Structural Shoring Design Guidelines
Types of Shoring Projects – Best Practices

Needle Beam Shoring (Wall Shoring)

INTRODUCTION

The purpose of this design guide is to represent and further develop the safety, standards, and guidelines of the structural shoring industry not covered or detailed by current codes and organizations such as OSHA, ANSI, and ACI which focus on various topics in the industry including access scaffolds and concrete construction and masonry work in construction. Shoring systems used in renovation, retrofit, and emergency applications on structures consisting of various construction materials are installed daily throughout North America, but are not specifically addressed or accounted for within these existing standards. This guide will expand on present and historical standards but focus primarily on the above applications where large gaps currently exist. We want to ensure the shoring knowledge gained from years of cumulative experience and resources is spread throughout the industry and into the future. We believe promoting cooperation and communication will improve the quality of our industry's products and increase the safety of the public and all those working day in and day out in the construction industry.

Shoring for complete wall removals can typically be phased in such a way that needle beam shoring is not required. However, for new footings or openings in walls, further investigation into the sequences of construction is needed. Shoring of walls is typically required when:

- Sequence of construction requires support of the wall during full or partial removal.
- New openings are being placed within walls
- Wall footings are being fully or partially removed and replaced
- Wall footings are being undermined

In general, walls being removed should be demolished top down and should not be supported from structural members above the wall. Most existing structure beams are not designed to support the weight of the wall and/or the connections of the wall to the beam are not designed to support the weight of the wall. Walls are also typically not designed to span very far, and their capacities to span between needle beams depend on the construction of the wall.

Important Questions

1. Why does the wall need to be supported?
2. What is the wall construction (CMU, concrete, timber, metal studs, etc)?
3. What is the wall thickness?
4. What is the wall height to be removed and remain?
5. Do beams or roof/floor members frame into the wall?
6. Are there construction joints in the wall?
7. Will a waler be required to support the hanging wall in between needle beams? Partially grouted CMU walls, timber, and stud walls typically need walers such as C-Channels attached to the wall with thru-bolts or additional timbers secured to each stud. Large distances between the needle beams in a concrete wall could result in the need for walers as well.
8. Will loading conditions change during construction?
9. How long will the shoring need to be in place?
10. Is the structure occupied? What live load will be present?
11. Are drawings of the existing structure available? Are they current and accurate?

12. What are the ground conditions? Can it support the shoring load or are bearing pads needed?
13. How much clearance is required to complete work?
14. What obstacles, (e.g. sprinkler lines, electrical conduit, heat ducts), are present in the area where shoring will be installed and cannot be removed?
15. If obstacles are present, is it more expensive to move these lines or design a more complicated and difficult shoring system to avoid them?
16. Is there any damage in the wall that will require specific attention when shoring the wall?
17. What activities will be occurring while the wall is shored?
18. Is the structure adequate to be supported at the shoring locations due to the new localized loads?
19. Will the engineer of record be involved on the project and to what extent?
20. Are there deflection limitations that need to be adhered to?

