FORTESHIELD™

aluminium foam panel

Fortes INNOVATIONS

CASE STUDY FOR INDUSTRIAL APPLICATION

Background

- A manufacturing plant had an extension within its existing factory premises. The location of the extension was about 15 meters away from the nearest residential area.

Issue

- The extension included the installation of 2 new scrubber fans. During operation, noise from the fans was a source of concern.

Objectives

- The noise levels measured at the boundary of the extension was required to meet the authority guideline of 55 dB(A) during the night period.

To achieve that, mitigation measures were carried out in phases, together with pre and post measurements to determine the resultant effectiveness and consequential measures.

STAGE 1 - Noise Barrier

The mitigation measure for Stage 1 was to install a noise barrier around the scrubbers.

As the scrubber fans were located outdoor, barrier material had to be able to withstand and perform in prevailing weather. Aluminum foam panels were chosen to be used as noise barrier as they are

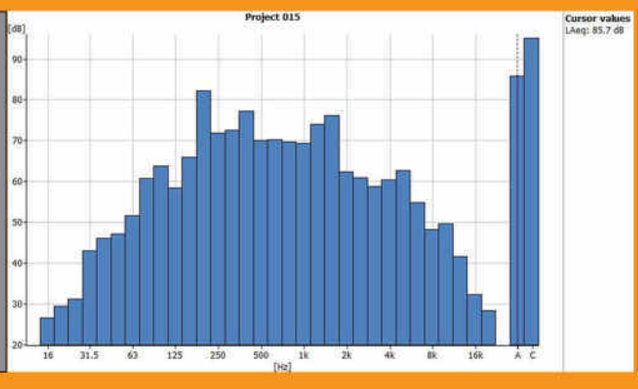
- Lightweight
- Weather resistant

Pre and Post Mitigation Measurements after 1st stage

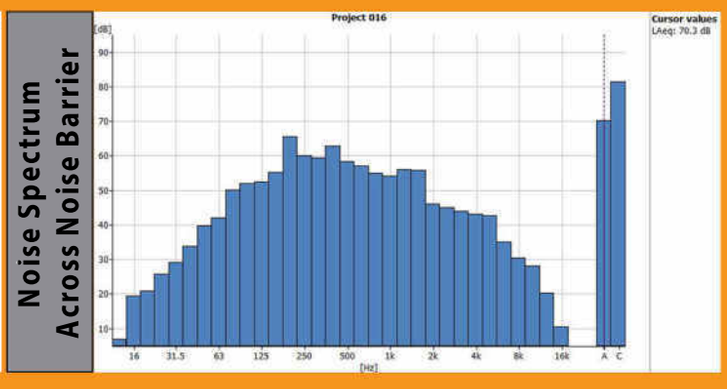
Noise Level 1m From Equipment	Noise Level Across Noise Barrier	Reduction in Noise Level
85.7 dB(A)	70.3 dB(A)	15.4 dB(A)

Noise Level @ Boundary BEFORE Noise Barrier	Noise Level @ Boundary AFTER Noise Barrier	Reduction in Noise Level
65.2 dB(A)	60.7 dB(A)	4.5 dB(A)

Noise Spectrum 1m From Equipment



Noise Spectrum Across Noise Barrier



CASE STUDY FOR ROOTOP APPLICATION @ DATA CENTRE

Background/Issue

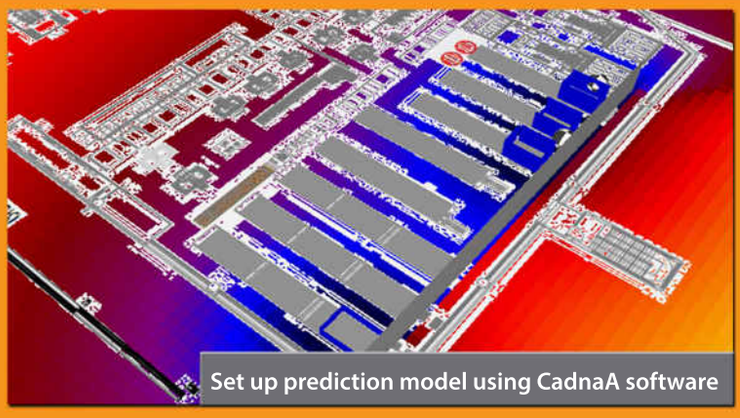
- Building surrounded by commercial premises
- Installed 8 chillers installed at rooftop
- Initial noise levels at 2 locations failed authority guideline for Boundary Noise Limits for Factory Premises

