain the position of the Commissioners on whether or not stress testing would be of value in the assessment of awards for permanent partial disability. In that decision, the Commissioners made an award of 2.5% in a case where there were primarily subjective complaints. However, this only represented the Commissioners' decision on the particular facts of that case. It was not intended that it be used as justification for awards in other cases for the so-called "subjective complaints" that a worker might describe in the absence of objective symptoms of disability.

In assessing a pension for permanent partial disability, regard must be had to the requirements of the *Workers' Compensation Act*. Section 23(1) requires that a pension be paid when a permanent partial disability results from the injury and will produce an impairment of earning capacity. In making a determination under this section, it is incumbent upon the Disability Awards Officer to enquire carefully into all of the circumstances of a worker's condition resulting from a compensable injury. The Disability Awards Officer should consider both the objective physical findings noted by the doctors who examined the claimant and his subjective complaints of pain. The fact that the complaints are largely subjective does not automatically preclude a finding that a worker has a disability within the meaning of Section 23(1). Nor, on the other hand, does the fact that subjective complaints exist automatically warrant a finding of disability. In all cases, a decision must be made on the particular facts of the claim as to whether or not a disability exists.

With regard to the question as to what type of evidence will be sufficient to justify a conclusion that a permanent disability exists in these cases, it is not possible to lay down an exclusive list. However, some suggestions can be made. There will, in the first place, be the claimant's own evidence regarding the nature and extent of his complaints and whether that evidence is credible and consistent. Regard must also be had to the claimant's conduct and activities and whether they are consistent with his complaints.

There will then be the evaluations of the claimant by the various professional personnel and Board's staff who have been involved in his case, for example, doctors, psychologists, rehabilitation consultants, and assessors in the Board's Industrial Department. Consideration will have to be given to the objective observations of these persons as well as their subjective assessments. They may be able to comment on whether the claimant's complaints are of a type and extent that might reasonably result from the type of injury which he suffered.

When there is little clinical evidence of objective impairment, extreme caution must be exercised in concluding that there is a permanent disability resulting from that injury. The evidence that is relied upon to support the assessment of such an award must be fully documented. It must clearly demonstrate that there is a permanent disability for which the payment of a pension award may be supported.

Decision No. 408

RE THE CONSUMER PRICE INDEX

Board Resolution considered by:

J.A. Nielsen, Chairman
B.M. Korman, Commissioner
J.M. Nutter, Commissioner
A.P. Devine, Commissioner

1st June, 1987

WHEREAS Section 25 of the *Workers' Compensation Act* requires the Board to determine as of July 1st, 1987, a ratio by comparing the Consumer Price Index for April 1987 with the Consumer Price Index for October 1986, and by applying that ratio to adjust those periodical payments of compensation referred to in subsection (2), and to adjust each dollar amount mentioned in the Act, except those referred to in subsection (5);

AND WHEREAS the Board is advised that the Consumer Price Index for April 1987 was 137.0 and for October 1986 was 134.0, giving a ratio of 1.02238806;

THE BOARD HEREBY DETERMINES that the ratio applicable under Section 25(1) is 1.02238806;

AND THAT all periodical payments of compensation described in Section 25(2) shall be adjusted by applying that ratio as of the 1st day of July, 1987;

AND THAT the British Columbia Regulation numbered 404/85 be repealed.

WORK SAFE BC
WORKING TO MAKE A DIFFERENCE

Ten-year summary of consolidated financial statements
Schedule A — Smoothed or funding basis

CONSOLIDATED BALANCE SHEET AS AT DECEMBER 31 ($ THOUSANDS)

