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NVSAGE

Newsletter on Noise and Vibration Engineering

www.nvdynamics.com
services@nvdynamics.com | +91 7760381818

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FOREWORD

By Ajith Krishna,
Lead Engineer

We closed Q1 on a high and completed an innovative, structural vibration isolation for a semiconductor lab here in Bangalore. Q2 opened quietly but quickly turned into one of our busiest stretch of the year.

Our team covered a lot of ground — from vibration assessments spanning the full 33 km of Mumbai Metro Line 3 to micro-vibration studies for a 25-acre greenfield site in Bhubaneswar to floor dynamic stiffness evaluations for a leading PCB manufacturer in Mysore.

Meanwhile, our long-standing engagements with Bhilai Steel Plant and Chowgule Shipyard continued through regular site visits, supporting smooth plant operations and on-time vessel deliveries. On the new projects front, we've secured the Noise and Vibration assessment contract for Mumbai Metro Lines 2B and 7A and are gearing up to begin the assessments soon.

We are also delighted to announce the recipt of LOA for the Jaipur Metro Phase-II Noise and Vibration contract and look forward to contributing to Jaipur's growing transit network. In maritime assignments, we are pursuing N&V assessments for 10 vessels across Cochin Shipyard and UCSL and look forward to being the frontrunner on both fronts.

As festivities begin, NV Dynamics extends warm season's greetings to our readers, clients, vendors, partners and looks forward to a productive Q3 and Q4 ahead.

STRUCTURAL ISOLATION AND VALIDATION MEASUREMENTS FOR VIBRATION CRITERIA (VC) COMPLIANCE

By Varun Yadav, Engineer - Technical Services

BACKGROUND

With the semiconductor industry expanding rapidly, effective vibration isolation is essential for sectors like semi-conductor research facilities and fabricators to protect sensitive equipment from ground-borne vibrations. Excessive vibrations can reduce measurement accuracy, disrupt precision processes, affect operational efficiency and manufacturing reliability across facilities.

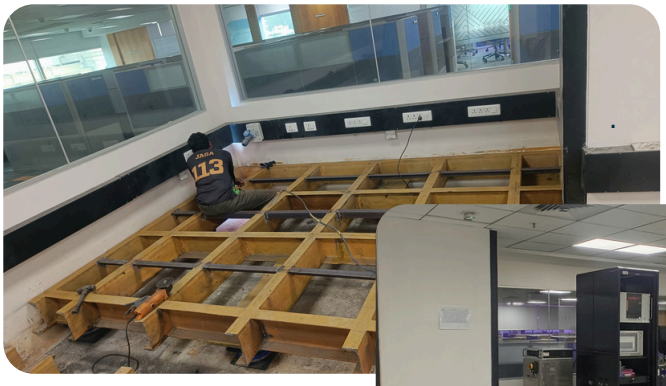
Analog Devices India Pvt. Ltd. engaged NV Dynamics to conduct vibration assessments at their laboratory space, where vibration-sensitive equipment is proposed for installation. The study assessed existing vibration levels, implemented a custom vibration isolation solution and evaluated compliance with applicable Vibration Criteria (VC) curves for suitability.

TASK TAKEAWAY

The structural isolation approach, custom anti-vibration mounts and a damping layer effectively overcame the floor unevenness and reduced vibration transmission. The assessment confirmed that the vibration-isolated deck performs well within the required Vibration Criteria limit under both ambient and footfall conditions, making the floor space suitable for installing the sensitive equipment.

SITE ACTIVITIES

The initial assessment indicated that the existing vibration levels exceeded the required VC criterion. While investigating the root cause, it was observed that the floor space had a steel ISMC 200 C-channel frame laid directly on the RCC floor to carry and distribute the equipment load. Due to floor unevenness, the frame made non-uniform contact with the slab, causing it to heave predominantly in the vertical direction. This resulted in amplified structural vibration at the equipment location and as such required structural isolation from the slab and vibration mitigation before equipment installation. To resolve this, the frame was separated from the adjoining sections and raised to a calculated height. Anti-vibration mounts were designed for the frequency band of interest and were installed at support points chosen for load distribution and mass centring. The frame top surface was machined and lined with a damping layer, followed by a levelled Higher Density High Moisture Resistant Board (HDHMR). After this implementation, vibration assessments were repeated and the values were found to be within the limits required for VC compliance.







