

Neu Railways **Acoustic** modelling for optimised vacuum trains

Two vibro-acoustic modelling methods were combined to validate the design of vacuum trains for the New York City subway network.



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OUR CUSTOMER

Corporate name
Neu Railways

Turnover
Approximately EUR 8M in 2017, 80% of which on the export market

Workforce
35 employees

Business activity
Neu Railways designs and supplies equipment to railway maintenance warehouses (sand pit filling systems, toilet drain systems, internal vacuum systems and machines to wash trains, trams and subways). The Marcq-en-Barœul-based company (59, France) developed the Vaktrak vacuum train to clean and vacuum train stations and tunnels. It is the world leader on this market with some twenty references worldwide.

The New York City subway operates around the clock. As a result, the maintenance of the railway lines must take place alongside the commercial traffic. To guarantee user comfort, the network operator defined acoustic emission levels that must not be exceeded by its new trains tasked with vacuuming the railway lines. *“In general, the specifications of construction machinery do not include very restrictive noise requirements. However, in this case, they particularly specified the noise level that must be complied with by our machines”,* stated Cédric Delobel, head of the vacuum train division at Neu Railways, which won the contract for the supply of

three vacuum trains for the New York City subway network.

Hybrid modelling

The French manufacturer which does not have an in-house simulation department called on Cetim to make sure that the design of its trains complied with the specified requirements. Given that finite element modelling proved to

be more complex to implement on a relatively high frequency spectrum (up to 2 kHz), it was coupled with the SEA (Statistical Energy Analysis) method via the VA-ONE software. Three models were built using this hybrid simulation methodology. *“As a result, we were able to identify the most problematic frequency bands and then to propose the appropriate absorbing materials and their optimum location”,* explained Thomas Gardin from Cetim.

Following this study, Neu Railways these recommendations involving in particular the thickness and density of the isolating materials. The first train compliant with the acoustic requirements was delivered to New York in 2018 and will be followed by two others in early 2019.

Cetim's asset

Cetim carries out acoustic modelling over a large frequency spectrum and uses hybrid methods suited to the application to perform in-depth analysis of equipment and propose solutions that comply with specific customer requirements.

