Beams which have their compression flanges within the depth of a concrete floor may be regarded as laterally supported by the floor.

In the case of beams entirely encased in concrete at least 2 in. thick all round, properly secured to the steel beam with reinforcement, the breadth b in the above formula may be taken as the width of the flange of the beam plus the least concrete cover to the edge of the flange on one side only, but the added width due to cover is not to exceed 4 in.

In no case may the length l be greater than fifty times the breadth b.

3. Filler joists encased in a floor of solid hard brick, stone, or concrete with a hard aggregate (not breeze or pumice) mixed in the proportion of one to two and a half to five (1 : 2½ : 5), or richer mix, may be calculated, neglecting the effect of the concrete, as if the joists were stressed to 20,000 lb. per square inch for floors in which the concrete is flush on top with the joists, and an additional 2,000 lb. or fraction thereof per square inch on the joist (but not exceeding 26,000 lb. per square inch) for every inch or fraction of an inch of concrete over the top of the joists, provided that if the stress of 22,400 lb. per square inch is exceeded the spacing of the joists in inches is not less than—

$$\frac{10w\,(7c + 2d)}{(d + c)^2}$$

where w = weight of the joist in pounds per foot run; c = concrete cover to top of joist (inches); d = depth of joist (inches).

If filler joists are spaced farther apart than eight times the depth of concrete, suitable transverse reinforcement must be provided.

4. Stresses for pillars, struts, and bracing compression members shall not exceed the following per square inch :—

$\frac{l}{r}$	Allowable Working Stresses.		$\frac{l}{r}$	Allowable Working Stresses.	
	lb.	Tons.		lb.	Tons.
0–60	13,440	6	160	4,480	2
80	11,200	5	180	3,360	1½
100	8,960	4	200	2,800	1¼
120	6,720	3	220	2,240	1
140	5,600	2½	240	1,680	¾

where l=length of member and r=least radius of gyration of member.

For intermediate values of $\frac{l}{r}$ the value of the allowable stress shall be obtained by interpolation.

For pillars the ratio $\frac{l}{r}$ shall not exceed 120.

In pillars continuous over more than one story the above stresses are to be reduced by one-sixth for the top length, and for the bottom length if resting on a beam not in the foundation.

The same reduction—namely, one-sixth—is to be made for pillars of single-story length.

Stresses are to be calculated on the gross section without reduction for rivet-holes, but in no case is the area or moment of inertia to be taken as more than one and a quarter times the net value.

5. For determining the slenderness ratio $\frac{l}{r}$ the length l is to be taken as the height from centre to centre of successive beams in the various intermediate lengths; from the base of pillar to the centre of the beam for the bottom length; and from the centre of the beam below to centre of beam above for the top length, whether the beams are supported on a cap or attached to the side of a pillar. Alternatively, l may be taken from floor-line to floor-line for the intermediate floors. Where the depth of the upper beam in any story exceeds one-twelfth of the story-height, such excess may be deducted from the length l of the pillar as given above.

The greater value of $\frac{l}{r}$ shall be taken considering both axes. Where l is the same for both axes, the least r shall be taken in determining the safe stress. Where l differs for the two axes, the r and $\frac{l}{r}$ applicable to each axis shall be taken.

APPENDIX III.—REPORTS UPON INVESTIGATIONS OF DAMAGE BY THE EARTHQUAKE OF 3RD FEBRUARY, 1931, AND SUBSEQUENT SHOCKS.

(*a*) NAPIER.

By A. G. Harris, B.E., A.M.Inst.C.E., Public Works Department.

In making a choice of buildings for individual investigation an endeavour has been made to cover typical examples of the various classes of construction used, and also to cover typical successes and failures in those classes.

The buildings in this area may be divided into the following classes :—

(1) Buildings of wood :
(2) Buildings with brick bearing walls :