

## ENGINEERING AND GINNING

### OSHA Noise Regulations and Agriculture, Including Cotton Gins

Phillip J. Wakelyn and J. Kelley Green

#### ABSTRACT

Since its formation in 1971, the Occupational Safety and Health Administration (OSHA) has recognized agriculture was not covered by their noise standards. However, in 2014, OSHA cited two gin companies under the OSHA general duty clause for an alleged failing to protect employees from exposure to hazardous noise levels by not requiring employees to wear hearing protection. In January 2016, OSHA withdrew both citations.

The 2014 interpretations by OSHA were contrary to OSHA's enforcement of the federal OSHA noise standards and guidance since 1971 when OSHA came into existence; 1981, when the hearing conservation amendment was promulgated and agriculture was specifically excluded; and 1983 when the OSHA 90 dBA level was reaffirmed. OSHA's contention that their general duty clause requires these two gins to mandate hearing protection conflicts with OSHA guidance specifically related to this topic, as well as over 40 years of consistent enforcement of the Occupational Noise Exposure ("noise standard") standards relating to agriculture.

OSHA has not presented any new health data indicating that working in a cotton gin over a working lifetime causes occupational noise-induced hearing loss, or issued any new guidance on enforcement of the OSHA noise standard as it applies to agriculture. The science and OSHA's current guidance continue to support the conclusion that intermittent/interrupted exposure to noise in agriculture, including cotton gins, is not an occupational hazard, requiring mandatory hearing protection and a hearing conservation program.

The OSHA noise regulations as they apply to agriculture, including cotton gins, are discussed.

In 2014, the Occupational Safety and Health Administration (OSHA) office in the Corpus Christi, TX area cited two cotton gins under the OSHA general duty clause [OSH Act of 1970 Section 5(a)(1)] for an alleged failure to protect its employees from exposure to hazardous noise levels (OSHA, 2015). If OSHA does not have a specific standard they can apply the General Duty Clause:

**29 U.S.C. § 654, 5(a)1.** Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.

Additionally

**29 U.S.C. § 654, 5 (a)2.** Each employer shall comply with occupational safety and health standards promulgated under this act.

**29 U.S.C. § 654, 5 (b).** Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA stated that these two gin companies should adopt a mandatory policy requiring employees to wear hearing protection. These citations were the result of inspections conducted during the 2014 ginning season. This arbitrary interpretation by the OSHA Corpus Christi regional office is contrary to OSHA enforcement for agriculture of the federal OSHA noise standards and guidance since 1971 when OSHA came into existence, and 1981 and 1983, when the hearing conservation amendment to OSHA's noise standard was promulgated in which agriculture was specifically excluded and the 90 dBA level for mandatory controls was reaffirmed (Occupational Noise Exposure; Hearing Conservation Amendment, 46 FR 4078-01, 16 January 1981; Final Rule 48 FR 9776, 8 March 1983).

OSHA's contention that the general duty clause requires these two gins to mandate hearing protection conflicts with the manner in which OSHA has enforced the Occupational Noise Exposure Standards (noise standard) for agriculture and OSHA guidance for agriculture. To establish a violation of the general duty clause, the Secretary must prove by a preponderance of evidence that: (1) a workplace condition presents a hazard, (2) the employer or its

industry recognizes the hazard, (3) the hazard was likely to cause physical harm, and (4) there was a feasible and useful means of abatement that would eliminate or materially reduce the hazard.

For cotton ginning: (1) OSHA has not established that a workplace condition presents a hazard for noise. In the rulemaking where OSHA promulgated the hearing conservation amendment in 1981 (Occupational Noise Exposure; Hearing Conservation Amendment 46 FR 4078-01, 16 January 1981) and 1983 (Final Rule, 48 FR 9776, 8 March, 1983) where the 90 dBA exposure level was reaffirmed, OSHA made an informed decision after considering all the available information, including the 1972 National Institute for Occupational Safety and Health (NIOSH) Noise Criteria Document (NIOSH, 1972), not to include agriculture, including cotton ginning, in the general industry comprehensive noise standards. (2) OSHA has not shown that the employer or its industry recognizes the hazard. Noise is not a recognized hazard in cotton ginning now, nor has it been in the more than 40 years that the noise standard has been in effect. (3) OSHA has not established that the alleged hazard was likely to cause physical harm. The difference between general industry, construction, and agriculture has to do with the daily, annual, and lifetime noise exposure (intermittent/interrupted exposure to noise vs continuous exposure) and a long respite (recovery time) from exposure that allows recovery.

The science and OSHA's guidance continue to support the conclusion that intermittent/interrupted exposure to noise in cotton gins is not a hazard requiring mandatory hearing protection or any other element of a hearing conservation program. Therefore, this arbitrary interpretation by the regional OSHA Corpus Christi regional office was contrary to federal OSHA enforcement of the federal OSHA noise standards and guidance from OSHA's inception to the 1981 hearing conservation amendment and in 1983 when the noise level for mandatory controls was reaffirmed. OSHA's contention that the general duty clause requires gins to mandate hearing protection conflicted with the manner in which OSHA has enforced the noise standard and OSHA guidance at that time for agriculture (OSHA. Appendix IV: B). The secretary has not presented any health data that show the occupational exposure to noise in cotton ginning leads to occupational noise-induced hearing loss, issued any new guidance on enforcement of the

OSHA noise standard, or any other new information as to the basis for changing the interpretation of the long-held enforcement position on the noise standard as it applies to agriculture.

