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Division Headquarters
August 15, 1958

D. L. Hinmon

Kaylo Plant Visitation
Berlin, N. J.

PLAINTIFF'S
EXHIBIT
K-1517

On July 2, 1958 T. H. Eaton, J. B. Jobe, J. B. McCarty, L. R. Blair and R. W. Dobson were privileged to review the Kaylo Plant operations at Berlin, N. J. We met with and were escorted thru the Plant by W. C. Taylor, O. W. Pfeifer, J. A. Pershing, R. S. Grant and A. D. Denny.

PROCESS OBSERVATIONS

Raw Material

1. Fiber - JM 6D and JM 4K Chrysotile Asbestos and W-3 Amosite are used in the Kaylo operation. The amounts and percentages were not discussed.
2. Silica - Two sources of silica are used in each batch. These are Eagle Picher Celatom and a silica flour ground to +5% on a 325 mesh screen. We were advised that these are used in equal proportions.
3. Lime - Bell Mine quick lime is used following a slaking operation which is done just prior to making up the batch.

Batch Preparation

1. Fiber - The fiber receives no cleaning whatsoever but is wet milled in a Bauer mill. We understand that two mill settings are required, one for the Canadian Fiber and the other for the Amosite. In neither case is the fiber given a severe milling, and no tests are conducted to determine the openness or crudiness of the fiber.
2. Silica and Lime - Raw materials are not weighed for the pan cast process. Bag weights are generally accepted. On the other hand raw materials for the new pipe covering pressure molding process are accurately weighed. The batches for this process are made in a different part of the Plant and are under careful control.
3. Mixing and Batch Preparation - All ingredients are mixed together with water in the rate of one part of solids to approximately five parts of water. Fresh water is used since the Kaylo process is not a filter process and no water is recovered. The batch size is 30,000 lbs. The batch mixing is carried out in a hydropulper and the mixed batch is then transferred to a series of horizontal mixers which serve as the storage reservoirs for slurry ahead of the molding operation.

It is understood that molding slurry is heated to a temperature of about 185°F without automatic temperature control. We understand that if the slurry is boiled the resultant pan cast product is filled with voids and will be subject to a high reject rate. Greater precautions are taken with the batches for pressure molding where the temperature is accurately controlled between 200 and 205°F.

We were advised that the only in-process batch control for slurry formation is a test which was said to be similar to the J-M Hutto cake test. Details concerning this test were not discussed.

DEFENDANT'S
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Molding

1. Pan Casting - In the pan cast process slurry is pumped from the horizontal storage reservoirs to the molding pans by a centrifugal pump. The slurry temperature at this point is in the order of 100°F. The slurry is run into the molds through nozzles which spray it in ribbon form along the mold surfaces. Excess slurry is leveled off and returned to the process. Slurry to the pipe molds is fresh. Excess slurry is returned for use in block casting.
2. Pressure Molding - Kaylo has one pressure molding unit installed for making pipe covering up to 6". We witnessed the production of pipe covering approximately $1\frac{1}{2}$ " x 1" which is molded 15 full sections per charge. The molding cycle for this size covering is approximately 4 cycles per hour or 60 sections per hour. We understand that Kaylo plans the installation of additional pressure molding machines.

In the pressure molding process carefully weighed materials are mixed and heated in a small cement type mixer and then discharged into a bank of vertical, cylindrical molds. Metal fingers are then lowered into the mold to agitate the slurry and to release any entrapped air. The jacketed molding cylinders are then subjected to a steam pressure of approximately 15 lb. psi and a temperature of 275°F for about $7\frac{1}{2}$ minutes. This treatment gives the slurry sufficient set so that the cast pieces can be removed from the molds for final autoclaving.

It is noted that in addition to operating the molding machines, the molder operators also slit their own production prior to canvassing.

Pre-autoclave Treatment

Both the pan cast and the pressure molded products were placed in moist, warm air humidity chambers prior to final autoclaving. We understand that this treatment is to prevent drying prior to autoclaving and to increase the set for improved product handleability. It was stated that this humidity phase of the process could be by-passed without harmful effect if autoclave space were immediately available.

