

Plant Descriptions of

Penn-Dixie Cement Corp.

Plant No. 9, West Winfield, Pa.

By J. C. McGrath, Supt.

Medusa Portland Cement Co.

Wampum, Pa. Plant

By W. B. Hanlon, Director of Engg.

Universal Atlas Cement Division of United States Steel Corp.

Universal, Pa. Plant

By E. F. Harchelroad, Plant Mgr.

Green Bag Cement Division of Pittsburgh Coke & Chemical Co.

Neville Island Plant

By H. J. Haffner, Supt.

November, 1958

**PORTLAND CEMENT ASSOCIATION
Research and Development Laboratories**

5420 Old Orchard Road

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GENERAL TECHNICAL COMMITTEE

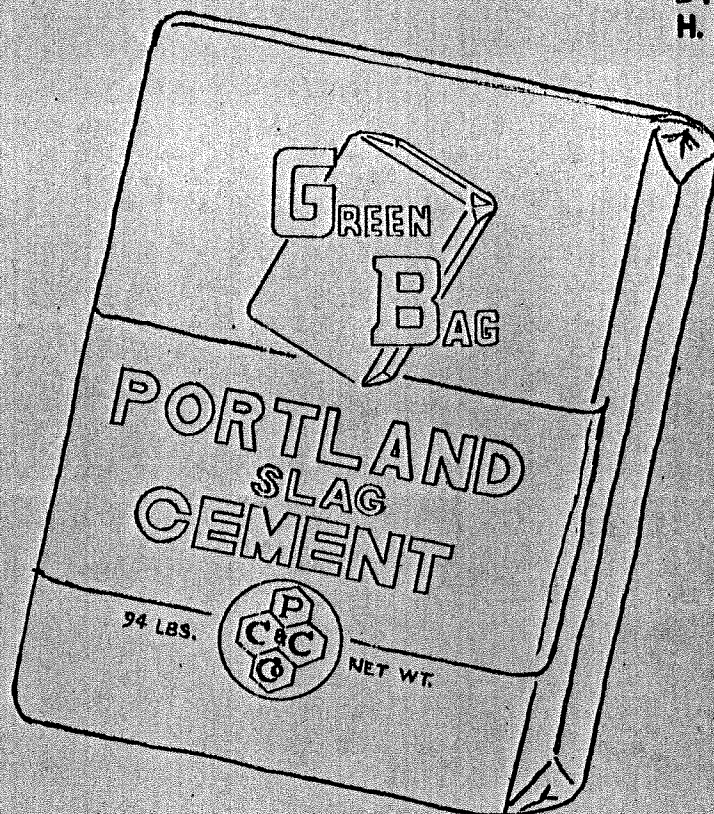
PORTLAND CEMENT ASSOCIATION

Sept. 22-25, 1958, Pittsburgh, Pa.

DESCRIPTION
OF
GREEN BAG CEMENT

DIVISION OF
PITTSBURGH COKE & CHEMICAL CO.

BY
H. J. HAFFNER



**PORTLAND CEMENT ASSOCIATION
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SEPTEMBER 1958

GREEN BAG CEMENT DIVISION

of

PITTSBURGH COKE & CHEMICAL COMPANY

by

H. J. Haffner*

Pittsburgh Coke & Chemical Company is located on Neville Island, five miles downstream from Pittsburgh, Pennsylvania.

The company consists of 3 main divisions - Construction & Building Products, Coke & Iron, and Chemical. Each main division is sub-divided in the following manner:

1. Construction & Building Products

1. Cement
2. Concrete Pipe and related products

2. Coke & Iron Division

1. Blast Furnaces
2. Coke Plant
3. Steam & Power

3. Chemical

1. Activated Carbon
2. Protective Coatings
3. Industrial Chemicals

The Cement Plant was built in 1928 and was designed for the production of 1,000,000 barrels per year of Portland Cement.

In 1933, the production of Green Bag Mortar Cement was introduced.

Portland Slag Cement was added to the cement line in 1938.

In 1956, the production of Portland Cement was discontinued. Since this time, all cement is of the Blast Furnace Slag Cement variety and Mortar Cement. Rated capacity - 2,000,000 barrels per year.

We are presently the only producer of Blast Furnace Slag Cement by a wet process.

This plant is located in a residential area and the company recognizes its responsibility to the community to eliminate all of the dust sources. The following dust suppression equipment has been installed:

KILN AREA

1. Discharge end-cyclone type before exhaust stack.

*Superintendent - Green Bag Cement Division - Pittsburgh Coke & Chemical Co.

2. Feed end-cyclone type at kiln seals.
3. Dust chambers under waste heat boilers.
4. Gas Washer - Dorr Thickener.
5. Water sprays on clinker drag conveyors.

