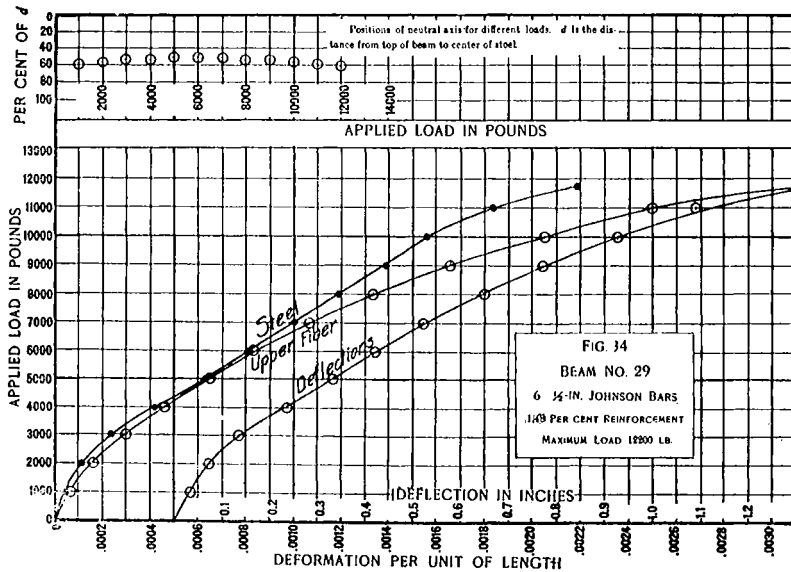
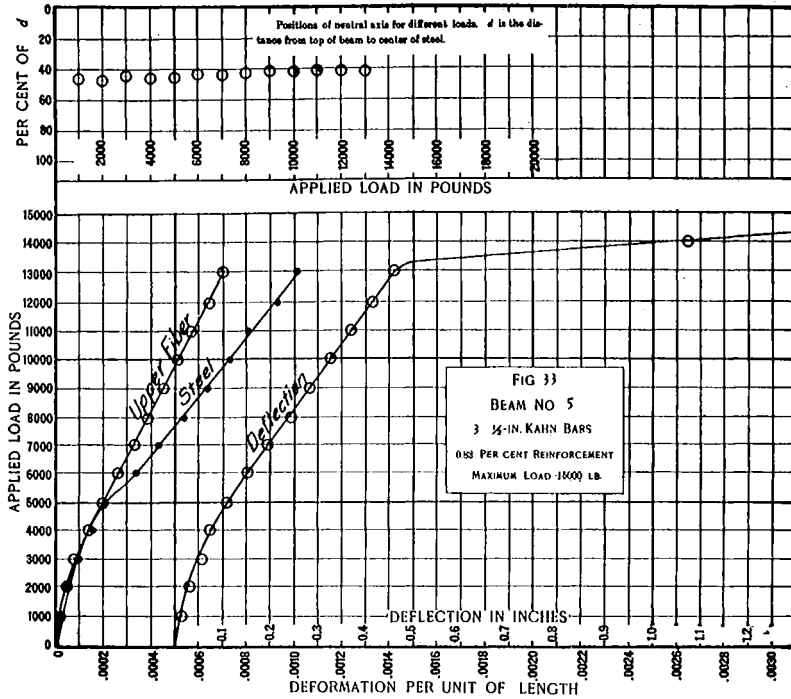
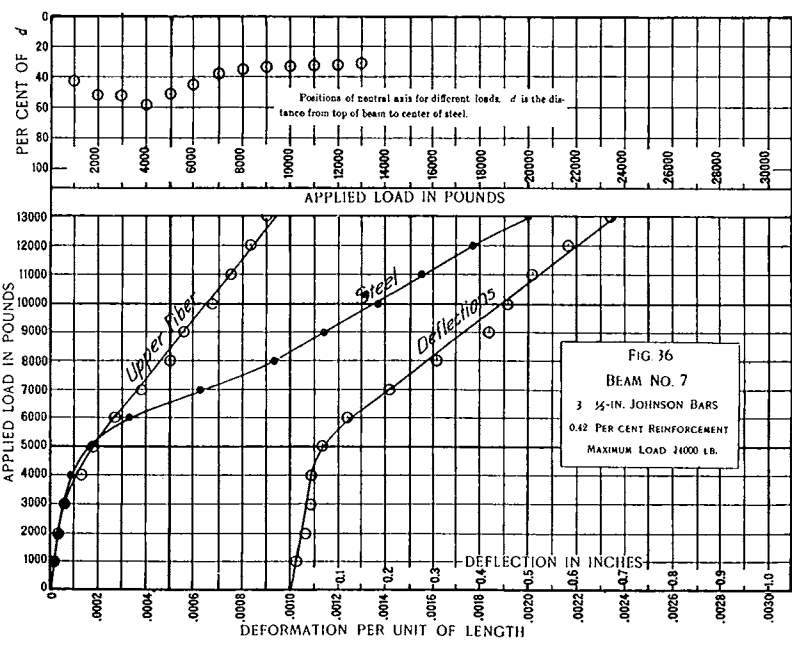
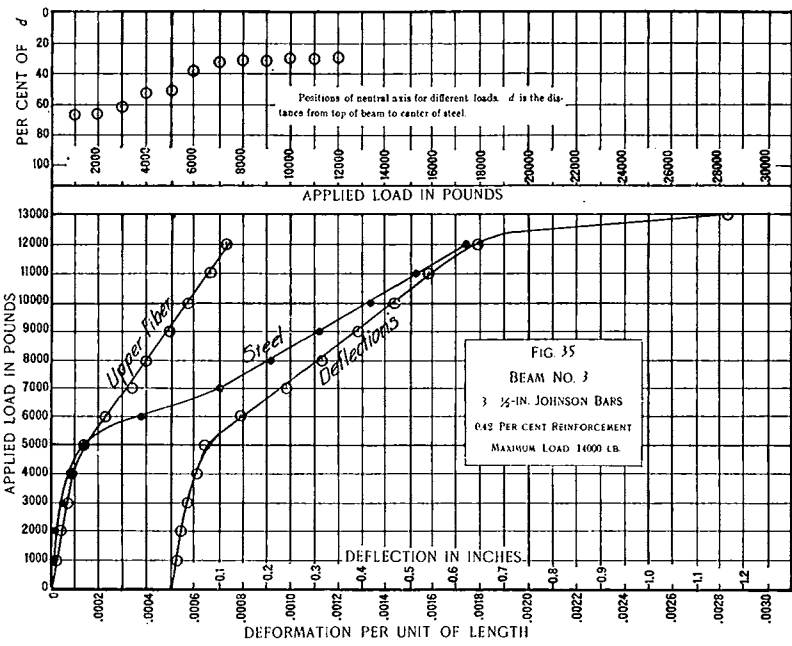
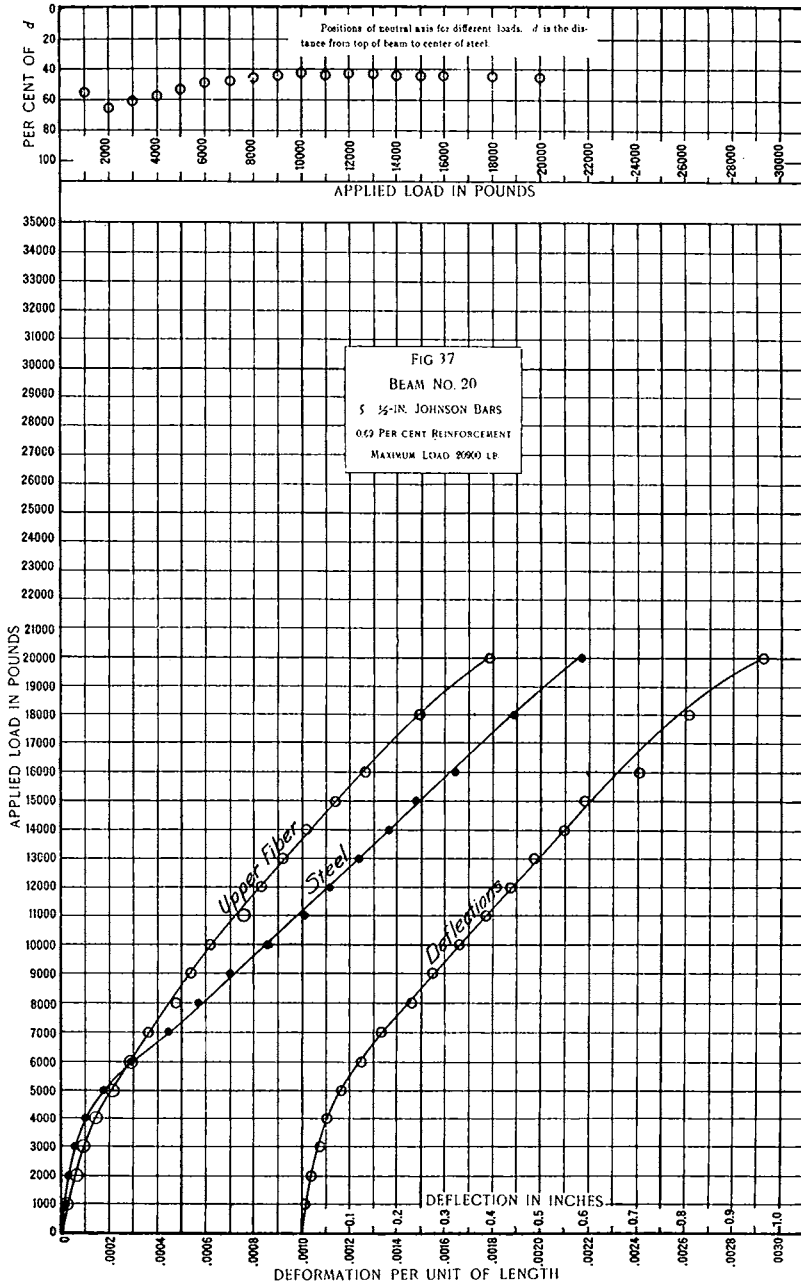
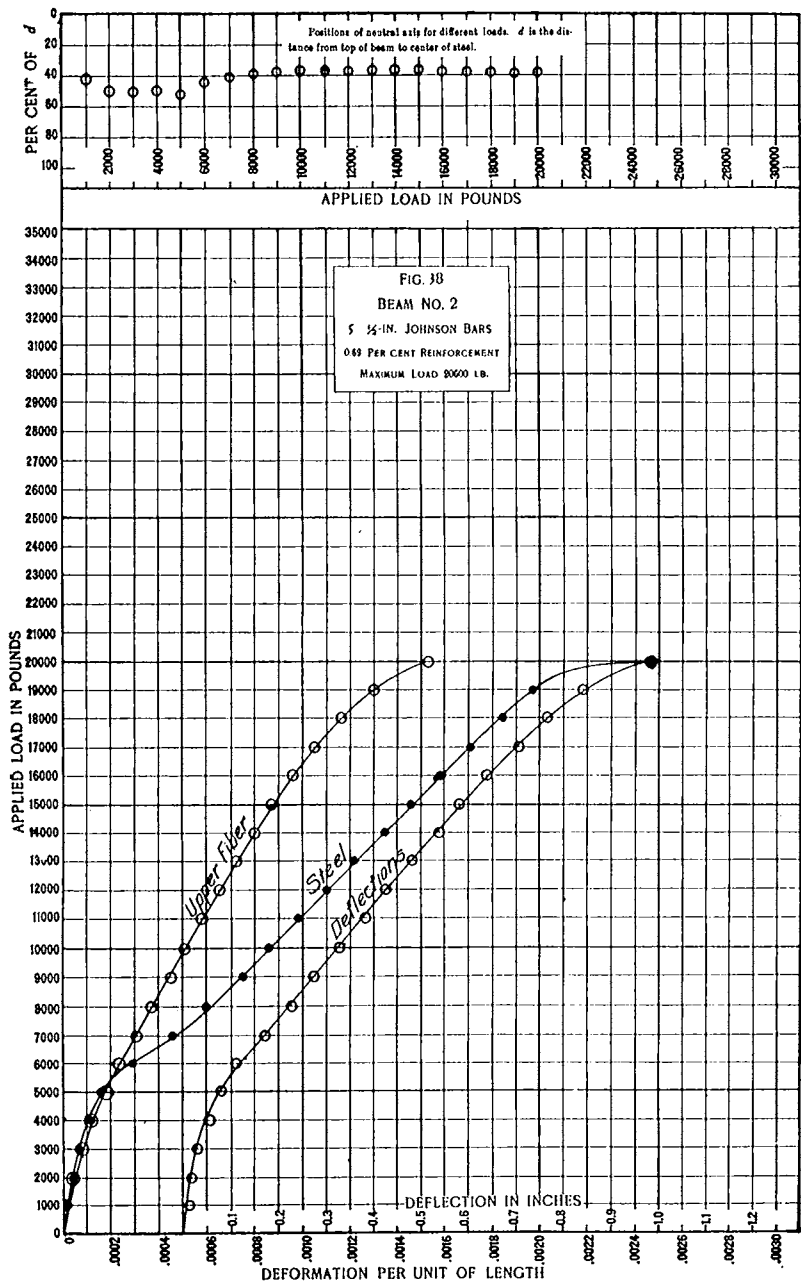
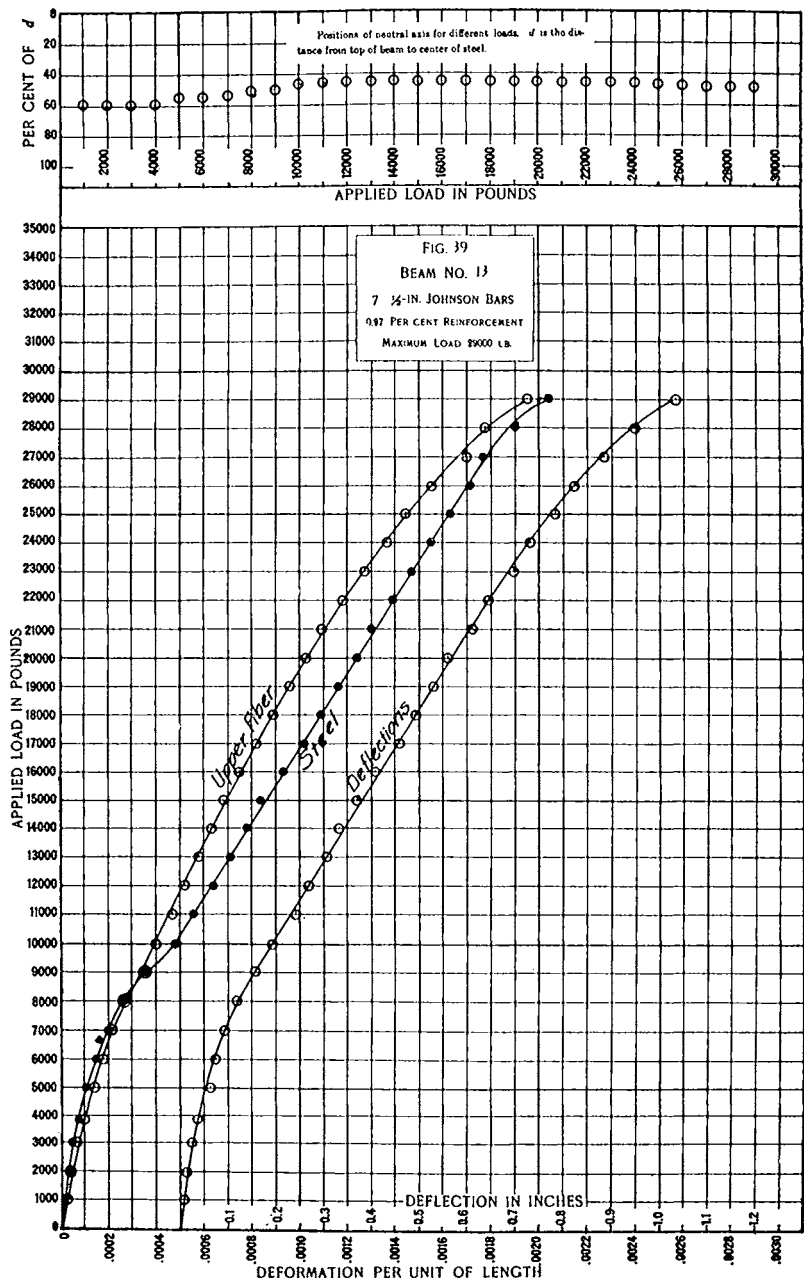


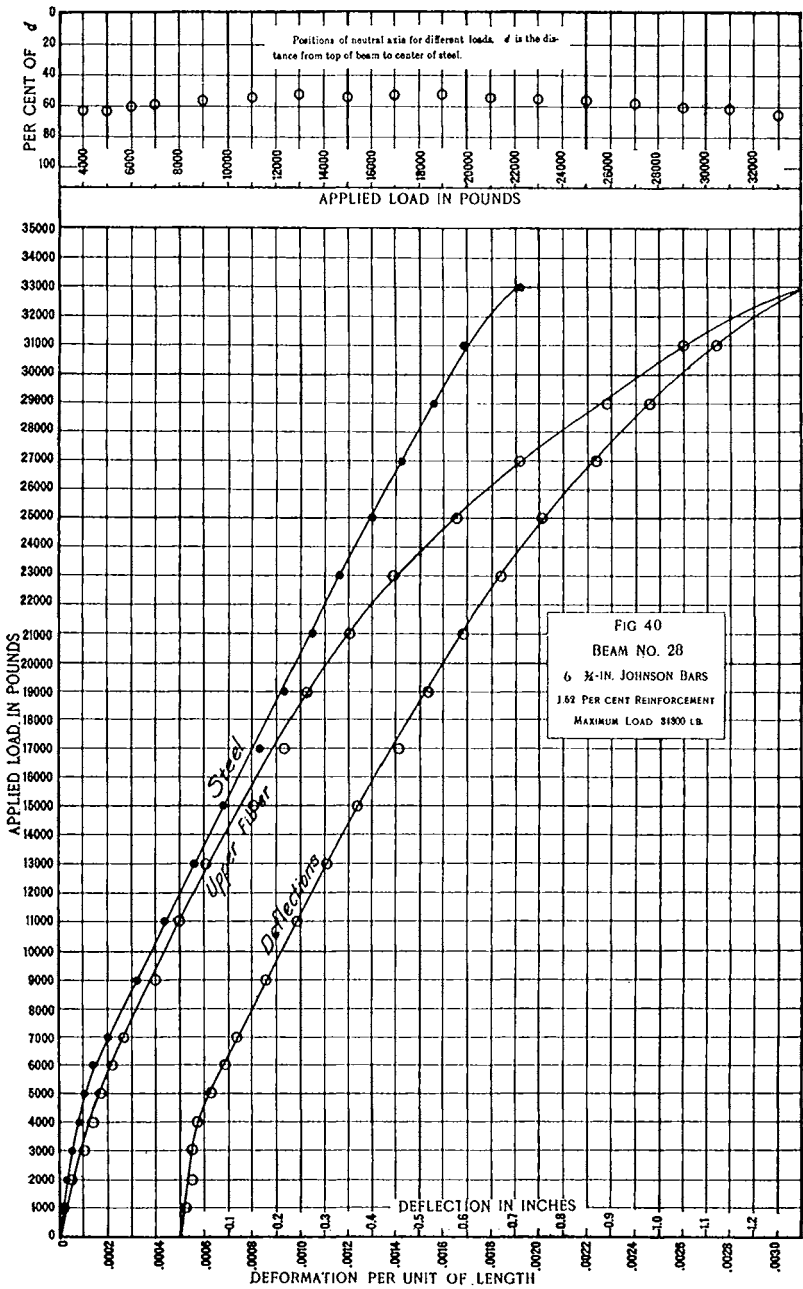