Best Practices

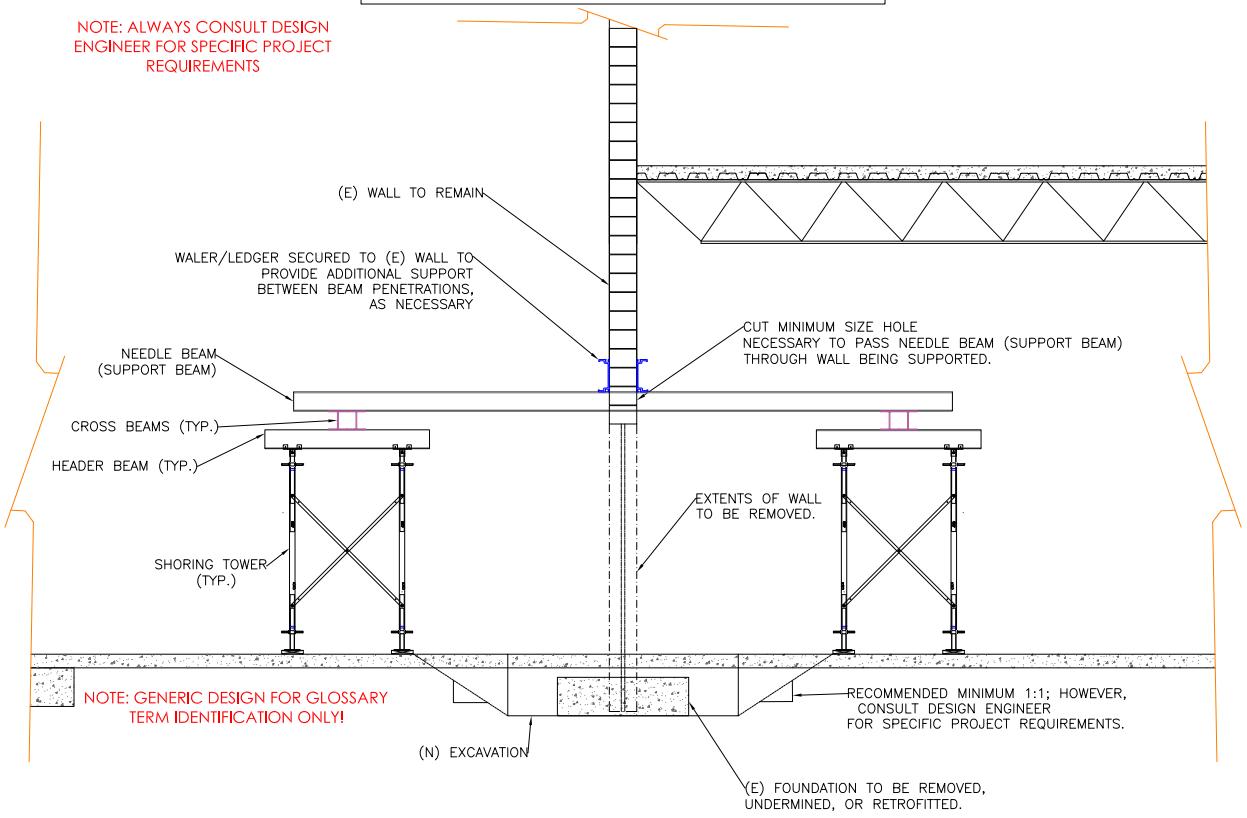
1. Explain to the erection crew why they are doing what they are doing.
2. Keep it simple.
3. Coordinate activities with all the impacted trades.
4. Limit deflection of needle beams to avoid cracking of walls.
5. Limit long spans of needle beams as much as possible. Shorter spans mean easier to control deflection with smaller beams.
6. Determine appropriate inspection procedures and perform as required.
7. Record all the existing cracks and indications of movement in the structure prior to installing shoring.
8. Monitor shoring and existing structure to ensure no movement or new cracking is observed.
9. Provide clear signage and enforcement of live load limitations. Protect area by barricading or similar to restrict access as required.
10. Ensure that the shoring equipment has been installed and braced according to the design and/or manufacturers recommendations prior to commencing work.

Practices to Avoid

1. Avoid suspending walls from existing beams or below shoring supports of wall if not specifically designed to do so.
2. Avoid using dissimilar shoring systems or equipment.
3. Avoid using untrained personnel to install the shoring.
4. Avoid jobsite vibrations adjacent to the shoring which could compromise stability of the shoring.