In January 2016, OSHA agreed to withdraw both citations in exchange for abatement considerations (voluntarily following OSHA guidance for agriculture, which includes making hearing protection available to the workers and encouraging the workers to wear hearing protection). OSHA guidance is voluntary, not mandatory. In the past, for some industries, OSHA has tried to enforce guidance as mandatory and used settlement agreements as a way to get requirements accepted that are more stringent than OSHA regulations.

The purpose of this paper is to discuss the OSHA noise regulations as they apply to agriculture, including cotton gins.

#### **ORIGINAL OSHA NOISE STANDARDS AND HEARING CONSERVATION AMENDMENT EXCLUDE AGRICULTURE**

The OSH Act of 1970 requires industry to maintain a safe and healthful workplace (OSHA "general duty clause"). It gives OSHA the authority to develop regulations and enforce regulations to ensure employers meet their obligations under the law. OSHA has different standards for general industry (29 CFR 1910) than for agriculture. OSHA occupational health and safety standards for agriculture are contained in 29 CFR 1928. OSHA general industry standards applicable to agriculture are listed in 29 CFR 1928.21(a), "Applicable standards in 29 CFR 1910." The OSHA noise standard, 29 CFR 1910.95, is not on this list. In OSHA Agricultural standards [29 CFR 1928(b)] other standards are made inapplicable to agriculture: "Except to the extent specified in paragraph (a) of this section the standards contained in Subparts B through T and Subpart Z of 1910 of this title do not apply to agriculture." If there is not a specific standard that is applicable, OSHA can cite under the general duty clause. To establish a violation of the general duty clause, two conditions the Secretary must show are that (1) a workplace condition presents a hazard and (2) the hazard is likely to cause physical harm.

OSHA adopted the original noise standard, 29 CFR 1910.95, as part of a package of existing federal industry standards adopted without notice-and-

comment rulemaking pursuant to Section 6(a) of the OSH Act as an existing national standard, shortly after the agency was formed (39 FR 23502, 27 June 1974). The Noise standard was developed by the American National Standards Institute (ANSI) and the American Conference of Governmental Industrial Hygienists (ACGIH, 1968 edition) and included the Walsh-Healey Act, which included standards that were considered existing federal standards. OSHA affirmed that the general industry noise standard did not apply to agriculture in a memo following a meeting of the OSHA Standards Advisory Committee on Agriculture (1974).

This federal advisory committee, made up of representatives of all interests/sectors of agriculture, pointed out that nearly all agricultural noise exposures are steady-state noise marked by prolonged rests from noise exposure in excess of 85 dBA. It can be noted that long respites from exposure that allow recovery are vastly different from general industry where the exposure is continuous without long recovery times. This recommendation of the OSHA agricultural advisory committee that the noise standard did not apply to agriculture was important. OSHA scientists at the time agreed with the committee's recommendation that ended in agriculture not being covered by the noise standards.

The OSHA hearing conservation amendment to the OSHA noise standard was proposed in 1974 and promulgated pursuant to section 6(b) of the OSH Act in 1981 (Occupational Noise Exposure; Hearing Conservation Amendment 46 FR 4078-01, 16 January 1981) after 9 years of notice and comment rulemaking, 10 or more weeks of hearings, and hundreds of thousands of comments. Agriculture was specifically considered for inclusion in the noise standard and after review of all available information, OSHA again excluded agriculture from any noise standard or related requirements, according to the Summary of the 1981 standard's Preamble, to 1981 and 1983 interpretive letters and memorandum, and much other information.

### SUMMARY

This final rule establishes a hearing conservation program, including exposure monitoring, audiometric testing, and training, for all employees who have occupational noise exposures equal to or exceeding an 8-hour time-weighted average of 85 dBA. This amendment covers all employees except those engaged in construction or agriculture. This rule is the outgrowth of the proposed revision of the occupational noise exposure standard which was proposed

in 1974. By its action today, OSHA is deferring final action on two issues raised in the 1974 proposal: the permissible exposure level for occupational noise and the appropriate method of compliance with the permissible exposure level. These two issues will continue to be governed by the existing standard.

The letter to David Potts from Leonard Vance (Vance, 1983) cited specific language in the 16 January 1981 Hearing Conservation Amendment Final Rule that is repeated in the preamble to the 21 August 1981 notice of proposed regulation for further rulemaking on the Hearing Conservation Amendment. Although the statement was not repeated in the final amendment, OSHA's position had not changed, according to this OSHA interpretive letter.

