



December 10, 2021

Roger Strobridge
Town of Worcester, Select Board
Drawer 161
Worcester, VT 05682

Reference: Structural Inspection of Fire Station Suspended Slab

Dear Roger,

As requested, on October 4, 2021, I visited the above referenced site to complete a structural assessment of the existing Slab that supports the front section of the apparatus bay floor. The reason for the inspection was the discovery of cracks in the concrete floor under the apparatus bay. Based upon the results of our visual inspection, we recommended immediate closure of the floor to use by emergency vehicles.

During the site visit, the floor in question was unoccupied and a full visual inspection of the floor surface and the framing beneath the floor was completed. Inspection of the steel framing showed that many of the steel beams that support the floor are severely rusted (see photographs 1 and 2). In fact, in one location the bottom flange of the steel beam was completely severed. Calculations indicated that the steel beams in their current condition can not support significant wheel loads and even in their original condition could only support wheel loads of approximately 10,000 pounds. In addition to the damage to the steel beams, the slab has been compromised. The existing slab is 6" thick and has unknown reinforcement. At some locations random reinforcement steel was discovered but the reinforcement steel was severely compromised. In examining the underside of the slab several locations of severe spalling were also discovered (see photographs 3 and 5). The spalling likely indicates that the reinforcement that is not visible currently has rusted sufficiently to expand and damage/compromise the slab.

During the site visit, I also was shown the current tanker truck used by the fire department. Unlike many tanker trucks, the current tanker truck utilizes a single rear axle. In a truck carrying the volume of water stored within the tanks it is likely that the rear axle load is near the maximum axle load allowed by the Vermont Agency of Transportation. Typically, the maximum load on a single axle is 16 Tons or 32,000 pounds. It is possible that some of the slab damage that was noticed during the inspection was caused by this extreme load being applied to the slab rather than being applied directly over the steel beams.

Based upon the results of our analysis and visual inspection, we continue to recommend that the slab remain unoccupied by emergency vehicles. In order to reopen the apparatus bay to emergency vehicles, we recommend that the existing suspended slab be removed in its entirety and be replaced with a slab on grade sufficient to support the heavy wheel loads of the trucks and ambulance. It is my professional opinion that the replacement of the slab is the best long-term solution for the town. At your request, we have completed design of the repairs necessary. The attached drawings S1.0 dated December 10, 2021 should be sufficient to price, permit, and bid the project.

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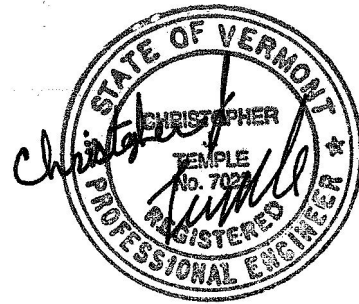
If you have any questions concerning this report, or the attached drawings, please call or write. DeWolfe Engineering would be happy to assist you in bidding and permitting the project. We would also be happy to assist you in construction oversight if needed.

Sincerely,



Christopher J. Temple, P.E.

Enclosures:



Photograph #1 – Steel beam with missing bottom flange and severe rust.



Photograph #2 – Steel beams with lower severity of rust damage.



Photograph #3 – Severe rust and spalling in concrete slab reinforcement and concrete slab.



Photograph #4 – Rust and spalling in concrete slab reinforcement and concrete slab.



Photograph #5 – Spalling and slab damage