FINISH MILL

1. Dust collectors - Pregrinding Mills - (bag type).
2. Dust collectors - each Finish Mill - (bag type).

SLAG

1. Cyclone type.

PACK HOUSE

1. Bag type - each packer.

The company has conducted extensive research in the following areas and has approved of the following installations:

1. Water sprays - Slag Drier stack.
2. Dust Collectors - Bulk loading station.

Engineering is studying closed storage for our Finish Mill feed stock.

It is fully the company's intention to make this plant as dust free as possible.

RAW MATERIALS

- Slag - A by-product of company blast furnaces.
- Limestone - Purchased and received by truck or car and stored in the ore yard.
- Flue Dust - Collected in Blast Furnace Dust Collector.
- Water - Deep well water.
- Gypsum - Purchased and received by car and stored in gypsum pit.
- Sand - Purchased and received by barge.

SLAG

Granulated Blast Furnace slag is fed into a 90' long by 8' diameter castable lined rotary slag drier with parallel flow and firing coke oven gas. The moisture content of the slag is reduced from approximately 40% to less than 1% at the rate of 500 N.T. per day. The dried slag is conveyed by a vibrating conveyor to a vertical elevator and discharged over two rotating permanent magnets to remove the iron. From there it is conveyed to a covered slag storage pit. The exhaust gases and dust are passed through a cyclone type dust collector, then into a stack to the atmosphere. The dust removed by the collector is fine enough to use as finished cement and as such is pumped to the separators in the finish mills by a Fuller Kinyon Pump.

WET MILLS

Wet Mill feed is stocked in the blast furnace ore yard. The material is transferred by means of transfer car and ore bridge to the Wet Mill feed hoppers.

Limestone, slag, flue dust, water, and sand are proportioned continuously by poidometer belts into two 8' x 7' x 26' Compeb Mills - open circuit.

Each mill has two sections - the preliminary end is charged with 15 tons of 3½" diameter balls - the discharge end with 35 tons of 1" diameter balls.

The specifications of the slurry are 38-40% H₂O, 85-90% - 200 mesh.

The mills discharge into a common sump and are pumped through 450' of 6" line to the slurry tank area. This is accomplished by 75 HP Wilfley type pump.

BLENDING AND STORAGE TANKS

The slurry is pumped to a set of four blending tanks. The slurry is normally ground with a lime deficiency. Chemical analysis is made and the slurry is adjusted. The finished slurry is pumped to a set of four kiln feed tanks. Size of tanks - 30' x 20' - 1000 bbls. capacity.

Each tank is constantly kept in movement by motor driven agitators equipped with high pressure air nozzles.

Slurry from storage silos is pumped to Ferris Wheel feeders. Overflow returns to storage silos for repumping.

The discharge of the feeders feed two double valve vacuum rotary filters. The speed of the filter system and feeders is synchronized with the kilns.

The water that passes through the filters is drained to a Dorr Thickener.

The filter cake is dropped on an endless belt for kiln feeding.

KILNS

The two kilns are 10' in diameter - 175' long straight section lined with basic brick in the hot zone followed by alumina brick and insulating brick. They are powered by AC 30-60 HP variable speed motors. The kilns rotate at a speed of 25-75 RPMs. Fuel is generally coke oven gas. A specially designed burner can be installed to burn this low BTU (540) gas. However, we are equipped and do use coal when gas is not available. Coal is ground in a Raymond Roller Mill and is fed to kilns by a manually controlled screw feeder.

The clinker is discharged into an inclined grate cooler equipped with hammer mill.

The cooled and crushed clinker is discharged into a drag conveyor to a stock pile.

An induced draft fan pulls the exhaust gases through a dust chamber. Then, the dust collected in the dust chamber is reclaimed and blended with the filter cake as it is being fed to the kilns. Then, through a waste heat boiler that generates 225 p.s.i. at 525°F. This steam enters the main distribution system of the plant. The exhaust gases are passed through a spray type washer, then expelled to the atmosphere. The discharge from the gas washer is collected in a Dorr Thickener and the sludge is pumped back to the Ferris Wheel feeders.

GRINDING MILLS

From the storage bins - clinker, stone, and gypsum are proportioned by Syntron vibratory feeders to the Pregrinding Roll Mills. The pre-

ground material is transferred by air slides and screw conveyors to the Finish Mill feed hoppers. This material is proportioned with dried Blast Furnace Slag for feed to any one of four finish mills. The slag is proportioned with Hardinge feeders. Clinker is proportioned with Screw Feeders. The mills discharge is conveyed by a bucket elevator to the air separators. The rejects are returned by means of air slides for further grinding. This finished cement is pumped to the appropriate silos.

The feed of each mill has provisions for the addition of an air entraining agent and/or a grinding aid.

PACKING AND LOADING

The cement to be packaged is transferred to the Pack House where six St. Regis packers are available. The packaged cement is then shipped by truck or box car.

