

Noteworthy Decision Summary

Decision: WCAT-2006-02502-RB **Panel:** Marguerite Mousseau **Decision Date:** June 13, 2006

Whole body vibration – Degenerative disc disease – Causation – Ergonomics – Exposure estimates based on scientific literature – Standards of exposure from other jurisdictions

Degenerative disc disease and osteoarthritis of the spine have not been designated or recognized as occupational diseases by the Workers' Compensation Board (Board). To establish employment causation, it must first be established that the proposed relationship is biologically plausible. There must be sound evidence that whole body vibration (WBV) can cause or accelerate lumbar degenerative disc disease. WBV may be a significant contributing factor in low back disorders. It may be difficult to obtain reliable evidence of the extent of exposure which includes both amplitude of vibration and duration. To estimate the vibration amplitude exposure of a worker who has used different types of equipment over long periods of time, it is appropriate to use measurements found in the literature. It is appropriate to refer to standards of exposure to WBV from different jurisdictions as the Board has not created standards.

The worker was employed as a heavy equipment operator in the forest industry. He had suffered two previous work injuries. In 1976 the worker suffered multiple traumatic injuries. X-rays taken at the time revealed degenerative disc disease in the cervical and lumbar spine. In 1995 the Board accepted his claim for a low back strain. In 2001 the worker requested that his 1995 claim be reopened as he had been having back problems since that time. A CT scan revealed degenerative changes of the lumbar spine. A Board Medical Advisor (BMA) concluded the changes were consistent with an aging spine and there was no correlation between the state of the worker's spine and his two prior compensable injuries. In addition, the BMA stated there was no evidence that years in the bush or work involving heavy labour caused back pain. The Board concluded the worker's current symptoms could not be attributed either to his earlier work injuries or to the nature of his employment. The worker appealed to the former Review Board. On March 3, 2003, the Workers' Compensation Appeal Tribunal (WCAT) replaced the Review Board.

In 2004 the worker requested a decision from the Board specifically with respect to the effect of his exposure to WBV. The Board concluded this matter had been adequately addressed by the BMA prior to the initial decision and it was not necessary to issue a new decision.

The worker presented two reports to WCAT. A report by a certified ergonomist stated that the worker ran heavy equipment for approximately 31 years. She stated she could only estimate the vibration levels of the skidders operated by the worker as many were no longer available and it would be impossible to reproduce the conditions under which he worked. She did this by using values in the scientific literature for similar pieces of equipment. She concluded the worker's exposure to vibration exceeded the safe lifetime dose according to standards developed by the German Federal Ministry of Labour by a factor of 2.8. The worker also presented a report by an orthopaedic surgeon who relied on the ergonomist's report to conclude WBV was a major contributor to the worker's degenerative disc disease.

The panel noted that under policy item #26.50 of the *Rehabilitation Services and Claims Manual, Volume I* degenerative disc disease and osteoarthritis of the spine are not recognized

as occupational diseases. Thus, it must be shown that it is biologically plausible for WBV to cause or accelerate lumbar degenerative disc disease. The panel considered the conflicting epidemiological reports on this issue. One epidemiologist (Dr. A) concluded there was no evidence WBV caused low back disorders. On the other hand, another epidemiologist (Dr. B) found overwhelming evidence of a relationship between WBV and low back disorders that is consistent and strong, increases with increasing exposure, temporally precedes exposures, and is biologically possible. The panel noted that, in *Decision #2002-2499*, the former Appeal Division had found the reports supporting a causative relationship between WBV and low back disorders should not be rejected simply because they did not meet the exacting analytical standards of Dr. A. It was sufficient to have persuasive evidence that it was more likely than not that a causal relationship existed. Finally, the panel noted that, in *WCAT Decision #2006-01568*, the panel undertook a further review of articles published since 2002 and concluded that there was no basis for disagreeing with the conclusion that WBV has the capacity to cause low back disorders.

The panel concluded the orthopaedic surgeon's view that WBV is a risk factor for spinal disorders was supported by the research literature.

The panel also concluded the ergonomist's report fairly estimated the worker's exposure to WBV. The panel also accepted that, in the absence of any standards or policy direction in British Columbia, it was appropriate to use a standard recognized in another jurisdiction to determine if there had been overexposure to WBV.

The worker's appeal was allowed. His lumbar degenerative disc disease was significantly aggravated or accelerated by his work exposure to WBV.

WCAT Decision Number: WCAT-2006-02502-RB
WCAT Decision Date: June 13, 2006
Panel: Marguerite Mousseau, Vice Chair

Introduction

The worker appeals a decision of an officer of the Workers' Compensation Board (Board) dated September 27, 2001. In the decision letter of that date, the officer informed the worker that the degenerative changes in his lumbar spine were not accepted as compensable.

