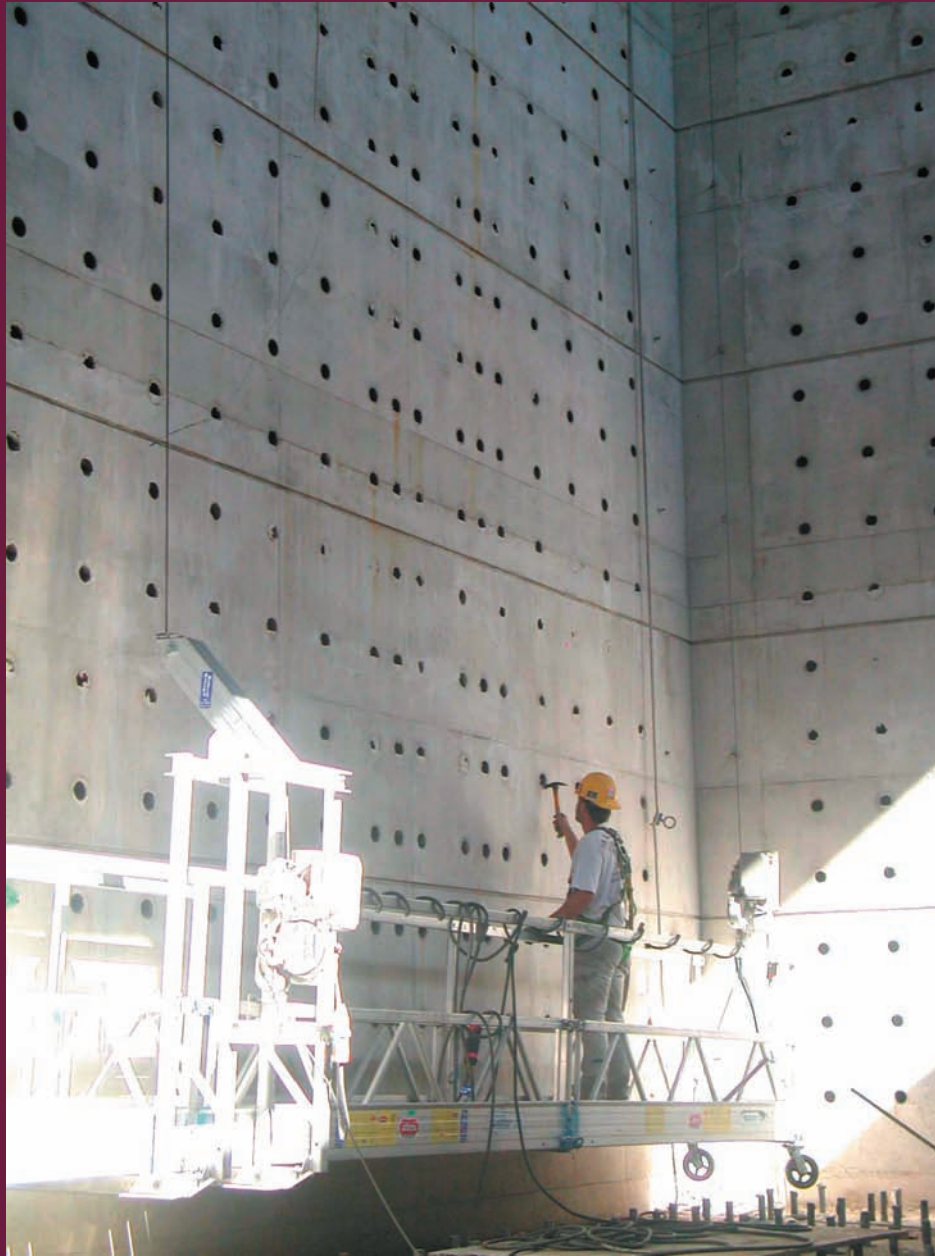


# Strong wall/Strong floor

University of Minnesota MAST Laboratory



Through hole capacity in wall and threaded hole capacity in floor capable of resisting 125k in tension/compression and shear simultaneously  
 Concrete – 6,000 psi design strength  
 Conventional rebar for strength  
 Floor steel – 3 No. 14 bars at 18" o. c. top and bottom, both ways  
 Wall steel – 6 No. 11 bars at 18" o. c. front and back vertically  
 Prestressing steel for crack control  
 Dywidag threaded bars in strong floor and strong wall  
 1-3/4" diameter bars at 18 inches o.c. top and bottom, both ways  
 Floor plates - 5 1/2" thick, A572 Grade 50  
 Threaded holes - 3"-4 UNC Grade 8 Studs  
 High Strength Tie-Rods for Floor Plates ASTM A193 Grade B-7  
 Post-tensioned to 70% tensile strength

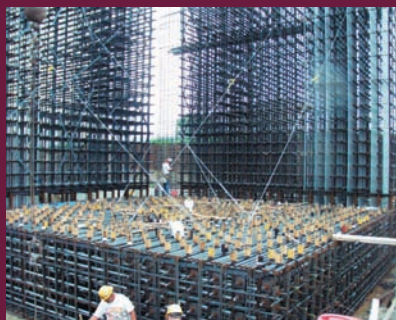
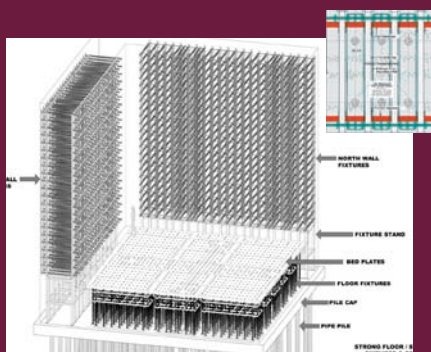
## STRONG FLOOR:

1. Load capacity of vertical holes:  
 Each threaded hole:  $\pm 125$  k vertical & 125k horizontal, simultaneously  
 Groups of 8 holes off cruciform area:  $\pm 1,000$  k vertical & 1,000k horizontal, simultaneously. Groups of 12 holes on cruciform area:  $\pm 1,500$  k vertical & 1,500k horizontal, simultaneously  
 Each end of cruciform:  $\pm 330$  k vertical & 330k horizontal, simultaneously