	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
ASSETS										
Receivables	494,052	491,698	514,471	515,804	542,501	551,121	508,035	458,703	427,728	405,547
Portfolio investments	11,344,839	11,205,956	10,940,350	10,617,981	9,820,522	8,948,692	8,320,084	7,879,525	7,499,966	7,899,120
Capital assets	154,873	163,822	167,414	165,054	148,559	136,068	139,686	142,180	150,906	162,037
	11,993,764	**11,861,476**	**11,622,235**	**11,298,839**	**10,511,582**	**9,635,881**	**8,967,805**	**8,480,408**	**8,078,600**	**8,466,704**
LIABILITIES AND FUNDED (DEFICIENCY) POSITION										
Payables and accruals	303,964	264,396	246,488	232,951	215,476	231,073	201,604	202,895	195,854	172,253
Benefits liabilities	9,389,369	9,424,103	9,347,925	8,751,988	8,765,301	8,576,574	8,412,023	8,269,650	8,029,458	7,870,287
Total liabilities	9,693,333	9,688,499	9,594,413	8,984,939	8,980,777	8,807,647	8,613,627	8,472,545	8,225,312	8,042,540
Reserves	1,859,000	1,409,000	1,409,000	1,430,000	840,000	440,000	260,000	260,000	260,000	290,000
Unappropriated balance (unfunded liability)	441,431	763,977	618,822	883,900	690,805	388,234	94,178	(252,137)	(406,712)	134,164
Total funded (deficit) position	2,300,431	2,172,977	2,027,822	2,313,900	1,530,805	828,234	354,178	7,863	(146,712)	424,164
	11,993,764	**11,861,476**	**11,622,235**	**11,298,839**	**10,511,582**	**9,635,881**	**8,967,805**	**8,480,408**	**8,078,600**	**8,466,704**

CONSOLIDATED STATEMENT OF OPERATIONS AND UNAPPROPRIATED BALANCE (UNFUNDED LIABILITY) FOR THE YEARS ENDED DECEMBER 31 ($ THOUSANDS)

	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
INCOME										
Premiums	1,060,219	1,024,500	1,141,319	1,081,896	1,267,238	1,239,777	1,175,089	1,077,383	1,019,250	916,378
Investments	544,773	610,418	590,452	1,014,939	893,520	631,741	522,072	495,937	(223,798)	585,716
	1,604,992	**1,634,918**	**1,731,771**	**2,096,835**	**2,160,758**	**1,871,518**	**1,697,161**	**1,573,320**	**795,452**	**1,502,094**
EXPENSES										
Claim costs										
Short-term disability	259,561	291,022	280,691	252,717	217,624	209,774	205,206	199,508	253,019	308,329
Long-term disability	220,785	235,283	306,354	294,622	376,384	504,081	459,094	691,555	738,273	742,605
Survivor benefits	75,943	50,372	74,399	65,425	58,781	87,844	70,996	76,370	85,885	69,463
Health care	364,617	400,199	412,007	273,111	258,307	281,873	299,763	170,345	237,623	221,349
Vocational rehabilitation	99,877	82,028	46,028	35,497	3,627	1,550	15,544	34,492	130,490	117,330
Claim administration	271,745	263,024	243,597	195,369	209,870	180,936	165,262	191,662	178,985	189,618
Extraordinary adjustments to revalue liabilities[a]	—	—	487,364	36,514	185,269	—	—	(75,546)	(414,674)	—
	1,292,528	1,321,928	1,850,440	1,153,255	1,309,862	1,266,058	1,215,865	1,288,386	1,209,601	1,648,694
Operating and prevention costs										
Operating	342,124	335,591	321,885	296,998	283,778	258,983	256,780	257,411	278,134	250,775
Prevention	80,598	69,767	63,441	56,362	47,546	41,849	44,006	38,452	40,418	44,067
Less: Claim administration payments	(237,712)	(237,523)	(217,917)	(192,875)	(182,999)	(169,428)	(165,805)	(165,504)	(161,825)	(154,637)
	185,010	167,835	167,409	160,485	148,325	131,404	134,981	130,359	156,727	140,205
	1,477,538	**1,489,763**	**2,017,849**	**1,313,740**	**1,458,187**	**1,397,462**	**1,350,846**	**1,418,745**	**1,366,328**	**1,788,899**
SURPLUS (DEFICIT) FROM OPERATIONS	**127,454**	**145,155**	**(286,078)**	**783,095**	**702,571**	**474,056**	**346,315**	**154,575**	**(570,876)**	**(286,805)**
UNAPPROPRIATED BALANCE (UNFUNDED LIABILITY) — January 1	763,977	618,822	883,900	690,805	388,234	94,178	(252,137)	(406,712)	134,164	420,969
Withdrawal from (appropriation to) Research Reserve	—	—	—	—	—	(30,000)	—	—	30,000	—
Withdrawal from (appropriation to) Capital Adequacy Reserve	(400,000)	—	21,000	(590,000)	(150,000)	(150,000)	—	—	—	—
Withdrawal from (appropriation to) Injury Research and RTW services	(50,000)	—	—	—	—	—	—	—	—	—
Withdrawal from (appropriation to) General Reserve	—	—	—	—	(250,000)	—	—	—	—	—
UNAPPROPRIATED BALANCE (UNFUNDED LIABILITY) — December 31	**441,431**	**763,977**	**618,822**	**883,900**	**690,805**	**388,234**	**94,178**	**(252,137)**	**(406,712)**	**134,164**