This appeal was filed with the Workers' Compensation Review Board (Review Board). On March 3, 2003, the *Workers Compensation Act* (Act) was amended to replace the Appeal Division and Review Board with the Workers' Compensation Appeal Tribunal (WCAT). As this appeal had not been considered by a Review Board panel before that date, it has been decided as a WCAT appeal. (See the *Workers Compensation Amendment Act (No. 2), 2002*, section 38.)

The worker is represented by legal counsel. He was self-employed from 1985 to 2000 and is not participating in the appeal as an employer. Prior to that, he worked for an employer which has not been registered with the Board since 1981. No successor was located for this employer.

An oral hearing took place on August 16, 2005 in Richmond which was attended by the worker and his representative.

Issue(s)

The issue on this appeal is whether the worker's lumbar degenerative disc disease was significantly aggravated or accelerated by his exposure to whole body vibration (WBV) in his employment as a heavy equipment operator.

Background

The worker was a heavy equipment operator in the forest industry. In April 2001 he contacted the Board and informed an officer that he had been having back problems since 1995 and he wished to have his 1995 claim for compensation reopened. That claim involved an injury to his lower back which had been diagnosed as a low back strain, but he stated that his symptoms had become progressively worse since then. He said that he had been unable to work since November 2000. He denied that there had been a new injury or further aggravation but sometime in 2000 he had been using a chainsaw to cut a tree when he had to pull out the saw because the tree was pinching it. He felt a sharp pain that got progressively worse. He was unsure if he had sought

medical treatment at the time. He continued to work and was unable to recall the exact date or any further details.

The Board officer informed the worker that if he was relating his current difficulties to that incident he should establish a new claim which would be adjudicated separately.

I note that the worker did submit an independent operator's application for compensation and report of injury dated April 23, 2001, in which he stated that the incident he described to the Board officer occurred on October 20, 2000. It appears that there has been no adjudication of the incident described in this application for compensation. The Board officer considered only whether the worker's symptoms could be related to his 1995 claim or to his work generally.

A Board officer requested medical records regarding the worker's back from his physician, Dr. Hoy, noting that the last medical evidence of lumbar back problems was in 1995. Dr. Hoy, who has been the worker's physician since at least 1995, submitted records dating back only to March 6, 2000. The entry of this date refers to painful calves when walking, which is limited to one block. It notes chronic left lower back pain, worse in the past five years. The assessment is peripheral artery disease and strained lower back. There is no reference to any particular incident that might have caused a low back strain.

The next entry is dated November 14, 2000 and states that the worker has had left lower back pain in the past three weeks. There was no radiation to his legs. It was recurring every three months and there were no obvious injuries. Movement was slightly painful and there was "slightly tender left paralumbar". The assessment was a strained lower back.

An x-ray was taken on November 20, 2000. The report states that these findings were compared to an x-ray taken in November 1995. The more recent x-ray again revealed degenerative changes throughout the lumbar region. The findings were similar to those seen on the previous examination.

Dr. Kokan, orthopaedic surgeon, saw the worker on December 5, 2000 for lower back pain and numbness in his left leg. Dr. Kokan said the worker had sustained injuries in 1967 and that he had had intermittent back pain since then. The last attack had started while digging potatoes in late September (presumably in 2000). A month before seeing Dr. Kokan the worker had developed left leg pain for the first time. He had not been able to work since October because of pain although he was feeling a little better when he saw Dr. Kokan. He still could not work or walk for more than half a block and he was limping on the left side of his leg.

Dr. Kokan thought the worker's symptoms in the back and left leg were likely related to a focal spinal stenosis with a degenerative process of the lumbar spine and a bulging disk. The monoradiculopathy could be caused by early diabetes and this usually

affected the third and fourth lumbar nerve root. He recommended a CT scan, noting that the calf symptoms could be related to vascular insufficiency. The CT scan was done on January 15, 2001 and the results were described in a consultation report by Dr. Kokan dated January 23, 2001. He said that the CT scan revealed stenosis, particularly at the L3-4 and L4-5 levels, involving the nerve root on the left side at the L3-4 level.

He said that, in retrospect, the worker had a longstanding back problem with degenerative changes of the facet joints, ligamentum flavum, hypertrophy, and probably a bulging disc which has worsened since September of last year. Dr. Kokan felt that the worker had developed left leg symptoms due to the worsening of his back problem. He thought that recovery would be slow and that the worker might not actually recover from the recent worsening of his lower back symptoms with development of left leg pain. He thought the worker could try working if the symptoms subsided.

This was the last entry in the records submitted by Dr. Hoy. After these had been received by the Board, the Board officer noted that the worker had also sustained injuries in 1976. In a claim log entry dated August 6, 2001 the officer outlined the injuries sustained by the worker in an accident on September 16, 1976. The worker had suffered injuries to his face and head, multiple fractures to his left arm, abrasions to the right leg and neck injuries. X-rays taken at that time had revealed degenerative disc disease in the cervical and lumbar spine.

