

Illinois TRT / US&R Co. & US&R Task Force
Structural Collapse
Job Performance Requirement Task Time Maximums

BREACHING TASK MINIMUM ACCEPTABLE PERFORMANCE(SKILL TIMES)

The following table assumes that one, 6-person Rescue Squad is used, who has worked together before and has had proper training in breaching and Breaking. Also it is assumed that the tools, equipment and other required equipment are all laid out ready to go including water supply when applicable.

Fort Breaching and Breaking in an Open Area

Task Type	Task Time
Lift outs	60 minutes
Dirty Breach	45 minutes
Stitch Cut	45 minutes

These times are based on the simulations performed during Structural Collapse Tech Class at ISFSI and are bounded by the FSI skills sheets. Concrete simulation for the Lift Outs are generally minimum 5ft by 5ft by 8 in. thick re-enforced concrete. All other concrete simulations are four foot square, 4 inch thick re-enforced concrete slabs. Positioned in a collapse simulation for skill performance.

SHORING TASK MINIMUM ACCEPTABLE PERFORMANCE(SKILL TIMES)

The following table assumes that one, 6-person Rescue Squad is used, who has worked together before and has had proper training in constructing shoring. Also it is assumed that the tools, lumber and equipment are all laid out ready to go, along with a cutting table.

For Pre-Fab Shoring Placed in a Relatively Open Area

Shore Type	Pre-fab Time	Install Time
T-Shore	15 – 24 min	3 minutes
Dbl -T Shore	24 – 30 min	5 minutes
2-Post Vert	24 – 30 min	5 minutes
3-Post Vert	N/A	See In-place
Laced Post	30 – 36 min	36 – 45 min
Pair, Solid Sole Raker	60 min	36 – 45 min
Pair, Split Sole Raker	90 min	45 – 60 min
One Flying Raker	30 min	15 min
Prefab Window Shore	15-24 min	3 minutes

For Built in Place Shores in a Relatively Open Area

Shore Type	Erection Time
2-Post Vert	30 - 36 min
3-Post Vert – 10ft max High	36 -45 min
Laced Post	75 - 90 min
Crib-2x2 w/4x4 – 3ft High	5 – 8 min
Crib-2x2 w/4x4 – 6ft High	10 – 16 min
Crib 2x2 w/6x6 – 3ft High	8 – 10 min
Crib 2x2 w/6x6 – 6ft High	10 – 20 min
Window Shore	24 - 30 min
Door Shore	30 - 45 min
Pair, Sloped Floor Shores	60 - 75 min

NOTE for CARRY CONDITIONS

These times **Do Not** account for moving the pre- assembled shore into position or moving the material into position for the Built in Place Shores. That would have to be determined **On-Scene** at each event, and each area on the Site. (Carry Distance)

TIME TO BUILD SHORES - SPECIFIC CONDITIONS

Example 1 (Vert, Crib, Laced Post & Sloped floor)

Like Pentagon, Puerto Rico, (similar to OKC) 1st & 2nd story, Shore your way in, remove debris as you go. Material & cutting area within 200ft outside

ADD 10 min for 1st floor and 15 min for 2nd floor.

Traveling thru heavy debris add 10minutes more

Example 2 (Vert, Crib & Sloped floor)

10 story concrete bldg - Need to carry material upstairs into bldg. Partly prefab in safe area on same floor. Need to move furniture, desks, etc to go 60 to 100 ft across floor to collapsed area

ADD 5 min for each additional floor ascended.

Example 3 Each Pair of Raker Shores

12 ft insertion point up Tilt-up wall - AC paving, parking lot next to building not much debris

Each Pair to be Assembled, Installed & Braced in 30 min

Example 4 Each Pair of Raker Shores

9 ft insertion point up URM wall w/ some debris AC paving or Dirt next to wall. Use Split sole Rakers w/ sloping sole. Each Pair to be Assembled, Installed & Braced in 40 min

MULTI-STORY CONDITIONS & SEQUENCING

When shoring a single damaged floor in multi-story, sound, existing bldg the following procedure may be used:

- For Wood-frame, 1-undamaged fl can supported 1-damaged fl
- For Steel-frame, 2- undamaged floors to support 1- damaged fl
- For Reinf. Conc, 3-undamaged floors to support 1- damaged fl
- For Precast Conc, the shoring should extend to the ground
- This does not apply to structures that are under construction, subject to cascading/progressive collapse, or to structures that have collapsed suddenly, without any apparent cause
- Usually the best strategy for multi-story shoring is to start directly under the damaged floor, and work down

THE SHORING TEAMS

To conduct Shoring Operations safely and efficiently, two separate Shoring Teams are formed.

