ROOFING GRANULES INDUSTRY IN SOUTHEASTERN PENNSYLVANIA

By

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Introduction.

In August 1922 when the writer visited many quarries of different materials in the eastern half of Pennsylvania, a group of quarries and plants on Jacks Mountain and Susquehanna River near the Maryland line aroused special interest. These plants were producing small rock chips or granules to be used in surfacing flexible, stone-coated shingles and roll roofing. This paper briefly describes these plants.

Definition.

Roofing granules are crushed rock of various kinds which are made for imbedding in an asphalthic or other matrix to form roofing material. The covering may be applied as shingles or rolled sheets, or it may be poured in place.

The rapidly decreasing wood resources and consequent rise in price of wood shingles; the natural desire of home builders for a non-inflammable roof; the comparatively high cost of slate; and the abundance of waste slate, have resulted in an effort on the part of several manufacturers to produce a roof covering that shall be fire-resistant, light weight, easily attached and of pleasing color. A shingle or sheet made of burlap impregnated with asphalt in which fine crushed stone is imbedded meets these requirements. Roofing granules as a rule will pass through a 10-mesh screen and be retained on a 20-mesh.
Raw Material.

Red, green, and black non-fading slate are acceptable material, and are available in quantity in Maine, New York, Vermont, Pennsylvania, and Maryland within reasonable shipping distance of large consuming centers. Slate waste is used but little for making granules because quarrying solid rock has seemed cheaper than sorting waste and because breaking slate makes a large percentage of dust for which there is little or no market. In New York and Vermont, for instance, the roofing slate output is green and purple, but granules are made from a red slate that splits less readily.

Pennsylvania slate is all blue or black, and roofing granules made from it give a somber effect. Because of a popular preference for colors, the granule industry in Pennsylvania is based in part on greenstone, epidote, or serpine, which have an attractive green color very suitable for roofs.

An effort has been made by the U. S. Bureau of Mines and by the slate producers to find a market for the great quantity of waste slate in the dumps at the numerous quarries. To crush this waste into granules for use in asphalt shingles seemed a simple solution. In practice, however, handling waste dumps seems to have little if any economy over quarrying, and the desire for colored material reduces the demand for Pennsylvania slate quarry waste.

Producing Plants.

Roofing granules have been or are being made at four places in Pennsylvania. Iron Springs, Greenstone, Peach Bottom Station, and Delta, all close to the Pennsylvania-Maryland line.

Iron Springs, Adams County. At the north end of Jack's Mountain, 2 miles southwest of Fairfield and on the loop of the Western Maryland R. R. at Iron Springs is the quarry and mill of the Shelden Slate Products Co. The office of the company is at Granville, New York. This property has been idle for about 3 years, except 2 weeks in the spring of 1922 when it was operated. It consists of a quarry on the south-facing hillslope and a mill. The quarry about 100 feet long and 40 feet deep is in dark greenstone.

A narrow cut through the intervening rock leads to the mill on the hillslope directly below the quarry. This mill is a large wooden structure equipped with one large gyratory crusher, 4 steel roller mills, 5 Newago screens and an air-separating system. Steam power was used throughout the mill. Two sizes of green granules were produced for roofing paper and shingles. Dust from this plant was wasted. The plant is directly on a railroad.
Greenstone, Adams County. In the southwest corner of Adams County at the south end of Jacks Mountain where the Western Maryland Railroad loops around the head of Miney Branch, three quarries and mills are operating on greenstone. The Blue Mountain Stone Co. has two quarries and two mills on the west side of the valley and the Advance Industrial Supply Co. plant is on the east side. Greenstone postoffice is one-half mile east of the Franklin County line.

Both quarries of the Blue Mountain Stone Company are toward the bottom of the valley. One mill is below its quarry and the finished product is carried by several stretches of belt conveyor to a bunker on the railroad much higher on the mountain. From the second quarry the rock is hauled in cars on a double track incline to a mill directly on the railroad.

The flow at the first plant from quarry to railroad car is via quarry cars to No. 6 gyratory crusher, to two Simon 24" dish crusher, 1 Sturtevant 16" by 36" rolls, 2 Newago and 2 Hum-mer screens, belt conveyor up mountain side to bunker on railroad. The greenstone is prepared in one size only, 10 to 60 mesh, and all sold for roof granules. The capacity of the Blue Mountain Stone Co. from both plants is about 200 tons daily. Electric power from Hagerstown, Maryland, drives all machinery.

