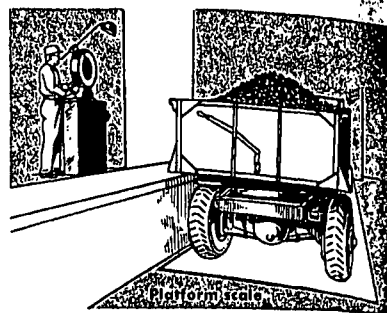
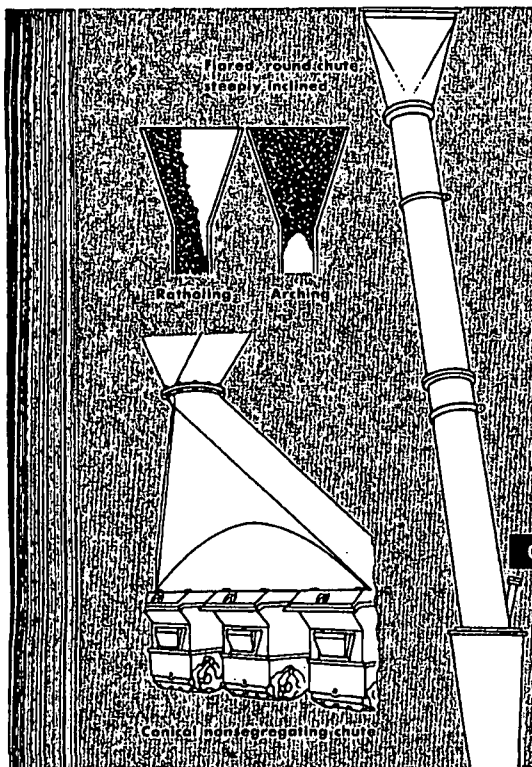




COAL IS WEIGHED AS RECEIVED, DURING...

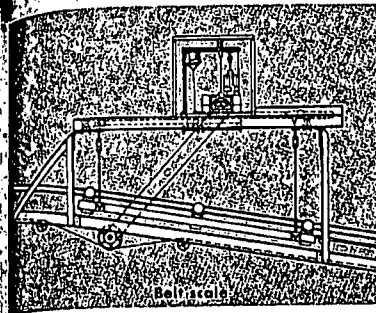
With fuel a major cost item, keeping track of quantity and quality is important. Total coal received may be weighed at unloading point or somewhere in the handling system, or coal going to individual boilers may be weighed at final handling step. It often pays to do both.

CHUTE DESIGN FOR GOOD FLOW

Ratholing and arching can be particularly troublesome at the final handling step—but proper design of bunkers, chutes and hoppers can lick them. Chutes, like the one at left, should be steeply inclined, preferably round or oval, and should flare in direction of flow (chute shown is 18-in. diameter at top and

22-in. at bottom). There should be no projections into the flow system, and it is desirable to use corrosion- and abrasion-resistant materials to keep the coefficient of friction a minimum.

To avoid segregation in firing-equipment hoppers, the special conical-design chute, left, is often employed.

