

REINFORCED CONCRETE SLABS.

Live Load—One 12-Ton Engine.

| Clear span. | Effective span. | 1 Ft. Fill. | | 2 Ft. Fill. | | 3 Ft. Fill. | | 4 Ft. Fill. | | 5 Ft. Fill. | | 6 Ft. Fill. | | 7 Ft. Fill. | | 8 Ft. Fill. | | S |
|-------------|-----------------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|------|
| | | D | M | D | M | D | M | D | M | D | M | D | M | D | M | D | M | |
| 2 Feet | 2 ft. 6 in. | 6 | 1387 | 6 | 1465 | 6 | 1293 | 6 | 1085 | 6 | 1022 | 6 | 1027 | 6 | 1035 | 6 | 1068 | 0.23 |
| 3 " | 3 " | 7 | 2038 | 7 | 2192 | 7 | 1865 | 7 | 1746 | 7 | 1728 | 7 | 1755 | 7 | 1819 | 7 | 1899 | 0.33 |
| 4 " | 4 " | 8 | 2757 | 8 | 3010 | 8 | 2650 | 8 | 2550 | 8 | 2480 | 8 | 2671 | 8 | 2808 | 8 | 2968 | 0.43 |
| 5 " | 5 " | 9 | 3903 | 9 | 4355 | 9 | 4035 | 9 | 4020 | 9 | 4170 | 9 | 4405 | 9 | 4705 | 9 | 5083 | 0.55 |
| 6 " | 6 " | 10 | 5780 | 10 | 6700 | 10 | 6150 | 10 | 6220 | 10 | 6480 | 10 | 6840 | 10 | 7277 | 10 | 7830 | 0.65 |
| 7 " | 7 " | 11 | 8300 | 11 | 9700 | 11 | 8835 | 11 | 8930 | 11 | 9385 | 11 | 9850 | 11 | 10480 | 11 | 11320 | 0.70 |
| 8 " | 8 " | 12 | 11730 | 12 | 13650 | 12 | 12535 | 12 | 12830 | 12 | 13685 | 12 | 14580 | 12 | 15525 | 12 | 16770 | 0.89 |
| 9 " | 9 " | 13 | 16000 | 13 | 18750 | 13 | 17240 | 13 | 17805 | 13 | 19000 | 13 | 20000 | 13 | 21325 | 13 | 23115 | 1.01 |
| 10 " | 10 " | 14 | 21000 | 14 | 24750 | 14 | 22535 | 14 | 23505 | 14 | 25000 | 14 | 26500 | 14 | 28225 | 14 | 30475 | 1.12 |
| 11 " | 11 " | 15 | 27000 | 15 | 31750 | 15 | 29240 | 15 | 30510 | 15 | 32500 | 15 | 34500 | 15 | 36925 | 15 | 39975 | 1.26 |
| 12 " | 12 " | 16 | 34000 | 16 | 39750 | 16 | 36240 | 16 | 38010 | 16 | 40500 | 16 | 43000 | 16 | 45925 | 16 | 49475 | 1.44 |
| 13 " | 13 " | 17 | 42000 | 17 | 48750 | 17 | 44240 | 17 | 46510 | 17 | 49500 | 17 | 52500 | 17 | 56425 | 17 | 60475 | 1.68 |
| 14 " | 14 " | 18 | 51000 | 18 | 58750 | 18 | 53240 | 18 | 56010 | 18 | 59500 | 18 | 63000 | 18 | 67425 | 18 | 72475 | 1.88 |
| 15 " | 15 " | 19 | 61000 | 19 | 69750 | 19 | 63240 | 19 | 66510 | 19 | 70500 | 19 | 74500 | 19 | 79425 | 19 | 84975 | 2.02 |
| 16 " | 16 " | 20 | 72000 | 20 | 81750 | 20 | 74240 | 20 | 78010 | 20 | 82500 | 20 | 87000 | 20 | 92425 | 20 | 98475 | 2.09 |
| 17 " | 17 " | 21 | 84000 | 21 | 95750 | 21 | 86240 | 21 | 90510 | 21 | 95500 | 21 | 101000 | 21 | 107425 | 21 | 114475 | 2.24 |
| 18 " | 18 " | 22 | 97000 | 22 | 110750 | 22 | 100240 | 22 | 105010 | 22 | 110500 | 22 | 117000 | 22 | 124425 | 22 | 132475 | |
| 19 " | 19 " | 23 | 111000 | 23 | 127750 | 23 | 115240 | 23 | 121010 | 23 | 127500 | 23 | 135000 | 23 | 143425 | 23 | 152475 | |
| 20 " | 20 " | 24 | 126000 | 24 | 144750 | 24 | 130240 | 24 | 137010 | 24 | 144500 | 24 | 153000 | 24 | 162425 | 24 | 172475 | |

