

TESTS ON THE COMPARATIVE FRIABILITY OF  
ILLINOIS COALS AND THEIR PRAC-  
TICAL APPLICATION

ABSTRACT

L. A. MYLINS, UNIVERSITY OF ILLINOIS

PROBLEM

The comparative friability of Illinois coals refers to the comparative tendency among them to produce fines or breakage or degradation products under like conditions. In mining and marketing coal the excessive handling needed shatters some coals more than others. Commercially this is of great importance, since in general a reduction in size or an increase

in fines in the coal means a distinct loss in value. The problem, therefore, was to test Illinois coals from the different districts, under varying conditions, to discover any laws governing this breakage, and to establish some standard of relative friability by which the reduction in market value due to degradation might be impartially estimated.

#### PROCEDURE

The procedure involved a search of literature on the subject and a study of any methods and apparatus which had been used previously. After testing some of these methods they were rejected as unsuited to the problem, and new apparatus devised.

A drop test machine was constructed, in which a box filled with 50-100 pounds of the coal to be tested and provided with a gate on the bottom is elevated to any height up to ten feet above the floor.

The gate is opened suddenly and the coal falls to the floor, which may be wooden, steel or concrete. By screening this coal through a standard set of screens the breakage of the larger sizes into the smaller is determined quantitatively. A great deal of care is necessary in manipulation to secure results which are in agreement.

#### RESULTS

The results have shown a surprising individuality among different coals in regard to their comparative friability. It seems possible to give definite coal of definite size a fixed comparative friability factor. The difference among Illinois bituminous coals in themselves is about as great as between anthracite and the least friable of the Illinois coals. A great difference was noted as to the material of the floor on which the falling coal struck. Steel and concrete causing much more breakage than wooden floors or bins. The size of the coal and the amount of moisture present in the coal are other important factors. For example, it was found possible to place coal in water for a minute or two and greatly reduce the amount of breakage.

## FUTURE WORK

Further testing work is necessary to definitely fix additional points on the curves that are being plotted. The work should be extended to show the effects of weathering, of handling in larger or smaller lots, and from pressure, etc., in passing through bins and stock piles. Finally, it is hoped to deduce formulae by which breakage can be calculated for the actual conditions of commerce.

---