A Board medical advisor (BMA), in a memo dated September 26, 2001, provided an opinion that the degenerative changes of the lumbar spine which had been revealed in a CT scan of January 15, 2001 were consistent with an "aging spine" - the worker's date of birth is December 28, 1938. There was no correlation between the state of the worker's spine and his two prior compensable injuries. In addition, the BMA stated that current medical information did not establish a causal relationship between years in the bush or work involving heavy labour and back pain.

The decision of September 27, 2001 was issued after a review of the BMA opinion. In the decision letter, the Board officer noted that the worker's 1995 claim was accepted for a lower back strain injury. The worker had continued to work and it appeared that the worker's recovery followed a normal pattern. There had been no further medical evidence of back problems until November 2000. The officer also noted that there had been an earlier claim in 1976 and that an x-ray report of October 22, 1976 had revealed narrowing of the L4-5 intravertebral space due to degenerative disc disease. After reviewing the medical evidence, including the opinion of the BMA, the Board officer concluded that the worker's current symptoms could not be attributed to the work injuries of either 1976 or 1995 since these were both minor injuries from which the worker had not suffered permanent consequences. The officer also concluded that the worker's degenerative disc disease was not attributable to the nature of his employment, based on the opinion of the BMA.

As previously noted, the question of whether the worker had sustained a new injury as reported in his application for compensation of April 24, 2001 was not addressed.

The worker appealed the decision of September 27, 2001 to the Review Board and a deferral of the appeal was requested until mid-2005. In December 2004 the worker's representative requested a decision from the Board specifically with respect to the effect of the worker's exposure to WBV. In a claim log entry dated December 13, 2004 a Board officer concluded that this matter had been adequately addressed by the BMA in 2001 and it was not necessary to issue a new decision regarding WBV. Accordingly, no further decision was issued.

At the oral hearing before WCAT, the representative submitted an ergonomic assessment dated April 23, 2003, which was prepared by Ms. Judy Village, a certified professional ergonomist, as well as a medical-legal report dated July 20, 2004, which was prepared by Dr. Christopher S. Bailey, orthopaedic surgeon.

Ms. Village has prepared a number of ergonomic assessments with respect to exposure to WBV which have been considered by panels of the Appeal Division and WCAT in appeals related to this matter. These reports have been recognized as the reports of an expert in ergonomics based on qualifications which include a Masters of Science in ergonomics/kinesiology, lengthy experience in industrial ergonomics, and numerous publications in the area of WBV. I also accept her report as that of an expert in ergonomics.

In her ergonomic assessment report of April 23, 2003, Ms. Village referred to three prior reports relating to WBV which have also been cited and discussed in a number of prior Appeal Division and WCAT decisions. These reports are:

- "Back Disorders and Whole-Body Vibration in Equipment Operators and Truck Drivers, Epidemiology, Pathology and Exposure Limits" (1998 report), which was prepared by the worker's counsel and Ms. Judy Village, ergonomist, in 1998.
- Addendum to: "Back Disorders and Whole Body Vibration in Equipment Operators and Truck Drivers: Epidemiology, Pathology and Exposure Limits" (1999 report).
- "Whole Body Vibration and Back Disorders Among Motor Vehicle Drivers and Heavy Equipment Operators, A Review of Scientific Evidence," a report prepared by Dr. Teschke *et al*, dated April 4, 1999 (Teschke report).

Ms. Village states that she interviewed the worker by telephone and determined that he had spent approximately 31 years running heavy equipment in the forestry industry. He had worked for approximately 15 years for one employer, now defunct, where he had worked primarily as a skidder operator although he also did some bucking, operated a tracked caterpillar and drove a water truck which was an old logging truck. He worked

eight hours a day, five days a week. Most of the time he operated a skidder but in the summer he also often operated a caterpillar. He worked twelve months a year while working for the company.

In 1983 he became unemployed and in 1985 he purchased his own skidder and caterpillar and started working as an independent skidder/caterpillar operator until he stopped working late in 2000. During those years he worked ten months of the year since there usually was no work available during spring break-up. During the ten months of work, he estimated that he worked five or six days a week and nine or ten hours a day. He had Personal Optional Protection while self-employed.

Ms. Village noted that one could only estimate the vibration levels of the skidders operated by the worker as many were no longer available and it would be impossible to reproduce the conditions under which he worked. She considered that it was therefore appropriate to consider "measurements from reputable authors in the scientific literature for similar pieces of equipment" although the worker's actual exposure might be somewhat higher or somewhat lower than these measurements. These are the same measurements set out in Table A of the 1998 report which she co-authored, with the addition of measurements from a 2002 study which she references by author, without providing a further citation.

Using these measurements of vibration she considered that the worker's exposure to vibration exceeded the safe lifetime dose (according to standards developed by the German Federal Ministry of Labour) by a factor of 2.8. She also stated that prolonged sitting postures have been shown to increase the risk of back problems, a matter discussed at some length in the 1998 report and she also discussed the effects of awkward postures and lifting.