OSHA deferred final action on two issues raised in the 1974 proposal: the permissible exposure level (PEL) for occupational noise and the appropriate method of compliance with the exposure level (Occupational Noise Exposure; Hearing Conservation Amendment 46 FR 4078-01, 16 January 1981). OSHA reopened the record in a proposal (21 August 1981) for the submission of new evidence on these issues. On 8 March 1983, the final rule addressing these two issues was promulgated and OSHA reaffirmed the 90 dBA noise PEL (Occupational Noise Exposure; Hearing Conservation Amendment, Final Rule, 48 FR 9776, 8 March 1983). The revised version issued in 1983 has not been altered since.

OSHA specifically considered agriculture in the rulemakings that resulted in the hearing conservation amendment to the noise standard. The reason cited for exemption in earlier considerations is that the noise exposure in agriculture and the respite from exposure (i.e., recovery time) is different from general industry exposures. The memorandum from the OSHA Agricultural Advisory Committee (1974) and a paper by Harris et al. (1976) reinforced that the noise level exposure/duration and recovery time are important criteria for determining annual and lifetime noise exposure, which constitutes a significant risk of chronic hearing loss.

The PEL is required to be set at a level that OSHA believes would be protective of worker safety and health over a working lifetime (8 hours per day, 5 days per week, 48 weeks per year for 45 years) if used in combination with engineering and work practice controls, exposure and medical monitoring, posting and labeling of hazards, worker training, and personal protective equipment [OSH Act Section 6(b)(5)].

The OSHA general industry noise standard (29 CFR 1910.95) stated:

- **PEL:** The permissible exposure limit (PEL) for noise is **90 dBA**, as an eight hour time-weighted average (TWA). The PEL is also referred to as a 100% “dose” noise exposure. [see [Table G-16](#)]
- **Exchange Rate:** The standard utilizes a **5 decibel (dB)** exchange rate. The *exchange rate* is the increase or decrease in decibels (dB) corresponding to twice (or half) the noise dose. For example, when using a 5 dB exchange rate, a dose of 90 dB is twice the dose of 85 dB, assuming that the duration of exposure is the same. (**Appendix III: A-1. Instrument Settings**)
- Only instruments using a 5dB exchange rate may be used for OSHA compliance measurements.
- Sound Air or sound pressure is measured in Pascals (Pa) but is expressed as a sound pressure level (Lp) in decibels (dB), which is a logarithmic scale used to compress the range of audible sound pressure. The relationship between sound pressure and Lp is as follows:  $L_p \text{ (dB)} = 10 \log(p^2 / p_{ref}^2) = 20 \log(p / p_{ref})$  Where Lp = sound pressure level (dB); p = sound pressure (Pa);  $p_{ref} = 2 \times 10^{-5}$  - reference sound pressure (Pa)
- For setting up of SLM (Sound Level Measurement) and frequency weightings, the most common weighting used in environmental noise measurement is A-weighting. The A-weighting represents the way the human ear is more sensitive to mid-range frequencies and less sensitive to high and low frequencies.
- Feasible engineering or administrative controls must be utilized when employees are subjected to sound exceeding the PEL.

**NIOSH Recommended Standard.** The 1972 NIOSH Noise Criteria Document had a recommended exposure level (REL) of 85 dBA as an 8-hr TWA, with a 5-dB exchange rate and was considered by OSHA in the rulemaking on the hearing conservation amendment for the 85-dBA action level and for retaining/reaffirming the 90-dBA noise PEL. In the 1998 Noise Criteria Document, NIOSH did a revised risk assessment and changed the REL to 85 dBA with a 3-dB exchange rate. With a 40-year exposure at 85 dBA, the lifetime exposure risk of developing occupational noise-induced hearing loss (NIHL) is 8%, which is lower than the 25% excess risk at the 90-dBA PEL enforced by OSHA. (For enforcement of most PELs OSHA recognizes uncertainty in measurement of +/- 25%.) The NIOSH recommendations go beyond attempts to conserve hearing by focusing on prevention of occupational NIHL.

The 1998 NIOSH Noise Criteria Document does not mention agricultural noise or consider noise exposures other than continuous workplace exposure. No REL has ever been adopted by OSHA,

but they have been and are used as guides. Although not legally enforceable limits, NIOSH RELs are considered by OSHA during the promulgation of legally enforceable PELs. The difference between a REL and a PEL is essentially what is recommended versus what is permissible and RELs do not consider technological and economic feasibility, which OSHA is required to do by statute.

**ACGIH Recommended Standard.** In 1994, the ACGIH, a voluntary standard setting organization, adopted 85 dBA as an 8-hour TWA threshold limit value (TLV), with a 3-dB exchange rate. ACGIH TLVs are different from OSHA PELs in that they are recommended levels as opposed to comprehensive mandatory standards. OSHA has considered the NIOSH and ACGIH recommended standards, but the revised version issued in 1981 and 1983 has not been altered since then.

### OSHA’S NOISE STANDARDS ARE NOT APPLICABLE TO COTTON GINNING

OSHA’s long-standing position is that cotton ginning is an agricultural operation and not a general industry operation (Visscher, 2002; Wakelyn et al., 2005). The only standards that OSHA can apply to agricultural operations are the agriculture standards in 29 CFR 1928, and the few general industry standards referenced in §1928.21(a) that also are applicable to agricultural operations.