S—Area of steel in sq. in. per ft. of width.

C—Compressive stress in concrete in lbs. per sq. in.

M—Max. Mom. in ft. lbs.

D—Depth of beam in inches.

A variation in the compressive strength of these samples mixed in a proportion one part cement to six of the sample is illustrated by the seven and twenty-eight day tests given:—

Compressive Strength of Gravel Concrete.

| Gravel. | No. | 7 Days, | | 28 Days, | |
|------------------|-----|--------------|--|--------------|--|
| | | lbs. sq. in. | | lbs. sq. in. | |
| Greene Co. | 1 | 625 | | 1,030 | |
| Greene Co. | 2 | 774 | | 1,490 | |
| Greene Co. | 3 | 636 | | 1,170 | |
| Greene Co. | 4 | 475 | | 865 | |
| Greene Co. | 5 | 557 | | 1,195 | |
| Carroll Co. | 1 | 504 | | 1,137 | |
| Story Co. | 1 | 720 | | 1,485 | |
| Story Co. | 2 | 735 | | 1,370 | |
| Story Co. | 3 | 531 | | 1,275 | |
| Emmet Co. | 1 | 940 | | 1,950 | |
| Emmett Co. | 2 | 389 | | 744 | |
| Emmett Co. | 3 | 465 | | 873 | |
| Average | | 612.6 | | 1,215.3 | |

The specification for classes of concrete is referred to in the following paragraph:—

"Measuring and Proportioning:—The proportions of the different classes of concrete shall be carefully maintained by some method of measuring satisfactory to the engineer, the cement being measured as packed by the manufacturers and the aggregate loose. The use of bottomless boxes and square wheelbarrows of uniform size, designed for this purpose, will be accepted as satisfactory methods."

Without going into this subject too much in detail, it is perhaps worth while to include the following specification for the reinforcing steel:—

"Reinforcing Steel:—Except as otherwise specifically stated herein, all reinforcing steel used shall be of such a section as to provide a mechanical bond at frequent intervals and to insure a thorough contact between the steel and concrete. Net sections, sizes and distribution and bonding shall be exactly as shown on the drawings. The transverse bars shall consist of one-half inch round rods placed in pairs as shown on the drawings, and connected by a lattice bar of the required length, punched with five-eighths inch holes, and placed at intervals of three feet. The lattice bars shall be held rigidly to position by blocking to the forms and wiring to the bars it crosses. Medium steel, having an elastic limit not less than 32,000 pounds per square inch shall be used, and shall withstand cold bending equal to twice the diameter of the test piece without fracture. Only steel free from rust, dirt and grease shall be used, and some means shall be provided for cleaning the surface of the steel before placing."

PATENTS.

The following is a list of Canadian patents recently obtained through the agency of Messrs. Ridout & Maybee, 103 Bay Street, Toronto, from whom further particulars may be obtained:—

Antoine H. Imbert, electric rotary furnace; Lyman Melvin Jones, combined side delivery rake and hay tedder; Lyman Melvin Jones and R. H. Verity, lifting device for mower cutter bars; John Taylor and E. W. Buckley, mechanical weft feeling mechanism for looms; John Taylor and E. W. Buckley, mechanical weft feeling mechanism for looms (No. 2); John Taylor and E. W. Buckley, mechanical warp stop motion for looms; Wm. Henderson, stoves; Thomas L. Mullally, portable sectional coverings; Milton E. Shantz, Grate Bars; J. C. Wagg, stone gathering machine; Ernest W. Lee, baker's peel.