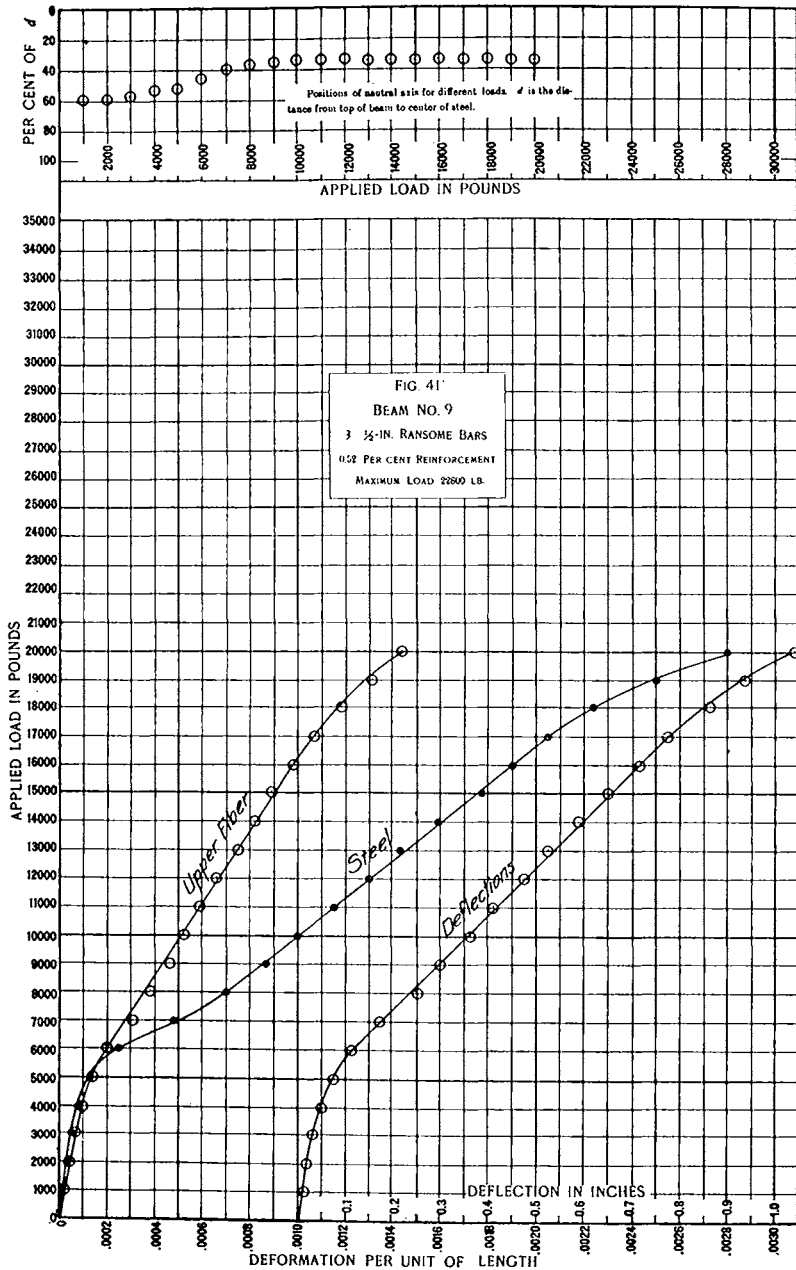














## TABLES

On the following pages are given the original readings and a part of the derived values for beams on which extensometer readings were taken. The first column gives the applied load in pounds and does not include the weight of the beam or of the I-beam used to transfer the load to the one-third points. The column headed "Deflection" does not contain the original readings from the scale or the deflectometer but instead the deflections from the position of zero load. In the four columns headed "Extensometer Reading" are given the original readings for the four extensometers. These readings were taken directly in decimals of an inch. It should be kept in mind that 0 and 0.5 are at the same point on the dial and hence that such readings as .4968 and .0032 are consecutive although at first glance they might not appear to be so. The sub-headings, I, II, III and IV, indicate the four extensometers. Unless otherwise stated in the notes, I and II are always the upper extensometers, and III and IV the lower, I and IV being on one side and II and III on the other. In the two columns headed "Deformation" are given the deformations per unit of length for the fiber indicated in the sub-heading, computed with reference to zero deformation at the first zero of applied load under the assumptions and by the methods explained on page 19. In the remaining column is given such further information regarding apparatus as seems necessary for the discussion of the results and such observations concerning appearance of first visible crack, subsequent development of cracks, and manner of failure as seem pertinent to the purpose of this bulletin.

