

Response Mapping

A New Tool for Optimizing Vibration Design of Floors

Development of structural framing configurations early in design is a critical step in establishing vibration performance of a facility. A successful design requires balance between performance, cost, and functional space layouts.

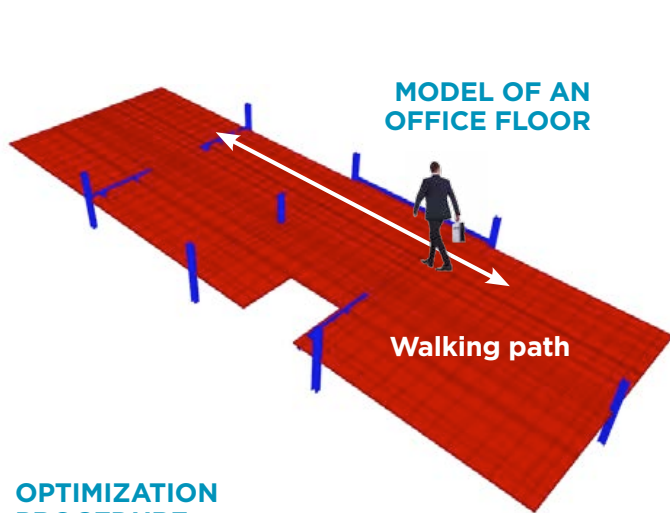
A visualization tool that lets you see the vibration performance of your design

Using state-of-the-art approaches to modeling and prediction of floor dynamic response, Novus has developed a visualization tool that is helping designers make better decisions.

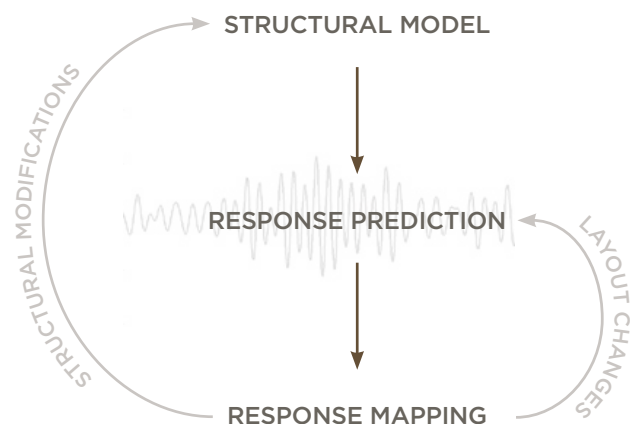
Response Mapping is a new service that provides designers with a contour map of expected vibration response for the entire floor, facilitating selection of structural schemes, development of strategic space layouts, and an efficient, holistic approach to vibration design.

BENEFITS

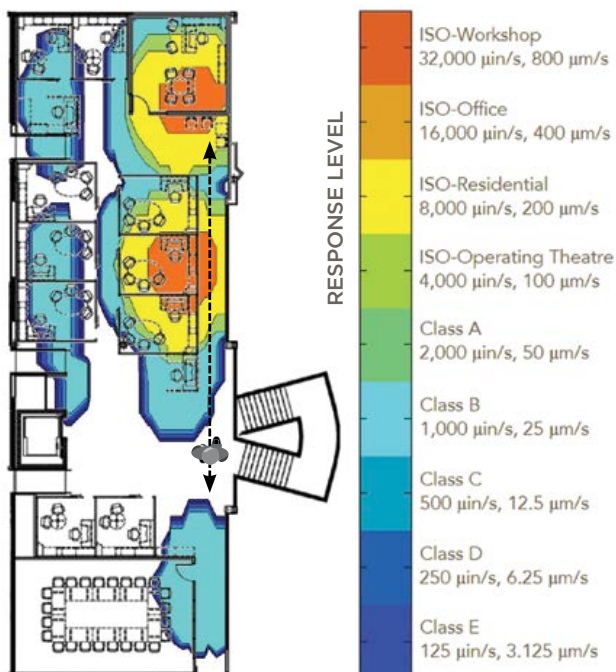
- Potential for savings on structure
- Direct design input for space layouts
- Applicable to all building types for assessing occupant comfort and vibration sensitive equipment/procedures
- Applicable to any supported floor, for any source of vibration, applied at any location
- Results are visual and easy to interpret
- Areas requiring mitigation are readily identified



OPTIMIZATION PROCEDURE



RESPONSE MAP FOR AN OFFICE FLOOR



How it works

More traditional methods of floor vibration analysis produce estimates of response at a single location. Response Mapping generates the response of the entire floor, for any vibration source, applied at any location — including moving loads such as vehicles, occupants etc. This permits visualization of the vibration levels at all areas of the floor for visualizing impacts of design changes.