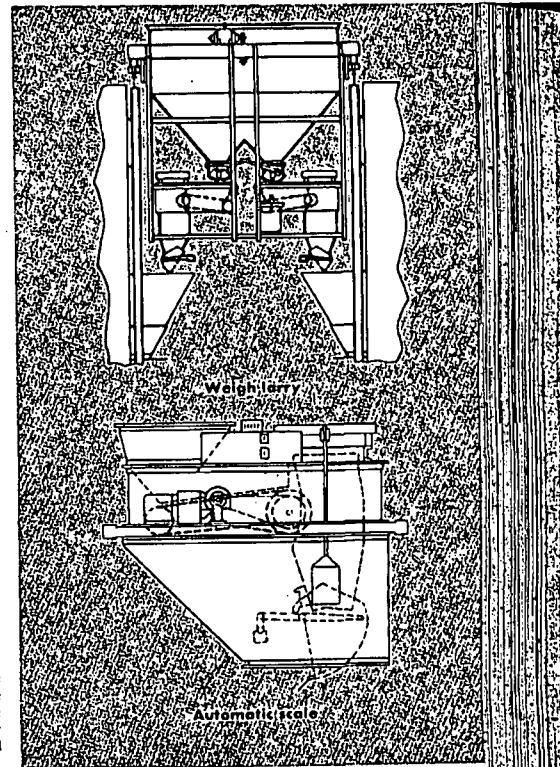


HANDLING, OR AS DISTRIBUTED

Track scales, often automatic, weigh coal coming in by rail. Truck deliveries may be checked by familiar platform scale, above, left. Weighing devices are built into unloading equipment—rotary car dumpers, feeders, etc.—and scales often installed between receiving hopper and conveyor.

Coal is weighed in transit, also. In the belt scale, above, the weigh beam connects to a suspended section of the carrying run. An integrator relates running weights and belt travel to record amount of coal being handled.

For weighing coal to each boiler, the time-honored larry still finds use. Suspended from overhead rails or running on floor tracks, it is basically a means of distributing coal. Drive may be by hand or motor. When weighing equipment is added to the basic larry, it may be manual or automatic. Basic element of many modern systems is an automatic scale of general type illustrated, right. Such units are accurate to about 0.5% under average conditions. One shown has multiple-scale lever system with weight carrier and counter to record weighing of preset amounts.



The final handling step, of which weighing is ... often a part, is important to good operation

In the final handling stage—from live storage to firing equipment—conveying equipment just described is sometimes used, to feed any firing unit from any bunker section, or to transfer coal from one bunker section to another. But in most plants, discharge from bunkers is handled by chutes. Apparently simple, chutes can give rise to flow troubles unless properly designed. Recent studies (Powar, June 1953, p 92; Aug 1945, p 70) yield practical tips.

Chute Design. Diagrams and caption above show some features of good practice. Also, chutes should change direction gradually, with, if possible, a *breakaway*, or larger-area section, to give coal a chance to realign itself. Where two streams of coal meet, keep angle of convergence to a minimum.

Avoid constrictions, cramped layouts.

Segregation. In talking about storage, we stressed the need for avoiding segregation—the tendency of fine and coarse particles to go their separate ways. This same problem crops up between storage and firing units. How serious it is depends on how much segregation the handling system produces, and on the firing equipment. Segregation can cause size of coal fed to pulverizers to change from minute to minute. Usually more serious is the effect on stokers, where segregation that reaches the fuel bed sets up big differences in resistance to air flow and an extremely spotty fire. First step, of course, is to avoid, if possible, handling-system conditions that cause segregation. Final answer, however,

seems to be some form of special non-segregating chute.

Checking Coal. A frequent part of in-plant handling is keeping tabs on quantity and quality of coal fired. Weighing, of feed to individual boilers or of total receipts, is outlined briefly above, with sketches of typical setups. In addition, there are measuring devices, working on volumetric principles. One has a vane or helix that projects down into the center of a spout and records movement of coal past it on a meter calibrated to read in pounds. Another employs an endless chain instead of a vane. Similar volumetric principle is used when revolution counters are put on stoker shafts and pulverizer feeders. These serve well for a rough check on unit consumption.

KEEPING TABS ON COAL

Just as scales check coal quantity, sampling for analysis keeps tabs on quality. Process of reducing a gross sample by hand quartering and riffling can be eliminated by using an automatic sampler. Unit illustrated (far right) has an additional splitter: it can deliver the normal 5, 10 or 15% sample, or a faster-worked 5% sample of anyone of them.

As we've seen, we also want to keep tabs on coal flow and level in bins, silos, bunkers, etc. This applies equally to the final handling stage, where we want to check flow and level in chutes and hoppers. Two units designed for the job appeared on p 87, another is shown, right. It has a stainless-steel sensing element, which is said to resist buildup of dust and wet coal. Acting through a spherical pivot and seal, the probe operates a microswitch.

