Translation Book #168
Reel 123
Frame 23-30

1780

S-101

Portland cement Work Dottershausen

A. Cement Plant.

the Portland Cement Plant has been erected in the years 1940/41 in accordance with the Lurgi process.

* Frame 19

At this plant, Portland cement, hydraulic limestone and shale oil are being produced. It has been planned to erect a factory for porous (light) concrete, where plates are to be manufactured, which would serve as building material for houses, and also stone wool, an insulating mineral fiber. The locally mined oil shale has an oil content of ca. 4.5%, the actual yield being 3.5%. But the operation is economically sound, since the entire residue can be worked up.

The shale oil can be used in Lanz - Bulldogg machines without purification and refining; the Dottershausen method of producing the oil is superior in this respect to all the other usual methods (Abstracted. M. B.)

The carbonization residue may be used in different ways:

(1) The carbonization residue is mixed with limestone in a 50:50 or 40:60 ratio, in accordance with the specifications regarding the content of oil, and is used for preparing the raw powder.

(2) The calcined cement clinker is ground together with 20 to 50% carbonization residue, depending on specifications, replacing the raw gypsum which is otherwise required for controlling the setting time.

(3) Carbonization residue, ground by itself, yields hydraulic lime, by virtue of its hydraulic properties.

Performance

.....

Costs

The average production costs of one ton of mixed cement are R M 16.70, of one ton of hydraulic lime, RM 10.- E

Energy Consumed

per ton of finished cement, incl. packing, averages 99 kwh, for lime 35 kwh/to.

Fuel

For manufacturing 250 to of cement clinker = 300 or 325 to of cements, there are required.

(1) 50 to anthracite coke grits, having a heating value of 5200units
(2) 15 to of coke in 20/40 vs 40/60 size lumps.

Description of Plant

Limestone quarry

(1) In the limestone quarry, the material is blasted, loaded with a scoop and transported to the hammer crusher where the limestone is broken up into granules of 0 to 25 mm. From there it is fed to the plant's raw material silo by means of a 2.5 kilometer cableway.

(2) Oil-shale quarry

The blasted material is loaded with a scoop, transported by means of a narrow gauge railway to the hammer crusher (6) and broken into pieces of 0-35mm. The entire material is passed over a screen and divided into 2 classifications

0 to 5mm : raw material for the cement production
5 to 55mm : carbonization raw material.

(3) Crude Mill/ Drying mill 2.8 x 5.5m lg. performance 25 to/ hr.

In the " rude mill", the 0 to 25 min. limestone pieces, the 0 to 25mm shale fraction and carbonization residue are mixed and ground, their ratios being such that th portion of limestone contained in the mixture will be suitable for the manufacturing of clinker.

(4) Sintering unit (Performance 10 to 11 to/hr.)

If necessary, the "crude" powder which had been fed from the "crude mill" to the "crude powder" silos, is homogenized once more. Then it is mixed with coke frits of a 0 to 5 mm size at a 1:10 ratio this mixture is formed into granules in drums, 15% of water being added. The granules are brought upon the sintering conveyor. This sintering conveyor is also known in the up grading of low - grade ores, whereit is called a DWEYD - LLOYD conveyor. Before placing the granules upon the sintering conveyor, the grate is provided with a protective layer 6 to 7cm deep, consisting of 5 -8 mm clinker fine in order to prevent the sintering of the wrought - iron grate bars. The granules are then passed through the ignition head, where generator gas is burned, igniting the fine coke particles contained in the granules. Combustion air is constantly sucked through. The temperatures generated in the layer of granules which is 0.5m high and 2 m wide are 1600 to 1650°C, thus effecting the sintering. The entire clinker, as it leaves the conveyor, is paned over a vibration screen, which screens off 3 fractions, that is:

(1) mesh size 0 - 5 mm which is refed to the granulation drum for the purpose of better granulation.

(2) mesh size 5 - 8mm, used as protective layer for the grate of the sintering conveyor

(3) above 8mm the finished product which is transported to the clinker hall.

(5) Cement Mill (Three - Chamber - combination mill 2.40 x 13.0m lg.)

70 to 80% of sintered clinker and 30 to 20% ofcarbonisation residue are fed to the cement mill. The mill has a performance of 18 to 20 to/hr. The material is ground to a fineness of 8 to 10% and to 9900 mesh. It is pneumatically

transported to the cement silos.

(6) Packing and Loading

The substance is brought by a pneumatic device from the silos and filled into the valve bags by means of a four - nozzle valve - bag package machine.

B. Oil - Shale Carbonization Unit

The carbonization process is based on the principle that shale is slowly sliding vertically downward through a vertical carbonization shaft which is not made of iron but of ceramic material, while at the same time highly superheated steam is passed through it in a horizontal direction. A set of eight furnaces is in continuous yielding a high - grade oil.

(1) Mode of operation

The shale goes from a storage tank (1) through a predrier (2) into the carbonization shaft (3), issuing through a cooler unit and a discharge unit (9).

The issuing steam of a steam turbine is superheated to about 400°C in a superheater (5), flows then through the recuperator (6) and reaches the carbonization shaft (3) at a temperature of about 800°C. The carbonization is subjected to the action of a suction apparatus, which sucks the evolving steam - gas mixture via a gas - recovery chamber (7) in a circuit (8). This circuit leads to a condensation system (9) where at first, the high-boiling oil and then an oil - water mixture is recovered. The latter is separated into oil and water in a settling ditch. The water contains ammonia and is worked up to crude aqueous ammonia in a special unit (11). The non- condensable gas is recycled by means of a suction apparatus (12) to the furnace and is used for heating up the recuperator (6). The exit - gases which are thereby evolved serve for superheating the moist steam to ca 400°C in the superheater (5).

(2) Oil

Two thirds of the oil yields are thin oil and can be immediately used in the Lanz - Bulldog as a fuel. The Lanz - Bulldog is provided with GLUHKOPFZUNDUNG and is a very popular - agricultural tractor. One third of the oil si viscous oil and has been hitherto worked up in refineries.

Performance

With 4 to 5 furnaces 210 tons of shale oil per month
Residue for the cement factory 5,100 kg per 24 hrs.
Costs of 1 ton of oil

M. Beth

July 21, 1943

MB:RMc

Distribution: All Divisions