Response Mapping is a three-step process:

- 1) A dynamic model of the structure is developed,
- 2) the vibration response of the structure is computed, and,
- 3) the analysis results are processed to produce two-dimensional response maps — referenced to relevant vibration criteria — for evaluation of the design.

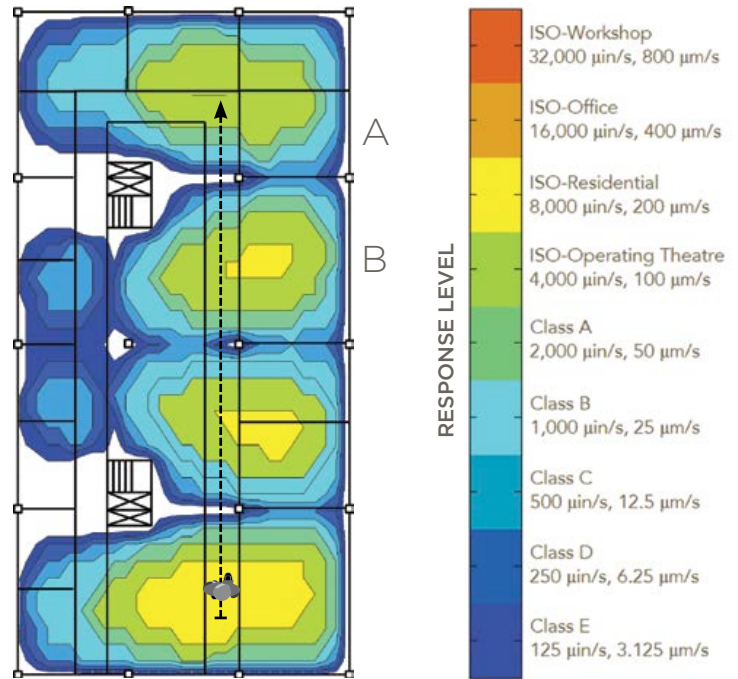
The Response Mapping procedure is repeated to evaluate and visualize the effects of revisions to layouts, changes in structure etc. Optimum performance is reached once target criteria are achieved at all critical areas of the floor.

INFORMED DESIGN DECISIONS

- Assess/compare the performance of steel vs. concrete designs
- Evaluate control measures (e.g., dampers, structural modifications)
- Assess vibration transmission across multiple floors
- Correlate numerical models with testing for mitigation design

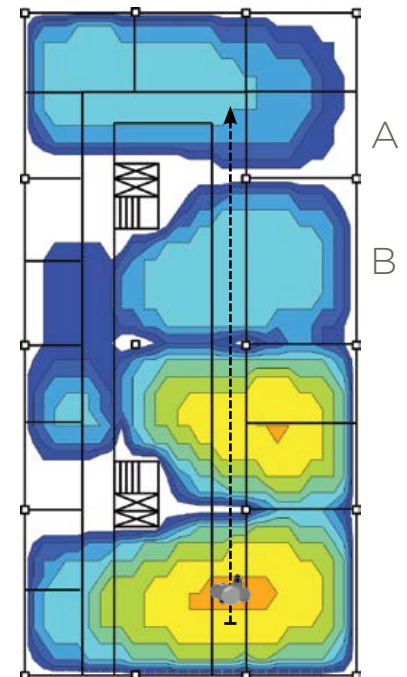
EXAMPLE

Footfall Response of a Laboratory floor



MAP 1: INITIAL DESIGN

Target Class C criterion is exceeded at Room A and target Class B criterion is exceeded in Room B due to walker in corridor.



MAP 2: MITIGATED DESIGN

Target criteria are achieved at both locations by strategic changes to framework in corner bays.



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