She considered that the worker's risk or likelihood of injury to his back resulting from WBV was high, given the magnitude and number of years of skidder operation.

As previously noted, there is also a medical-legal opinion by Dr. Bailey, orthopaedic surgeon. Dr. Bailey is a spinal surgical consultant with a practice at the Vancouver General Hospital Spine Program and a clinical instructor in the Department of Orthopaedics, Division of Spine, Faculty of Medicine, University of British Columbia. I recognize his opinion as that of an expert in the field of spinal disorders. Dr. Bailey states that his opinion is based on his assessment of the worker which included a physical examination and a detailed history. In addition, he reviewed the ergonomic report prepared by Ms. Village and a list of medical and other relevant documents contained on the worker's 1976 and 1995 claim files.

The worker gave Dr. Bailey a history of intermittent episodes of low back pain since 1976 which had become constant since the late 2000, when he had also developed left buttock pain. He also had pain in his calves if he walked more than one kilometre.

The worker described work-related low back injuries in the accident of 1976 and in 1995 and 2000. Dr. Bailey noted that there was no record of a low back injury in 1976 although an x-ray had been taken of the lumbar spine. He noted that the 1995 injury had been diagnosed as a soft tissue injury. In addition, the worker had described an incident at work in March 2000 when he had been bucking a log and the saw had jammed, causing him to fall. This had led to an exacerbation of his symptoms which were noted by Dr. Hoy and Dr. Kokan. I note there is no record of this incident in Dr. Hoy's clinical records nor was this incident reported to the Board. The worker however said that his current symptoms have been constant since this accident and he had been unable to continue working.

Dr. Bailey relied on Ms. Village's report of the worker's work history, which he incorporated in his report noting that the worker had done 31 years of full-time heavy equipment operation in his 47 year employment history.

With regard to the worker's medical history, he noted that it was significant for smoking. The worker was a life-long smoker and he had acknowledged smoking one-half to one package of cigarettes per day.

In addition, he reviewed the lumbar spine x-ray report of 1976, an x-ray report of the same area on November 20, 2000 and the CT scan report of January 15, 2000. In addition, he reviewed the CT scan film report stating that he agreed with the report with the exception that he would describe the spinal stenosis at the L4-5 level as moderate rather than "mild".

Dr. Bailey's diagnosis was lumbar degenerative disc disease and he considered that the worker's low back symptoms and left buttock symptoms were secondary to this diagnosis. The numbness in the right anterior thigh was not related to degenerative changes in his spine.

Dr. Bailey agreed with the BMA that it was unlikely that the worker's current symptoms were related to any injuries sustained in 1976 or 1995 in that these were soft tissue injuries that would not have resulted in permanent consequences. Rather, the chronic and longstanding low back symptoms were directly related to the degenerative disc disease and spinal stenosis. He agreed that all lumbar discs undergo age-related changes; however, this process did not always result in degeneration. He quoted from an orthopaedic text a statement to the effect that disc degeneration may result from acceleration or exacerbation of normal aging or from a distinct process that is superimposed on normal aging.

He stated that there are several factors which result in degenerative disc disease by altering nutritional transport within the intervertebral disc. These factors included increased disc loads due to demanding physical activities, prolonged immobilization, WBV, and spinal deformity. Other factors lead to degenerative disc disease by compromising the vascular supply. Smoking was one of these factors.

Dr. Bailey noted that Ms. Village's report indicated that the worker had been exposed to a number of occupational risk factors for degenerative disc disease. These included prolonged immobilization in a sitting position, increased disc loading due to various forms of manual labour and exposure to WBV. In addition the worker had the significant non-occupational risk factor of smoking. In Dr. Bailey's view, all four factors would lead to the acceleration of the worker's lumbar degenerative disc disease but the two most significant factors were the exposure to WBV and smoking.

In his view, the sitting position alone would not have accelerated the disc degeneration nor would the manual labour, which would lead to increased loads across the lumbar intervertebral discs. Similarly, he felt that the smoking, independent of the other occupational risk factors, would not have resulted in the current symptoms, absent the exposure to WBV.

Relying on Ms. Village's report respecting the worker's likely lifetime exposure to WBV, Dr. Bailey concluded that the WBV was a major contributor to the worker's degenerative disc disease and that the worker's 31 years of skidder operation had produced symptoms and disability which would not otherwise have been present.

At the oral hearing the worker provided essentially the same evidence as he had provided to Ms. Village. He had worked for a subsidiary of one company from 1967 to the early 1980's when the company went "belly up". He had operated a skidder for most of that time although he also drove a logging truck on occasion. I note that he was driving a logging truck when the accident occurred in 1976. While working for the company he worked eight hours per day plus travel time which was an average one to one and one-half hours per day, on gravel roads in a crummy. He worked five days a week, 12 months of the year. He was generally not off work during break-up while working for this company. On weekends he occasionally went out on the road to work with a bulldozer.