NEEDLE BEAM SHORING OF EXISTING (E) WALL

NOTE: ALWAYS CONSULT DESIGN ENGINEER FOR SPECIFIC PROJECT REQUIREMENTS



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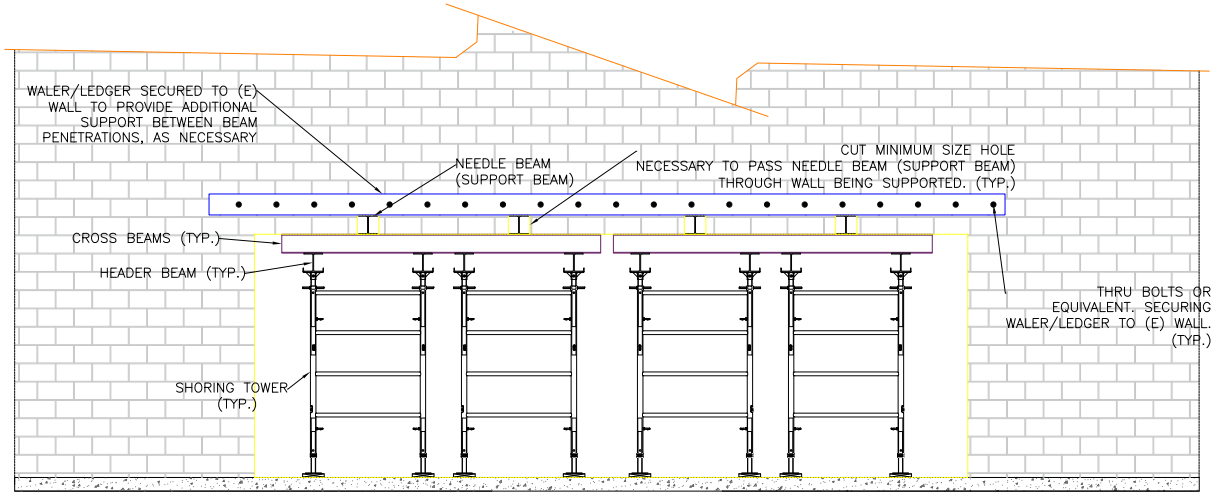
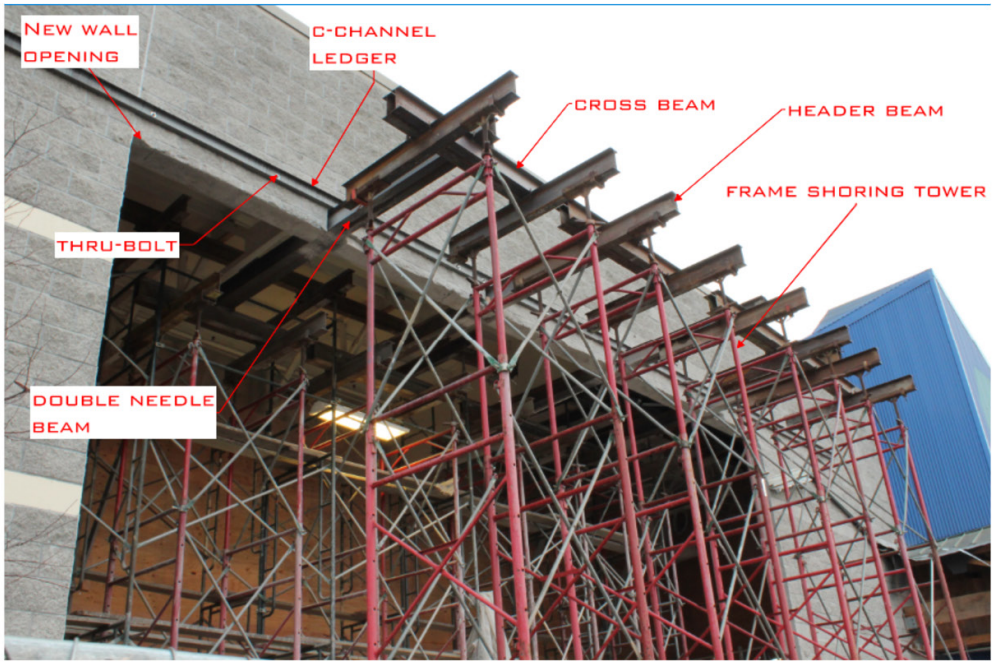
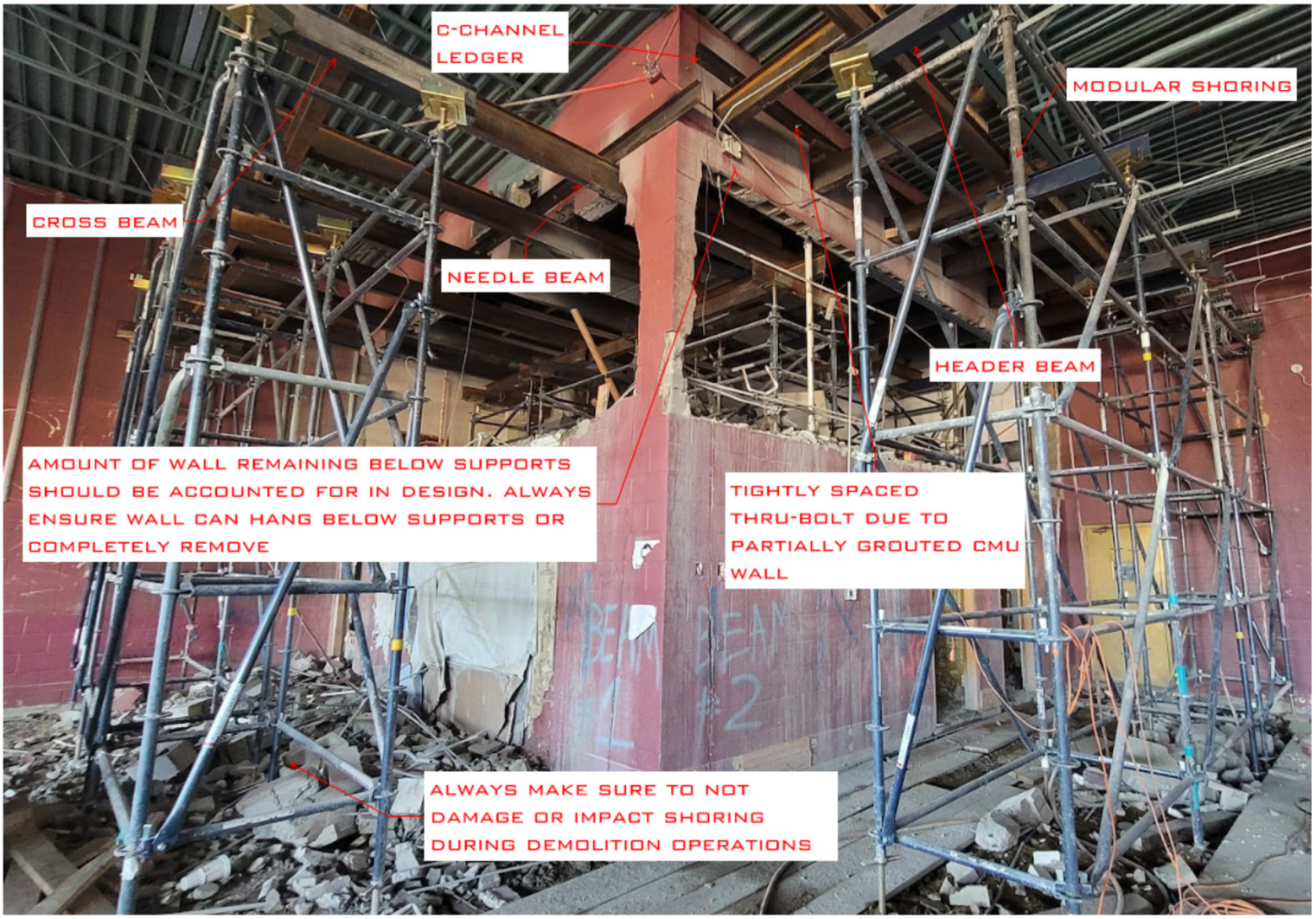