Note: *The above amounts have been restated reflecting the retroactive effects of changes in accounting policies.*

a The extraordinary adjustments to revalue liabilities in 2008 relates to the lowering of the net discount rate from 3.5 percent to 3.0 percent. The extraordinary adjustments to revalue liabilities for 2007 relates to an adjustment of a non-recurring expense in 2006 stemming from a Supreme Court decision on benefit eligibility, and to a revision of mortality assumptions. The extraordinary adjustments for 2000–2003 relate to the following items: Bill 37 in 2003, and Bill 49 and mortality assumption changes in 2002.

WORKSAFE BC
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	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
SUPPLEMENTARY FINANCIAL INFORMATION ($ thousands)										
Capital asset expenditures	15,706	21,873	39,860	45,893	50,085	40,329	26,599	19,548	18,050	25,583
Special reserves costs (included in claim costs)	115,980	88,802	97,589	91,222	94,455	101,215	112,060	154,263	114,234	120,774
Claim costs:										
Current year's injuries	1,016,373	1,104,020	1,123,651	1,039,381	972,291	932,334	893,825	841,047	933,688	990,697
Prior years' injuries	276,155	217,908	239,425	77,360	152,302	333,724	322,040	522,885	690,587	657,997
Non-recurring costs	—	—	487,364	36,514	185,269	—	—	(75,546)	(414,674)	—
	1,292,528	1,321,928	1,850,440	1,153,255	1,309,862	1,266,058	1,215,865	1,288,386	1,209,601	1,648,694
Claim costs:										
Payments	1,327,262	1,245,750	1,254,503	1,166,568	1,121,135	1,101,507	1,073,492	1,048,195	1,050,430	1,086,991
Change in benefit liabilities	(34,734)	76,178	595,937	(13,313)	188,727	164,551	142,373	240,191	159,171	561,703
	1,292,528	1,321,928	1,850,440	1,153,255	1,309,862	1,266,058	1,215,865	1,288,386	1,209,601	1,648,694
STATISTICS										
Claims first reported[a]	136,742	141,600	168,262	173,381	172,841	164,266	156,762	152,070	156,780	169,492
Claims accepted[b]	95,663	94,815	121,118	127,412	124,570	121,323	115,542	113,117	114,995	125,674
Claims disallowed[c]	8,813	9,099	12,298	11,525	12,097	10,634	9,432	9,031	9,609	10,753
Claims rejected[d]	1,643	1,509	1,918	1,943	2,084	1,967	1,768	1,591	1,798	1,728
Claims disallowed as a proportion of claims reported (%)[e]	6.4%	6.4%	7.3%	6.6%	7.0%	6.5%	6.0%	5.9%	6.1%	6.3%
Injury rate (number of short-term disability claims per 100 person-years of employment)	2.27	2.34	2.96	3.06	3.12	3.08	3.06	3.05	3.24	3.64
Short-term duration of claims (days paid per claim)[f]										
— in injury year	31.7	31.6	27.9	26.6	25.9	26.3	26.9	26.5	26.2	26.8
— total of all years[g]	58.8	54.5	48.3	46.2	45.5	47.4	48.2	46.8	47.3	49.1
Prevention inspection reports issued[h]	42,191	38,615	35,424	31,650	26,261	20,074	15,573	15,980	21,511	28,073
Prevention worksite activity hours[i]	328,553	298,937	268,448	251,392	218,069	205,764	202,125	223,321	273,149	285,718
Employers registered	206,510	202,390	200,959	197,190	188,164	184,239	179,257	173,008	171,583	169,650
Average premium rate ($)[j]										
— published rate										
base rate	1.56	1.56	1.56	1.69	1.90	1.97	2.06	2.05	2.03	2.02
surplus abatement, transition capping and experience rating imbalance	(0.05)	(0.05)	(0.04)	(0.07)	(0.07)	(0.11)	(0.15)	(0.13)	(0.13)	(0.23)
— collection rate	1.51	1.51	1.52	1.62	1.83	1.86	1.91	1.92	1.90	1.79
— actual final collection rate	1.43	1.40	1.50	1.54	1.89	1.99	1.99	1.94	1.88	1.78
Investment return of portfolio (%)										
— total return (market yield)	9.8	8.7	(8.2)	4.4	11.6	12.5	10.3	13.4	(2.4)	(0.9)
— accounting return smoothed basis (yield on average value of portfolio)	4.8	5.5	5.5	10.2	9.4	7.2	6.4	6.4	(2.8)	7.5
— real return smoothed basis (yield in excess of inflation)[k]	2.4	5.4	2.9	7.8	8.5	4.6	4.1	4.8	(6.0)	5.6
Percent funded (ratio of assets to total liabilities) (%)	124	122	121	126	117	109	104	100	98	105