Under the Standard Industrial Classification coding system, cotton ginning is under Agricultural Services and has the industry code of 0724. Under the North American Industrial Classification System (NAICS) coding system, cotton ginning is under agricultural support activities for crop production and has the industry NAICS code 115111/Cotton Ginning.

A paper by Harris et al. (1976) indicated that exposure/duration and recovery time are important criteria for determining annual and lifetime noise exposure that constitutes a significant risk of chronic occupational noise-induced hearing loss:

**Abstract:** This paper describes background information, measurement procedures, data analysis techniques, and results pertaining to assessment of agricultural employee occupational noise exposure. The criteria on which the proposed OSHA 85 dB(A) 16-hour general industry noise regulation is based has been applied to predict hearing damage risk. Analysis of 237 man days of measured noise exposures shows that annual occupational noise exposure must be established to assess hearing damage risk. No evi-

dence was found that agricultural employees are exposed to noise levels/durations which exceed the criteria for annual and lifetime noise exposure on which the proposed OSHA general industry regulation is based. (Harris et al., 1976.)

An American College of Occupational and Environmental Medicine (ACEOM) guidance statement on NIHL (Kirchner et al., 2012) indicated:

- Continuous noise exposure throughout the workday and over years is more damaging than interrupted exposure to noise, which permits the ear to have a rest period. At the present time, measures to estimate the health effects of such intermittent noise are controversial.
- There is insufficient evidence to conclude that hearing loss due to noise exposure progresses once the noise exposure is discontinued.
- Individual susceptibility to the auditory effects of noise varies widely.
- There are a number of other causes of sensorineural hearing loss besides occupational noise [...] especially recreational noise, such as loud music, weapons firing, motor sports, etc. Other causes include a wide variety of genetic disorder, infectious disease, pharmacological agents, head injury ...

The risk of developing chronic/permanent noise-induced hearing loss from acute occupational/workplace exposure in agriculture, including cotton ginning, is different from general industry. In general industry, OSHA recognizes that for promulgating health standards, the usual hourly, daily, weekly, and yearly components when calculating an employee's working life are 8 hours per day, 5 days per week, 48 weeks per year for 45 years of continuous noise exposure (Galassi, 2011), which can result in chronic/permanent noise-induced hearing loss. Section 6(b) (5) of the OSH Act stated that OSHA, in promulgating health standards, must "... set the standard which most adequately assures to the extent feasible, on the basis of the best available evidence, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working lifetime."

With regard to cotton ginning, the typical ginning season in South Texas is 7 to 8 weeks per year followed by 10 months of respite (recovery time) from ginning noise exposure. In other parts of the U.S. the typical season can be longer. This means that for a gin worker to be exposed to the 8 hours per day, 5 days per week, 48 weeks per year for 45 years

of continuous noise exposure that is recognized by OSHA as required for chronic occupational-induced hearing loss in general industry, a cotton gin worker would have to work for more than 100 years in the cotton ginning industry.

In the two recent gin cases, OSHA presented no medical data (e.g., cross-sectional or longitudinal epidemiologic or other medical studies) or any medical research that shows acute occupational/workplace levels of noise in a cotton ginning workplace over a working lifetime leads to the chronic/permanent occupational NIHL. Furthermore, no evidence was presented regarding the threshold of exposure and duration of exposure for a worker with 7 to 8 weeks per year exposure to occupational/workplace noise and 10 months respite (recovery time) from exposure every year that would be high enough to cause occupational chronic NIHL. After excluding both construction and agriculture from the hearing conservation general industry noise standard in 1981 and 1983, OSHA developed a separate construction noise standard (OSHA Construction Standards, 29 CFR 1926; 29 CFR 1926.52) but not a separate agriculture noise standard. OSHA has not adopted a specific hearing conservation program for construction, but some aspects are in 29 CFR 1926.52 and 1926.101.

Before OSHA can promulgate an agricultural noise standard, OSHA would first have to show significant risk of an occupational noise-induced health hazard at current acute noise exposures and recovery times (rest period; respite from exposure) in cotton ginning and agriculture workplaces.

**OSHA noise standards do not apply to agricultural operations, including cotton ginning.** That the Hearing Conservation Amendment does not cover construction or agriculture was confirmed in a letter to David Potts from R.L. Vance OSHA, Health Standards (Vance, 1983).

March 29, 1983  
Mr. David Potts  
Safety and Health Director  
National Constructors Association  
Suite 1000  
1101 15th Street, N. W.  
Washington, D.C. 20005

Dear Mr. Potts:

The hearing conservation amendment to the occupational noise exposure standard, 29 CFR 1910.95, published on March 8, 1983, is applicable to all employees who work for employers who are covered by the Occupational Safety and Health Act except those engaged in construction or agriculture. This position was stated in the January 16,

1981, hearing conservation amendment and was repeated in the preamble to the August 21, 1981, hearing conservation amendment. While this statement was not repeated in the March 8, 1983, final hearing conservation amendment, OSHA's position has not changed. The construction industry is covered by its own noise standard, 29 CFR 1926.52.