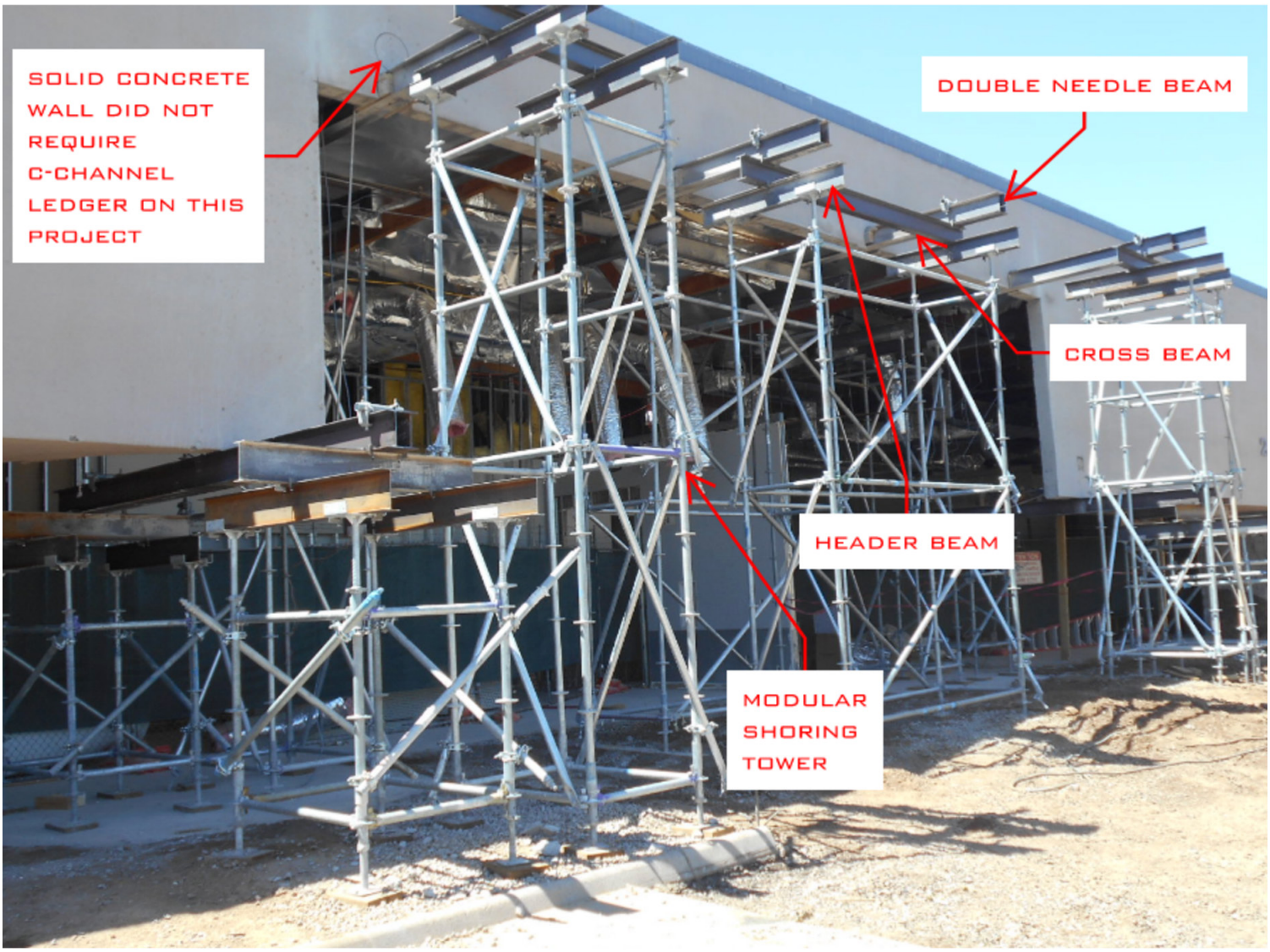
NOTE: Pictures outline various completed projects from SAIA members. There are alternative and unique ways of solving shoring problems, which are depicted in some of these example projects. Always consult design professional prior to undertaking shoring project.



