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Suggestions on the Storage of
Soft Coal



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Suggestions on the Storage of Soft Coal

It is apparent that if consumers are to be certain of a continuous supply of fuel throughout the year, a large part of the coal needed must be stored during the spring and summer months. To the householder, the storage of a year's supply of coal does not ordinarily present any difficulties, but the losses which may take place in large quantities of stored soft coal must be considered by the users of large amounts.

These losses are due to (1) loss of heating value on account of oxidation of combustible portions of the coal; (2) slacking or breaking up of the coal into fine particles which in many cases cannot be burned efficiently; and (3) spontaneous combustion.

LOSS IN HEATING VALUE

Experiments made at the University of Illinois indicate that such coals as are found in Illinois and neighboring states are not affected seriously during storage from the standpoint of weight and heating value. The loss of heating value was found to be most rapid immediately after mining, on account of the exposure of the freshly broken surfaces, and for the coals tested averaged about 1 per cent for the first week. For the same coals, the loss of heating value averaged $3\frac{1}{2}$ per cent for the first year of storage, although in some instances the loss was as high as 5 per cent in a year. This loss in heating value, due to slow oxidation, takes place in all stored soft coal except that stored under water.

LOSS DUE TO SLACKING

The losses due to slacking and spontaneous combustion of stored coal are of much more importance than the loss of heating value. This is especially true in the case of Iowa coals which slack rapidly when stored out of doors. The loss due to slacking cannot be expressed in percentage, as this loss will vary with

individual plants, depending upon how effectively the dust and fine particles can be burned. The losses due to slacking can be minimized by storing a larger size of coal than is to be burned. In cases of most Iowa coals it seems to be the general experience that storage under cover, so as to avoid alternate wetting and drying, also is a factor in reducing slacking. Many users believe, from experience, that coal stored under cover should be dry when stored, to prevent slacking in the pile. Storage of coal under water will prevent slacking to a large extent, as well as preventing any losses due to fire. This form of storage is used by one of the largest users of steam coal in the state.

SPONTANEOUS COMBUSTION

Spontaneous combustion is caused by slow oxidation of coal in an air supply sufficient to support oxidation but insufficient to conduct away the heat generated. While this oxidation takes place in all stored coal (except that stored under water) it is usually only in large piles where the heat cannot get away that any heating is noticed. Dust or finely crushed coal oxidizes very readily on account of the large surface exposed. Fine coal is therefore a dangerous form of coal for storage in large quantities, especially if mixed with lumps which allow access of air to the finer particles in the interior of the pile. Alternate wetting and drying affect spontaneous combustion, especially with Iowa coal, by promoting slacking and thus increasing the amount of fine coal. Storage near a boiler or other outside source of heat should be avoided, as the danger of spontaneous combustion is increased by even moderate increases of temperature.

SUGGESTIONS ON STORAGE

Do not pile Iowa screened lump coal over 8 feet high. Coal which contains much dust or fine particles, should not be piled over 4 or 5 feet high. Iowa steam coal should be piled in small piles not over 3 or 4 feet in height, which can be readily moved in case of spontaneous combustion.

Store a larger size of coal than is to be used, if possible. The loss due to slacking will be minimized if this is done. The larger sizes of coal are also less liable to take fire spontaneously.

Keep out dust as much as possible, by storing only screened coal, and by careful handling in piling.



In piling coal, see that the lumps and fine coal are distributed evenly throughout the pile.

Do not store near external sources of heat, such as boilers, etc., as many cases of spontaneous combustion have been traced to such sources.

Avoid alternate wetting and drying. Coal stored under cover should be dry when stored.

If coal is stored in sheds, they should be rain and wind tight; otherwise nothing is gained over storage in the open.

Do not ventilate coal piles with pipes and flues which may do more harm than good.

If a coal pile shows signs of heating, spread out the entire pile so that it can cool off. Coal which has been stored six weeks or more, if cooled off and repiled will seldom heat again.

Storage under water will prevent slacking to a large extent, and will prevent any losses due to fire. Many engineers believe that storage under water is the only practical way of storing Iowa steam coal.

The losses due to spontaneous combustion are often not confined to the coal pile, as records show many disastrous fires from this cause. Ordinarily it is difficult to put out a fire in a coal pile with water from a hose, as a crust forms over the fire so that the water cannot reach it and it is usually necessary to remove the coal from around the burning part before the fire can be put out. If a coal pile catches fire, the entire pile should be spread out to cool off.