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Engineers who work on office buildings and residential towers to specify, design, install and maintain equipment, including HVAC systems and elevators, must take noise into consideration. For most residential and office properties, the focus is on controlling the noise experienced by residents and tenants, both in their own units and in the common areas. However, while these buildings are not generally as noisy as other structures, such as manufacturing plants, they do produce noise externally and, as such, are coming under scrutiny.

For engineers who work on industrial properties, there is the noise of manufacturing and processing equipment to be managed.

Noise control also comes into the work of engineers involved in resource extraction—there are increasing requirements to control noise, not just “inside the fence” to protect the hearing of employees, but to protect the communities and wildlife in the area within a potential zone of influence.

Engineers need to be familiar with noise regulations, and how they can make sure their work enables their clients to remain compliant with regulations. Engineers also need to be able to find solutions to issues faced by their clients and employers—solutions that involve finding ways to meet the organization’s business purposes.

Why now?

Part of the impetus to control noise is coming from the increased pressure that the Ontario Ministry of the Environment (MOE) is putting on noise emitters to control the impacts that their operations have on their surroundings. This means buildings not in compliance with accepted standards can be subject to MOE orders and fines. Noise issues can also stress relationships with neighbours, resulting in complaints and pressure from municipal governments to take action.

Noise is regulated on a provincial basis, and this article deals with issues in

Noise regulations: Sharper teeth for enforcement in Ontario

There’s more noise about noise in Ontario. Noise is being increasingly considered a pollutant, a fact that is affecting the work of a wide range of engineers.

Ontario. While other provinces have their own regulations and standards, the issues are the same in any jurisdiction.

Most commercial/industrial facilities, and some multi-use buildings, must have a valid Certificate of Approval (air and noise), that includes an indication of the level of noise that may be received at the nearest neighbour (known as a “point of reception”) location. This is the term used for a house, hospital, school or other building or recreational land use where the occupants may experience noise. In the case of a residential condominium or office building, the nearest receptor location is likely the suite or tenant premises most highly impacted by noise emissions located within the building under investigation.

Previously, some entities felt they could safely ignore the noise issue, aware that although their certificate specified the noise levels they were permitted, MOE exerted little pressure to comply. Some companies adopted a “file and forget” attitude toward the noise provisions in their Certificate of Approval.

The guidelines have not changed in this regard, but our experience is that MOE is becoming more assertive in requiring companies to live up to the terms of their certificates. Recently, MOE “SWAT” teams have been travelling the province, putting pressure on emitters who are in violation of their certificates, including the noise specifications.

Good data key

The objective of MOE noise policy is to allow all property owners the enjoyment of their properties by reducing noise disturbances from industry. It has been found that some organizational managers think

they understand noise issues, but miss out in some crucial areas. Engineers need to be able to advise their clients on the regulations involved.

One little-understood area has to do with MOE’s three acoustic property classes of permitted noise levels. Class One properties are typically in a central urban environment, and are permitted higher noise levels due to elevated background noise resulting from urban hum than are Class Two (generally, an urban-suburban blend) and Class Three, which is generally rural. For each classification, permitted noise levels are specified for day, evening and night.

What many companies fail to understand is that it is not the level of noise emitted that matters, but rather the noise level experienced by each receptor.

For example, consider a building near the edge of a town. It might be in a Class Two area itself, but a farm house a few hundred metres away is in a rural area, where Class Three levels cannot be exceeded. The building would be required to maintain noise levels that do not exceed the MOE-prescribed noise levels for Class Three, not the less-stringent Class Two.

To deal with this issue, it is not enough to simply put up some microphones around the property and measure the sound levels. Measurements must be done by a qualified professional at the receptor point at various times of the day and week to establish existing ambient noise levels. Measurements must also be taken of each major source of noise on the property. This would include cooling towers, exhaust fans and stand-by generators—anything that contributes to the overall noise emitted from the property.

These measurements are then put into a computerized model, and “what-if?” scenarios run to help produce an action plan for bringing the operation into compliance with its Certificate of Approval.

Good back-up team needed

For engineers involved in bringing a building into compliance with provincial regulations on noise emissions, it is important to have available a qualified team of professionals who can help obtain a good result.

Points to look for:

- *Able to generate alternatives.* The service provider you choose should be able to generate a workable plan that will not cause undue disruption to operations, or pose an undue cost burden. For example, it may be a good idea to redirect or relocate an exhaust stack to a less sensitive location, rather than install an upgraded muffler for a generator.
- *Understands noise and vibration physics.* Acoustics is a complex topic that involves logarithmic rather than linear mathematics and is, in some ways, contrary to

what common sense would suggest. While there are no set standards for consultants’ qualifications, it helps to work with professionals who have a deep knowledge of the issues and principles involved. For example, a 100 MW gas turbine rated at 85 dBA at 1 m with a large surface area is a much more significant noise source than a small exhaust fan that is also rated at 85 dBA at 1 m.

- *Can point you to qualified suppliers.* It doesn’t help you if a consultant simply recommends a noise-control measure, but provides little guidance as to how to obtain it. A good report will include detailed specifications with recommendations for several suppliers who can provide the necessary equipment.
- *Understands structural issues.* In some cases, noise-attenuation measures may cause other problems. For example, a barrier wall erected around a roof-mounted cooling tower may exceed the roof’s load-bearing capacity. Also, such a barrier may turn into a giant sail in a high wind, possibly with career-limiting consequences for management. Engineers with structural experience and training need to be sure the solutions proposed by the acoustics professionals do not cause other problems.
- *Able to be part of the team.* Engineers who subcontract work to acoustics professionals need to feel confident these people will reflect favourably on

them. This includes a demonstrated ability to explain issues to the client or employer in laypeople’s terms, and to propose workable solutions. It does little good to present to management solutions that are not workable from a business or financial perspective.

Like much of business, noise compliance is a moving target. One way this can show up is when a new, sensitive “receptor” (such as a housing development) moves close enough to a building that noise impacts may result at this new location. In this case, there may be higher requirements for noise control. This means that even if a building is currently in compliance, it is important to watch for zoning change signs that may indicate a change in land use. The time to respond to such proposed developments is early in the process, not after the bulldozers have moved in.

Paying enough attention to noise issues can help an organization build and maintain good relations with its neighbours, so it can concentrate on its work, rather than being involved in time-consuming, costly struggles with regulatory authorities. ❖

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An employee measures noise levels on the roof of the Golder building in Mississauga.

Photo: Golder Associates Ltd.