1. **The Shore Assembly Team** – Performs the actual shoring size-up and construction of the shores.
2. **The Cutting Team** – Establishes the equipment area and cuts the shoring lumber.
3. **The Shore Assembly Team** consists of the following:
 - a. **The Shoring Officer** (Rescue Squad Officer) – is in- charge of the operation and works with the Structures Spec to determine where to place and erect the shores.
 - b. **The Measure** – performs all the measuring required in the erection of the shoring and relays all measurements and lumber size to the Layout of the Cutting Team.
 - c. **Shores** – clears away debris and obstructions that could interfere with shore construction. He also assists the Measure as needed to erect the shores.

4. **The Cutting Team** The initial responsibility of the cutting team is to secure an area as close as possible to the collapse operation to minimize the number of personnel needed to relay the materials to the shore assembly team. The assistance of several other personnel may be required to help expedite the movement of lumber and tools to the collapse area.
 - a. **The Layout** – is in charge of setting up the cutting station and preparing the materials to be cut. Performs all measuring, layout of angle and should be in direct contact with the shore assembly team “measure” via portable radio to eliminate mis-communications on dimensions, etc.
 - b. **The Cutter** – cuts the shoring material.
 - c. **Tools and Equipment** – directs the movement of tools and equipment to be placed where they are requested, anticipates logistical needs of the shoring team and keeps an inventory checklist/log sheet for easier retrieval of tools and equipment at the conclusion of rescue operations.
5. A single Rescue Squad can normally fill the six individual shoring team positions during most shoring operations.
6. Larger or more complex shoring operations may require Two Rescue Squads, with One squad assigned to the Shore Assembly Team and the Other assigned to the Cutting Team.
7. **Shore Assembly Team with a Six person Rescue Squad:**
 - a. The Shoring Officer (Rescue Squad Officer)
 - b. The Measure
 - c. Shores
 - d. Shores
 - e. Safety
 - f. Runner – ensures tools, equipment, and shoring materials are moved from the shoring operation primary access point to the shoring site and assists in the erection of shores as needed.
8. **Cutting Team with a complete Six person Rescue Squad:**
 - a. The Cutting Team Officer (Rescue Squad Officer)
 - b. The Layout
 - c. The Feeder – moves and feeds measured and marked shoring material from the Layout to the Cutter and helps secure it when being cut.
 - d. The Cutter
 - e. Tools and Equipment
 - f. Runner – ensures tools, equipment, and shoring materials are moved from the cutting area to the shoring operation primary access point.

NOTES for VERTICAL SHORING ref US Army Corp of Engineers “Shoring Operations Guide”

- Maximum Post Heights have been specified as 10'-3", 12'-3", etc. , and Shore is then limited to next Full Foot in Height
- Design Load (Safe Working Load) for Class 1 & 2 Shores is based on Shore Height. (Not Post Length)
- The use of 4x4 & 6x6 Headers is desirable, since this maintains a relatively stable 1 to 1 height to width ratio. This allows the use of one sided connections to headers.
- It is desirable to use 2-sided connections at Posts to Sole Plates at Wedges. The connectors should be 6"x12", Half Gussets. This is change from the 12"x 12" gusset, and it uses fewer nails + allows a better view to see Cupped Wedges.
- Use of 4x4 Headers for 4ft o.c. Posts and 6x6 for 5ft o.c. Posts is based on supporting Normal Wood Floors and Intact Concrete Floors. For supporting badly cracked Concrete Floors, and for shores with larger post spacing, obtain special design by US&R Structures Specialist.