



VACC Recent Key Projects: NNDT Retrofit Facility Vibration Design Novo Nordisk A/S Hayward, California

Owner
Novo Nordisk A/S

Architect-Engineer
Fluor Daniel

Contractor
DPR, Inc.

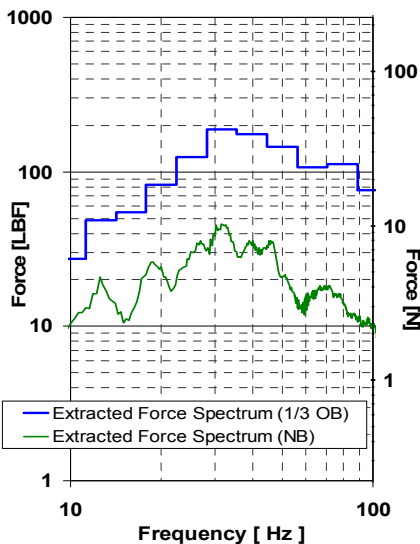
Design Scope
Vibration Design
Acoustic Design
Noise Design

Test & Measurement Scope
Dynamic Force Extraction
Vibration Propagation Testing
Impact Noise Testing

Design Goals
Custom vibration criteria
OSHA Noise+Vibration

Total Building Area
82,000 square feet

Completion
2007



Vibro-Acoustic Consultants was asked to offer vibration and noise design consulting services for the retrofit of an existing 82,000ft² building in Silicon Valley. Novo Nordisk is a leading manufacturer of pharmaceutical products for diabetes care.

The retrofitted facility houses a manufacturing line for a drug delivery system. One of the final manufacturing steps requires a custom-built ballistic punch-press that generates large **impact vibration forces**.

Sensitive receivers include a precision scale (50ft setback); a manufacturing tool with sensitive machine vision (120ft setback); and a laser-based micro-machining tool (180ft setback). In addition, the tool operators have workstations near the tool. Each of these, including the ballistic press, is located on a slab-on-grade floor.

The Architect approached us during concept design to determine whether press operation might disturb sensitive receivers, even at long distances. We performed two types of tests: first, we performed testing to **extract the dynamic forcing function** of the prototype tool at the tool vendor's facility; and secondly, we performed **vibration propagation testing** at the existing facility in Hayward.

Using the dynamic force and the actual transfer functions from the retrofitted facility in Hayward, we were able to predict vibration response at the location of all vibration-sensitive receivers in the retrofitted facility, including human receivers working near the tool. The predictions were compared with tool criteria and OSHA guidelines.

We also addressed the noise impact of ballistic press operation. We designed absorptive panels in the walls and ceiling of the tool space to minimize noise levels both in the immediate vicinity as well as in adjacent spaces.