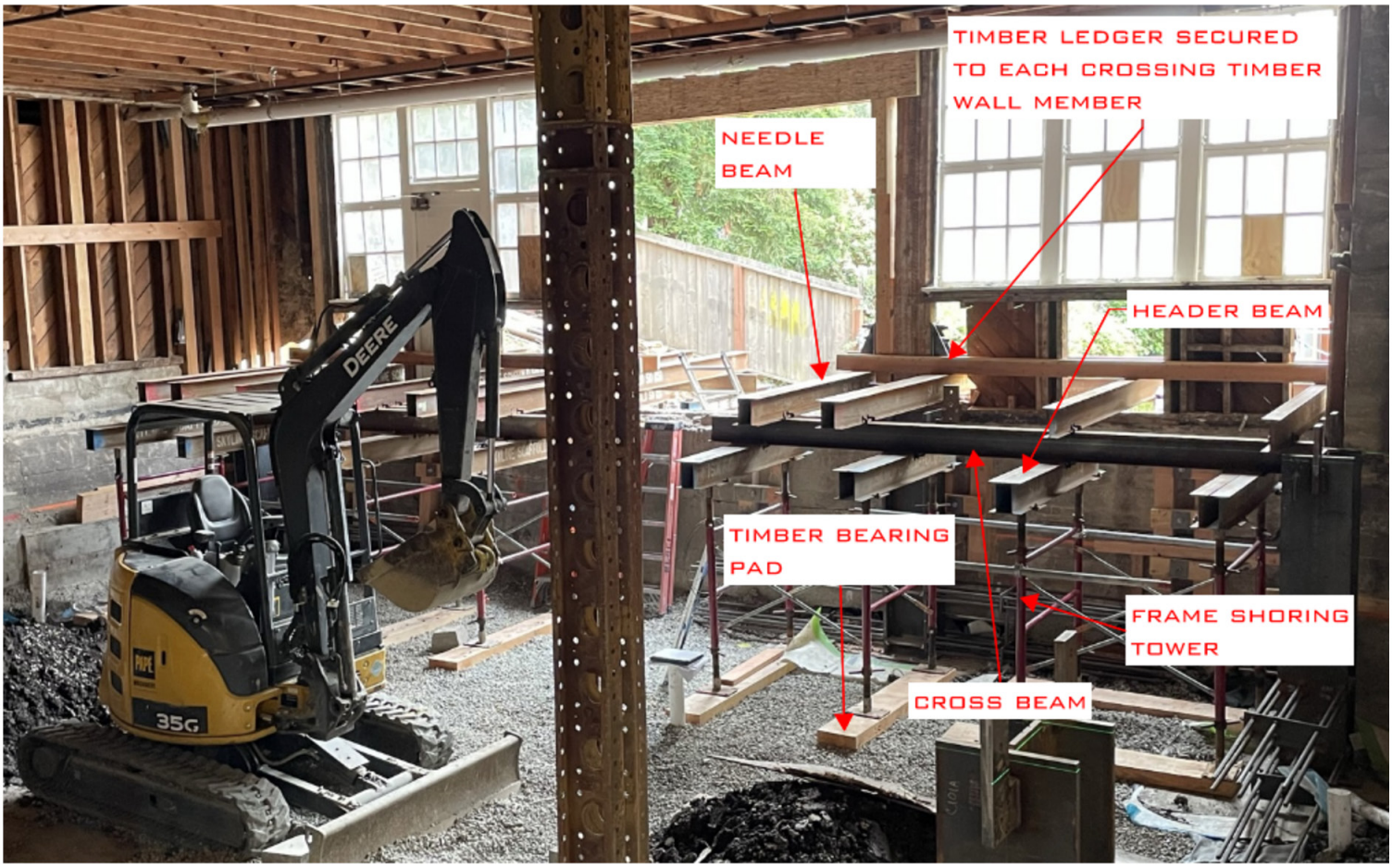
Shoring of CMU wall for new opening.
C-channel ledgers to provide additional support of wall were installed along with needle beams and frame shoring.