At the second quarry the rock is hoisted in buckets on a traveling cable-way and dumped in cars on a double track tram terminating at the upper edge of the quarry. The cars are hauled by cable up the incline to a mill on the railroad much higher on the mountain.

The Advance Industrial Supply Co. operating directly across the valley has a quarry about 300 feet long with a face 60 feet high. Air and steam drills are used. The rock is loaded and trucked by hand to the adjacent mill. It passes through an Allis-Chalmers No. 5 gyratory crusher, Felsmith gyratory, rolls, revolving cylinardical screen, and is marked as 10-34 mesh. The color is called "copper oxide."

Dust from these plants is collected by air separation system and wasted. A few carloads have been sold for experimental purposes and as fertilizer filler.

Delta, York County. The Blue Mountain Slate Company holds a lease on 79 acres of slate land one mile north of Delta and is making granules from dumps at the old quarries. A great abundance of rock discarded by former quarrying operations as unsuitable for roofing slate is usable for granules. The rock is loaded by hand in steel dump cars which are hauled by gasoline motor to the mill. The mill machinery is driven by electric power developed by an oil engine. The cars are dumped at a gyratory crusher and the crushed rock is carried by a belt conveyor under the road to a mill on the lower side of the road. Here it is elevated by bucket belt to a secondary crusher, from which it goes to screens. A spur railroad delivers cars directly to the lower end of the mill. As there is no sale for the dust, it is dumped in the hollow below the railroad.
In August 1922 the company was employing 56 men and shipping
12 or 13 cars of dark blue slate granules weekly. An output of 100
tons of granules daily means the handling of nearly 200 tons of rock
because the old quarry dumps contain a large proportion of unsuitable
material. The plant is operating 24 hours daily.

Peach Bottom Station, Lancaster County. Gorsuch Brothers,
Inc., have a large slate granule plant on the east bank of Susquehanna
River half a mile above Peach Bottom Station. The mill and quarry are
directly on the Pennsylvania Railroad. A slate quarry was opened here
in 1795 and produced a high grade, lustrous, blue black roofing slate.
Operation was discontinued in 1877 by an injunction obtained by the
Raftsmen's Association against dumping quarry waste in the raft
channel. When the dam was built in Susquehanna River at Holtwood
the accumulated rubbish at the slate quarry was used to raise the railroad
grade and dumping ground was made available.

The property was purchased by the present owners in 1903.
The first mill was built in 1918 and has since been enlarged by two
additional units. The first unit is driven by a steam engine and the
other two by 100 and 125 h.p., solid jet oil engines. At present slate
is quarried only for crushing to granules. Quarry cars are loaded by
hand and hauled up to the mill by cable. The rock is broken in 24 by
12 inch jaw crushers, and then reduced to granules in swing hammer
pulverizers. It is then elevated, sized in rotary screens, and
cleaned by hammer and jolt screens. The final product is cleaned by
air as the dust must be eliminated to secure adhesion to the asphalt.
The size accepted by the trade at present runs from No. 10 to No. 24
mesh, or granules which pass a screen having 10 meshes to the inch
and are retained on a screen having 24 meshes to the inch. As yet no
regular market has been found for the dust and screenings below No.
20 mesh and it runs to waste. The entire output is sold to the

The company is cleaning out the old quarries and removing
overburden with the intention of producing roofing slate. Evidence of
the quality and durability of Peach Bottom slate is abundant in
numerous roofs in the vicinity that were laid more than 100 years ago
and are now as sound and serviceable as when first laid.

When the writer visited the plant 65 men were employed; the
mill was operating 23 hours daily in two shifts of 13 and 10 hours,
and the quarry was running only one shift.

Prices.

Market quotations on roofing granules are $6.50 to $7.50
per ton f.o.b. plant, shipment being made in sacks or paper-lined
cars. The dust derived by crushing and collected by cleaning the
granules is an incidental product for which the market has not been
developed. This material when in demand may bring a much higher
price per ton than the granules, and eventually may be the principal
product rather than a waste.