What Price Decibels?

By HARRY A. NELSON

A Wisconsin official views his State's legislation to compensate for damage to hearing suffered by workers in industry.

IF NOISE, as so aptly defined, is unwanted sound, it may conservatively be stated that to many of our citizens the subject of industrial loss of hearing belongs in the category of noise.

In nature, noise within the accepted definition is rare, but, in civilization, noise has become increasingly frequent and unpopular, even to the stage of anathema.

That the subject of industrial loss of hearing is a serious one cannot be doubted. We listen to questions about the elimination of noise, protection of hearing, and whether compensation or damages shall be paid to those who have suffered loss because of industrial exposure. We hear estimates that occupational loss of hearing could result in the filing of several billions of dollars in claims.

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The fact that the usually unsuspecting consumer of products must ultimately bear the financial burden of noise does not dispose of the problem of immediate fiscal impact on employers and insurance carriers. They may be faced with payment for loss of hearing accrued over many years and may be unprepared for a liability not anticipated and for which no reserves have been established. Elements of competition between industries in States with different laws create economic quandaries.

A Complex Problem

Much of the confusion which has arisen as to compensation liability arises because of deviation from original concepts. When compensation laws were first enacted, certain basic principles were recognized. A primary tenet was that benefits were to be based on wage loss. Why do we not measure wage loss as and when it occurs, and award compensation accordingly? Those who are acquainted with workmen's compensation administration recognize the almost insuperable task that a system of that kind would involve. Benefits would vary from week to week and require repeated adjudication. The factors of speed, security, and certainty—implicit in good compensation administration—would be lost.

As a workable scheme for administration of approximate justice, most States have adopted

schedules of fixed benefits. These schedules provide for certain measurable payments based on physical loss. In many cases, they bear little relation to actual wage loss. They leave much to be desired as to meticulous relativity and uniformity, even between items in given schedules.

Why does loss of hearing present such an extreme problem in workmen's compensation? To the informed, the answer is simple. Noise is almost ubiquitous. There are so many possible claimants. Many industrial operations engender noise sufficient in time to cause loss of hearing. Few employees actually lose wages because of their partial deafness. Few, if any, become totally deaf because of prolonged exposure to noise. Difficulties are present as to determination of levels of noise sufficient to cause loss. The cause of the loss is not always easily determinable. The price to be paid for loss to the employee produces much controversy.

There has been a pronounced tendency to deviate from the initial test of wage loss and to award compensation for trivial physical impairment regardless of wage loss. Should amounts so expended and so urgently needed be used instead for benefits to be paid to those who suffer substantial wage loss? The issue must be decided by legislative bodies with the use of such logic and evaluation of contentions as customarily motivate lawmakers in constructing legislation.

The Wisconsin Act

Wisconsin's compensation act (1953 Wis. Stat., ch. 102) included occupational diseases in 1919. Although silicosis is a typical occupational disease, claims based on that disease were not filed in any number until about 1932. More remarkably, only a few stray claims for gradual loss of hearing were filed before 1951.

When the Wisconsin act embraced occupational diseases, apparently it was assumed that they were to be handled in the same manner and with like benefits as were accidental injuries. "Time of injury" was defined as the "date of the accident which caused the injury or the date when the disability from the occupational disease first occurs." Under these provisions, the court held in claims arising from silicosis that to enforce liability there must be disability during the period of actual employment—disability such as to result in wage loss.

Later, the law was amended (sec. 102.01 (2)) to provide that in the event of disease "time of injury" should be "the last day of work for the last employer whose employment caused disability." This definition was included to protect cases where disability started after the employee had ceased work.

The Wisconsin act included schedules of permanent partial disabilities 2 years after its original enactment and 6 years before the adoption of the occupational disease provision. The present schedule (sec. 102.52) calls for payment of 50 weeks' indemnity for loss of hearing in 1 ear and of 333⅓ weeks' indemnity for total deafness of both ears, which, at the maximum rate, amounts to something over $12,000. "Relative injury" provisions call for pro rata apportionment when partial deafness results. For 50-percent deafness of both ears, the allowance would be over $6,000.

When the State of Wisconsin Industrial Commission was faced with a considerable number of claims, it was confronted with some difficult questions: Was it possible to prove that loss was due to noise? Was such loss of hearing an occupational disease? Was it required that there be a "last day of work"? Was wage loss necessary? Did the schedule apply? Could partial loss be measured on a schedule basis?

The commission considered that the schedule, having existed prior to the enactment of the occupational disease law, was read into the law providing coverage for disease and, therefore, was to apply to slowly developing disease as well as to injury by accident. The law made no stated exception as to application of schedules. Was constructive exception to be made in a single type of disability although in all other types the schedule was to be applied?

