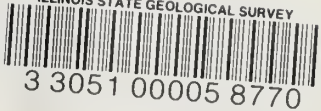



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Urbana, Illinois

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ILLINOIS

INDUSTRIAL MINERALS NOTES

Number 6, July 15, 1957

This issue of Industrial Minerals Notes deals with mineral economics and relates to a comparison of fuels consumption in 1947 and 1954 in three industries whose raw materials are industrial minerals, namely cement, glass products, and brick and hollow tile. The following material is based on nation-wide data and has been calculated from reports of the U. S. Bureau of Census. The information has been brought together as of interest to Illinois industries.

TREND IN FUEL USES IN SELECTED INDUSTRIAL MINERAL PRODUCTS,
1947 AND 1954

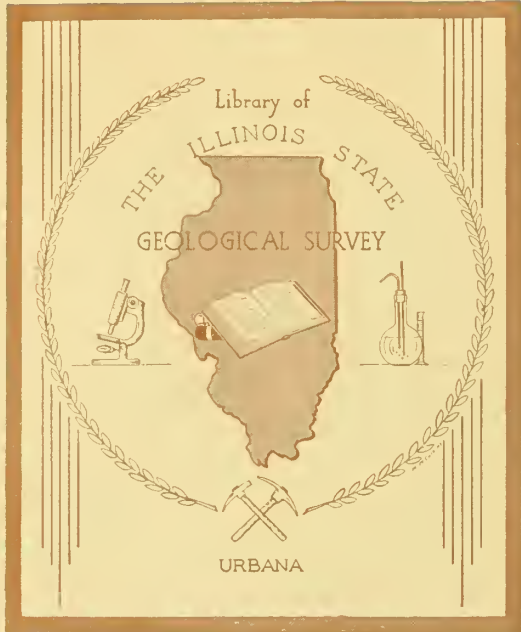
Walter H. Voskuil
Principal Mineral Economist

The Census of Manufacturers, in the years 1947 and 1954, gathered detailed reports on the quantity and cost of fuels and electric power used in manufactures. From the data presented in the Census reports on manufactures, an analysis has been made showing the quantity and cost of each fuel used, the quantity of fuel used per man employed, and the change from 1947 to 1954, the cost of each of the fuels used (expressed in b.t.u.'s), the relation of fuel costs to wages and salaries paid, and the number of kilowatt-hours used per employee and the change from 1947 to 1954. Three industrial mineral products have been selected for analysis -- cement, glass products, and brick and hollow tile.

Fuels Consumption in Cement Manufacture, 1947 and 1954

Cement manufacture is one of the industries which uses a large quantity of fuel relative to the number of persons employed.

Table 1 shows that cement production in 1954 was 43.7 percent greater than in 1947. During the same period, number of employees increased 11.5 percent whereas average incomes increased 56 percent.



Coal, fuel oil, and natural gas are all used as fuels. Coal showed a slight decline, fuel oil showed a modest gain, and natural gas a gain of 77 percent. The over-all gain in fuel use was 17.9 percent, but fuel consumption per barrel of cement declined 18 percent during the 1947 to 1954 interval. The relation of fuel costs to wages and salaries dropped from 63.5 percent in 1947 to 58.3 percent in 1954.

Natural gas, the lowest cost fuel, has shown the most increase in cost from 1947 to 1954.

Electric power used per worker increased 24.5 percent.

Table 1. - NATIONAL TRENDS IN CEMENT MANUFACTURE

| <u>Item</u> | <u>1947</u> | <u>1954</u> | <u>Percent change</u> |
|--|-------------|-------------|-----------------------|
| No. of employees | 35,662 | 39,769 | +11.5 |
| Payroll, \$1,000 | \$98,626 | \$167,659 | +70.0 |
| Average income per employee | \$ 2,766 | \$ 4,216 | +56.0 |
| Fuels used, trillion b.t.u.'s | | | |
| coal | 209.7 | 201.8 | -3.76 <i>-3.76</i> |
| coke | .20 | -- | -- |
| fuel oil | 25.7 | 34.2 | +33.01 |
| gas | 70.7 | 125.2 | +77.12 |
| Total | 306.3 | 361.2 | +17.9 |
| Cost of fuels, \$1,000 | \$62,507 | \$ 97,419 | +56.1 |
| Percent fuel cost of payroll | 63.5 | 58.3 | |
| B.t.u.'s per worker, millions | 8,589 | 9,082 | + 5.7 |
| KW hrs. per worker | 115,641 | 144,007 | +24.5 |
| Fuel costs, cents per million b.t.u.'s | | | |
| coal | 21.42 | 26.15 | +22.1 |
| coke | -- | -- | -- |
| fuel oil | 32.40 | 51.26 | +58.2 |
| gas | 13.07 | 21.66 | +65.7 |
| Barrels of cement produced | 189,470,465 | 272,352,557 | +43.7 |
| B.t.u.'s used per barrel | 1,616,616 | 1,326,180 | -18.0 |
| Average cost per barrel | \$ 1.90 | \$ 2.76 | +45.3 |

Fuel Consumption in Glass Products Manufacture,
1947 and 1954

Glass industries in this report include "flat glass, glass containers, and pressed and blown glassware," as classified by the Census. It does not include "products of purchased glass."

