CLASSIFICATION CONFIDENTIAL
SECURITY INFORMATION

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

50X1-HUM

COUNTRY	USSR	DATE OF INFORMATION	1950 - 1953
SUBJECT	Economic - Coal briquetting		
W BLISHED	Monthly periodical, book	DATE DIST. 20 Aug 1953	
IERE BLISHED	Moscow/Leningrad	NO. OF PAGES	3
TE PUBLISHED	1950, Apr 1953	SUPPLEMENT TO REPORT NO.	
LANGUAGE	Russian		

THIS IS UNEVALUATED INFORMATION

SOURCE Book and periodical as indicated.

COAL BRIQUETTING IN THE USSR

/Numbers in parentheses refer to appended sources./

Because briquetting of coal is one of the most effective ways of transforming low-grade, small-lump coal into a large-lump, high-grade product, coal briquettes are extensively in demand in industry, transport, and also for domestic uses.(1)

The first USSR briquetting plant, constructed in 1870 in Odessa, prepared egg-shaped briquettes from anthracite culm. Present-day briquettes differ greatly in content, shape, and method of preparation. The raw material used in making them may be fines from bituminous coal, coke, semicoke, or lignite, as well as ordinary peat.(2) In the case of fuel bituminous coal, briquetting is used only for the purpose of forming lumps out of fines produced during the course of mining. However, in the case of immature lignite, all run-of-the-mine coal must be briquetted if it is to be used effectively in the national economy.

That part of the Ukraine west of the Dnepr has rich supplies of lignite but until recently there has been little demand for this fuel. The efficiency of boilers and fireboxes working on this fuel was low because the moisture content of the lignite was 50-55 percent. The haulage of such moist fuel also meant an inefficient utilization of transport. However, the construction of large lignite-briquetting plants is laying the foundation for the efficient exploitation of this rich deposit and for a considerable extension of the fuel reserves of the Ukraine.

Depending on the quality of the coal, its age, and its physicochemical properties, the briquetting process is carried out either without a binder or with a binder.

The process of briquetting coal without a binder is as follows: Run-of-the-mine coal is delivered to the plant, crushed to 2-6 millimeters in size, dried to a moisture content of 8-16 percent, cooled after drying to a temperature of 50 degrees centigrade, and pressed at a pressure of 1,000-2,000 kilograms per square centimeter into a compact, mechanically tough briquette.

Briquetting with a binder is somewhat more complicated. Fines from zero to 13 millimeters in size are separated out from run-of-the-mine coal for briquetting. These are crushed to 6 millimeters in size and then dried to a moisture content of 2-3 percent. At the same time, the binder substance is crushed in another apparatus to a size of one millimeter to zero. Then the coal and the binder are put together in a mixing device and heated to a temperature of 80 degrees centigrade. The pressing of the batch is carried out at the relatively low pressure of 100-350 kilograms per square centimeter. The prepared briquette is cooled.

Soft-textured, immature lignite of the Ukrainian and Bashkirian types and the harder Moscow basin types are briquetted without a binder. Briquetting changes the quality of immature lignite substantially, transforming friable, small-grained, very moist coal into mechanically tough lumps with a high calorific value which are easy to transport.

These coals are generally briquetted without a binder at a pressure of 1,000-2,000 kilograms per square centimeter. In the run-of-the-mine variety of immature lignite the moisture content ranges from 40 to 60 percent and the ash content has a wide range, while the calorific value is 2,800-3,700 calories (for fuel used in plant operations). Briquetting increases this calorific value to 4,500-5,000 calories primarily as a result of the reduction in moisture content to 14-16 percent.

It is to be noted that the largest lignite deposits of the Soviet Union, including that part of the Ukraine west of the Dnepr River, the Far East, and the Bashkirskiy ASSR, lie at a shallow depth, which permits mining by the open-pit method, with the use of highly productive machinery and a sharply reduced production cost.

A modern briquetting plant consists of the following chief shops or departments: a crushing-sorting department, a drying-pressing department, a cooling department, and a shipping and storage department.

In the crushing-sorting department a magnetic separating device of the drum type is set up to separate out iron particles which may have fallen into the batch and which might damage the crushing apparatus. Depending on the productivity of the briquetting plant, the crushing and sorting department consists of one or several systems, each including the following: screens for sifting out fines below 4-6 millimeters in size, hammer or roller crushers, and transport installations to convey the crushed coal to the screens. The crushing and sorting apparatus is similar to that used in coal-cleaning plants.

In all the most modern briquetting plants, the drying and pressing departments are combined in one main building of the plant, called the drying-pressing department. The moisture content of coal, required for pressing, is determined experimentally; a definite figure has been set up for each type of coal. Deviations of $\pm$ 2 percent are permitted. In the case of immature lignite of the Ukrainian type, the average moisture content required for briquetting is 14-16 percent; this is achieved by subjecting the coal to drying by steam or by a stream of hot gases. Two types of driers are used for steam-drying coal, disk and drum driers, both drying by steam at a low pressure (2.5-3.5 atmospheres).

Die presses are used to press immature lignite. These are manufactured in three different types: single-die, double-die, and multiple-die presses. The double-die press is the most widely used.

The press is started by an electric motor or a steam engine. The capacity of the electric motor is 165-300 kilowatts.

In the Aleksandriyskiy Briquetting Plant, where the coal is dried to a moisture content of 16-17 percent before it is pressed, a gas drier has been operating for about 15 years. The installation is exceedingly efficient, drying 35-40 tons of coal per hour. The diameter of the pipe with which this machine is equipped is 1,100 millimeters.

Recently there arose the need for a special type of briquette for which the coal had to be dried to a moisture content of 8-10 percent before it was pressed, and a pressure of 1,800-2,000 kilograms per square centimeter had to be reached in the pressing. Neither steam drying nor die presses assured these results. However, new gas-drying installations and ring presses made it possible to meet the new technical requirements.. The requirement for this special kind of briquette and the construction of new aggregates to obtain it resulted from the fact that when lignite contains more than 10 percent of bituminous substances it becomes a rich raw material for the chemical industry and dozens of valuable chemical products may be derived from it by suitable processing.

The technological process of briquetting bituminous coal is considerably more complicated than in the case of lignite, since all bituminous coal requires the addition of a binder in the process of briquetting. Coal-tar pitch is used for the binder in the amount of 6-8 percent /7-10 percent according to source 2/ of the weight of the batch. It has a softening point of 50-100 degrees centigrade, a melting point of 100-200 degrees centigrade, and an ash content of about one percent.

Briquetting of coal with a binder is carried on at a relatively low pressure (100-350 atmospheres) in roller and disk presses. The most responsible operation in the briquetting of bituminous coal is the assuring of an adequate amount of binder and a thorough mixing of the coal and binder, since otherwise briquettes of poor quality will be produced.(1)

One of the chief tasks facing the coal-briquetting industry is to find a substitute for coal-tar pitch as a binder since this material is expensive and in short supply. In addition, coal-tar pitch is very useful in such branches of industry as road building and roofing. Scientists and workers at briquetting plants are working on the development of new types of binders.(2)

SOURCES

1. Moscow/Leningrad, Osnovy Obogashcheniya Uglya, Ugletekhizdat, 1950

2. Moscow, Master Uglya, No 4, 1953

- E N D -