

Oil-Mixed Concrete

New Uses Found for Important Building Material

Concrete as a construction material has attained wide popularity. Nevertheless, it has faults which have rendered it of little value for certain classes of work. Perhaps the most serious of these faults is its porous, absorbent qualities. This is evidenced by the damp appearance of concrete houses during periods of wet weather, and in reservoirs that persist in losing water.

How the Discovery was Made

Until recently it has been impossible to produce a concrete mixture that would not absorb moisture. While carrying on experiments with a view to obtaining a non-absorbent, dustless road material, an engineer, Mr. L. W. Page, found that when a heavy, mineral residual oil was mixed with Portland cement paste, it entirely disappeared in the mixture, and, furthermore, it did not separate from the other ingredients after the cement had hardened. The possibilities of oil-cement mixtures for waterproofing were recognized, and further extensive experiments were carried out in order to ascertain the physical qualities of concrete, to which varying quantities of oils had been added. The results are, briefly, these:

(1) Concrete containing oil has been demonstrated to be damp-proof.

(2) The admixture of oil does not affect the tensile strength of the concrete, where the mixture consists of one part of cement to three of sand, with the oil added, not to exceed 10 per cent. of the weight of the cement used.

(3) The compressive strength of the concrete suffers to a slight extent where oil is used in the mixture.

(4) The bond of oil concrete to plain steel reinforcement is much less effective, than where the oil is left out. In the cases where deformed steel or wire mesh was used, however, the bonding was found to be satisfactory.

(5) Petroleum residuum oils which conformed to somewhat scientific specifications were found to be the most suitable for this class of work, and considerable extra care is necessary in the mixing of the concrete. In short, the results of the experiments go to show that the use of oil in concrete has enlarged the field of usefulness of one of the most important building materials. Such structures as basement floors and walls, cisterns, silos, reservoirs, roofs and concrete blocks can, in this way, be rendered damp-proof at a comparatively trifling expense.

Cities, like men, have careers, which to a great extent are determined by environment and to a great extent by the innate energy and the habitual ethical standards of their inhabitants. The city can no more escape from the penalties of early heedlessness than a man can remove from his life the scars left by recklessness and wickedness in his youth.—*Deos F. Wilcox.*

Large National Forest Timber Sale

How Timber is Disposed of from National Reserves in the United States

The United States Forest Service has recently made a sale of 800 million feet of timber on the Sierra National Forest, California. Such large and long-time sales of national forest timber as that to the California company are a new development in the Forest Service. Great bodies of mature but inaccessible timber can be put on the market only if sale contracts are let on terms which will justify a very heavy initial investment in transportation facilities. In entering into such contracts, however, special safeguards to protect the public against monopoly and to prevent an undue speculative profit are employed. To open up this area, will require the construction of 70 miles of logging railway, which will also place on the market a large amount of national forest timber not included in this sale. The company is given a cutting period of 22 years to remove the timber, and a readjustment of stumpage prices every five years, is provided for. Brush will be so disposed of as to minimize the fire danger and seed trees will be left to ensure a future crop. The adoption of this policy of wise use will greatly increase the forest revenues and will, in the long run, leave the forest in better shape than before. For several years the Forest Service has been selling in the neighbourhood of a million dollars worth of National Forest stumpage per year, but this combined with what is cut for free use is only about one-eighth of what might be cut without reducing the permanent stock of the forests.

The foregoing indicates the profits that will accrue to Canada when it is possible to make similar sales of timber in the areas that have been segregated as forest reserves.

USE OF SAWMILL REFUSE IN GAS PRODUCERS

It Prevents Clogging with Tar as in the Case of Anthracite-Burning Plants and Produces a Gas of Much Higher Efficiency

In a recent number of an engineering publication an engineer gives his experiences in using different kinds of fuel in a gas producer plant of 840 h.p. capacity. At first, various kinds of anthracite were used, but had to be discarded on account of clogging the whole system of pipes and engines with tar. Coke was next tried, but was found unsatisfactory, both because a lower quality of gas was produced—*from 80 to 110 B. t. u.*, as compared with 125 B. t. u. for the gas generated from anthracite—and also because the producers filled up with ash which fused, causing cavities that could not be poked out.