If you have any further questions, please do not hesitate to contact us.

Sincerely,  
R. Leonard Vance, Ph.D.  
Director  
Health Standards Programs

And in a memo:

OSHA Instruction STP 2.21  
December 12, 1981 Office of State Programs  
Subject: Occupational Noise Exposure; Hearing Conservation Amendment, 29 CFR 1910.95

An amendment to 29 CFR 1910.95, Occupational Noise Exposure requiring a hearing conservation program under specified circumstances, was published in the Federal Register on January 16, 1981 (46 FR 4078-01). The amendment was to become effective on April 15, 1981, with various provisions being phased in over a 2-year period. However, in order to give the agency time to evaluate the numerous requests for clarification and petitions for administrative stay, OSHA acted by notices in the Federal Register April 10, 1981, May 29, 1981 and July 31, 1981, to defer the effective date of the amendment until August 22, 1981.

OSHA clarifying letters from John Martonik, Deputy Director, Health Standards OSHA (1982) and Thorne Auchter, Assistant Secretary of Labor for OSHA (1982) and memoranda regarding application of the hearing conservation amendment to cotton ginning (Shay, 1982; Tyson, 1982) all stated that cotton ginning is classified under agriculture. The hearing conservation amendment does not apply to agricultural operations and, therefore, does not apply to cotton ginning. It is of note that a cotton gin in California was cited under the OSHA general industry noise standard in 1982. These letters and memoranda were persuasive to CAL OSHA that the OSHA noise standard did not apply to cotton ginning and the citations were withdrawn.

Every time since 1971 that federal OSHA has been asked for an interpretation on whether agriculture and cotton ginning are covered by any OSHA noise standards, OSHA's interpretation has been that there is no noise standard that applies to agriculture. Several OSHA regions have raised the question, as Davis Lane and Gary Visscher (2002) indicated in their memorandum. Each time OSHA interpretive memoranda and letters have provided the OSHA inspector with the same interpretation of OSHA's

position on enforcement of OSHA noise standards in cotton gins, the OSHA regional and state office has withdrawn or declined to issue a citation for violation of OSHA noise standards. The citations against two gins in 2014 were the first time in the more than 30 years (since 1982) that an OSHA area office has cited a cotton gin for noise.

In summary, in the rulemakings that resulted in the hearing conservation amendment to the OSHA noise standard [Occupational Noise Exposure; Hearing Conservation Amendment, 29 CFR 1910.95(c), 46 FR 4078-01, 16 January, 1981] and reaffirming the 90 dBA level for mandatory control (48 FR 9776, 8 March, 1983), OSHA made an informed decision, after considering all the available information, not to include agriculture, including cotton ginning, in the general industry comprehensive noise standards; it was not an oversight.

**Noise not a recognized hazard in cotton ginning by the cotton ginning industry.** To establish a violation of the general duty clause, the Secretary must also show that the employer or its industry recognizes the hazard. Under the general duty clause, “[a] hazard is deemed ‘recognized’ when the potential danger of the condition or activity is either actually known to the particular employer or generally known in the industry.” [ *St. Joe Minerals*, 647 F.2d 840, 845 (8th Cir. 1981) (citing *Usery v. Marquette Cement Mfg. Co.*, 568 F.2d 902, 910 (2d Cir. 1977)]. It is recognized that even if there is not a specific standard but there is a recognized hazard and employers do not take reasonable action to prevent or abate the hazard, OSHA can cite an employer under the general duty clause.

OSHA attempted to establish that the cotton ginning industry recognizes noise as a hazard through the citation of publications and testimony of expert witnesses. The publications listed below are from the OSHA expert witness and OSHA rebuttal expert witness, and were introduced by OSHA in late 2015 and early 2016, just before the 2014 citations against two cotton gins were scheduled for trial. In general, none of these publications (four of which are in peer-reviewed journals) is a medical study dealing with cotton ginning workplaces in the U.S. (e.g., a cross-sectional or longitudinal epidemiologic study of U.S. cotton gin workers) that shows that acute intermittent/interrupted occupational exposures in agriculture, including cotton ginning, leads to chronic occupational-induced hearing loss for an

agricultural worker over a working lifetime. None of the publications specifically indicates that the U.S. cotton ginning industry recognizes that noise exposures in cotton ginning over a working lifetime is a health hazard that leads to chronic occupational induced hearing loss. Two papers deal with cotton ginning machinery: “Reduction of lint cleaner noise” (Glover and Anthony, 2003) and “Noise levels in cotton ginning systems” (Anthony et al., 1978) The 2003 paper by Glover and Anthony reported on an experimental, non-commercially available method for reducing lint cleaner noise from 93.6 dBA to 78 dBA. The paper stated “cotton gins are agricultural operations, and as such, are not covered under the 1970 standard”. The paper does not indicate that the cotton ginning industry recognizes noise as an occupational hazard. The paper by Anthony et al. (1978) is a survey of four ginning systems conducted by engineers. Because the paper was published in 1978, it was available to OSHA for consideration during the noise rulemaking that led to agriculture being excluded from the OSHA hearing conservation noise standards. It also does not indicate that the cotton ginning industry recognizes noise as an occupational hazard.

