

a. Point Load and Live Load. Use Figure 11 (Reference 5, Anchored Bulkheads, based on the work by Terzaghi) to compute lateral pressure on wall due to point load and line loads; this assumes an unyielding rigid wall and the lateral pressures are approximately double the values obtained by elastic equations. The assumption of an unyielding rigid wall is conservative and its applicability should be evaluated for each specific wall.

b. Uniform Loading Area. For uniform surcharge loading lateral stress can be computed by treating the surcharge as if it were backfill and multiplying the vertical stress at any depth by the appropriate earth pressure coefficient.

c. Uniform Rectangular Surcharge Loading. For the effect of this loading see Figure 12 (see Reference 6, Lateral Support Systems and Underpinning, Volume 1, Design and Construction (Summary), by Goldberg, et al.). If the construction procedures are such that the wall will move during the application of live loads, then the pressure calculated from Figure 12 will be conservative.

d. Practical Considerations. For design purposes, it is common to consider a distributed surface load surcharge on the order of 300 psf to account for storage of construction materials and equipment. This surcharge is usually applied within a rather limited work area of about 20 feet to 30 feet from the wall and is also intended to account for concentrated loads from heavy equipment (concrete trucks, cranes, etc.) located more than about 20 feet away. If such equipment is anticipated within a few feet of the wall, it must be accounted for separately.

5. WALL MOVEMENT. For the effect of wall movement on the earth pressure coefficients, see Figure 1.

a. Wall Rotation. When the actual estimated wall rotation is less than the value required to fully mobilize active or passive conditions, adjust the earth pressure coefficients by using the diagram on the upper right hand corner of Figure 1. Relatively large movements are required to mobilize the passive resistance. A safety factor must be applied to the ultimate passive resistance in order to limit movements.

b. Wall Translation. Wall uniform translation required to mobilize ultimate passive resistance or active pressure is approximately equivalent to movement of top of wall based on rotation criteria given in Figure 1.

c. Internally Braced Flexible Wall. Sheeting on cuts rigidly braced at the top undergoes insufficient movement to produce fully active conditions. Horizontal pressures are assumed to be distributed in a trapezoidal diagram. (See Section 4.) The resultant force is higher than theoretical active force. For clays, the intensity and distribution of horizontal pressures depend on the stability number  $N_0 = \gamma H/c$ . (See Section 4.)

d. Tied Back Walls. Soil movement associated with prestressed tied back walls is usually less than with internally braced flexible walls, and design pressures are higher. (See Section 4.)