Autoclave - Drying

Kaylo combines steam curing and drying in one operation. Following the moist air treatment, the molds containing the slurry and the pressure molded pieces are placed in autoclaves for steam curing. Exact details of the steam cure-dryer treatment were not discussed but we were advised that the entire autoclave-drying cycle for a 2" block would require approximately 8 hours. It is understood that blocks are autoclaved at approximately 150 psi and 350°F.

The drying process in the autoclaves is by means of Dow Therm at a temperature of 600°F. We were advised that the Dow Therm system is a major maintenance problem.

The combined autoclave-drying permits a relatively short process time which makes it possible for Kaylo to be made and shipped on an expedite basis in 24 hours.

The dried products are then removed from the molds and loaded on pallet racks and trucks for subsequent finishing operations. The molds are then cleaned by air, painted with a parting compound made from motor oil, the block pans are lined with cardboard, and the pans returned to the production line for reuse.

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Finishing

1. Block - Blocks are rough-molded approximately 18½" x 37". Blocks are finished on all 6 sides and cut to any desired size on a straight line type finishing unit. The broad faces are finished with horizontal milling cutters and are cut to length and width by multiple saws. Blocks are packaged directly from this machine, without benefit of dust collection. Inspection of the loaded block cartons revealed numerous broken corners.
2. Small Pipe Covering - As noted above, Kaylo has only one pressure molding machine. At the present time pipe covering up to about 1" in size are machined from pre-cut block strips. These small sizes of Pipe Covering are canvased directly off the milling machine and restored on stock trucks for air drying of the canvas and adhesive. Mildew inhibitor is used in both the canvas and the paste. All pipe covering is packaged as a separate operation.
3. Large Pipe Covering and Segments - Large Pipe Covering and segments are trimmed on special machines. The segments are finished on a special unit incorporated to Monarch Unipoint Saws. This device is very similar to one that we have designed for quads and segments.

There is job shop equipment available for special shapes and cut pieces as required.

All pipe covering is canvased as a separate operation and with the exception of the small, milled sizes, is put directly in the cartons at the canvasing location.

There appears to be a good opportunity for more complete use of the straight line finishing techniques at Berlin particularly in the pipe covering, finishing, canvasing and packing operations.

K-20 Production

We did not see any production of the higher temperature K-20 product. We did learn that one batch is produced per day. We understand that the main difference in the K-20 formulation from regular Kaylo is in the selection of fibers. All Amosite Fiber is used rather than a mixture of chrysotile and amosite. The other important process difference is in the autoclave treatment. In place of the standard 150 psi, 350°F treatment the high temperature phase is developed with a 275 psi, 410°F steam cure. This is accomplished in a 10 ft. diameter autoclave which is also equipped with Dow Therm heating elements. We understand that the total autoclave--drying cycle is approximately 8 hours.

OPERATIONAL OBSERVATIONS

1. Organization - The Kaylo organization appears to be essentially the same as ours including the quality control, industrial engineering maintenance and billing and accounting departments.

There are approximately 185 hourly employees to operate the plant on a continuous 7-day, 3 shift basis.

There is a 94% incentive coverage on the operations.

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2. Order Handling - Orders are handled directly by the plant and all order processing and follow-up is done from the plant location. In the O-C opinion this does save appreciable time in order handling and results in improved production control and better delivery. The short process time resulting from the reduced autoclave-drying cycle makes it possible to ship on an expedite basis in 24 hours.

The Berlin warehouse covers approximately 80,000 sq. ft. and contains an extensive inventory. This warehouse space was filled to visual capacity. The warehouse is operated on a fork truck and pallet basis.

3. Quality Control - There appeared to be standard finished goods testing at Berlin but only a limited amount of process control work. We understand that the major control problems involve too low density and strength.
4. Maintenance - Kaylo has a fairly large well-equipped shop which works continuously on the repair and maintenance of molds.

We were extended every possible courtesy at Berlin and had both an educational and an enjoyable visit.

R. W. Dobson

RWD:mls

cc: T. H. Eaton
J. B. Jobe
J. B. Mc Carty - Manville Plant
L. R. Blair - Manville Research
G. T. Cresswell
File

E. Trout 11-21-67