The 1994 Cotton Ginners Handbook (Anthony and Mayfield, 1994) has a section describing Anthony’s research on noise control on non-commercialized equipment. It contains general review information on noise levels in gins but no medical data indicating that occupational exposure in cotton ginning leads to NIHL from a lifetime of working in a cotton ginning workplace.

Two general information pamphlets issued by NIOSH in 2007 discussed grain dryers not cotton gins: “They’re your ears, protect them. Hearing loss caused by farm noise is preventable” (NIOSH 2007b) and “Have you heard? Hearing loss caused by farm noise is preventable” (NIOSH 2007a). These pamphlets make no mention of the cotton ginning industry recognizing noise as an occupational hazard. Both papers refer to temporary threshold hearing loss (hearing loss and tinnitus) after acute noise exposure (above 90 dBA), not chronic permanent occupational-induced hearing loss from lifetime occupational noise exposures with long rest periods in between acute exposures. Temporary hearing loss after acute exposures is considered a temporary condition. This type of condition is commonly experienced by people that go to bars, restaurants, sporting events, gun shooting, etc. This is a temporary, reversible

condition, not permanent chronic occupational induced hearing loss (personal communication, Dr. Gordon Vap, otolaryngologist). These pamphlets likely were based on the 1998 NIOSH REL and 1998 NIOSH noise criteria document. OSHA has had this information for consideration for almost 20 years, but has not revised their noise PEL. NIOSH REL recommendations are considered and used as guides by OSHA during the promulgation of legally enforceable PELs.

Two other publications (NIOSH, 1982a, b) are NIOSH Health Hazard Evaluations on gins located in Arizona Indian territories that were conducted in 1982. They give data on noise levels in those gins, one with old equipment.

Papers from the Penn State Agricultural and Biological Engineering Department, and Iowa Agricultural Engineering Dept. are agricultural extension papers by engineers: “Noise induced hearing loss in agriculture” (Murphy et al., 2007), and “Lend an ear to hearing protection” (Schwab and Freeman, 2017). These papers mention various acute noise exposures in agriculture and ways to minimize noise exposure. Cotton ginning is not mentioned. They do not indicate that the cotton ginning industry recognizes noise as an occupational hazard nor offer data to indicate that temporary acute noise exposure (above 90 dBA) with long rest periods in between acute exposures leads to chronic permanent occupational-induced hearing loss from lifetime occupational noise exposures.

OSHA added another paper in a Violation Worksheet (12 May 2015) and report by OSHA expert witness Michael Miller, a Compliance Safety and Health Officer and industrial hygienist, who did one of the inspections: “Hearing impairment among workers exposed to excessive levels of noise in ginning” (Dube et al., 2011). This is an article in *Noise & Health* by three authors from the School of Environmental and Earth Sciences, North Maharashtra University, Jalgaon, Maharashtra, India, on 200 cotton ginning workers in 10 gins located at Jalgaon District of Maharashtra State, India. In India, the cotton ginning season at the time of this study (2008-2009) was longer than 6 months and Indian cotton was considered the most contaminated cotton in the world. India has modernized ginning and pressing factories since then. The 10 cotton ginning facilities studied operated predominantly in the manual setup and were highly labor intensive. Exposures levels, duration of exposure, and recovery time

from exposure were different from U.S. gins. This study in India was a limited study, which measured workers at the beginning of the day (8-10 hours); however, no further measurements were mentioned nor was there any information about what day of the week or time in the ginning season the measurements were taken. No information is provided on whether these acute daily exposures lead to chronic permanent occupational-induced hearing loss. The control population of 50 bankers (college-educated, upper-class people) was not a proper, appropriate matched control to rural Indian farm workers (generally uneducated, lower socioeconomic class). This, therefore, is not a meaningful study to compare to U.S. cotton gin workers. The paper does not indicate that the cotton ginning industry recognizes noise as an occupational hazard.

Medically related papers on hearing loss in agriculture have been published, for example: “Noise-induced hearing loss in agriculture: Creating partnerships to overcome barriers and educate the community on prevention” (Ehlers and Graydon, 2011), “Hearing sensitivity in farmers” (Karlovich et al., 1988); and “Occupational hearing loss in farmers” (Plakke and Dare, 1992). However, none of these are studies of cotton gin workers or deal with the type of non-continuous occupational noise exposure cotton gin workers are exposed to. OSHA experts thoroughly searched for any data related to noise exposure and agriculture and cited only the documents listed above.

When reviewed as a whole, none of the information provided by OSHA supports their contention that noise exposure in a cotton ginning workplace results in a chronic permanent occupational-induced hearing loss from a lifetime of occupational noise exposures. In addition, none of the information provided by OSHA supports their contention that noise exposure is a recognized hazard by the cotton ginning industry.