When the company stopped operations he looked for work for almost two years and then decided to buy a skidder and become self-employed. He estimated that he generally worked a minimum ten hour day, which included travel time of up to two hours. While self-employed he did not work during break-up, the period from the end of March to the end of May, but during the rest of the year he often worked six days a week. Depending on the contract, he often worked 12 days straight before going home for two days and then returning to work. This working pattern was common, especially in the winter months.

He acknowledged that he smoked up to one package of cigarettes per day and had done so since he was about 22 years old. He also has diabetes, type II, which is controlled by exercise and diet.

Law and Policy

Section 5 of the Act provides that compensation is paid for personal injury arising out of and in the course of employment. Section 6 of the Act provides that compensation is paid for an occupational disease that is due to the nature of the employment.

The Act provides several mechanisms for recognizing a disease or condition as an occupational disease, depending on the strength of the association between that disease and a particular occupation or process.

Osteoarthritis has not been recognized as an occupational disease. Policy item #26.50 of the *Rehabilitation Services and Claims Manual, Volume I* (RSCM I) discusses workers' compensation in relation to degenerative processes. It states:

It often happens that disability results from the natural aging process. At times the pace of the process and each aspect of it can be influenced by environmental circumstances and activity. Work, leisure activities, genetic factors, air purity, diet, medical care, personal hygiene, personal relations and psychological make-up are all factors that may influence the pace of many kinds of natural degeneration. Where the degeneration is of a kind that affects the population at large, it is difficult for the Board to attempt a measurement of the significance of each occupation on each kind of degeneration. It is also difficult to determine whether a particular occupation had any significant effect in advancing the pace of degeneration compared with other occupations, or compared with a life of leisure. Where a degenerative process or condition is of a kind that affects the population at large, it will not be designated or recognized by the Board as an occupational disease unless employment causation can be established.

If a worker is suffering from a kind of bodily deterioration that affects the population at large, it is not compensable simply because of a possibility that work may be one of the range of variables influencing the pace of that degeneration. For the disability to be compensable, the evidence must establish that the work activity brought about a disability that would probably not otherwise have occurred, or that the work activity significantly advanced the development of a disability that would otherwise probably not have occurred until later.

For example, osteoarthritis in the spine, rheumatoid arthritis, and degenerative disc disease have not been designated or recognized under #26.01, #26.02, or #26.03 as occupational diseases. (4), (5)

There is also policy regarding compensation in cases where employment activities have caused an aggravation of a pre-existing disease. The policy at item #26.55 addresses this situation as follows:

Where a worker has a pre-existing disease which is aggravated by work activities to the point where the worker is thereby disabled, and where such pre-existing disease would not have been disabling in the absence of that work activity, the Board will accept that it was the work activity that rendered the disease disabling and pay compensation. Evidence that the pre-existing disease has been significantly accelerated, activated, or advanced more quickly than would have occurred in the absence of the work activity, is confirmation that a compensable aggravation has resulted from the work.

This must be distinguished from the situation where work activities have the effect of drawing to the attention of the worker the existence of the pre-existing disease without significantly affecting the course of such disease. For example, a worker who experiences hand or arm pain due to an arthritis condition affecting that limb will not be entitled to compensation simply because they experience pain in that limb from performing employment activities. Similarly, a worker with a history of intermittent pain and numbness in a hand/wrist due to a pre-existing median nerve entrapment (carpal tunnel syndrome) will not be entitled to compensation just because their work activities also produce the same symptoms. To be compensable as a work-related aggravation of a disease, the evidence must establish that the employment activated or accelerated the pre-existing disease to the point of disability in circumstances where such disability would not have occurred but for the employment.

Submission

The worker's representative has provided a brief submission in which he states that he relies on two prior decisions of the Appeal Division, Ms. Village's report and Dr. Bailey's medical-legal opinion. He submits that any qualified physician dealing regularly with occupational issues could not fail to be aware of the vast literature linking spinal degeneration to the operation of equipment and he submits that the Board's view should be ignored.

The Appeal Division decisions cited by the representative are *Appeal Division Decision #99-1868* (16 WCR 265) and *Appeal Division Decision #2002-2499*, which may be accessed on the Board's website. Decisions of the Appeal Division and WCAT

are not policy and, with the exception of WCAT decisions issued by a panel constituted under section 238(6), these decisions are not precedents. But, in some cases the analysis is useful and, for the purposes of consistency, it is appropriate to apply similar standards and approaches to similar cases.