Note: *Refinements in measurement approach have resulted in minor changes to previously reported figures in some cases. The above amounts have been restated reflecting the retroactive effects of changes in accounting policies.*

a Claims are not necessarily disallowed, rejected, or accepted in the year in which they are reported. The counts of reported claims in this table have been revised from those that appeared in the 2009 annual report: the claim consolidation process results in some duplicate claim numbers from past years being eliminated.

b Claims accepted include claims accepted for health-care-only benefits.

c Disallowed claims are those that fall within the scope of the *Workers Compensation Act* but are not payable because they are not work-related.

d Rejected claims are those that do not fall within the scope of the Act: claims from workers employed in industries not covered under the Act, claims from self-employed workers without optional protection, accounts from physicians submitted in error to WorkSafeBC.

e Reported claims that are not accepted, disallowed, or rejected are either suspended claims or no-adjudication-required claims. Suspended claims are those where the claimant fails to respond to a request for information from the adjudicator, or withdraws the claim. No-adjudication-required claims are accident reports that are not claims for benefits.

f Duration numbers for all 10 years exclude days paid as vocational rehabilitation days. The durations include only short-term disability days.

g To compute short-term disability (STD) duration for a given year, five components are calculated and added together, including: first, the number of days paid in the year for STD injuries that occurred in the year divided by the number of STD injuries that occurred in the year; and, second, the number of days paid in the year for STD injuries that occurred in the previous year divided by the number of STD injuries that occurred in the previous year. The third, fourth, and fifth components are computed analogously. An adjustment is made to the sum of the five components with respect to the days paid in the year for injuries that occurred more than four years earlier. The calculation includes the days arising from short-term disability payments and excludes the days arising from rehabilitation payments.

h These figures represent the number of inspection reports issued by prevention officers in each respective year, and include both provincial inspections and federal Workplace Hazardous Materials Information System (WHMIS) inspections. Inspection reports represent either new or follow-up prevention activity and most inspection reports are the result of a worksite visit.

i Prevention activity hours include both Worker and Employer Services and Investigations officer time. These hours represent the number of hours spent in each respective year on inspections, education, consultations, investigations, and other industry and worker services combined. Prevention activity hours include travel time.

j The published base rate is the rate announced at the time the assessment rates are set. The published collection rate consists of the published base rate reduced by three elements — the pre-2000 subclass surplus abatement, transition capping of rate increases from the old to new classification structure, and an allowance for the imbalance in the experience rating program. The transition capping element has largely disappeared since 2005. The pre-2000 subclass abatement has also largely disappeared since 2009. The actual final time collection rate differs from the published collection rate due to changes in payroll distribution and refinement of estimates.

k Inflation is the change in the All Canada CPI from the preceding October to the current October value, reflecting the indexation of injured worker benefits.

