

Engine Co. 27

Washington DC, USA



Case Study



Project Owner

District of Columbia Engine Co. 27



Main Contractor

Winmar Construction, Inc.



Architect

LeMay Erickson Willcox Architects



Acoustic Consultant

Phoenix Noise & Vibration



Structural Engineer

Ehlert Bryan Consulting Structural Engineers

Stravifloor Jackup, Stravilink PHR

- Jack-up floating floor system with reinforced steel boxes cast into concrete (Stravifloor Jackup)
- Spring isolation hangers designed to support suspended ceilings, lighting rigs, pipework, and HVAC units and isolate them from the main building structure. (Stravilink PHR)

OVERVIEW

The new 2-story Washington DC Fire & EMS Deanwood Engine 27 firehouse is located within fifty feet of the freight and commuter rail line. Per the acoustical consultant's report, 221 trains passed the site in a 24-hour measurement period, including 24 CSX freight trains and 197 metro trains. Some of the CSX trains exceeded the vibration impact criteria applied to this project of 0.0040 in/sec.

Following Federal Transit Administration (FTA) guidelines and U.S. Department of Housing and Urban Development (HUD) standards for noise and impact upon residential buildings, it was deemed necessary to isolate the building.

In collaboration with the acoustical consultant, design team, and contractor, CDM Stravitec designed a box-in-box solution with a spring-supported floor and spring-suspended ceiling for the crew quarters.



SOLUTION

To acoustically isolate the crew quarters from noise and vibration coming from the nearby railroad, a Stravifloor Jackup concrete floating floor with reinforced steel boxes was installed. After placing the steel boxes, installing a PE-film (bond breaker), and pouring the concrete, the jackup slab is raised to the desired level.

To further the acoustic design, the walls were supported by the isolated slab and a drop ceiling with Stravilink PHR spring isolation hangers was installed.

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AT A GLANCE

CHALLENGES

- With the FEMA (Federal Emergency Management Agency) 500-year floodplain requirements, a typical Stravibase foundation isolation solution was not viable. Therefore, a box-in-box design with a spring-supported floor was used to protect the crew quarters from noise and vibration

BENEFITS

- Jack-up slab allows for use of springs with a low natural frequency
- By jacking up the slab, the height of the slab can be better matched to the surrounding slab
- Minimal contact points due to increased spacing between jack up boxes (standard spacing = 6' o.c.)

800 ft²

Stravifloor
Jackup

124 pcs

Stravilink
PHR

