

ENGINEERING AND ACOUSTIC DESIGN EXPERTS

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Abstract

Stantec is a Canadian engineering consulting firm with more than 15 000 employees working in over 250 offices mainly located in North America. Over 35 acoustics professionals regularly share their knowledge and innovations in Canada and the United States, allowing us to offer customers innovative and economically viable solutions. For over 20 years, Stantec (previously Dessau) has offered acoustics services in Quebec.

Keywords: acoustics, noise, assessment, mitigation, public-address system, intelligibility.

Résumé

Stantec est une firme de conception qui compte plus de 15 000 employés oeuvrant dans plus de 250 bureaux répartis principalement en Amérique du Nord. L'entreprise regroupe plus de 35 professionnels travaillant en acoustique au Canada et aux États-Unis, qui partagent régulièrement entre eux leurs expertises et innovations, ce qui lui permet de proposer à sa clientèle des solutions innovatrices et économiquement viables. Depuis plus de 20 ans, Stantec (anciennement Dessau) offre des services en acoustique au Québec.

Mots clefs : acoustique, bruit, expertise, atténuation, sonorisation, intelligibilité.

Stantec offers acoustics services in various fields:

- ✓ Roadway, railway, aerial and industrial noise control and assessments;
- ✓ HVAC noise control;
- ✓ Architectural acoustics and soundproofing;
- ✓ Enhanced sound insulation of building envelope;
- ✓ Room acoustics optimization, reverberation control, intelligibility enhancement;
- ✓ On-site noise readings;
- ✓ Noise level calculation and prediction using computer simulations (software TNM, CadnaA, Ease, etc.);
- ✓ Guidance and recommendations;
- ✓ Design of mitigation measures ;
- ✓ Preparation of plans and specifications;
- ✓ Legal expertise;
- ✓ Drafting noise regulations.

Most of our projects are located in the Montreal area. Our major clients are the Quebec Ministry of Transport (MTQ), the *Agence métropolitaine de transport* (AMT), the *Société des transports de Montréal* (STM), municipalities, industries, architects, real estate developers and road infrastructure contractors

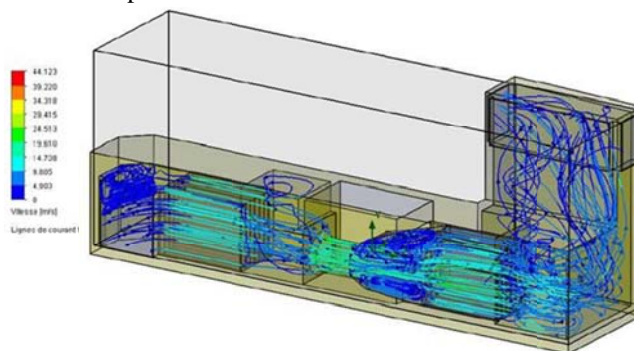
A brief overview of some of Stantec's acoustical projects follow.

Réno-Systèmes– Ventilation stations

For 10 years, Stantec's (previously Dessau) acoustics team has been working in consortium with the STM in the *Réno-Système* project office, dedicated to the modernization of fixed equipment in the Montreal metro.

One of the *Réno-Systèmes* projects, was the renewal of several ventilation stations over 25 years old. Located in the tunnels between the subway stations, these ventilation stations have two 100 000+ cfm fans supplying or extracting air to or from the subway tunnels. The ventilation shafts are usually located behind residential buildings, so the major challenge is to ensure that shaft noise levels fully comply with Montreal noise limits.

To that end, we designed large-high performance silencers (approx. 3m x 3m x 5m), and monitor the execution and worksite supervision.



Réno-Systèmes– Stations public-address system

Another *Réno-Systèmes* project was the metro stations public-address systems (PAS). Montreal metro stations architecture seriously hinders the PAS acoustical performance (reflective surfaces, complex volume, etc.). Stantec proposed a new public-address system which provides better intelligibility of the messages for both customers and staff.

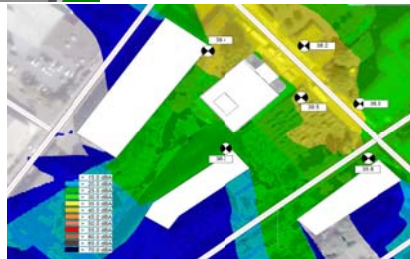
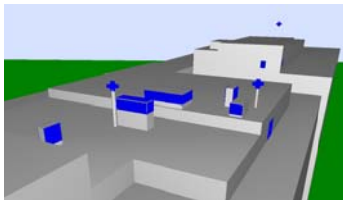
Réno-Systèmes project– Control center

Stantec assisted mechanical engineers and architects in the lay out of the new control center to integrate acoustic aspects in the building design and equipment selection. Severe noise criteria as well as the installation of a 1 500 kW generator and a mechanical room just below the control room, required a particular attention to acoustics.

Stantec also defined the NC criteria in the control room and other working spaces, recommended architectural treatments in the control room for an optimum reverberation time, recommended the partitions noise insulation and the HVAC treatments.

Projects – Environmental noise assessments

These projects assess the noise produced primarily by industries and verify their compliance with the noise levels recommended by the *Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques* (MDDELCC). Using on-site noise readings, a computer simulation evaluates the contribution of each sound source (dryers, chimneys, dust collectors, etc.) at several locations. Subsequently, Stantec recommends measures to reduce the noise from the main sound sources.



For example, the construction of a test cell for industrial gas turbines by Rolls Royce Canada in an urban area required careful management of the noise emissions to meet the noise criteria in Montreal and Verdun. The facility included a test cell for industrial gas turbines, a natural gas compressor, a 120 kW transformer substation, a room for auxiliary equipment, a control room and administrative offices. Noise control was one of the major challenges of this project.



Roadway noise projects

In the field of roadway noise, Stantec's expertise is well known in Quebec. Over thirty noise pollution studies or noise impact assessments were conducted for the MTQ. Stantec carries out studies, recommends mitigation measures and works with the ministry at the *Bureau d'audiences publiques sur l'environnement* (BAPE) or at citizen consultations. Stantec works on, among others, the project to rebuild the Turcot Interchange (see pictures below) and the modernization of the Notre-Dame boulevard in Montreal.



Railroad noise projects

Stantec has had the privilege to participate in several related to railroad and marshalling yard noise projects.

- ✓ Noise impact assessment of the new 12 km suburban railway between Mascouche and Charlemagne. Project submitted to the BAPE proceedings.
- ✓ Assessment of the noise levels produced by the Charny marshalling yard and recommendations of mitigation measures for residential, commercial and industrial developments in adjacent areas.
- ✓ Assessment of the noise produced by a suburban railway based on the new noise and vibrations proximity guidelines of the Canadian Transportation Agency.
- ✓ Noise impact assessment of the East Junction staging– a 90 degrees crossover - between the Saint-Laurent and Deux-Montagne railways (see pictures below).



- ✓ Study of the electrification of the AMT railway routes. This project assessed the noise benefits of changing the energy source for trains from diesel locomotives to electrical power.