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Noise Abatement and Control: An Overview of Federal Standards and Regulations

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Summary

Noise is generally considered to be unwanted sound. Noise can be harmful or merely irritating, depending on how loud it is and the degree of exposure. Constant or repeated exposure to sounds of 90 decibels or higher can lead to hearing loss. Most individuals are also sensitive to unwanted sounds above 65 decibels, and often perceive such sounds as intrusive. To limit the public's exposure to these sound levels, the federal government sets and enforces uniform noise standards for aircraft and airports, interstate motor carriers and railroads, workplace activities, medium- and heavy-duty trucks, motorcycles and mopeds, portable air compressors, federal highway projects, and federal housing projects. State and local governments determine the extent to which other sources of noise are regulated, including commercial, industrial, and residential activities. This report explains how noise is measured, identifies the sources of noise that are currently regulated by the federal government, describes the extent to which the federal standards limit noise, and explains the role of state and local governments. It will be updated as developments warrant.

Introduction

According to the National Institute on Deafness and Other Communication Disorders, exposure to loud sounds is responsible for hearing impairment in 10 million of the nearly 30 million people with hearing loss in the United States. Another 30 million people are daily exposed to dangerous noise levels. Many individuals are also regularly exposed to sound levels that may not lead to hearing loss, but can be intrusive and impair one's quality of life. Several federal laws require the federal government to provide uniform standards for various sources of noise. The responsibility for setting and enforcing these standards is divided among multiple federal agencies. In the past, the Environmental Protection Agency (EPA) coordinated all federal noise control activities through its Office of Noise Abatement and Control. However, Congress phased out the office's funding in FY1983 as part of a shift in federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments. Although EPA no longer plays a prominent role in regulating noise, its past standards and regulations

remain in effect, and other federal agencies continue to set and enforce noise standards for sources within their regulatory jurisdiction. Public interest in the adequacy of current noise control standards continues to be strong, as sources of noise such as airports and highways have expanded over time and as residential development has resulted in people living closer to such sources.

How Loud Is Too Loud?

Sound is measured in units of decibels (dbA), and an increase of 10 dbA represents sounds that are perceived to be twice as loud. Constant or repeated exposure to levels of 90 dbA or higher can lead to hearing loss.¹ Although sounds quieter than 90 dbA are not harmful to human hearing, most individuals perceive unwanted sounds in excess of 65 dbA to be intrusive. Exposure to such noise can impair one's quality of life, depending on the sensitivity of the individual and the frequency and duration of exposure.

Sound Levels Generated by Various Sources of Noise

Sound Level	dbA
Quiet library, soft whispers	30
Living room, refrigerator	40
Light traffic, normal conversation, quiet office	50
Air conditioner at 20 feet, sewing machine	60
Vacuum cleaner, hair dryer, noisy restaurant	70
Average city traffic, garbage disposals, alarm clock at 2 feet	80
Subway, motorcycle, truck traffic, lawn mower	90
Garbage truck, chain saw, pneumatic drill	100
Rock band concert in front of speakers, thunderclap	120
Gunshot blast, jet plane	140
Rocket launching pad	180

Source: Deafness Research Foundation.

What Sources of Noise Are Subject to Federal Regulation?

The Noise Control Act of 1972 (P.L. 92-574) and several other federal laws require the federal government to set and enforce uniform noise standards for aircraft and airports, interstate motor carriers and railroads, workplace activities, medium and heavy-duty trucks, motorcycles and mopeds, portable air compressors, federal highway projects, and federal housing projects. The Noise Control Act also requires federal agencies to comply with all federal, state, and local noise requirements. Most federal noise standards focus on preventing hearing loss by limiting exposure to sounds of 90 dbA and higher. However, some are stricter and focus on limiting exposure to quieter levels that are annoying to most individuals and can diminish one's quality of life. In addition to

¹ For more information on the effects of noise exposure on human hearing, see the National Institutes of Health website at [<http://www.nidcd.nih.gov>].

loudness, there has been some concern about the human health effects of low frequency sound, which we can feel but not hear. At this time, noise control standards in the United States do not regulate low frequency sound below the threshold of human hearing. Current standards and the federal agencies that set and enforce them are discussed below.