In silicosis cases, compensation was usually based on disability such as to cause wage loss. In those cases, the court had held that to find liability, there must be wage loss and not merely so-called medical disability. There was no schedule which applied to the body as it did to members of the body, although a more recent court construction now in effect has so held.

The court had not been faced with a situation in which occupational disease without wage loss had produced a disability which, if caused by accident, clearly was to be compensated for under the schedule regardless of wage loss.

A Test Case

The test under the Wisconsin act is that of reasonable probability rather than either possibility or certainty. In the 1951 test case decided by the industrial commission, the testimony clearly established that noise can and does result in loss of hearing and that the employee had worked in noise of a kind and over a sufficient period to result in loss, some of which was permanent. A so-called fatigue loss coexisted from which some recovery might result. Noise was established as the cause of loss of hearing. The claimant suffered from an occupational disease not resulting from a single trauma but from innumerable impacts of energy. The claim was not barred by the statute of limitations since it was found that the claim was made within 2 years from the "last day of work."

The commission further decided that there should be a reduction in the recorded percentage of loss because of hearing loss common at the age (60) of the claimant. The testimony established that the average loss at age 60 was 7.07 percent. Although some restoration of hearing might be anticipated, at the most it could not amount to more than 25 percent, leaving 75 percent as clearly caused by work exposure.

In determination of loss, the American Medical Association method (*1*) with the use of the pure tone audiometer was found to be the most reliable evolved to the date of decision. Under the Wisconsin statute (sec. 102.52 (17) and (18)), the value of the "second" ear is considered to be 5⅔ times the value of the "first" ear. Therefore, in the test case the smaller loss was computed, multiplied by 5⅔, added to the greater loss, and the total was divided by 6⅔. After further deduction as required by the statute (sec. 102.53 (2)) because the claimant's age was over 50, the final result called for payment of 13.511 percent of binaural loss, or 45.04 weeks of compensation, in the sum of $1,575.46.

Upon appeal of the test case, the Circuit Court of Dane County, Wis., reversed the commission's order, holding that there was no "last day of work" because the employee was still in service and that wage loss must be shown before compensation could be paid in occupational disease. It stated that the schedule did not apply. The court commented that the case before it was new and novel and not foreseen or anticipated. It made no attempt to exercise the judicial ingenuity which the Supreme Court of Wisconsin had invoked in silicosis cases.

The Supreme Court of Wisconsin on October 6, 1953, in *Green Bay Drop Forge Co.* v. *Industrial Commission* (265 Wis. 38), upheld the findings of the commission and reversed the decision of the circuit court. It held that wage loss was not necessary to establish a claim for loss of hearing by prolonged exposure to noise; that the schedule applied; that the "last day of work" provision applied only in cases where an employee had actually quit his work; and that the commission had properly fixed the day before the filing of application as the date for liability. It further held that termination of employment was not a condition precedent to establishment of claim; that loss of hearing was disability within the purview of the statute; and that such cases were compensable. On rehearing of the case, the court reiterated its decision.

The Proposed Formula

For many years, the Wisconsin commission has maintained an advisory committee on workmen's compensation legislation. This committee is composed of representatives of industry, labor, and insurance carriers. When unanimous agreement is reached as to proposed changes, the changes are usually adopted by the legislature.

The committee considered the subject of occupational loss of hearing and felt that because of uncertainty as to legal and economic results at least temporarily a change in law was desirable. The legislature agreed, and effective July 1, 1953 (1953 Laws of Wis., ch. 328, sec. 13), abrogated the schedule as to loss of hearing from prolonged exposure to noise but retained it as to accidental loss. It provided that under the amendment an employee must establish that

he has loss of hearing as a result of prolonged exposure to noise in a given employer's service for a total period of at least 90 days; that because of his loss he has been discharged or transferred from employment; or that he has ceased such employment since it is inadvisable for him to continue in it because of impairment of hearing. If he can then establish wage loss, he may receive benefits not to exceed $3,500.

To discourage unnecessary discharge or transfer, the employer in such cases, as in the case of a similar provision covering nondisabling silicosis, is charged with uninsurable primary liability.

The advisory committee requested the industrial commission to study and evolve a formula for determination of loss. There was thought that the present formula of the American Medical Association is not realistic, particularly in that it gives undue credibility to the ability to hear sounds outside the range of conversation. A medical subcommittee was then appointed by the advisory committee. The subcommittee recommended that sound below 90 decibels, as measured on a C scale of an approved sound level meter, should not be considered hazardous regardless of the length of exposure.

