Thus, the capacity of this anchor bolt detail is limited by the bending strength of the column flange even after the clip angle has been satisfactorily stiffened.

The force back through the column web is:

$$F = (915 \text{ lbs/in.})\ (11'') + 2\ (1370 \text{ lbs})$$
$$= 12{,}800 \text{ lbs}$$

A ½″ fillet weld 3 inches long on the top of the angle opposite the column web will satisfactorily resist the force couple:

$$F = (3'')\ (5600 \text{ lbs/in.}) \qquad \text{E70 welds}$$
$$= 16{,}800 \text{ lbs.} \qquad \underline{\text{OK}}$$

For greater anchor bolt capacities than shown in Figure 22, either horizontal stiffeners or diaphragms should be provided to prevent bending of the column flanges.

Problem 3

A rather simple detail, whereby a wide-flanged channel serves as a stiffener, is shown in Figure 23.

This detail was used with three 1⅝″-dia anchor bolts on a 14″ × 87-lb mill building column designed to resist a wind bending moment of 175,000 ft-lbs combined with a direct load downward of 130,000 lbs.

The tension on the bolts is determined by taking moments about the right-hand compression flange of the column after first determining the eccentricity at which the direct load will cause a moment of 175,000 ft-lbs about the centerline of the column. The eccentricity is—

$$e = \frac{(175{,}000)(12)}{(130{,}000)}$$
$$= 16.15''$$

The load on the bolts is—

$$F = \frac{(130{,}000)(9.49)}{(15.66)}$$
$$= 78{,}800 \text{ lbs}$$

The area of the three 1⅝″ dia. bolts in the unthreaded body area is—

$$A = (3)(2.074)$$
$$= 6.22 \text{ in.}^2$$

The tensile stress in the bolts is:

$$\sigma = \frac{(78{,}800)}{(6.22)}$$
$$= 12{,}700 \text{ psi} < 14{,}000 \text{ psi} \qquad \underline{\text{OK}}$$

(AISC Sec 1.5.2)

The compression flange reaction (R) is the sum of the 130,000-lb column load plus the 78,800-lb pull of the anchor bolts, or 208,800 lbs. The 13″ ship channels are set up just clear of the bearing on the base plate so that the end of the column will take the compressive load of 208,800 lbs without overloading channels.

Bearing stress on masonry

The bearing stress on the masonry support is maximum at the extreme edge of the bearing plate, and is assumed to decrease linearly back along the plate. This bearing stress would resemble a triangle in which

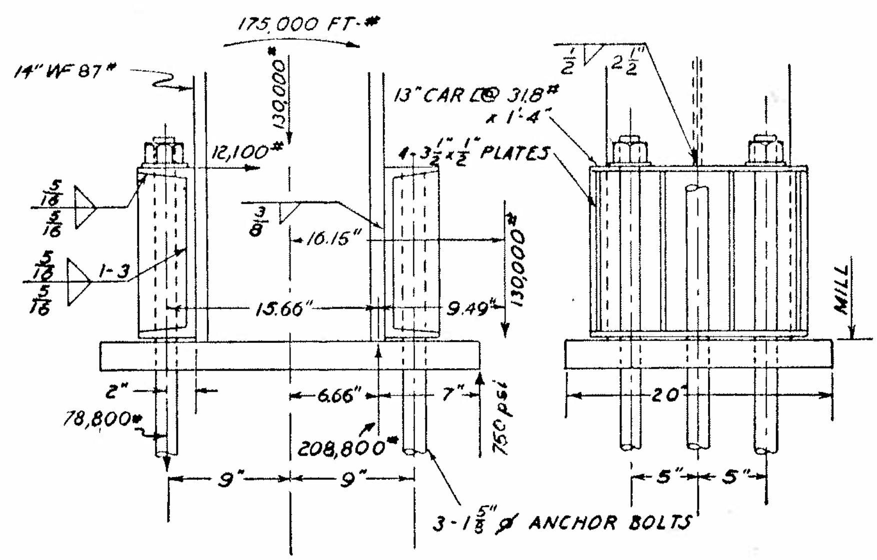

FIGURE 23