Objective

- To implement mitigation measures and conduct pre and post measurement to determine the resultant effectiveness and ensure compliance

Using Acoustic Software

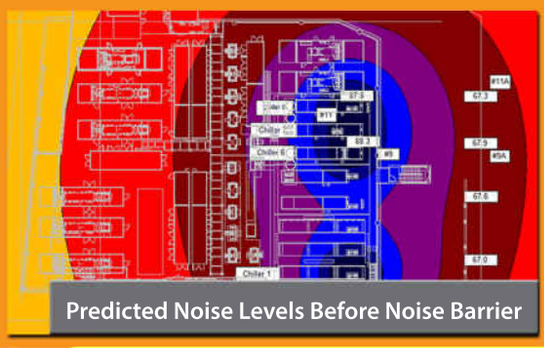
- Use of CadnaA software to predict the noise levels emitted when the chillers are in operation. Results show that predicted noise levels will exceed authority guideline.



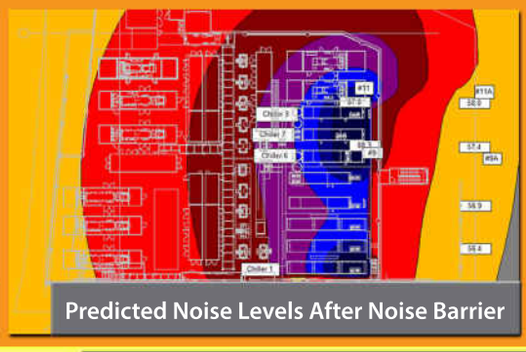
Set up prediction model using CadnaA software

Predicted Pre and Post Migation Measurements

Location	Noise Level @ Boundary BEFORE Noise Barrier	Noise Level @ Boundary AFTER Noise Barrier	Reduction in Noise Level
#9	67.9 dB(A)	57.4 dB(A)	10.5 dB(A)
#11	67.3 dB(A)	58.0 dB(A)	9.3 dB(A)



Predicted Noise Levels Before Noise Barrier



Predicted Noise Levels After Noise Barrier

Proposed Noise Barrier

- Mitigation measures in the form of an aptly-designed lightweight, non-combustible noise barrier was proposed due to site requirements.
- Performance rating for the noise barrier was input into the CadnaA model and run.
- Results show reduction of noise levels at failed points, ensuring compliance to authority guideline.

Installation and Post Measurement

- Supervision and installation of noise barrier at rooftop around the equipment.
- Post measurements results show deviation between predicted and actual site measurements after installation of barrier to be approximately within 1%.

On Site Pre and Post Mitigation Measurements

Location	Noise Level @ Boundary BEFORE Noise Barrier	Noise Level @ Boundary AFTER Noise Barrier	Reduction in Noise Level
#9	66 dB(A)	58.0 dB(A)	8.0 dB(A)
#11	66 dB(A)	57.5 dB(A)	8.5 dB(A)

FORTES Innovations Pte Ltd is an organization who believes is making more friends than foes, especially with our Mother Earth and the environment. Thus, we constantly seek, source, search and bring together products and/or services which are either environmentally-conscious, sustainable, innovative or renewable. The 3Rs are major considerations in our quest – Reduce raw materials and wastage, Retrieve and salvage common materials to be re-used, and Recycle materials by re-working them as inputs into new products. In doing so, we consider ourselves Friends Of Renewable Technologies which are Environmental and Sustainable. Our services include **Product Resource Management, Product Resource Innovation, and Technical Feasibility Study .**

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