WORKSAFE BC

Ten-year summary of consolidated financial statements
Schedule A — Smoothed or funding basis

Consolidated balance sheet
as at december 31 ($ thousands)

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
ASSETS										
Receivables	394,119	405,470	357,498	491,698	514,471	515,804	542,501	551,121	508,035	458,703
Portfolio investments	11,072,651	11,029,700	11,462,184	11,205,956	10,940,350	10,617,981	9,820,522	8,948,692	8,320,084	7,879,525
Capital assets[a]	—	—	—	163,822	167,414	165,054	148,559	136,068	139,686	142,180
Property and equipment	203,510	206,036	208,088	—	—	—	—	—	—	—
Intangible assets	86,611	92,607	92,384	—	—	—	—	—	—	—
	11,756,891	11,733,813	12,120,154	11,861,476	11,622,235	11,298,839	10,511,582	9,635,881	8,967,805	8,480,408
LIABILITIES AND FUNDED POSITION										
Outstanding payments	9,307	13,499	12,023	—	—	—	—	—	—	—
Payables and accruals[b]	(7,173)	(18,087)	190,856	264,396	246,488	232,951	215,476	231,073	201,604	202,895
Injured workers' retirement benefit liability	21,500	15,285	10,768	—	—	—	—	—	—	—
Employee benefit liabilities	316,279	260,728	287,336	—	—	—	—	—	—	—
Claims benefit liabilities	10,386,771	9,654,740	9,389,369	9,424,103	9,347,925	8,751,988	8,765,301	8,576,574	8,412,023	8,269,650
Total liabilities	10,726,684	9,926,165	9,890,352	9,688,499	9,594,413	8,984,939	8,980,777	8,807,647	8,613,627	8,472,545
Reserves	1,552,000	1,755,000	1,859,000	1,409,000	1,409,000	1,430,000	840,000	440,000	260,000	260,000
Unappropriated balance (unfunded liability)	(521,793)	52,648	370,802	763,977	618,822	883,900	690,805	388,234	94,178	(252,137)
Total funded (deficit) position	1,030,207	1,807,648	2,229,802	2,172,977	2,027,822	2,313,900	1,530,805	828,234	354,178	7,863
	11,756,891	11,733,813	12,120,154	11,861,476	11,622,235	11,298,839	10,511,582	9,635,881	8,967,805	8,480,408

Consolidated statement of operations and unappropriated balance
(unfunded liability) for the years ended december 31 ($ thousands)