**Noise standard depends on level of exposure and duration of exposure.** Many safety standards refer to an issue related to physical systems, where health issues are also usually exposure dependent. For example, an energy system in agriculture can be much the same as an energy system in general industry, so the hazard of an unguarded pulley is much the same potential safety hazard in either setting. The example used by the Administrative Law Judge was trench safety, where the potential safety hazard would be essentially the same in agriculture as in general industry.

Potential hazards such as noise are different because the hazard exposure level is time dependent, that is, at what threshold level does an acute daily and yearly exposure, after a working lifetime exposure, lead to the chronic health problem of hearing loss? Section 6(b)(5) of the OSH Act, 29 U.S.C. § 655(b)(5), (OSH Act of 1970) states that OSHA, in promulgating health standards, must “... set the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life. For promulgating health standards, the usual hourly, daily, weekly, and yearly components when calculating an employee’s ‘working life’ are 8 hours per day, 5 days per week, 48 weeks per year for 45 years (Galassi, 2011).”

Cotton ginning workers, like most agricultural workers, are exposed to intermittent/interrupted noise levels/durations for daily, annual, and lifetime exposure that are much different from continuous exposure in general industry. This has been recognized by OSHA (even in the recent cases), and led to agriculture not being covered by the federal noise standard. The OSHA general industry noise standard (29 CFR 1910.95) is time dependent and is expressed in dBA over an 8-hour TWA that a worker can be exposed to for a working lifetime.

When the original general industry hearing conservation amendment to the noise standard was developed (Occupational Noise Exposure; Hearing Conservation Amendment, 46 FR 4078-01, 16 January 1981), agriculture and construction were excluded. A separate noise standard was subsequently developed for construction after 1983, but OSHA never developed a noise standard for agriculture. For years OSHA maintained a guidance document (OSHA Appendix IV). This document was removed subsequent to the two gins cited in 2014. Since then, OSHA has issued an updated guidance (OSHA Technical Manual, 2017).

A paper by Harris et al. (1976) explained and reinforced that the noise level exposure/duration and recovery time are important criteria for determining annual and lifetime noise exposure that constitute a significant risk of chronic occupational noise-induced hearing loss. The long-term (annual and lifetime) exposures are where the differences lie between general industry, construction, and agriculture.



The TWA acute personal exposure readings OSHA took in 2014 in the cotton gins inspected might be applicable for the general industry noise standard, but in agricultural operations these readings do not indicate how these acute short-term readings impact the overall annual and lifetime exposure of a cotton gin employee. This long-term exposure is critical, and in the case of agriculture, is not well enough defined for OSHA to determine the appropriate noise limit for regulatory purposes. There is no medical, scientific, or anecdotal evidence that short-term, intermittent/interrupted exposure to the noise levels recorded by OSHA at the cotton gin facilities during the underlying inspections constitutes an occupational NIHL hazard to cotton gin employees.

The annual and lifetime exposure for agricultural workers is much lower than for general industry or construction workers, so the risk of developing chronic/permanent occupational NIHL from acute workplace exposures is different from general industry. As a basis for setting the 90 dBA threshold for controls and 85 dBA action level in the hearing conservation amendment, OSHA recognized that 45 years in general industry of noise exposure can result in chronic/permanent hearing loss.

If OSHA had developed a noise standard for agriculture at some point in the more than 30 years since the general industry hearing conservation amendment standards were developed, OSHA would have had to determine what, if any, appropriate regulatory limit in cotton ginning was equivalent to the general industry thresholds. Is this threshold value after a series of lifetime acute intermittent/interrupted occupational noise exposures, 90 dBA, 95 dBA, or any number of other limits? The current occupational noise levels in cotton gins are the same or less noise than the levels of occupational exposure considered by OSHA during rulemaking in 1971 and again in 1981 and 1983. Nevertheless, during the nine years of rulemaking that lead to the 1981 hearing conservation standard (Occupational Noise Exposure; Hearing Conservation Amendment, 46 FR 4078-01, 16 January 1981), OSHA reviewed agricultural worker occupational noise exposures and other agricultural health data and chose not to include agriculture, including cotton ginning, in the general industry noise standards.

OSHA has opined multiple times since the noise standards were promulgated that the noise standard does not apply to agriculture (see letters and memorandum discussed earlier). In addition, OSHA has issued guidance for agriculture related to noise and which cotton gins generally follow.