2. Vertical load capacity – horizontal strips in each direction:  
 Overall:  $V = 2,200$  k &  $M = 43,950$  ft-k  
 9 ft wide edge strip:  
 $V = 470$  k/ft &  $M = 2,160$  ft-k/ft  
 9 ft wide middle strip:  
 $V = 470$  k/ft &  $M = 1,635$  ft-k/ft  
 17 ft wide wall strip:  
 $V = 470$  k/ft &  $M = 1,090$  ft-k/ft
3. Maximum vertical floor deflection from any load combination: 0.10"

## STRONG WALL

1. Load capacity of horizontal wall holes:  
 Each through hole:  $\pm 125$  k lateral & 125k shear, simultaneously  
 Each wall:  $\pm 880$  k lateral at 16ft elevation &  $\pm 880$  k lateral at 32ft elevation & 1,760k shear, simultaneously
2. Lateral capacity – vertical strips in each wall:  
 Overall:  $V = 1,760$  k &  $M = 43,600$  ft-k  
 Distributed: shear = 195 k/ft  
 Distributed: moment = 2,115 ft-k/ft
3. Maximum horizontal wall deflection from any load combination: 0.50"

The 7-foot thick L-shaped strong wall and the 7-foot thick strong floor are designed to permit a wide range of specimen configurations. A prefabricated steel grid was used to permit precise placement of the grid of holes used to tie down specimens and actuators. The system can test specimens up to 25 feet tall.



Strong wall and strong floor designed by ESI Engineering Inc.