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
INCOME										
Premiums	1,156,456	1,151,983	1,028,232	1,024,500	1,141,319	1,081,896	1,267,238	1,239,777	1,175,089	1,077,383
Investments	530,410	273,316	569,048	610,418	590,452	1,014,939	893,520	631,741	522,072	495,937
Other[c]	10,865	9,025	13,072	—	—	—	—	—	—	—
	1,697,731	1,434,324	1,610,352	1,634,918	1,731,771	2,096,835	2,160,758	1,871,518	1,697,161	1,573,320
EXPENSES										
Claim costs										
Short-term disability	324,638	312,996	258,157	291,022	280,691	252,717	217,624	209,774	205,206	199,508
Long-term disability	547,588	418,571	215,707	235,283	306,354	294,622	376,384	504,081	459,094	691,555
Survivor benefits	73,955	72,582	75,399	50,372	74,399	65,425	58,781	87,844	70,996	76,370
Health care	535,286	474,596	361,008	400,199	412,007	273,111	258,307	281,873	299,763	170,345
Vocational rehabilitation	134,887	133,475	99,274	82,028	46,028	35,497	3,627	1,550	15,544	34,492
Claim administration	303,555	233,070	281,744	263,024	243,597	195,369	209,870	180,936	165,262	191,662
Extraordinary adjustments to revalue liabilities[d]	328,821	—	—	—	487,364	36,514	185,269	—	—	(75,546)
	2,248,730	1,645,290	1,291,289	1,321,928	1,850,440	1,153,255	1,309,862	1,266,058	1,215,865	1,288,386
Administration and prevention costs										
Administration	362,582	332,698	370,902	335,591	321,885	296,998	283,778	258,983	256,780	257,411
Prevention	59,666	56,390	54,921	69,767	63,441	56,362	47,546	41,849	44,006	38,452
Less: Claim administration payments	(243,699)	(229,041)	(247,711)	(237,523)	(217,917)	(192,875)	(182,999)	(169,428)	(165,805)	(165,504)
	178,549	160,047	178,112	167,835	167,409	160,485	148,325	131,404	134,981	130,359
Injury research and reduction initiatives[e]	13,153	26,549	17,305	—	—	—	—	—	—	—
Investment costs[f]	9,357	4,658	21,905	—	—	—	—	—	—	—
	2,449,789	1,836,544	1,508,611	1,489,763	2,017,849	1,313,740	1,458,187	1,397,462	1,350,846	1,418,745
SURPLUS (DEFICIT) FROM OPERATIONS	(752,058)	(402,219)	101,741	145,155	(286,078)	783,095	702,571	474,056	346,315	154,575
Other comprehensive income (losses)	(25,383)	(19,935)	(63,378)	—	—	—	—	—	—	—
UNAPPROPRIATED BALANCE (UNFUNDED LIABILITY) — January 1	52,648	370,802	763,977	618,822	883,900	690,805	388,234	94,178	(252,137)	(406,712)
IFRS adjustment to 2010 opening unappropriated balance	—	—	18,462	—	—	—	—	—	—	—
Withdrawal from (appropriation to) Research Reserve	—	—	—	—	—	—	—	(30,000)	—	—
Withdrawal from (appropriation to) Capital Adequacy Reserve	203,000	104,000	(400,000)	—	21,000	(590,000)	(150,000)	(150,000)	—	—
Withdrawal from (appropriation to) Injury Research and RTW services			(50,000)	—	—	—	—	—	—	—
Withdrawal from (appropriation to) General Reserve	—	—	—	—	—	—	(250,000)	—	—	—
UNAPPROPRIATED BALANCE (UNFUNDED LIABILITY) — December 31	(521,793)	52,648	370,802	763,977	618,822	883,900	690,805	388,234	94,178	(252,137)

Note: *The accounting policies used to determine the 2003–2009 figures above were based on Canadian generally accepted accounting principles (GAAP), except for the smoothing of investment income. Figures starting 2010 are based on International Financial reporting Standards (IFRS), except for the smoothing of investment income, investment expenses and actuarial gains and losses for employees' benefit plans.*

a Prior to 2010, property and equipment and intangible assets were reported together as capital assets.

b Prior to 2010, outstanding payments, injured workers' retirement benefit fund, and employee benefit liabilities were reported as payables and accruals.

c Prior to 2010, other income was reported as recoveries under operating expenses.

d The extraordinary adjustments to revalue liabilities in 2012 relates to a revison of mortality assumptions, and to the lowering of the health care net discount rate from 0.5% to 0%. The extraordinary adjustments to revalue liabilities in 2008 relates to the lowering of the net discount rate from 3.5% to 3.0%. The extraordinary adjustments to revalue liabilities for 2007 relates to an adjustment of a non-recurring expense in 2006 stemming from a Supreme Court decision on benefit eligibility, and to a revision of mortality assumptions. The extraordinary adjustments for 2003 relate to Bill 37.

e Prior to 2010, injury research initiatives were reported as reductions to premium income and research grants were reported as reductions to investment income.

f Prior to 2010, investment costs were reported as reductions to investment income.