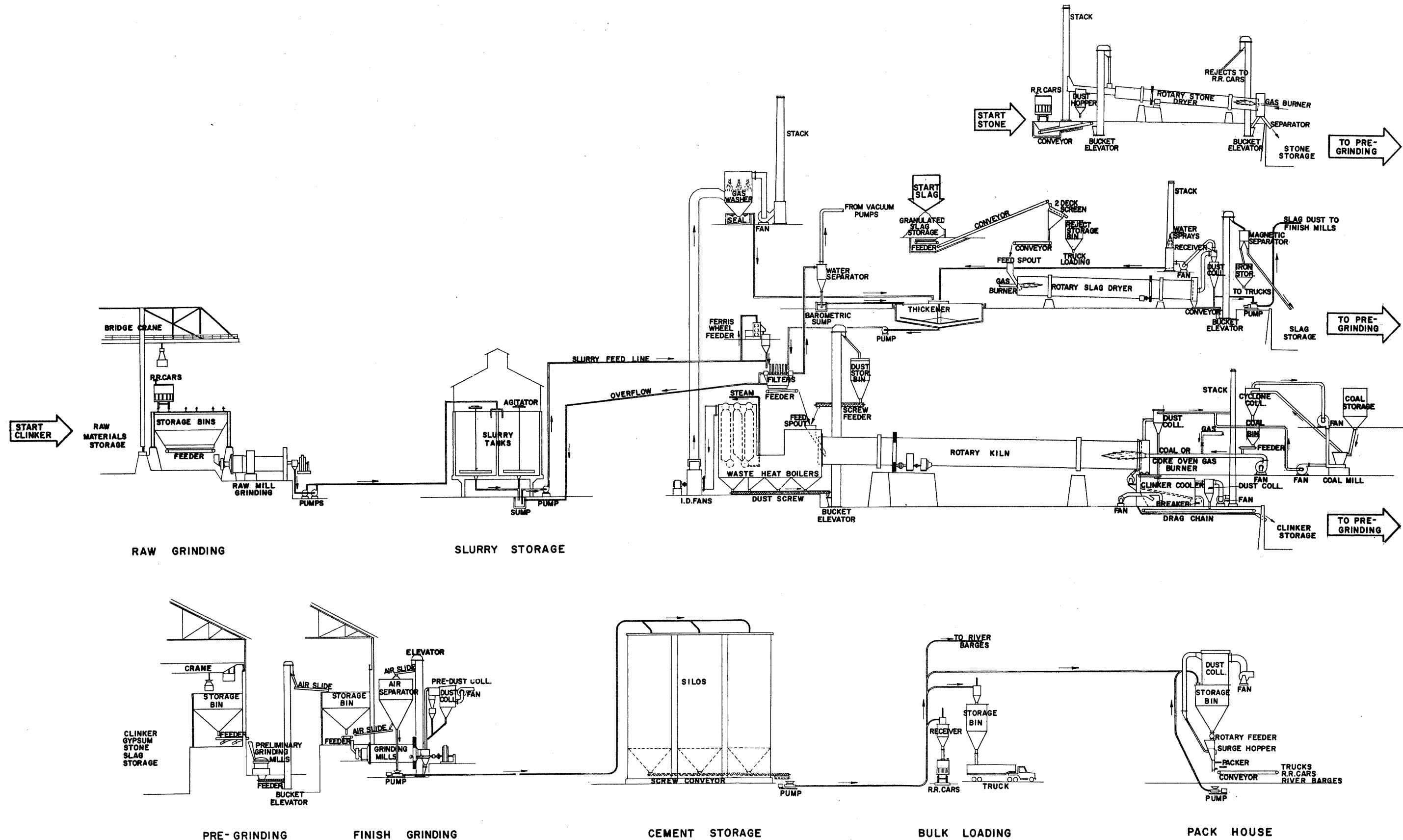
Cement that is to be loaded on barges is pumped from the silos to the barge loading building where it can either be bulk loaded or bagged for loading.

Truck bulk loading is done in two bulk loading stations - each equipped with weigh hopper scales. The cement is weighed and then deposited into trucks.

Bulk cement for railroad shipping is pumped directly into the cars.

STORAGE

There are three groups of six silos each and using the interstices - a capacity of 240,000 bbls. of cement is available.



REFERENCES	REVISIONS	DRAWN J.R.Z.	PITTSBURGH COKE & CHEMICAL CO.	
	6	TRCD.	NEVILLE ISLAND, PA.	
	5	CHKD.	B. M'S. PLANT GREEN BAG CEMENT DIVISION	
	4	SCALE NONE	WET PROCESS CEMENT PLANT	
	3	APPR.		
	2	APPR.		
	1	APPR.		
			JOB N ^o	DWG. N ^o