Appeal Division Decision #99-1868 involved a worker who had worked for more than 35 years operating trucks, caterpillars, loaders and bulldozers. After considering the 1998 and 1999 reports and the Teschke report in some detail, the panel concluded that the literature pointed to “an association between vibration and low back disorders”. The panel expressed some concern regarding the degree of reliance that could be placed on the exposure guidelines described in the 1998 report; however, it was noted that the worker’s exposure to WBV exceeded by a factor of ten the exposure limits recommended in the standards established by the German Federal Ministry of Labour. Without explicitly embracing the German standard, the panel accepted a medical-legal opinion that the worker’s exposure to WBV had aggravated a pre-existing degenerative disc condition.

The second Appeal Division decision cited by counsel, *Decision #2002-2499*, involved a worker who had been employed operating heavy equipment from 1962 to 1999. In that case, the panel reviewed the three previously noted reports and a subsequent report obtained by the Board: “Whole Body Vibration and Low Back Pain, Literature Review”, by Dr. Keith Chambers, Clinical Epidemiologist (Chambers report). Dr. Chambers concluded that the current epidemiological literature does not support the existence of a causative relationship between WBV and low back disorders. This report is accessible on the Board’s website.

In addition to these four reports, the panel went on to consider a number of other review articles. Ultimately, the panel concluded that, “WBV has the capacity to be a significant contributing factor in low back disorders”. The panel found that in the case before it, the worker’s exposure to WBV had caused a permanent aggravation of his pre-existing low back pathology.

In addition to these two Appeal Division decisions, there is a recent decision, *WCAT Decision #2006-01568* which has also addressed the epidemiological evidence regarding the relationship between WBV and low back disorders.

Reasons and Decision

As stated in policy #26.50 of the RSCM I, degenerative disc disease and osteoarthritis of the spine have not been designated or recognized as occupational diseases by the Board. That policy explains why degenerative conditions generally are not recognized as occupational diseases unless employment causation can be established. In order to establish employment causation, it must first be established that the proposed relationship is biologically plausible. In this case, this means that there must be sound evidence that WBV can cause or accelerate lumbar degenerative disc disease. Just as

importantly, there must also be sound medical evidence that this is what has occurred with the worker.

There is some dispute as to whether it is possible to isolate WBV as a causative factor in degenerative disc disease given the prevalence of this condition in the general population and, according to the policy, the myriad factors which may impact its development. In his report, Dr. Chambers clearly expressed doubt that there was any sound epidemiological evidence of such a relationship. He summarized his conclusions as follows:

In summary, it appears that current epidemiological literature does not support the notion that whole body vibration causes low back disorder. This inability to demonstrate a causative relationship despite decades of research by multiple researchers is remarkable. Criteria to assess future research in this area must be stringent, as with this much research activity, there is likely a strong bias in terms of publishing positive results. This publishing bias could strongly skew study results in favour of the relationship of WBV to LBD [low back disorders].

On the other hand, Dr. Teschke *et al* found otherwise. They summarized their conclusions as follows:

Epidemiological studies of the association between back disorders and vehicle operation jobs with vibration exposure shows overwhelming evidence of a relationship that is consistent and strong, increases with increasing exposure, temporally precedes exposures, and is biologically possible.

...

The data support a causal link between back disorders and both driving occupations and whole body vibration. Numerous back disorders are involved, including lumbago, sciatica, generalized back pain, and intervertebral disc herniation and degeneration. Elevated risks are consistently observed after five years of exposure.

The panel in *Appeal Division Decision #2002-2499* questioned whether Dr. Chambers had been too exacting in his critique of the original research or, alternatively, whether he had appropriately identified problems in the original research such that conclusions based on a review of the original research articles were suspect. After reviewing all of the review literature upon which the two reports were based, the panel found that no “perfect” study of the influence of WBV on the low back had yet been conducted in that there had not yet been “a longitudinal study with, among other matters, a very large number of workers, physical verification of low back pathology, sophisticated

measurements of vibration, acknowledgement of and adjustment for other risk factors, and very reliable methodology.”

The panel noted, however, that the report by Dr. Chambers was the most critical review of the literature seen by the panel although the same literature had informed the opinions of Dr. Teschke *et al* and many of the other review authors including those of a report prepared by the National Institute for Occupational Safety and Health (NIOSH). The panel noted that the NIOSH reviewers expressly acknowledged imperfections in the studies yet they had also concluded there was strong evidence of a positive association between exposure to WBV and back disorders.

It was also noted that scientific researchers may hold opposing opinions which are nonetheless based on thorough evaluations of the scientific evidence. The panel did not consider that the views of reviewers who found support for a causative relationship between WBV and low back disorders should be rejected because they did not meet the exacting analytical standards brought to bear by Dr. Chambers. The panel noted that other reviewers also made comments which revealed their awareness of flaws in the studies under review, “Yet almost all of those reviewers still concluded there was a support in the literature for concluding WBV had the capacity to contribute to low back disorders and was a risk factor associated with low back disorders”.