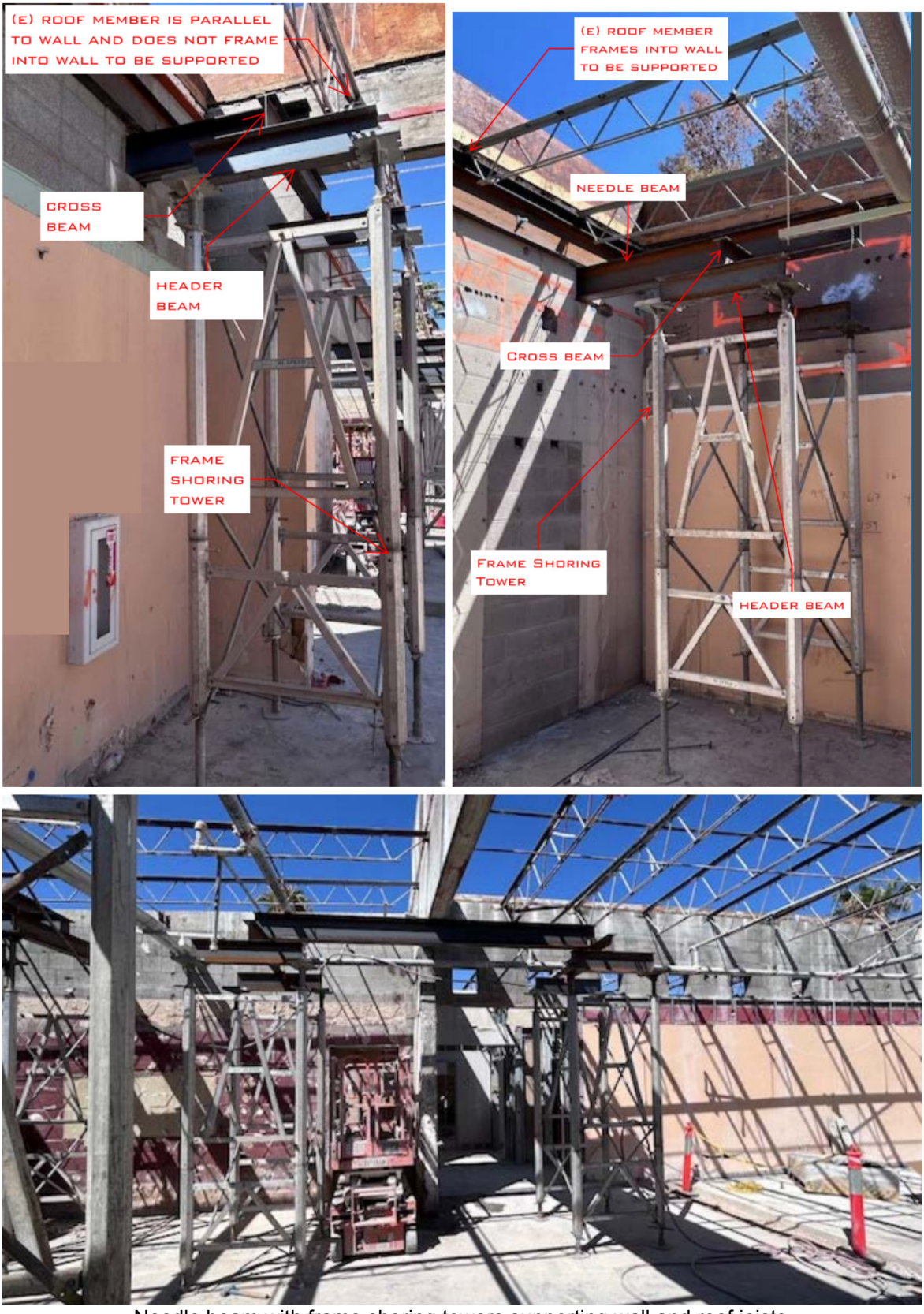
Shoring of partially grouted CMU wall at corner.
Corner conditions can result in shoring in multiple directions, requiring beams to be offset to avoid interference.



Shoring of existing solid concrete wall.
In this particular case, no C-Channel ledger or thru-bolts through the wall were required.



Shoring of existing timber wall. Each wall member or stud had to be supported on this project.



Needle beam with frame shoring towers supporting wall and roof joists.

Needle beam support of brick wall and existing roof framing members.

Needle beam support of multi story structure with heavy duty modular shoring tower.

Timber needle beam support of existing CMU wall and existing roof framing members with standard frames.

Install progress photo of needle beam support of existing precast concrete panel wall.