Aircraft and Airports.² The Aircraft Noise Abatement Act of 1968 (P.L. 90-411) requires the Federal Aviation Administration (FAA) to develop and enforce safe standards for aircraft noise.³ In developing these standards, the FAA generally follows the noise restrictions established by the International Civil Aviation Organization (ICAO). Federal noise regulations define aircraft according to four classes: Stage 1, Stage 2, Stage 3, and Stage 4. Stage 1 aircraft are the loudest, and Stage 4 are the quietest. All Stage 1 aircraft have been phased out of commercial operation, and all unmodified Stage 2 aircraft over 75,000 pounds were phased out by December 31, 1999, as required by the Airport Noise and Capacity Act of 1990 (P.L. 101-508, Subtitle D).⁴ Stage 3 aircraft must meet separate standards for runway takeoffs, landings, and sidelines, ranging from 89 to 106 dbA depending on the aircraft's weight and its number of engines.⁵ Stage 4 standards are stricter and require a further reduction of 10 dbA overall relative to Stage 3 standards.

The Stage 4 standards are relatively new and are based on standards that the ICAO adopted in June 2001 (referred to as "Chapter 4" in ICAO parlance). The FAA proposed the Stage 4 standards in December 2003⁶ and finalized them in July 2005,⁷ adopting the ICAO standards by reference. The Stage 4 standards apply to newly manufactured airplanes for which a new design is submitted for airworthiness certification on or after January 1, 2006. As the majority of aircraft designed in recent years are already quiet enough to attain the Stage 4 standards, some have commented that the impact of the stricter standards on most aircraft manufacturers may be less significant than otherwise. At this time, existing Stage 3 aircraft also will be allowed to continue operation.

In addition to aircraft certification standards, airports receiving federal funds are required to meet noise control standards for their operation, based on land use. The standards range from 65 dbA for residential areas to over 85 dbA for agricultural and transportation uses.⁸ The Airport and Airway Improvement Act of 1982 (P.L. 97-248) established the Airport Improvement Program (AIP) to provide federal assistance for airport construction projects and to award grants for mitigating noise resulting from the expansion of airport capacity. Airport operators applying for such grants must design noise exposure maps and develop mitigation programs to ensure that noise levels are compatible with relevant land uses, noted above.

² For more information on aircraft noise, see the FAA's website at [<http://www.aee.faa.gov>].

³ 49 U.S.C. 44715

⁴ 49 U.S.C. 47528

⁵ 14 C.F.R. 36

⁶ 68 *Federal Register* 67329-67336.

⁷ 70 *Federal Register* 38742-38750.

⁸ 14 C.F.R. 150

Interstate Motor Carriers. The Noise Control Act required EPA to develop noise standards for motor carriers engaged in interstate commerce, and it authorized the Federal Highway Administration to enforce them.⁹ All commercial vehicles over 10,000 pounds are subject to standards for highway travel and stationary operation, but the standards do not apply to sounds from horns or sirens when operated as warning devices for safety purposes.¹⁰ For highway travel, the standards range from 81 to 93 dbA, depending on the speed of the vehicle and the distance from which the sound is measured. The standards for stationary operation are similar and range from 83 to 91 dbA, depending on the distance from the vehicle. The standards apply at any time or condition of highway grade, vehicle load, acceleration, or deceleration.