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	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
SUPPLEMENTARY FINANCIAL INFORMATION ($ thousands)										
Capital asset expenditures	18,587	25,320	15,706	21,873	39,860	45,893	50,085	40,329	26,599	19,548
Special reserves costs (included in claim costs)	207,582	143,373	115,980	88,802	97,589	91,222	94,455	101,215	112,060	154,263
Claim costs:										
Current year's injuries	1,250,355	1,089,822	1,024,671	1,104,020	1,123,651	1,039,381	972,291	932,334	893,825	841,047
Prior years' injuries	669,554	555,468	266,618	217,908	239,425	77,360	152,302	333,724	322,040	522,885
Non-recurring costs	328,821	—	—	158,983	487,364	36,514	185,269	—	—	(75,546)
	2,248,730	1,645,290	1,291,289	1,480,911	1,850,440	1,153,255	1,309,862	1,266,058	1,215,865	1,288,386
Claim costs:										
Payments	1,516,699	1,379,919	1,326,023	1,245,750	1,254,503	1,166,568	1,121,135	1,101,507	1,073,492	1,048,195
Change in benefit liabilities	732,031	265,371	(34,734)	76,178	595,937	(13,313)	188,727	164,551	142,373	240,191
	2,248,730	1,645,290	1,291,289	1,321,928	1,850,440	1,153,255	1,309,862	1,266,058	1,215,865	1,288,386
STATISTICS										
Claims first reported[a]	144,865	141,434	136,632	141,539	168,249	173,370	172,834	164,260	156,759	152,064
Claims accepted[b]	104,710	103,940	95,663	94,815	121,118	127,412	124,570	121,323	115,542	113,117
Claims disallowed[c]	10,967	9,335	8,813	9,099	12,298	11,525	12,097	10,634	9,432	9,031
Claims rejected[d]	1,997	1,824	1,643	1,509	1,918	1,943	2,084	1,967	1,768	1,591
Claims disallowed as a proportion of claims reported (%)[e]	7.6%	6.6%	6.4%	6.4%	7.3%	6.6%	7.0%	6.5%	6.0%	5.9%
Injury rate (number of claims per 100 person-years of employment)[f]	2.34	2.34	2.27	2.34	2.95	3.05	3.12	3.08	3.05	3.04
Prevention inspection reports issued[g]	37,640	39,201	42,323	38,635	35,426	31,651	26,261	20,074	15,573	15,980
Prevention worksite activity hours[h]	301,569	302,980	328,553	298,937	268,448	251,392	218,069	205,764	202,125	223,321
Employers registered	214,801	210,673	206,510	202,390	200,959	197,190	188,164	184,239	179,257	173,008
Average premium rate ($)[i]										
— published rate										
base rate	1.54	1.54	1.56	1.56	1.56	1.69	1.90	1.97	2.06	2.05
surplus abatement, transition capping and experience rating imbalance	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.07)	(0.07)	(0.11)	(0.15)	(0.13)
— collection rate	1.50	1.50	1.51	1.51	1.52	1.62	1.83	1.86	1.91	1.92
— actual final collection rate	1.48	1.51	1.43	1.40	1.50	1.54	1.89	1.99	1.99	1.94
Investment return of portfolio (%)										
— total return (market yield)[j]	9.5	4.1	11.1	8.7	(8.2)	4.4	11.6	12.5	10.3	13.4
— accounting return smoothed basis (yield on average value of portfolio)	4.6	2.4	4.8	5.5	5.5	10.2	9.4	7.2	6.4	6.4
— real return smoothed basis (yield in excess of inflation)[k]	3.4	(0.5)	2.4	5.4	2.9	7.8	8.5	4.6	4.1	4.8
Percent funded (ratio of assets to total liabilities) (%)	109.60	118.21	122.55	122.43	121.14	125.75	117.05	109.40	104.11	100.09

***Note:** Refinements in measurement approach have resulted in minor changes to previously reported figures in some cases. The above amounts have been restated reflecting the retroactive effects of changes in accounting policies.*

a Claims are not necessarily disallowed, rejected, or accepted in the year in which they are reported. The counts of reported claims in this table have been revised from those that appeared in the 2011 annual report: the claim consolidation process results in some duplicate claim numbers from past years being eliminated.

b Claims accepted include claims accepted for health-care-only benefits.

c Disallowed claims are those that fall within the scope of the *Workers Compensation Act* but are not payable because they are not work-related.

d Rejected claims are those that do not fall within the scope of the Act: claims from workers employed in industries not covered under the Act, claims from self-employed workers without optional protection, or accounts from physicians submitted in error to WorkSafeBC.

