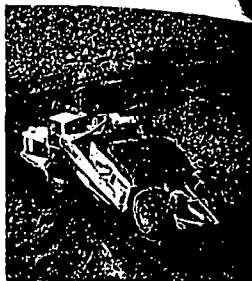




INDUSTRIAL LIFT TRUCK is sometimes used in small plants to transfer coal directly from outdoor storage to firing units.



BULLDOZER mounted on a crawler tractor



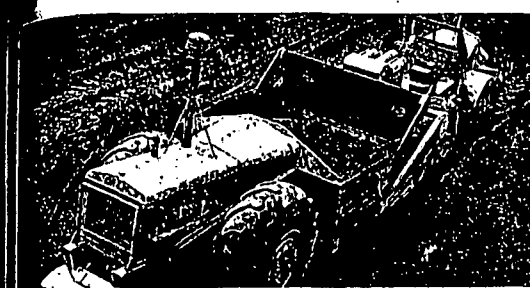
SCRAPER with rubber-tired prime mover

MOBILE EQUIPMENT

Use of mobile equipment for coal stockpiling has grown enormously in the past 20 years. Reasons are: (1) suitability for building layered, compacted piles (2) adaptability to various site conditions and changes (3) relatively modest first cost (4) possibilities of using equipment for other purposes, such as snow clearing, etc. To the original crawler-tractor bulldozer has been added an array of

crawler and rubber-tired equipment. With either crawler or rubber-tired tractor, the bulldozer fits best for relatively modest production rates on shorter hauls, say up to about 300 ft. Adding wings to the dozer blade raises capacity per push. On large piles, bulldozers are used for dressing, cleanup.

Pulling rubber-tired carry-type scrapers extends the economical work range of tractors. Units of this class can pick up from 10 to 20 tons of coal and haul it well over 1000 feet at relatively low cost (POWER, Aug 1945, p 88). For larger stockpiles (say, over



TWO-ENGINE SCRAPER, rubber-tired and self-loading, fits best in large operations

10,000 tons with piling and reclaiming demands of more than 150 tph) there is now a 2-engine scraper (POWER, Jan 1953, pp 94-95). One engine powers scraper wheels, and the other the tractor-drive wheels.

Selecting mobile equipment thus depends on an economic comparison of the various units in relation to the distances involved and the hourly production rates required. The operation is always much the same. For moving coal out to storage the starting point is a "cushion" pile from which bulldozer or scraper can take its load. (Scrapers

are also loaded from overhead hoppers for quicker filling.) The cushion is formed in any one of a variety of ways by the conveying equipment working out of the unloading point.

Coal is spread on the pile in thin layers and the normal traffic of mobile units usually proves adequate for compacting. If not, additional trips can be made just for compacting. In some cases, weighted rollers have been used, but this seems unnecessary. In reclaiming operations, the bulldozer or scraper usually unloads to a hopper or pit feeding conveying equipment.



HOPPER LOADING fills scrapers quicker than they can self-load, is sometimes used in larger stockpiling operations

For the outdoor stockpile: fixed and mobile...

Coal storage may be divided into two types according to purpose: live, or active, storage from which firing equipment feeds directly, and dead or reserve storage to guard against delays in shipments, etc. Usually, live storage is under cover and reserve storage is outdoors. But in some plants, one storage, covered or outdoor, does both jobs.

So on this pair of pages, and the next, let's look first at outdoor storage, keeping in mind that while it's usually reserve storage it may be live storage as well. That's true in many smaller plants, which may have outdoor storage under a rail-siding trestle or in some corner of the plant yard where trucks dump deliveries. In such cases, and others, industrial lift trucks with scoops (photo above) or specialized motor loaders are used to bring coal from the pile directly into ground-floor boiler rooms.

Stockpiling Equipment. When it comes to outdoor stockpiling, a tremendous variety of means is available. But they break down into two broad classes: fixed and mobile. Perhaps most widely used of the fixed group are drag scrapers. As sketched and discussed at the right, drag scrapers can be adapted to a wide variety of site conditions.

Locomotive cranes, and other types, fitted with clamshell buckets, are used for stockpiling. These can pile and reclaim only a limited distance either side of the track, but track can be looped or paralleled to fit many ground plans. For large operations, gantry or bridge cranes are used, spanning the distance between paralleled sets of tracks and carrying one or more trolleys with clamshell buckets. Such equip-

ment often handles unloading from barges and ships, or railroad cars, as well as stocking for storage.

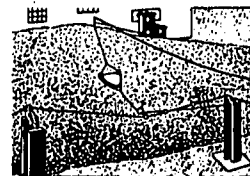
In recent years, use of mobile equipment has grown rapidly. In this group we have what are primarily earth-moving machines—tractors, bulldozers, scrapers, etc.—adapted to handling coal. All they need is an initial pile to work from and a point to reclaim to, both of which are normally provided by the equipment for unloading coal and moving it directly into the plant. Thus mobile methods call for no fixed structures and give a high degree of flexibility in utilizing available ground space.

Type of equipment selected for any given installation will depend on a great many factors, an important one being first cost. The fact that coal-handling equipment is frequently used just one shift per day makes it desirable to keep investment down. But experience shows it pays to mechanize to keep down labor costs, so the trick is to secure the best balance between first costs and operating costs.

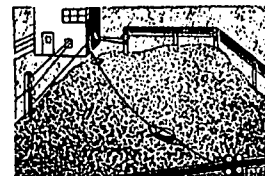
Storage Procedure. Where outdoor storage serves as a reserve, normal practice is to take part of incoming shipments directly into storage within the plant and divert a portion to the outdoor pile. As needed, reclaimed coal is routed into the plant. How much transfer between outdoor and indoor storage there is, and how often stockpile coal is reclaimed depends on the nature of the coal and its storing qualities, also of pile in relation to plant use, etc.

Regardless of equipment used, economical and safe storage calls for know-how. See next spread for the methods.

...equipment meets varying site needs, but...

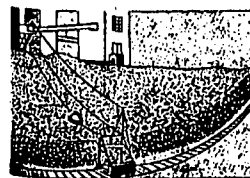


DRAG SCRAPER on back post and bridge

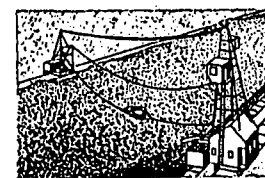


MONORAIL and trolley moves tail pulley

DRAG-SCRAPER LAYOUTS



RADIAL SETUP: Back post moves on track



PARALLEL, 2-tower layout for large pile

Simplest drag scraper has fixed back posts. Cable from scraper drive, near head post, passes over one head block, out to scraper bucket, then to tail block and back to second head block and drive. To build pile, bucket works out from initial pile near head post; to reclaim, the bucket is reversed.

Back post height depends on storage depth and distance hauled. As a general rule, back posts run 8 ft tall for 15- to 20-ft storage depth. In this layout, tail block is shifted by hand.

For larger piles and longer hauls, tail blocks are heavier and easier shifting becomes important. One scheme uses a monorail and trolley, with fixed back posts. But in most larger installations, some form of mobile tower is used, often on a radial track. Towers have outriggers and rail clamps, may be shifted manually or may be motorized.

Fully mobile towers have propulsion motors and brakes controlled from operator's cab; two may be used in parallel layout as sketched. For drag-scraper details, see POWER, May 1946, pp 66-69, and July 1946, pp 74-75.