Both employment and fuel consumed declined slightly in the glass making industries in the interval from 1947 to 1954, (table 2.). Consumption of coal and fuel both lost heavily whereas gas gained in consumption. Fuel used per worker in the 1947 to 1954 interval declined slightly. Use of electric power per worker showed a gain of 44.7 percent. Fuel cost changes were varied. Fuel oil remained almost unchanged at a high level; coal gained less than oil and was the lowest cost fuel of the three.

Table 2. - TRENDS IN FUEL CONSUMPTION IN GLASS PRODUCTS MANUFACTURE, 1947 and 1954

| <u>Item</u> | <u>1947</u> | <u>1954</u> | <u>Percent change</u> |
|--|-------------|-------------|-----------------------|
| No. of employees | 116,543 | 115,893 | - .56 |
| Payroll, \$1,000 | \$314,354 | \$487,076 | ↑54.9 |
| Fuels used, trillion b.t.u.'s | | | |
| coal | 30.00 | 18.58 | -38.1 |
| coke | .50 | .50 | |
| fuel oil | 20.98 | 9.01 | -57.1 |
| gas | 100.29 | 121.70 | ↑21.35 |
| Total | 151.77 | 149.79 | - 1.3 |
| Cost of fuels \$1,000 | \$ 44,524 | \$ 53,510 | ↑17.00 |
| Percent fuels cost of payroll | 14.2 | 10.9 | -- |
| B.t.u.'s per worker, millions | 1,302 | 1,284 | - 1.4 |
| KW hrs. per worker | 13,008 | 18,819 | ↑44.7 |
| Fuel costs, cents per million b.t.u.'s | 1 | | |
| coal | 20.84 | 23.83 | ↑14.4 |
| fuel oil | 49.96 | 50.15 | |
| gas | 26.58 | 35.25 | ↑32.62 |

Fuel Consumption in Brick and Hollow Tile Manufacture, 1947 and 1954

The brick and hollow tile industry is engaged primarily in the manufacture of clay building brick, vitrified paving brick, and hollow structural tile.

The use of coal declined sharply from 1947 to 1954 and the use of natural gas increased correspondingly, (table 3.). Fuel oil accounts for less than 15 percent of all fuels used. Cost of fuels increased less than wages and salaries during this period. Gas costs less than coal but the cost is going up at a more rapid rate for gas than for coal. Fuel oil is more than double the cost of both coal and gas.

Fuels used per worker increased about 10 percent during the period whereas the use of electric power increased more than 40 percent.

Table 3. - NATIONAL TRENDS IN FUEL CONSUMPTION IN BRICK AND HOLLOW TILE MANUFACTURE

| <u>Item</u> | <u>1947</u> | <u>1954</u> | <u>Percent change</u> |
|--------------------------------------|-------------|-------------|-----------------------|
| No. of employees | 29,617 | 32,426 | ↑ 9.48 |
| Payroll (\$1,000) wages and salaries | \$69,399 | \$114,740 | ↑65.33 |
| Average payroll | \$ 2,343 | \$ 3,538 | ↑64.4 |
| Fuels used, trillion b.t.u.'s | | | |
| coal | 48.21 | 29.27 | -39.29 |
| coke | .16 | .44 | ↑183.33 |
| fuel oil | 8.95 | 13.93 | ↑55.72 |
| gas | 23.31 | 53.20 | ↑128.26 |

Table 3. (Cont'd)

| <u>Item</u> | <u>1947</u> | <u>1954</u> | <u>Percent change</u> |
|--|-------------|-----------------|-----------------------|
| Total fuels | 80.63 | 96.8 | +20.10 |
| Cost of fuels \$1,000 | \$21,160 | \$29,884 | +41.23 |
| Cost of fuels, cents per million b.t.u.'s | | | |
| coal | 24.14 | 27.95 | +15.8 |
| fuel oil | 51.38 | 56.89 | +10.7 |
| gas | 18.27 | 23.60 | +29.2 |
| Percent fuel cost of payroll | 30.49 | 26.04 | |
| B.t.u.'s per worker, | | 2986 | |
| millions used | 2,722 | 22,986 | + 9.70 |
| KW hrs. used per worker | 8,441 | 11,997 | +42.13 |