Interstate Railroads. The Noise Control Act also required EPA to establish noise standards for trains and railway stations engaged in interstate commerce, and it authorized the Federal Railroad Administration to enforce them.¹¹ The standards do not apply to sounds from horns, whistles, or bells, when operated as warning devices for safety purposes. There are separate standards for locomotives, railway cars, and railway station activities such as car coupling.¹² For locomotives built before 1980, noise is limited to 73 dbA in stationary operation and at idle speeds, and is limited to 96 dbA at cruising speeds. The standards for locomotives built after 1979 are stricter, and limit noise in stationary operation and at idle speeds to 70 dbA and at cruising speeds to 90 dbA. Noise from railway cars must not exceed 88 dbA at speeds of 45 miles per hour (mph) or less, and must not surpass 93 dbA at speeds greater than 45 mph. Noise from car coupling activities at railway stations is limited to 92 dbA.

Workplace Activities. The Occupational Safety and Health Act of 1970 (P.L. 91-596) required the Occupational Safety and Health Administration (OSHA) to develop and enforce safety and health standards for workplace activities.¹³ To protect workers, OSHA established standards which specify the duration of time that employees can safely be exposed to specific sound levels.¹⁴ At a minimum, constant noise exposure must not exceed 90 dbA over 8 hours. The highest sound level to which workers can constantly be exposed is 115 dbA, and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dbA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

Other Regulated Sources of Noise. The Noise Control Act directed EPA to set and enforce noise standards for transportation, construction, and electrical equipment, and motors or engines.¹⁵ Under this authority, EPA established standards for motorcycles and mopeds, medium and heavy-duty trucks over 10,000 pounds, and portable air

⁹ 42 U.S.C. 4917

¹⁰ 49 C.F.R. 325

¹¹ 42 U.S.C. 4916

¹² 49 C.F.R. 210

¹³ 29 U.S.C. 655

¹⁴ 29 C.F.R. 1910.95

¹⁵ 42 U.S.C. 4905

compressors. The standards for motorcycles only apply to those manufactured after 1982 and range from 80 to 86 dbA, depending on the model year and whether the motorcycle is designed for street or off-road use.¹⁶ Noise from mopeds is limited to 70 dbA. The standards for trucks over 10,000 pounds only apply to those manufactured after 1978 and range from 80 to 83 dbA depending on the model year.¹⁷ These standards are separate from those for interstate motor carriers. Noise from portable air compressors is limited to 76 dbA.¹⁸ The Noise Control Act also authorized EPA to require labels for products which reduce noise.¹⁹ Under this authority, EPA established *Noise Reduction Ratings* for hearing protection devices which require manufacturers to identify the level of sound from which the device protects the user.²⁰

There also are noise standards for federal highway projects and federal housing projects. The Federal-Aid Highway Act of 1970 (P.L. 91-605) required the Federal Highway Administration to develop standards for highway noise levels that are compatible with different land uses.²¹ The law prohibits the approval of federal funding for highway projects that do not incorporate measures to meet these standards, which range from 52 to 75 dbA depending on land use.²² Under general authorities provided by the Housing and Urban Development Act of 1968 (P.L. 90-448), there also are standards for federal housing projects located in noise exposed areas.²³ The standards limit interior noise to a daily average of 65 dbA.²⁴

What Is the State and Local Role in Controlling Noise?

As discussed above, the federal role in regulating noise is mostly limited to transportation, workplace activities, and certain types of machinery. State and local governments determine the extent to which other sources of noise are controlled, and regulations for such sources can vary widely among localities. Further, some states do not directly regulate noise, but allow local governments to play the primary role. Sources of noise commonly regulated at the state and local level include commercial, industrial, and residential activities. Regulations for such sources typically control the public's exposure to irritating or potentially harmful noise levels by limiting the activity concerned to specific times of the day, such as the operation of domestic power tools or gasoline-powered lawn equipment in residential areas.

¹⁶ 40 C.F.R. 205, Subparts D and E

¹⁷ 40 C.F.R. 205, Subpart B

¹⁸ 40 C.F.R. 204

¹⁹ 42 U.S.C. 4907

²⁰ 40 C.F.R. 211

²¹ 23 U.S.C. 109(i)

²² 23 C.F.R. 772

²³ 42 U.S.C. 3535(d)

²⁴ 24 C.F.R. 51, Subpart B.