



EMERGENCY SHORING IN SUPPORT OF A FIRE ORIGIN & CAUSE ANALYSIS

Technically accurate, fast, and comprehensive structural engineering services allowed the fire origin and cause investigation to move forward, and the client to retain all of their options for the subsequent dispute resolution. ESi provided a range of work products that included drawings sealed by a Professional Engineer, plus site supervision of the shoring work by the contractor, in addition to the origin and cause investigation.

SITUATION

A fire in a small commercial building partially collapsed the roof onto the portion of the building which was of interest in the subsequent fire origin and cause analysis. The building was a mixed-use facility with a “high-bay” shop area, offices, and a wood frame (internal) clean room. The tilt-up wall panels formed the primary structural elements regarding gravity and lateral load resistance and were in danger of collapse after the roof was compromised. The fire department wanted the building demolished, but doing so at this time would not have allowed the fire investigators access to the scene to witness and secure key evidence.

ESi was retained by the subrogation council for the fire origin and cause analysis which also necessitated a structural engineering effort to shore the building and provide supervision for the removal of the damaged roof. The fire investigation had to proceed immediately without compromising the safety of the individuals conducting the investigation, so an emergency shoring plan and job safety plan was quickly developed. Other areas of expertise included hazardous material risk mitigation, ability to work with municipal authorities, proven and effective engineer-contractor relationships, and seamless and quick access to other engineering disciplines, all of which ESi provides.

Practices: Structural Engineering
Fire Origin and Cause

ESi Consultant

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Services Utilized

- Emergency Shoring
- Safety
- Site Services

About ESi

For over 30 years, ESi has leveraged its multidisciplinary team of engineers, scientists, and professional technical staff to investigate many major accidents and disasters. Our technical expertise, hands-on experience and state-of-the-art facilities, combined with diagnostic, analytical and physical testing capabilities create an ideal environment for quickly identifying and interpreting the facts of a case.

Contact ESi

For more information visit our website or call us toll free at 866.596.3994

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SOLUTION

An ESi engineer arrived approximately 24-hours after the fire started. There were several issues that required immediate attention including:

- securing access to the building after the fire department left (members of the public were trying to enter the building);
- advising on the immediacy of any further collapse (e.g., was the building safe for experienced professionals, such as fire investigators, to enter);
- assessing the risk of the hazardous materials (HAZMAT; which were stored on-site); and
- preserving the evidence for the fire origin and cause analysis.

A relatively immediate falling hazard of the tilt-up panels overturning was assessed as a high risk due to the fact that the panels had rotated about the line associated with their bases such that the top of the walls were visibly out-of-plumb. Additionally, much of the roof structure was observed to have broken away from the seats that connected the ceiling joists to the walls.

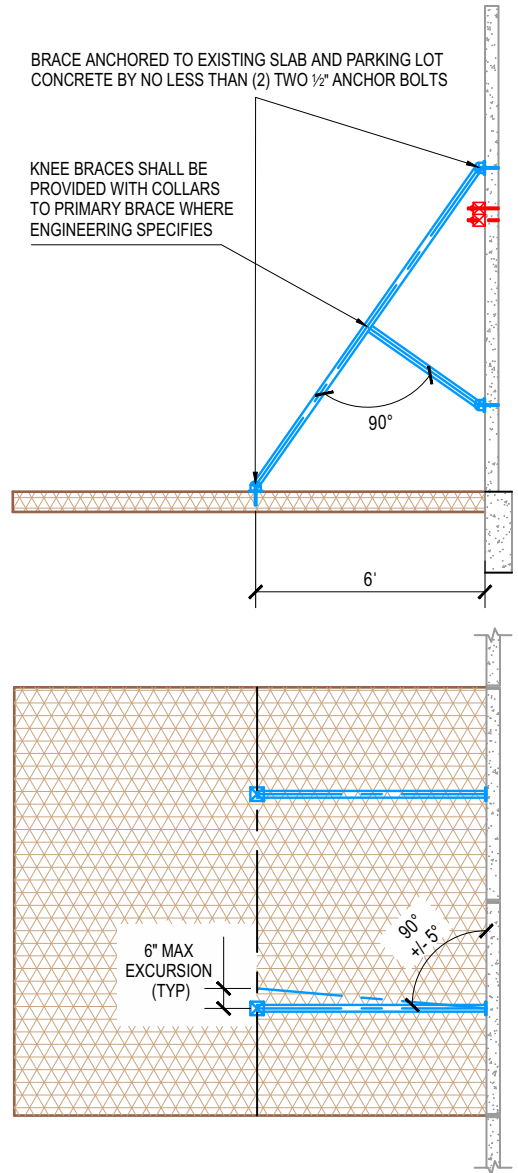
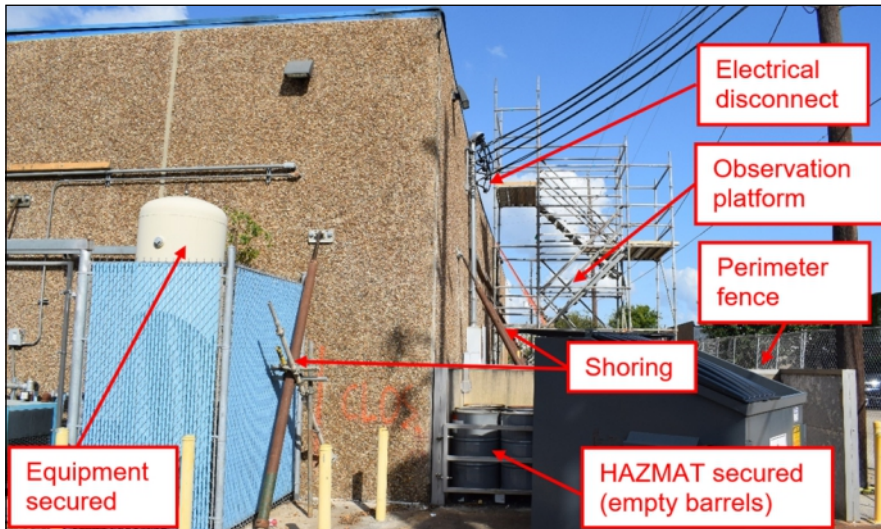
The roof was also assessed as being a falling hazard given that the collapse was only partial and that the ceiling joists were still under load and bearing on several different ad hoc supports including rubble, heavy shelving, and nonstructural wood framed walls internal to the tilt-up panels.

In support of the fire origin and cause analysis, ESi was tasked with supplying the emergency shoring design as well as engineering supervision of the shoring effort.

RESULTS

The plan and drawing for the emergency shoring had to be developed over a weekend to facilitate the work of the demolition contractor. Although the schedule was expedited, there was enough time to properly design (ACI 551 R-92 "Tilt-Up Concrete Structures"), analyze, draft, and review (internal QA/QC) the drawings before sending the plan to the demolition contractor.

ESi's structural engineering work, which provided an actionable plan to quickly and effectively shore the structure, allowed the fire origin and cause investigation to move forward safely. As a result, the evidence was collected successfully, which allowed the subrogation council to preserve interests. Without this shoring effort, the evidence could have been lost in the building demolition process prior to evidence collection.



WHY ESi.

ESi consultants are experts in the complete range of engineering disciplines. All of the technical expertise needed to tackle multi-disciplinary problems is found under one roof. In this case, ESi structural engineers were able to seamlessly support ESi's fire origin and cause investigators on the same project.



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