

# HATCH NOISE AND VIBRATION

Tim Kelsall

Hatch Noise and Vibration Group, Mississauga, Ontario

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## Résumé

Hatch est une importante firme de génie-conseil mondiale dont le siège social est situé à Mississauga, près de Toronto, au Canada. Hatch a été fondée en 1955 et, depuis les années 1970, le groupe Bruit et vibrations de Hatch fait figure de chef de file en aidant ses clients dans les secteurs des mines, de la métallurgie, de l'énergie et des infrastructures pour les questions liées au bruit au sein des communautés, au bruit d'origine industrielle et au contrôle du bruit et des vibrations.

**Mots-clés :** Hatch, génie-conseil, acoustique, bruit, vibration, mines, énergie, infrastructures

## Abstract

Hatch is a major global Consulting Engineering firm headquartered in Mississauga, near Toronto, Canada. Hatch was founded in 1955 and since the 70's Hatch's noise and vibration group has been a leader in assisting their clients in mining, metallurgy, energy and infrastructure with community noise, occupational noise, noise and vibration control.

**Keywords:** Hatch, engineering, acoustics, noise, vibration, mining, energy, infrastructure

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Hatch started with two main focuses: metals and subways. Engineers at Hatch designed the University subway, the first of its kind in Toronto and have designed subways and transit systems in Toronto, Vancouver, Buffalo, Los Angeles, Washington, Sydney and others. Working with CN and CP, Hatch designed and construction managed the replacements for the rail tunnels under the St. Clair river between Canada and the US. Each of these projects also required noise and vibration services to design quiet tunnel ventilation systems, to control ground borne vibration, station acoustics and to assess noise on the surface. Hatch also designed and managed a hydro tunnel under the city of Niagara Falls bored using the largest hard rock tunnel boring machine in the world (Figure 1), including assessing construction noise and vibration.

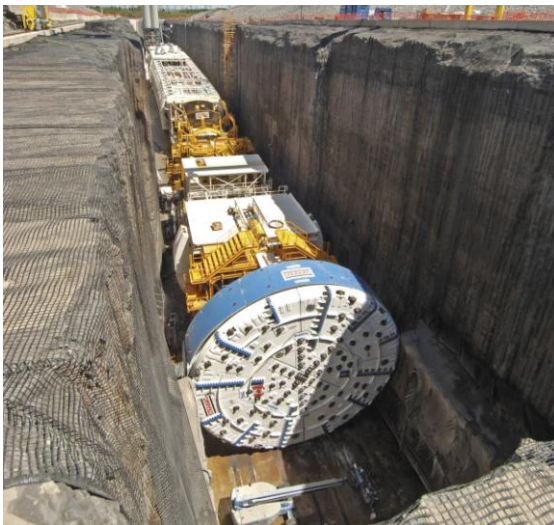


Figure 1. - Niagara Tunnel Boring Machine

Mining, smelting and forming metals has always had the potential to create noise. Electric arc furnaces (Figure 2) can produce over 110 dBA nearby and employees and the community need to be protected. Mining involves underground and above ground noise including large mine ventilation fans, heavy equipment and considerable material handling. Since their location is determined by ore bodies and towns tend to grow up around major mines noise can be a major factor in their design and operation. Hatch has done major work on noise and vibration control for such storied Canadian names as INCO, Falconbridge, Kidd Creek, Stelco, Dofasco and Noranda and more recently for Arcelor Mittal, US Steel, Vale, Mosaic and Glencore.



Figure 2. Electric Arc Furnace - Typically >110 dBA @ 10m

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\*tkelsall@hatch.ca

Hatch has designed and managed construction of major multi-billion dollar projects around the world. For the Stelco plant on Lake Erie, Hatch developed a computer model of the sound emissions back at the time when such models ran on computer cards. This model formed a basis for the CSA standard industrial noise propagation prediction developed in the 80s.

From steel mills to rail yards, from mines to quarries, Hatch has predicted, assessed and controlled noise in the community and occupational noise exposure in the workplace, especially heavy industry (Figure 3). Occupational noise measurements at Molson Breweries and IPSCO pipe mills helped develop the techniques that were later embodied in CSA Z107.56, the world's first standard on measuring occupational noise exposure, a standard still used across Canada and providing input into the ISO 9612 occupational noise measurement standard and the ANSI equivalent. Indeed, Hatch has been active in CSA acoustical standards for nearly 40 years.



**Figure 3.** Heavy Industry Noise a Specialty

Energy projects are now a major part of the Hatch portfolio and noise assessments and control have been an important part of hydro, wind, thermal and diesel power plants of all sizes around the world. These have included hydro power plants in Ottawa, St. Catharines and Surinam, diesel generating stations in the Dominican Republic, Mauritania, and the Canadian Arctic and wind farms in Canada, the US and Australia.

Our noise and vibration offices in Canada and Australia service clients around the world. Featuring advanced CADNA-A software for community noise, Operation Deflection Shapes (ODS) analysis, Operating Modal Shape (OMS) analysis and Structural Dynamic Modelling, multiple 1/3 octave Class 1 noise monitors and the ability to measure over 20 channels of vibration simultaneously, including significant low frequency capability, Hatch Noise and Vibration helps Hatch clients in a variety of heavy industries and transportation networks. Recent projects include:

- Using lasers to measure the clearance between a moving train and tunnel walls

- Diagnosing and correcting a crane cab which moved violently enough to injure operators
- Measuring vibration to assess passenger comfort as commuter trains moved through switch banks
- Measuring low frequency vibration at a major hydro dam

Hatch has undertaken noise and vibration projects for large and small clients, from multi-billion dollar projects down to assisting homeowners with noise complaints, and many in between.

Hatch has a large fraction of engineers with advanced degrees and specialties. What this means in noise and vibration is that no matter the industry, no matter the machine, Hatch noise and vibration specialists can call on the service of world class expertise. Such knowledge of our client's process, machinery and operations allows us to design noise and vibration controls which work successfully while allowing maintenance and operation to continue unabated. Examples include patented silencers for metal converters and a patent on a modal silencer able to effectively operate in dirty, wet and hot environments.

Some memorable projects include:

- Double silencers for mine ventilation fans achieving <25 dBA at the nearest residence,
- Low frequency silencers for large diesel generators
- Introducing STI to specify sound system performance in transit stations,
- Using simple metal baffles to break up standing waves in fan coolers
- Diagnosing and correcting whistling radiators

Consulting is an important part of Hatch's mandate. Typical projects have included

- Helping resolve major (and minor) community noise complaints,
- Assisting with municipal noise bylaws
- Hearing conservation advice
- Noise advice while purchasing major equipment
- Court appearances and other hearings

Helping keep multi-billion dollar projects from disturbing neighbourhoods and protecting the hearing of employees is useful and satisfying work. Hatch is proud to have been involved in helping major and minor clients solve these issues for over 40 years. For more information see:

[https://www.hatch.ca/Engineering/Noise\\_Vibration/default.htm](https://www.hatch.ca/Engineering/Noise_Vibration/default.htm)