STRUCTURE BORNE NOISE & VIBRATION ANALYSIS AS PER RDSO CT-38 FOR MUMBAI METRO LINE-3

By Hruthik H R, Engineer - Technical Services

BACKGROUND

For underground metro systems running beneath busy urban neighbourhood, the journey does not end at the tunnel walls. Vibrations generated by moving trains can travel through the track, tunnel and connected ground mass thus reaching nearby buildings. Effective vibration control is therefore an important consideration in underground metro rail transport design.

Against this backdrop, Mumbai Metro Rail Corporation Limited (MMRCL) commissioned NV Dynamics to assess the High Attenuation Low Vibration Track (HA-LVT) system installed along the 33.5 km Mumbai Metro Line 3 corridor. The assessment examined ground-borne vibrations generated during metro operations and evaluated the measured levels against the applicable RDSO CT-38 criteria. This study also used the measured vibration levels to predict associated ground-borne noise, providing an overall assessment of the potential impact on buildings and sensitive spaces along the corridor.

TASK INSIGHTS

The assessment confirmed that the HA-LVT system installed along Mumbai Metro Line 3 effectively controls ground-borne vibration and associated ground-borne noise at all 15 assessed locations. Measurements undertaken in accordance with RDSO CT-38 showed that structure-borne vibration and estimated noise levels remained below the applicable criteria.

SITE ACTIVITIES

The ground-borne vibration assessments were carried out at 15 representative chainage locations along Mumbai Metro Line 3 in accordance with the RDSO CT-38 guideline. The measurement locations were jointly screened with MMRCL, considering key parameters such as track type, soil strata, receptor sensitivity, building variants, distance from the alignment and expected train speed. At each location, seismic-grade transducers were installed in three orthogonal directions at the ground surface and tunnel wall, while tri-axial accelerometers were mounted on the track slab to capture vibrations generated during train movement.

For the measurements, a metro train loaded with sandbags equivalent to typical passenger loading was operated through the tunnel. Ten train passes were recorded at each location, along with background measurements in the absence of train movement. The train pass exhibiting highest vibration amplitude at each location was selected for detailed analysis. The recorded data was processed to determine vibration levels and estimate associated ground-borne noise levels. The results were subsequently compared with the applicable criteria for residential, institutional and commercial buildings.





PHYSICS TO KNOW



Acoustic fire extinguishers use low-frequency sound waves and infrasound to suppress flames without using water, foam or chemicals agents. The sound waves create pressure changes that disturb the flame and stop the burning process. Since no residue is left behind, this method is safe for sensitive equipment such as computers, laboratory instruments and electronic devices. Although the technology is still being developed, it offers a clean and environmentally friendly way to fight fires in places where traditional fire extinguishers may not be suitable.

GREAT MINDS & THEIR CONTRIBUTION TO THE WORLD OF SCIENCE

Dr. Shubha V. Iyengar is a prominent Indian aeronautical scientist known for her important contributions to aviation safety. She has had a distinguished career at CSIR–National Aerospace Laboratories (NAL), Bengaluru. She played a key role in developing Drishti, an indigenous system that helps improve runway safety during poor weather conditions such as fog, rain and dust. This system provides Runway Visual Range (RVR) information to pilots, measuring the distance visible on the runway. She also contributed to aviation weather monitoring systems used at airports. Her work has helped improve flight safety and strengthen India's capabilities in aerospace technology. In recognition of her contributions, she has received several prestigious awards, including the Padma Shri in 2026. Her achievements continue to inspire young scientists and engineers across India.



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CERTIFICATIONS

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