... [H]earing conservation programs **are not mandatory** in agricultural operations. However, if the Compliance Safety and Health Officer (CSHO) inspects such operations and determines that they are likely to cause employees to be exposed to noise in excess of an eight hour, time-weighted average of 85 dBA, the employer should be advised that it is good practice to reduce the noise level or provide ear protection" [emphasis added]. (Appendix IV: B. Hearing Conservation Program Requirements for Agricultural, Maritime, and Construction Worksites)

... Industries or worksites that **do not reference** the general industry noise standard (29 CFR 1910.95) include:

- **AGRICULTURAL WORKSITES.** Since 29 CFR 1928.21(a) does not reference the general industry noise standard (29 CFR 1910.95), hearing conservation programs **are not mandatory** in agricultural operations. However, if the CSHO inspects such operations and determines that they are likely to cause employees to be exposed to noise in excess of an eight hour, time-weighted average of 85 dBA, the employer should be advised that it is good practice to reduce the noise level or provide ear protection [emphasis added] and to train employees in the proper use and fit of ear protection and in the hazards of noise exposure. Wherever it is practical, periodic audiometric testing should be encouraged to ensure the effectiveness of hearing protection.
- **MARITIME WORKSITES.** Shipyard and longshoring operations come under the requirements of the general industry noise standard; therefore, employers in such operations must meet the elements of the general industry Hearing Conservation Amendment (HCA) [(29 CFR 1910.95(c) - (p)].
- **CONSTRUCTION WORKSITES.** Construction employees are not covered by the Hearing Conservation Amendment. However, certain aspects of hearing conservation are covered by the construction noise standards (29 CFR 1926.52 and 29 CFR 1926.101). In evaluating hearing conservation programs in construction workplaces, CSHO's should consider the information in the following paragraphs.

Gins can be relatively noisy operations, and voluntarily offering hearing protection to workers, as OSHA suggests, could be prudent in certain circumstances. Cotton gins typically follow OSHA's guidance of providing hearing protection to workers and encouraging the use of hearing protection. However, this does not constitute meaningful evidence that noise is a recognized hazard in cotton ginning by the U.S. cotton ginning industry or any individual gin company. Noise will not be a recognized hazard in cotton ginning until there are medical and other data that prove that acute noise exposure in the cotton ginning workplace, over a working lifetime in cotton ginning, leads to chronic/permanent occupational-induced hearing loss and OSHA establishes a regulatory threshold limit level at which the acute daily, yearly, and lifetime noise exposure in cotton ginning and agriculture cause chronic occupational-induced hearing loss.

Standard setting is properly accomplished in a notice and comment rulemaking process, following OSHA statute requirements, not through an arbitrary enforcement process, which reverses over 40 years of OSHA practice for enforcement of the federal OSHA noise standards as they apply to agriculture.

## CONCLUSIONS

The citations of two cotton gins in 2014 are the first time in more than 40 years since OSHA came into existence and noise standards were adopted, and more than 30 years since the hearing conservation amendment has been promulgated, that an OSHA regional office has tried to use the general duty clause to enforce the OSHA noise standards (29 CFR 1910.95) on a cotton gin. Previously, OSHA excluded agriculture from the noise standards that could be enforced under the general duty clause. OSHA's contention in the two recent gin cases that the general duty clause requires these two gins to mandate hearing protection contradicts how OSHA has enforced the noise standard (29 CFR 1910.95) and OSHA guidance (OSHA Appendix IV: B).

Further, (1) OSHA has not established that workplace conditions in a cotton gin present a hazard. In the rulemaking where OSHA promulgated the hearing conservation amendment in 1981 (Occupational Noise Exposure; Hearing Conservation Amendment, 46 FR 4078-01), OSHA specifically made an informed decision after considering all the available information not to include agriculture, including cotton ginning, in the general industry comprehensive noise standards. None of the information that OSHA used to support the position that the workplace exposure in cotton ginning presents a risk is a medical/health study that shows that 7 to 8 weeks of acute exposure in a cotton gin with 10 months of respite from exposure leads to chronic hearing loss during a working lifetime in cotton ginning.

(2) OSHA has not shown that an individual employer or the cotton ginning industry recognizes noise as a hazard. Gin companies voluntarily follow OSHA's guidance (OSHA Appendix IV: B) of providing hearing protection to workers and encouraging the use of hearing protection. OSHA is wrong to interpret this voluntary compliance with OSHA guidance as constituting meaningful evidence that noise is a recognized hazard in cotton ginning by the U.S. cotton ginning industry.

(3) OSHA has not established that the alleged hazard was likely to cause physical harm. OSHA has

not established that acute exposures in the cotton gin workplace for 7 to 8 weeks per year with 10 months respite from exposure causes physical harm in the form of chronic/permanent occupational-induced hearing loss that continuous exposure for 8 hours per day, 5 days per week, 48 weeks per year for a 45-year work period in general industry causes.

OSHA issues guidance from time to time that is voluntary not mandatory. For some industries, OSHA has tried to use guidance as a mandatory standard and settlement agreements to get requirements accepted by an employer that are more stringent than OSHA regulations. If an employer accepts requirements in a settlement agreement that are more severe than the guidance they are voluntarily following, at a later date they could be cited for a repeat violation, if they were no longer following the settlement agreement. A settlement agreement can sometimes be used by OSHA as evidence that something is a recognized hazard by industry.

If OSHA has data to support that acute noise exposures in the cotton ginning workplace leads to chronic occupational NIHL over a working lifetime in cotton ginning, then OSHA should establish a noise standard for cotton ginning and agriculture, using the proper notice and comment rulemaking process and statutory requirements of the OSH Act of 1970 for promulgating a health standard [Section 6(b)(5)].

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