The subcommittee also recommended a proposed formula for determination of hearing loss. These recommendations are based upon the best scientific information now available, subject to revision as additional information accumulates. The formula, which the advisory committee is now studying to determine whether it should be recommended for use by the commission, provides that—

Pure tone air conduction audiometric tests are to be used in evaluating hearing acuity only in the 3 readings of 500, 1,000, and 2,000 cycles. These are the frequencies ordinarily produced in speech conversation. (The American Medical Association table also includes the frequency of 4,000.) Frequencies between 250 and 8,000 cycles are to be used for diagnostic purposes.

To get the average decibel loss, losses in the 3 frequencies are to be divided by 3. Losses averaging 16 decibels or less are to be held not to constitute hearing disability, and losses of 80 decibels and over are to constitute total deafness. Between these points, each average decibel loss between 17 and 79 is prescribed a percentage of compensable hearing loss.

For binaural loss (both ears), the statutory formula is to be used with the recommendation that for purposes of legislation the relative value of loss as between 1 and both ears should be as 1 to 5.

Loss for presbycusis (age deafness) is to be subtracted at the rate of one-half percent at age 50, plus an additional one-half percent for each year thereafter. Some recovery of hearing may be expected after removal from a noisy environment. Just how much will depend on factors of years of exposure, degrees of loss, and individual susceptibility. A first examination for hearing loss should be made after 48 hours' removal from the noise environment followed by closely spaced periodic tests. Five decibels are to be deducted from each of the average ratings of the 500, 1,000, and 2,000 frequencies to allow for the "recovery factor." The result will be the final permanent loss except for those individuals who have been removed from noise for 6 months or longer.

Good Working Environments

How many employees will be discharged from their jobs or transferred to others because of loss of hearing? How many can show that it is inadvisable for them to continue because of existing partial deafness?

Certainly employers will not discharge, at great expense, skilled workers because of partial deafness. Employees will not be inclined to quit their jobs even though some loss has resulted and further loss may occur. One purpose of the Wisconsin law, retention of the employee at his work, probably would have been accomplished even without the July 1, 1953, amendment.

The Wisconsin Industrial Commission has before it approximately 530 loss-of-hearing cases for determination. Most of these were filed before July 1, 1953. Some were filed after July 1, claiming loss before July 1. There will have to be determination as to whether the amendment of July 1 blots out these claims or whether claim may still be made provided loss can be established as existing before July 1, 1953.

Other questions may still have to be determined by the Wisconsin Supreme Court. Liability of successive employers was not involved in the 1951 test case previously cited, so that a case on that point probably will go to the State supreme court on appeal. Whether any particular day must be taken as the date of "injury," in view of the statutory provision as to the "last day of work," must definitely be determined. That date involves the questions of wage basis and age of the injured, both of which bear on the amount of liability. What will be decided in a case where definite loss has been measured as of a given date following which there was subsequent employment entailing exposure to damaging noise? Shall the last employer who contributed to loss assume the entire liability, as has been held under somewhat different factors in silicosis cases? The question of operation of statutes of limitations is still to be clarified.

What about future legislation? The commission's advisory committee is continuing to study the subject with a view to new proposals for legislation. The basic question is whether loss of hearing shall be compensated strictly for wage loss or whether some schedule shall again be adopted.

Employers should use all possible diligence in surveying conditions of operation, ascertaining whether detrimental noise is present, and eliminating as much of that noise as possible. Engineers have made many suggestions as to redesign, repair, and maintenance of machinery and equipment, and application of acoustical materials. Segregation of noisy operations has eliminated the noise hazard for some employees. The first line of defense calls for the use of ear defenders or plugs until better or more positive methods can be adopted.

Labor will need to cooperate in making use of all safety devices and rules adopted. When a claim is made, an employee should be able to establish that loss was present at a given time, and employers should, as a matter of defense, be able to establish cause and extent of loss at the start of, and during, employment. Physical examinations for loss of hearing are vital both from the standpoint of safety and compensation; they should be made promptly and periodically. Is it possible to detect susceptibility of employees to noise? If so, especially susceptible employees should be protected or transferred to employment where the hazard of noise is not a factor.

Regardless of the basis of recovery, workers are rightfully going to insist that they be provided with working environments which will, within reasonably attainable bounds, eliminate the offending hazard. They are entitled to work in environments which will assure retention of their faculties as long as possible.

Codes and standards of safe practice can be written into law only when it is certain that they can be established as physically and economically feasible of attainment and can be accomplished on the basis of sound engineering and safety principles.

Because of the impact of safety codes and compensation laws, silicosis, lead poisoning, and other occupational diseases have been largely eradicated in some States. It is not too much to expect that loss of hearing resulting from industrial noise may be at least greatly reduced and that the ingenuity of science will in time achieve victory in the battle of noise.

REFERENCE

(*1*) Tentative standard procedure for evaluating the percentage loss of hearing in medicolegal cases. [Report of Council on Physical Medicine.] J. A. M. A. 133: 396–397 (Feb. 8, 1947).