e Reported claims that are not accepted, disallowed, or rejected are either suspended claims or no-adjudication-required claims. Suspended claims are those where the claimant fails to respond to a request for information from the adjudicator, or withdraws the claim. No-adjudication-required claims are basically accident reports that are not claims for benefits.

f Comparative figures for prior years have been restated from those published in the 2011 annual report due to a change in the data warehouse

g These figures represent the number of inspection reports issued by prevention officers in each respective year, and include both provincial inspections and federal Workplace Hazardous Materials Information System (WHMIS) inspections. Inspection reports represent either new or follow-up prevention activity and most inspection reports are the result of a worksite visit.

h Prevention activity hours include both Worker and Employer Services and Investigations officer time. These hours represent the number of hours spent in each respective year on inspections, education, consultations, investigations, and other industry and worker services combined. Prevention activity hours include travel time.

i The published base rate is the rate announced at the time the assessment rates are set. The published collection rate consists of the published base rate reduced by three elements - the pre-2000 subclass surplus abatement, transition capping of rate increases from the old to new classification structure, and an allowance for the imbalance in the experience rating program. The transition capping element has largely disappeared since 2005. The pre-2000 subclass abatement has also largely disappeared since 2009.

The actual final collection rate differs from the published collection rate due to changes in payroll distribution and refinement of estimates.

j The total return for 2010 includes two years of valuation updates from stopper corporations (i.e., for 2010 and 2009); this was done in preparation for reporting under IFRS starting 2011. Prior to 2010, total returns include valuation updates from stopper corporations from the prior year (e.g., 2009 total return includes 2008 valuation update and does not include the 2009 valuation update from stopper corporations).

k Inflation is the change in the All Canada CPI from the preceding October to the current October value, reflecting the indexation of injured worker benefits.

Calculation of Reduction in WorkSafeBC LTD Costs Post Bill 49

Using the Consolidated balance sheets published by the Board[1] LTD claims costs have been examined to estimate the amount by which permanent disability awards have been reduced since the legislative and policy changes after June 2002. The effect of these changes was a greater reliance on the PDES for compensating for impairment of earning capacity rather than performing any actual estimate of earning capacity under section 23(3) of the Act. It is clear that PPD awards were now made in the vast majority of cases, including cases where prior to these changes, an LOE assessment of the individual worker's actual circumstances would have resulted in an LOE pension under section 23(3) of the Act.

We have assumed, given the significant difference in costs between PFI awards and LOE awards, that It is likely that a very significant portion of the reduction in LTD claims costs after these 2002 changes results from this use of PDES and the functional method in cases where an individual assessment would have shown an impairment of earning capacity.

From 2001 to 2003 the LTD expenses were $742,605,000, $738,273,000 and $691,555,000 respectively. This averages out to $724,144,330 per year. Since there is lag time for the effects too disability awards and each of these three consecutive years fall within a fairly close range it would appear to be reasonable to use these three years as a pre-bill 49 baseline for permanent disability costs. In order to be very conservative we have reduced that $724M/year baseline to an even $700M per year. Using that average the LTD expenditures have been reduced as follows:

Using this baseline LTD cost estimate of $700M, we set out the Board's LTD costs after Bill 49 (2004-2012) and the difference between the pre- and post-Bill 49 costs for each year.

Table 1 Reduction in Permanent Disability Awards post Bill 49

Year	Baseline	LTD Cost	Difference
2004	$ 700,000	$ 459,094	$ 240,906
2005	$ 700,000	$ 504,081	$ 195,919
2006	$ 700,000	$ 376,384	$ 323,616
2007	$ 700,000	$ 294,622	$ 405,378
2008	$ 700,000	$ 306,354	$ 393,646
2009	$ 700,000	$ 235,283	$ 464,717
2010	$ 700,000	$ 220,785	$ 479,215
2011	$ 700,000	$ 418,571	$ 281,429
2012	$ 700,000	$ 547,588	$ 152,412
Total	**$ 6,300,000**	**$ 3,362,762**	**$ 2,937,238**

[1] http://www.worksafebc.com/publications/reports/annual_reports/assets/pdf/2012/10YrSummary.pdf and http://www.worksafebc.com/publications/reports/annual_reports/assets/pdf/2010/10YrSummary.pdf