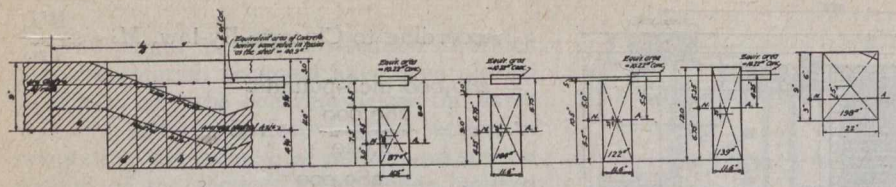

Fig. 6 Fig. 6A Fig. 6B Fig. 6C Fig. 6D Fig. 6E

Summarization of I's: Fig. 6A = 1,111; Fig. 6B = 1,177; Fig. 6C = 1,452; Fig. 6D = 1,933; Fig. 6E = 1,780.

The unit stress in the steel for the total load was 1,847 pounds per square inch, as found above.

This corresponds to a stress in the concrete at 2¾ ins. below the neutral axis of $1{,}847 \times \frac{2{,}800{,}000}{30{,}000{,}000} \times \frac{2\frac{3}{4}}{1\frac{13}{16}} = 262.$

$$\therefore \frac{125{,}000 \times 22.43 \times 12}{x} = 2{,}620 \times 262.$$

whence $x = 49$ or $M_c = \frac{WL}{49}$.

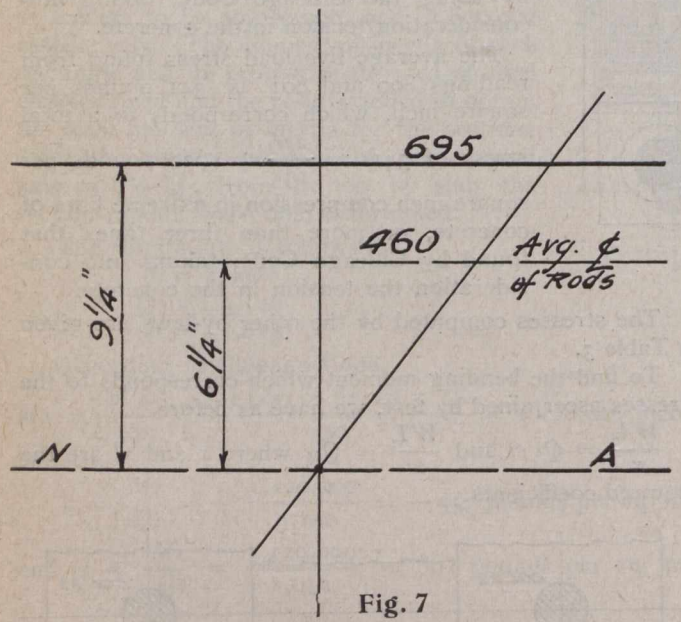

Fig. 7

Considering now the stress in the concrete, which was 622 pounds per square inch for total load, we have.

$$\frac{125{,}000 \times 22.43 \times 12}{x'} = 1{,}410 \times 622$$

whence we find $x' = 38.4$ or $M_c = \frac{WL}{38.4}$.

Taking the average of these two results, we have a moment of $\frac{1}{2}\left(\frac{WL}{49} + \frac{WL}{38.4}\right) = \frac{WL}{44}$ for strip B at centre.

Strip B at Centre Line of Columns

Fig. 9 shows a cross-section through strip B at the centre line of columns indicating the position of the neutral axis as determined from deformation readings.

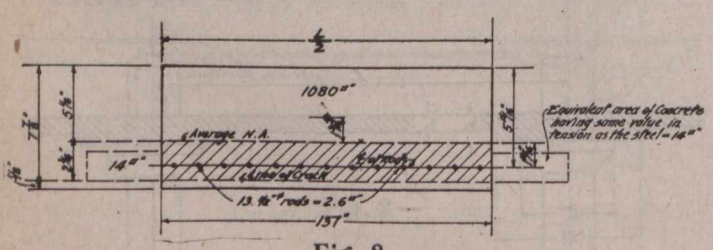

Fig. 8

$I = 7{,}195$ $Q_t = 2{,}620$ $Q_c = 1{,}410$

It was found in the same manner as before that a deformation of 2.5 for the live load would occur at 3.82 ins. above the neutral axis, so that only the concrete below this point could be considered effective. The properties of the section determined on this basis are:—