The panel discussed the applicable standards for findings of medical or scientific causation as opposed to legal causation and noted that it was not necessary to have scientific certainty of a causal relationship between WBV and low back disorders in order to accept that WBV has the capacity to contribute to low back disorders. It was sufficient to have persuasive evidence that it was more likely than not that there was a causal relationship.

Ultimately, the panel concluded that the literature provided sufficient evidence of the likelihood of a causal relationship between WBV and back disorders to satisfy the legal standard for causation although it may well not be sufficient to satisfy the scientific standard for causation. The panel was persuaded that WBV has the capacity to be a significant contributing factor in low back disorders. In *WCAT Decision #2006-01568* a panel undertook a further review of review articles published since 2002 and concluded that there was no basis for disagreeing with the conclusion that WBV has the capacity to cause low back disorders.

In the present case, neither Dr. Bailey nor the BMA referred to epidemiological evidence. In fact, the BMA’s opinion does not refer specifically to the effects of WBV. The opinion of the BMA, which was provided in September 2001, was simply to the effect that current medical information does not indicate a causative relationship between “years in the bush” or “heavy labouring situations” and back pain. Given the brevity and generality of the BMA’s opinion, even if I view it as conflicting with the opinion of Dr. Bailey, it can be given little weight.

I accept that Dr. Bailey is qualified to provide an expert opinion with respect to the causes of the worker's spinal condition and that his opinion should be accorded weight based on the usual considerations, which include the accuracy of the information on which it is based. In this regard, I have considered the ergonomic assessment which Dr. Bailey relied on with respect to the worker's exposure to vibration.

In cases involving cumulative exposure to a substance or process, it is often difficult to obtain reliable evidence of the extent of the exposure. Where WBV is the factor under consideration, Ms. Village states that both the amplitude of vibration and the duration of exposure are used to obtain a measure of vibration that may be compared to international standards. In cases involving WBV, there are problems associated with calculating the degree of vibration associated with the use of particular equipment, when the machinery used and the working conditions in which it was used no longer exist. In addition, it is not unusual that a worker will have been employed by various employers over the years and in various capacities. As a result, it becomes difficult to reconstruct a reliable history of the duration of exposure.

In this case, the worker's evidence was that he was steadily employed by one company for approximately 14 years, between 1967 and 1982, when the company went bankrupt. The records from his 1976 claim file indicate that he was hired by the company in 1968 and remained an employee when he was injured in 1976. He returned to work for that company and the company's registration was cancelled in late 1981. These records tend to support the worker's recollections regarding his employment during those years.

This is not to suggest that corroboration of the worker's evidence is necessary but it is helpful when discussing an employment history that spans almost 40 years to have supportive documentation. Accordingly, I accept that the worker operated heavy equipment, primarily a skidder, for the approximately 13 years that he was employed by that company and there is no reason to reject his evidence that he spent another 15 years as the owner/operator of a skidder. Accordingly, the duration of his exposure to vibration from the use of heavy equipment spanned approximately 28 years. Ms. Village estimated approximately 31 years of exposure and I do not think that a difference of perhaps 3 years is of significance when considering a period of this magnitude.

Turning to the measurement of the vibration amplitude, since some of the equipment used by the worker is no longer in existence, Ms. Village relied on measurements for similar pieces of equipment as described in the literature. The panel in *Decision #2002-2499* addressed this approach to measuring a worker's daily vibration dose and considered that it was appropriate to use measurements found in the literature as proxies of vibration experienced by a worker in using particular types of equipment. The panel considered that the figures in the literature had the advantage of being objective measurements of exposure although the lack of access to the original equipment did somewhat affect the reliability of the analysis of exposure. I agree with this reasoning.

The 1998 report includes a table (Table 1) which summarizes the vibration levels cited in the literature for various types of equipment. This table indicates that the typical vibration level for a skidder is 0.83 m/s^2 (meters per second squared). I note that the worker also drove logging trucks on unpaved roads and Table 1 indicates that the typical vibration level for this equipment is 1.05 m/s^2 .

The authors of the 1998 report refer to three standards for exposure limits to WBV: the *International Organization for Standardization Guide* for the evaluation of human exposure to WBV (various versions from 1974 to 1997); the “European Economic Community Council Directive” (1993); and, the “German Federal Ministry of Labour” limit dose value and total vibration dose (1994). The authors conclude, after comparing the exposure limits described in these standards, that exposures below 0.25 m/s^2 for eight-hour durations are not likely to cause back disorders. In the range of 0.315 m/s^2 to 0.63 m/s^2 for eight-hour durations, back disorders may occur and above 0.63 m/s^2 , and especially above 0.8 m/s^2 , back disorders are likely to occur. The latter is particularly true if the exposure is based on a history of ten years or more.