## BEAM NO. 2.—5 ½-IN. JOHNSON BARS

| Applied Load<br>lb. | Deflection | Extensometer Reading |       |       |       | Deformation |                | Remarks                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------|------------|----------------------|-------|-------|-------|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |            | I                    | II    | III   | IV    | Steel       | Upper<br>Fiber |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 0                   | .000       | .1072                | .3227 | .3325 | .1490 | .00000      | .00000         | Upper contacts 1 in. below top.<br>1 Lower contacts 12 in. below top.<br>4 Gauge length 60½ in.                                                                                                                                                                                                                                                                                                                      |
| 1000                | .013       | .1092                | .3211 | .3350 | .1472 | 2           | 1              |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2000                | .019       | .1121                | .3180 | .3380 | .1441 | 4           | 4              |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3000                | .031       | .1160                | .3139 | .3422 | .1400 | 7           | 8              |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4000                | .056       | .1208                | .3089 | .3480 | .1345 | 12          | 12             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5000                | .081       | .1265                | .3026 | .3555 | .1323 | 19          | 18             | Lower contacts 7 in. below top.<br>It was noticed that cross-bolt of<br>extensometer yoke was touching<br>top of beam.                                                                                                                                                                                                                                                                                               |
| 0                   | .019       | .1130                | .3180 | .3410 | .1513 | 8           | 4              |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 0                   | .019       | .0021                | .0807 | .0228 | .0884 |             |                |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1000                | .038       | .0040                | .0780 | .0260 | .0852 |             |                |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2000                | .050       | .0072                | .0750 | .0292 | .0821 |             |                |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3000                | .063       | .0105                | .0718 | .0325 | .0786 |             |                | Lower contacts 7 in. below top.                                                                                                                                                                                                                                                                                                                                                                                      |
| 4000                | .075       | .0136                | .0686 | .0359 | .0753 |             |                |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5000                | .094       | .0174                | .0647 | .0403 | .0708 |             |                |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 0                   | .019       | .0025                | .0791 | .0254 | .0855 |             |                |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 0                   | .019       | .1623                | .1000 | .0349 | .1579 | .00008      | .00004         |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1000                | .037       | .1650                | .0977 | .0374 | .1558 | 10          | 6              | Lower contacts 12 in. below top.                                                                                                                                                                                                                                                                                                                                                                                     |
| 2000                | .044       | .1680                | .0945 | .0416 | .1527 | 13          | 9              |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3000                | .059       | .1711                | .0912 | .0439 | .1493 | 15          | 12             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4000                | .075       | .1742                | .0880 | .0472 | .1459 | 18          | 15             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 5000                | .088       | .1776                | .0845 | .0510 | .1422 | 21          | 18             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 0                   | .025       | .1633                | .0991 | .0360 | .1569 | 9           | 5              | Lower contacts 12 in. below top.                                                                                                                                                                                                                                                                                                                                                                                     |
| 0                   | .025       | .1442                | .0226 | .0428 | .2407 | .00009      | .00005         |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1000                | .040       | .1468                | .0203 | .0458 | .2383 | 11          | 7              |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2000                | .053       | .1497                | .0172 | .0490 | .2351 | 14          | 9              |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3000                | .065       | .1528                | .0140 | .0524 | .2315 | 17          | 12             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4000                | .078       | .1560                | .0109 | .0558 | .2281 | 19          | 15             | First visible crack 2 in. inside N.<br>load at 9500.                                                                                                                                                                                                                                                                                                                                                                 |
| 5000                | .090       | .1593                | .0075 | .0596 | .2244 | 23          | 18             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 6000                | .119       | .1650                | .0018 | .0675 | .2166 | .00029      | .00023         |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 7000                | .171       | .1760                | .4910 | .0848 | .2004 | 46          | 31             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 8000                | .228       | .1850                | .4818 | .0994 | .1852 | 60          | 37             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 9000                | .275       | .1948                | .4722 | .1137 | .1801 | 75          | 45             | Several cracks visible within mid-<br>dle third 11000-12000.<br>Manner of failure: Vertical cracks<br>through full width of beam every<br>4 to 8 in. of middle third. Load<br>reached 20600 lb. and then<br>dropped slowly. Lower fibers<br>elongated rapidly, accompanied<br>by the rapid widening of several<br>cracks. After considerable<br>further deflection concrete final-<br>ly crushed out at top surface. |
| 10000               | .328       | .2030                | .4636 | .1269 | .1569 | 86          | 51             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 11000               | .384       | .2120                | .4542 | .1401 | .1434 | .00098      | .00058         |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 12000               | .428       | .2207                | .4454 | .1525 | .1310 | 110         | 65             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 13000               | .484       | .2300                | .4361 | .1654 | .1182 | 122         | 72             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 14000               | .540       | .2399                | .4263 | .1792 | .1042 | 135         | 80             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 15000               | .581       | .2489                | .4172 | .1912 | .0923 | 146         | 87             |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 16000               | .640       | .2595                | .4063 | .2051 | .0782 | .00158      | .00096         |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 17000               | .703       | .2705                | .3950 | .2191 | .0640 | 171         | 105            |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 18000               | .765       | .2818                | .3833 | .2336 | .0490 | 184         | 116            |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 19000               | .840       | .2960                | .3686 | .2509 | .0313 | 197         | 130            |                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 20000               | .984       | .3281                | .3353 | .3005 | .4815 | 245         | 153            |                                                                                                                                                                                                                                                                                                                                                                                                                      |