$I = 4{,}102$
$Q_c = 1{,}346$
$Q_t = 876$

The bending moment according to Chicago By-law is 236,000 inch-pounds.

$$\therefore c = \frac{236{,}000}{1{,}346} = 175\tfrac{1}{2} \text{ pounds per square inch.}$$

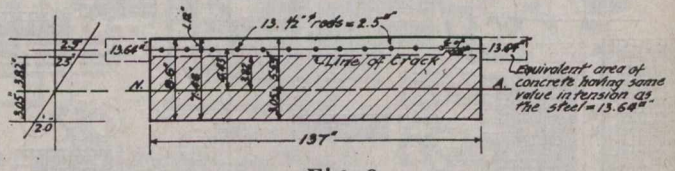

Fig. 9

$I = 4{,}102$ $Q_c = 1{,}346$ $Q_t = 876$

$$c_t = \frac{236{,}000}{876} = 270$$

and $s = 270 \times \frac{30{,}000{,}000}{2{,}800{,}000} = 2{,}890$ pounds per sq. in.

Readings 583 and 784 give $c = 319$ and $s = 3{,}960$ as the stresses for total load.

To find the bending moment coefficient corresponding to these readings we have

$$\frac{111{,}000 \times 21\frac{1}{4} \times 12}{x} = 876 \times 3{,}960 \times \frac{2{,}800{,}000}{30{,}000{,}000}$$

whence $x = 88$,

which gives $M_s = \frac{WL}{88}$ computed from stress in steel, also

$$\frac{111{,}000 \times 21\frac{1}{4} \times 12}{x'} = 1{,}346 \times 319$$

whence $x' = 66$

Code	Strip A	Strip B	Mr	Mb	Ms	Mc	C†	D†	T†	T'†
Chicago	1/2	1/2	-WL/30	+WL/80	-WL/120	+WL/120	.225L	.33L		6 or 1/32
Philadelphia	45/100 L	45/100 L	-WL*/28.4	+WL/94	-WL/155	+WL/149	.2L	.38L	1¾"	
Joint Comm'te	1/2	1/2	-WL/25	+WL/333	-WL/100	+WL/133	.2L	.4L		6 or 1/32

*Mr for steel in straight band is WL/24 and for steel in diagonal band WL/12.
†C, D, T, T' are minimum dimensions allowed by Codes.

Table 1—Comparison of Recommendations of Chicago and Philadelphia and Joint Committee Report

which gives $M_s = \frac{WL}{66}$ computed from stress in concrete,

or an average of $M_s = \frac{WL}{77}$ for strip B at the centre line of columns.

	At edge of Capitol						Strip A at Centre			Strip B at Centre						Strip B at ℄ of Cols.	
Reading No	710	713	717	601	607	614	655	662	663	657	658	659	660	785	786	800	801	784	583
Stress in	Steel	Steel	Steel	Conc	Conc	Conc	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Conc	Conc	Conc	Conc	Steel	Conc
Chicago Code	15900	15040	15570	-658	-592	-635	18000	16080	16080	17880	16350	16350	17880	-326	-390	-326	-390	13270	-357
Philadelphia Code	30620 lbs 10000 lbs	28800 lbs 9400 lbs	29800 lbs 9710 lbs	-695	-626	-671	15310	13630	13630	14890	13610	13610	14890	-302	-361	-302	-361	10270	-307
Joint Comm'te Report	19600	18450	19100	-789	-710	-762	25950	23160	23160	21570	20530	20530	21500	-294	-352	-294	-352	15300	-428
Test	5925	4680	2066	-176	-676	-562	3860	6480	7720	7240	7110	1504	2190	-574	-717	-685	-557	3960	-319

Table 2—Comparison of Stresses for Live and Dead Loads Combined According to Various Codes, with Those Found by Test. Stresses are in Pounds Per Square Inch