At pages 21 and 22 of the 1998 report the authors discuss the calculation of vibration for the purpose of applying German Federal Ministry of Labour standards. The total occupational vibration dose is the sum of the daily acceleration level (m/s^2) multiplied by the days per year of exposure multiplied by the number of years of exposure. Acceleration levels below 0.8 m/s^2 are not taken into account since there appears to be no clear danger to health when the 8 hour vibration acceleration is 0.8 m/s^2 . The risk of an occupational vibration induced spinal disorder is recognized when the product of this calculation, called the limit dose value, amounts to 1400 or more.

Ms. Village calculated the worker’s exposure at 3980 based on the worker having worked approximately 16 years at 220 days per year, operating a skidder and for 15 years, while self-employed, working 180 days per year. Ms. Village’s calculations result in fairly rough estimates but even if they involve some over-calculation of the worker’s exposure to vibration, the worker’s exposure would substantially exceed the limit dose value of 1400. This value of 1400 is not a standard recognized in this jurisdiction and I do not accept it as establishing a standard related to risk of spinal disorders generally. However, in the absence of any standards or policy direction in this jurisdiction with respect to the effects of WBV, I do consider it of note that this is a standard recognized in another jurisdiction and that the worker’s exposure substantially exceeds that value.

On the whole, I consider that the ergonomic assessment on which Dr. Bailey relied in preparing his medical-legal report fairly estimates the worker’s occupational exposure to WBV.

Returning to Dr. Bailey’s medical-legal opinion, I have also taken into account his background and primary area of expertise, which is spinal disorders. I consider that he was well apprised of the medical evidence as well as the worker’s exposure to WBV.

His examination of the worker and other medical evidence led him to conclude that the worker's symptoms were primarily due to degenerative disc disease of the lumbar spine. I accept that opinion.

Dr. Bailey has not expressed any doubt as to the biological plausibility of a causative relationship between WBV and degenerative disc disease. Although he agrees that it is "often difficult to identify and quantify the magnitude to which specific factors lead to a patient's degenerative disc disease", he appears confident that exposure to WBV is a risk factor for the acceleration of this disorder, as is smoking. He also appears confident that, of the three occupational risk factors identified by Ms. Village, WBV was the most significant. In this regard, he notes that Ms. Village has confirmed in her ergonomic assessment report that the worker was exposed to daily vibration exposure and a lifetime dose exposure which exceeds the exposure limit for a number of standards.

As previously noted, Dr. Bailey has not referred to any supportive scientific literature for his comments regarding WBV as a risk factor for the acceleration of WBV. This may be considered a significant flaw going to the weight of his medical opinion or it may reflect what the worker's representative has submitted, which is that it is well recognized in the medical field that WBV is a risk factor for back disorders. Having reviewed the Appeal Division and WCAT decisions cited above as well as the 1998 report, the 1999 report, the Teschke report and the Chambers report, I do not consider that Dr. Bailey's assumptions respecting WBV as a risk factor for spinal disorders reflect a view that is grossly inconsistent or unsupported by the research literature in this area. I consider that Dr. Bailey's apparent acceptance of the impact of WBV without reference to research that would support this view does not affect the weight of his opinion.

I view Dr. Bailey's opinion as a sound, reasoned opinion on a matter that is within his field of expertise and which was based on a reasonably accurate understanding of the worker's exposure to WBV. There is no conflicting medical or other opinion evidence before me that may be accorded any weight. Accordingly, I find that the worker's symptoms when he stopped working in November 2000 were primarily due to degenerative disc disease and that this condition has been significantly accelerated by his occupational exposure to WBV.

Expenses

The representative has requested reimbursement of the full cost of both Ms. Village's April 2003 ergonomic assessment report and Dr. Bailey's July 20, 2004 medical-legal report.

Under section 7 of the *Workers Compensation Act Appeal Regulation*, I direct the Board to reimburse the worker for the full expense incurred in obtaining Ms. Village's April 2003 ergonomic assessment report on the basis that a particular level of expertise is necessary to provide a report of this nature beyond what is required to prepare the more usual type of ergonomic assessment. Accordingly, the report is considerably more comprehensive than the usual ergonomic assessment.

Under the same authority, I direct the Board to reimburse the worker for expenses related to Dr. Bailey's July 20, 2004 report, according to the Board's schedule of fees. I consider that it was reasonable to obtain this opinion and I found it useful in addressing the worker's appeal. I do not consider it appropriate to reimburse more than the amount allocated in the schedule of fees because the substance of the report is within the parameters of the description of a medical-legal opinion contained in the schedule of fees.

Conclusion

The worker's appeal is allowed. I vary the decision of the Board officer dated September 27, 2001. I find that the worker's lumbar degenerative disc disease was significantly aggravated or accelerated by his exposure to WBV in his employment as a heavy equipment operator. His symptoms at the time that he stopped working in November 2000 were primarily due to the aggravation and acceleration of that degenerative disc disease.

Marguerite Mousseau
Vice Chair

MM/jd/gw