



# Noise Control

Welcome to **Environment**, our new column that shares with you the wealth of solutions and opportunities that are evolving as our industry accepts the challenges of combining growth and profitability with the preservation of our natural resources.

In this issue, we're exploring noise control solutions from Progressive Technologies; a manufacturer of robotic shot peening machinery. Noise might strike you as an odd form of pollution, but imagine enjoying a walk in a snow-bushed lane only to be disturbed by the mechanical sounds of the outside world. And worse yet are the consequences of hearing impairment — no sounds of nature, no music, no communication with loved ones.

**W**e strengthen metals, we clean surfaces, and we make noise, lots of noise. The average shot peening or blast cleaning machine can produce decibel levels between 85 and 125 dBA. And experts agree that continued exposure to noise above 85 dBA over time will cause hearing loss.<sup>1</sup>

Noise has always been a workplace hazard but it wasn't always considered a source of pollution. It may come as a surprise to some that hearing loss caused by noise in the workplace is second only to the broad category "disorders of the locomotor system" on the list of occupational diseases. As a result, hearing conservation programs are mandatory for most industries and compliance to noise level targets is governed by national standards and legislation. Protecting the hearing of workers in our manufacturing plants has become as important as protecting natural resources such as land, air and water in our manufacturing processes.

Noise exposure does not kill people, at least directly. There is, however, recent evidence of what common sense has told us all along, that high levels of noise and the resulting hearing losses contribute to industrial accidents. There is also reason for concern that hearing protection devices, which are worn to prevent noise-induced hearing loss, may actually impair work safety under certain

conditions. In addition, there is growing evidence that noise adversely affects general health, and the cardiovascular system in particular, which directly affects mortality. Although dose-response relationships for these factors are many years away, research evidence from outside the U.S. is mounting.<sup>2</sup>

Since a safe work environment, without the use of hearing protection devices, is the optimal goal, the United States' Occupational Health and Safety Administration (OSHA) asks employers to reduce noise at the source through engineering solutions and view hearing protection as a temporary solution. OSHA's hearing conservation requirements puts the burden on machine manufacturers to design better components rather than relying only on noise suppression techniques. That is a challenge that Progressive Technologies willingly embraces as a company that strives to be the global leader in the manufacturing and servicing of automated machinery and process controls for shot peening applications.

Progressive Technologies began building automated blasting equipment in 1967. The company has pioneered numerous advances in surface treatment automation including the use of robotics, closed-loop process controls and intelligent software systems. The company is also pushing the standards of noise control—its shot peening machines not only meet

OSHA's requirement of 85 dBA (According to OSHA's Permissible Noise Exposure guidelines, the average person can be exposed to 85 dBA for a maximum of 8 hours, without hearing protection, and not suffer hearing loss), but Progressive is building machines for European customers where the noise control laws are much stricter than in the United States.

Progressive Technologies has placed four machines in a Scandinavian Aeroengine Sub-Tier Supplier's facilities in Sweden and Norway. Sweden enjoyed tremendous industrial growth after the Second World War but, as a consequence, hearing loss because of noise is the third largest occupational illness in Sweden.<sup>3</sup> Sweden, like many other European countries, is aggressively modernizing and improving their noise regulation programs. Whereas 85 dBA readings are acceptable in the United States; 75 dBA and lower were the sound reading requirements for the machines Progressive delivered to Sweden and Norway. The newest machine design specifications for Progressive's European customer will require any continuously running fan, pump or idling device to have a maximum noise level of 65 dBA.

Read how Progressive is achieving these standards in the next article. For more information on their products and services, visit their web site at [www.ptihome.com](http://www.ptihome.com).

<sup>1</sup> [www.lhh.org/noise/decibel.htm](http://www.lhh.org/noise/decibel.htm), League for the Hard of Hearing <sup>2</sup> [www.nonoise.org/library/osha/osha.htm](http://www.nonoise.org/library/osha/osha.htm), NPC Library <sup>3</sup> [www.ki.se/cns/news/hearing-e.html](http://www.ki.se/cns/news/hearing-e.html)

# Sound Solutions from Progressive Technologies

First, we need to understand that sound or noise is created by vibration and measured in frequency or Hertz which are cycles per second. The typical hearing range of humans is from a low frequency of 20 Hz to a high frequency of 16,000 to 20,000 Hz. As we age, or as our hearing becomes damaged, we lose the ability to hear the higher frequency sounds.

As a machine builder, we need to assess the noise source and frequency in order to treat the overall machine noise level. There are three common methods we use to reduce the noise level and each works best with a certain range of frequencies. The higher frequencies are better affected when the noise is absorbed, the mid-range frequencies are treated best by creating barriers and the lowest frequencies need to be isolated. A typical Progressive Technologies shot peening machine will have all cabinet inlet or outlets, such as air inlet stacks on the roof of the cabinet and dust collector fan discharge areas, lined with a fiber or foam material. Often, they are covered with a perforated sheet metal. Absorption materials act to dissipate noise and reduce the reflections of the noise waves.

The mid-range frequencies are treated with barriers. The peening cabinets are fabricated of 1/2" thick sheet steel and all welds are solid

seam welds. Any doors or windows are treated with a double skin or double glazing with a foam absorption material packed between the layers. This method effectively blocks the transmission of the noise. Special care is taken to seal any areas where the blast hoses or robot enter the cabinet.

The low frequency noises are treated by isolating the machine from the plant floor with engineered machine vibration isolation mounts or feet. This method decouples the source of the noise from any path that would allow further transmission. It's very surprising to see how well the machine low frequency noise travels to the plant floor and is amplified. Additionally, we attach foam material to the underside of our machine hoppers to eliminate the noise from further reflections between the machine underside and the plant floor.

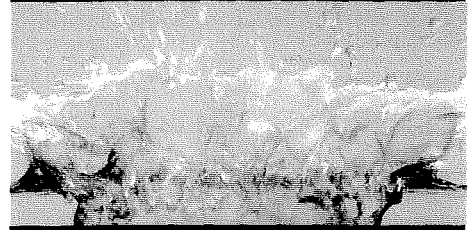
After the noise sources are treated, we locate the operator in a position around the machine where the noise is well treated or will be at the lowest dBA point. We try to advise our customers on the best or better location in their facility to place the machinery. A location too close to a wall will actually amplify the machine noise.

Our last consideration as a machine builder with regards to machine location is the ambient noise that exists in the area. The ambient noise will affect and increase the noise level of the new machine. An example of this is a machine that operates with a noise level of 80 dBA is placed near another machine that operates at 80 dBA, the combination of the two machines will produce a noise level of 83 dBA.

—Ken l'Anson  
Progressive Technologies

**One of the Progressive Technologies' robotic shot peening machines that was delivered to Europe.**

## Rating Noise



DbA	Sound Source
10	Normal breathing
20	Whispering at 5 feet
40	Quiet office or library
50	Rainfall
60	Normal conversation
65-95	Power lawn mower
80	Manual machine, tools
95	Electric drill
95-110	Motorcycle
100	Factory machinery
100	Snowmobile
100	Boom box
105	Snow blower
110	Baby crying
110	Leaf blower
110-120	Rock concert
120	Chain saw
120	Heavy machinery
120	Jet plane (at ramp)
120	Ambulance siren
140	Airplane taking off
150	Artillery fire at 500 feet
162	Fireworks (at 3 feet)
170	Shotgun
180	Rocket launching from pad

Source: [www.lhh.org/noise/decibel.htm](http://www.lhh.org/noise/decibel.htm), League for the Hard of Hearing