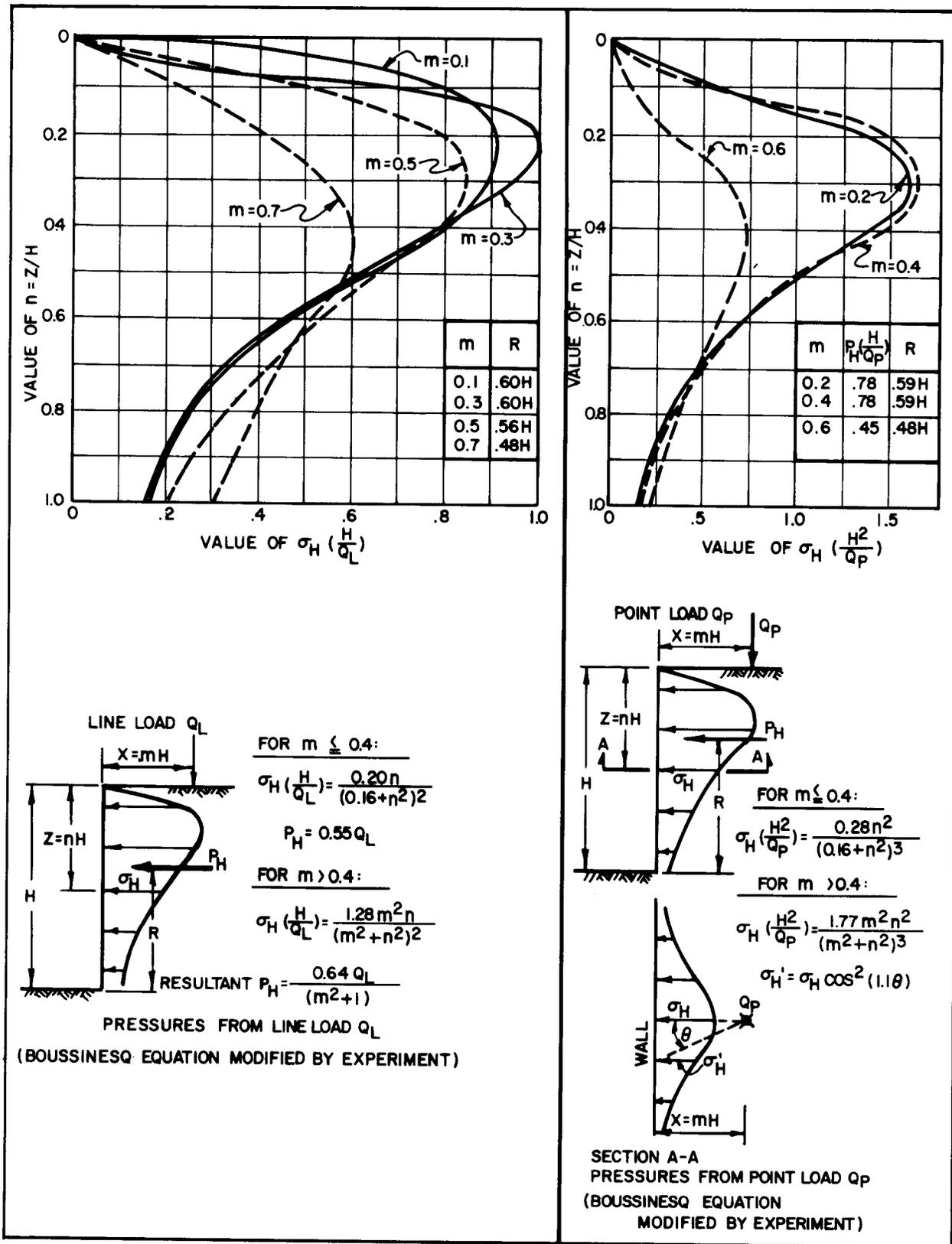


FIGURE 11  
Horizontal Pressures on Rigid Wall from Surface Load

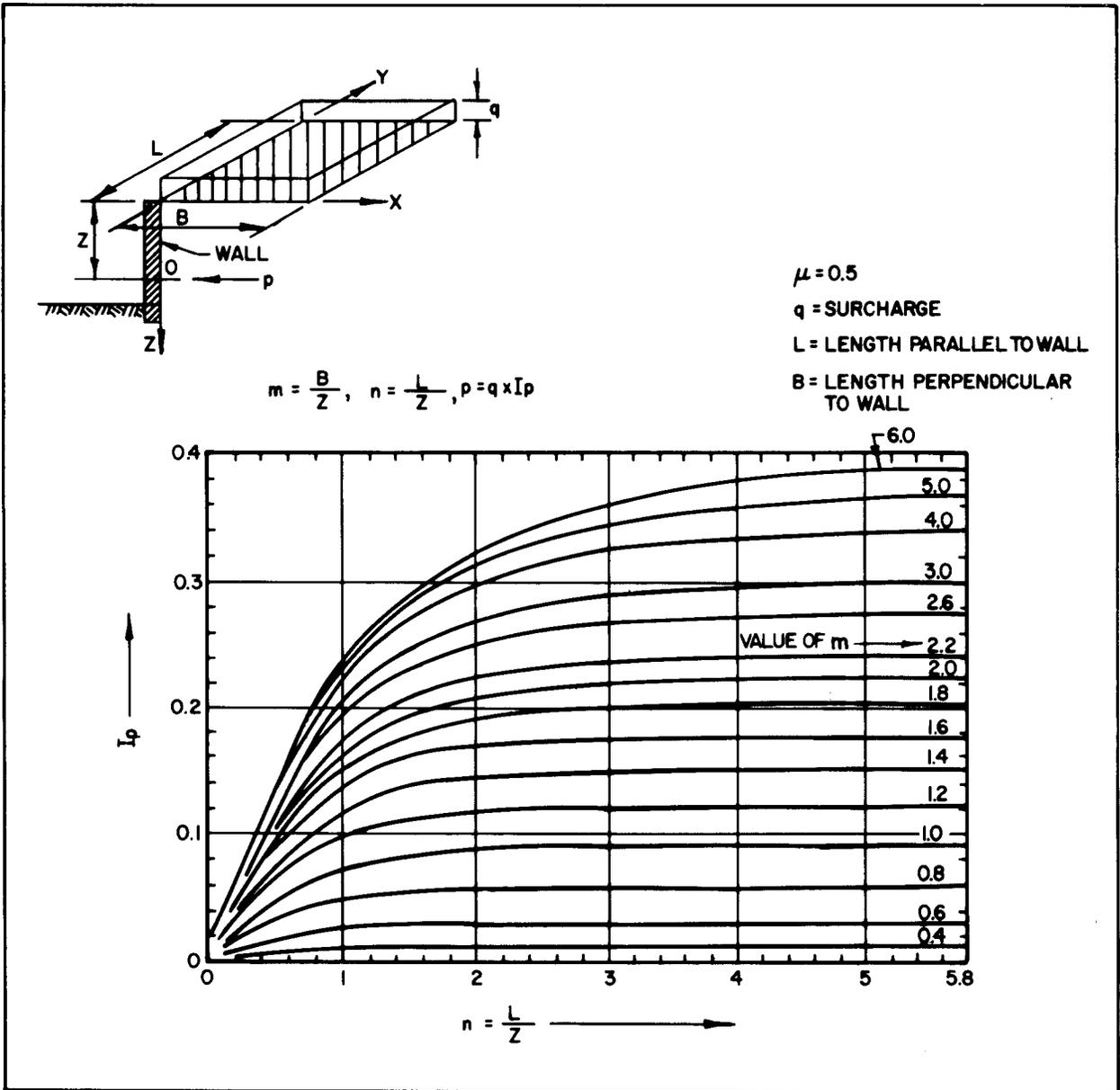


FIGURE 12  
 Lateral Pressure on an Unyielding Wall due to  
 Uniform Rectangular Surface Load