age of fuel supply. So far as I know there is no decrease in the actual production of oil, yet there is that ever-decreasing demand for the finer and crude oils. Up till the present there has been no difficulty in obtaining fuel oil, but the price has increased almost fifty per cent. during the past twenty months. It might also be interesting to know that the freight on fuel oil to Saskatchewan is approximately equal to the cost of oil in its home market. Under the same conditions as that of the steam and gas producer plants before mentioned, the oil consumption is approximately .12 of a gallon per unit generated at the switch-board. Taking the price of fuel oil at 12 cents per gallon, this gives a cost of 1.44 cents per unit.

Comparing the three types of prime movers discussed we have:—

Steam, with coal at $7 per ton, 2.1 cents per unit.

Gas, with coal at $8 per ton, 1.8 cents per unit.

Diesel, with oil at 12 cents per gallon, or approximately $27.60 per ton, 1.44 cents per unit.

In concluding the generating part of this paper, I might say that the labor costs are highest for gas engines and lowest for Diesel engines, with steam plant taking a position about midway between the two.

———◆——

ENGLAND'S EXPORT TRADE.

According to the Board of Trade the following are the values of produce and manufactures exported by the United Kingdom to the leading countries and self-governing dominions:—

Germany	£40,362,767
Australia	34,840,701
United States	30,065,806
France	25,585,681
Canada	23,531,311
South Africa	21,420,912
Holland	14,281,668
Belgium	12,193,306
New Zealand	10,390,334

———◆——

GRANITE AND TRAP-ROCK IN CANADA.

The production of granite and trap-rock in 1911, according to returns from forty-seven active firms reporting, and contained in the statistics given in the annual report on the mineral production in Canada, by John McLeish, B.A., was valued at $1,119,865, as compared with a production by thirty-three firms, valued at $739,516, in 1910; showing an increase of $380,349, or 51.4 per cent. There was a particularly large increase in the value of granite used for building purposes and in the production of crushed stone.

Quebec province was again the largest producer, the value of sales in 1911 being $462,678, as compared with $356,257 in 1910. The value of sales in British Columbia in 1911, however, approached very closely to that of Quebec, being $460,851, as against $244,767 in 1910. Ontario produced granite to the value of $131,816 in 1911, as compared with $109,678 in 1910. Both New Brunswick and Nova Scotia showed an increased production, the value of the New Brunswick output being $37,994. Much of the rough stone quarried in New Brunswick, as well as stone imported from Redbeach, Maine, and Mt. Johnston, Que., is worked up into finished monumental and ornamental stone at mills at St. George, the value of the finished product here in 1911 being $86,658.

BRIDGE FLOORS REPLACED WITH CONCRETE

———

MR. L. C. Smith, engineer for the Michigan State Highway Commission, in the fourth biennial report of the commissioners, advises the use of concrete wherever possible in the replacing of floors on old steel or wrought iron bridges, even though this may necessitate the laying of new steel stringers.

This plan has been followed for assumed load specifications and computing stress in truss:

(1) Concentrated wheel load of five tons on area 12 inches by 28 inches on floor slab.

(2) Concentrated wheel load plus weight of slab on two stringers spaced not more than 28 inches apart.

(3) Distributed ten-ton load plus dead floor load on floor beams.

(4) Ten-ton concentrated load tried on each panel joint plus dead load of whole bridge for the trusses.

In no case have concrete floors been recommended where the stress in the steel would be above 17,000 pounds, and in wrought iron above 13,000 pounds.

The following general specifications are used:

Steel.—Steel stringers shall be spaced not more than 28 inches nor less than 24 inches centres.

For panel lengths, from 12½ feet to 14 feet and width of roadway 16 to 18 feet. Eight-inch 18-pound I-beams shall be used for three centre stringers. On each side of these, two 7-inch, 15-pound I-beams, and, in place of side channels, 6-inch 12¼-pound I-beams shall be used at each edge. All stringers shall be long enough to reach two panel lengths, and be laid so as to break joints. Stringers shall be bolted to floor beams securely with one-half inch bolts at each intersection. Stringers shall be connected at ends with two three-eighths inch fish plates 14 inches long and wide enough to fit snugly between flanges. Fish plates shall be bolted with eight one-half inch bolts in each plate. Not more than one-quarter inch, nor less than one-eighth inch shall be allowed between ends of stringers.

All abutment and pier ends of stringers shall be bedded in Portland cement mortar mixed 1:3.

All floor beams, sway bracing stringers and connections shall be coated with two coats of linseed oil paint. Tops of stringers must not be painted.

Forms.—Forms shall be placed between stringers tight up under top flange. Tar or builders' paper must be used on forms to make them tight.

Curb forms shall be securely fastened in place before any concrete is placed.

Reinforcing.—Expanded metal No. 40—3-inch U.S. or Kahn rib metal No. 3 wire reinforcement, having the same area of cross-section per foot width, shall be used. Reinforcing shall be laid with main members, running at right angles to stringers. Ends of reinforcing shall be bent up three inches into curb. Strips shall be securely wired or clipped together. Reinforcing shall rest on top flange of stringers and be not more than one-half inch nor less than one-quarter inch from forms.

Concrete.—Gravel shall be from forty to sixty per cent. pebbles by weight, no stones larger than one-inch. An approved brand of Portland cement shall be used. Concrete shall be mixed in the proportion of one part cement to three parts gravel, wet mix. A batch mixer or very careful hand mixing shall be used.

Concrete shall be spread uniformly 3½ inches thick over tops of stringers. On account of stringers being of