It was noticed when burning coke

that the quality of the gas was improved by feeding in barrel staves. This led to the use of sawmill refuse as a fuel. The material used was "cypress hog," consisting of about 50 per cent. of chips discharged from the "hog"—a machine used to destroy sawmill refuse. The moisture content of these chips ranged from 30 to 55 per cent. From this fuel, a gas ranging from 130 to 135 B. t. u. was obtained. When "pine hog" was used, a gas showing 161 B. t. u. was produced.

The quality of the gas was found to be much more uniform than when the other fuels were used and no trouble was experienced with clogging from tar or carbon deposits. As a matter of fact, the dry scrubber, found to be necessary with the other fuels mentioned, was discarded and the tar extractor is only occasionally needed.

Utilization of By-Products An Important Feature of Modern Industry

By-products are a very important factor in modern industry. The old practice of discharging industrial by-products into the nearest stream, is not only a disgusting one, but it is exceedingly unprofitable as well. The modern manufacturer seeking for increased dividends looks about him for means to use his waste materials.

For example; the refuse of the oil refinery is converted into perfumes, flavouring extracts and mineral oils. The slag of iron furnaces is utilized as ballast on railroads, or is converted into paving stones, slag-brick or cement. The by-products of the meat-packing industry are so turned to account as to actually pay for converting the animals into food. The blood is transformed into albumen for bleaching, the offal into fertilizers, the hoofs into glue, the horns into buttons, knife-handles, etc. The hooves become ivory and gelatine, the hair is made into mattresses and felting, and the various fats into butterine, oleomargarine, etc. The by-products from the coking of coal may be transformed into gas for power, ammonia for refrigeration, ammonium sulphate for fertilizers, pitch for paving, roofing and as a binder for coal briquettes, carbolic acid, benzol, benzine, lubricating and other oils and aniline dyes. Recently too, a European forestry engineer has made the boast that he can utilize every particle of the tree but the rustle of the leaves.

More and more will be the industry of the future seek to prevent waste. Competition demands it. Common sense demands it. "Industrial wastes" must become an obsolete term.

The lack of adjustment between city and country must be remedied, but the remedies lie in fundamental processes and not in the treatment of symptoms. Undoubtedly very much can be done to even out the economic situation and the distribution of population; and this needs careful and continuous study by commissioners or other agencies created for the purpose.—*Dr. L. H. Bailey.*

Disposal of Coal Lands

Leasehold System Superior to Granting Lands in Fee Simple

The coal areas in Nova Scotia, Manitoba, Saskatchewan and Alberta, are, at the present time, disposed of under a leasehold system. From the standpoint of conservation this is an ideal system and it would be a deplorable mistake if it were changed in any of the above mentioned provinces.

The advantages of a leasehold system are as follows:—

1. The government obtains a revenue from every ton of coal produced.

2. The government retains a right to the coal areas. This would not be the case if they were disposed of fee simple.

3. There is less likelihood of conflict between surface rights and coal rights.

4. As the leases are given for immediate development, it is not possible for private interests to hold coal lands for speculative purposes.

5. The government has the power to insert clauses in all leases for the purpose of preventing wasteful mining operations and also requiring the operators to give complete information relating to the work.

Farm Drainage

Something About Its Cost and Its Advantages

Thorough under drainage may cost from \$20 to \$40 per acre but it will pay for itself in from one to three years because:—

1.—Land is ready for seeding earlier in the spring.

2.—The soil is warmer in the early spring. The seed, therefore, germinates more promptly and begins a healthy growth at once.

3.—There is no drowning out of crops due to heavy and continued rains.

4.—Fertilizers are not lost by surface washing.

5.—More air circulates through drained than through undrained soils, and all crops require pure air for their best growth.

6.—Roots of plants go deeper in drained than in undrained lands. This not only gives them greater feeding range, but makes them more drought resistant, because they are nearer the water line in dry seasons.

7.—Frosts do less injury to crops. The drains make it possible to get better catches of grasses and clovers and minimize the losses from late spring and early fall frosts.

8.—Drained land is more easily worked than undrained. The cost of man-power, horse-power and machinery is thus materially reduced.—*Central Experimental Farm Bulletin.*