

Mr. R. S. Grant, Toledo

R. F. Shannon, Granville

KAYLO RESEARCH AND DEVELOPMENT
MONTHLY REPORT FOR JANUARY 1968

February 5, 1968

Mr. M. Hardwick, Berlin
Mr. J. Helser, Berlin
Mr. A. J. Pearson, Toledo
Mr. J. Rhoads, Berlin
Mr. H. V. Smith, Toledo

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This report summarizes major Process Development activities carried out in January by the Kaylo Research and Development Laboratory in cooperation with Berlin plant personnel in support of plant operations. It also briefly summarizes the status of Marketing supported Kaylo Product Development programs.

Process Development

1. Process Audit

Continuing audits of the Berlin operation by R & D indicates a substantial upsurge in product quality, workmanship, plant appearance and equipment and mold maintenance. This was evidenced by higher job efficiencies and higher throughputs in December and January.

A quality control product audit, conducted on February 1 by Marketing and Toledo and plant Quality Control personnel gave further evidence of the recent upsurge in product quality. Included in this audit were many of the pipe sizes, which are considered the toughest to pour, i.e., those sizes which normally have the highest incidence of visual defects and low job efficiencies. The general consensus of those present at the audit was quality of Kaylo pipe had improved in recent months with fewer air holes and broken corners. Kaylo block was of very high quality, probably the best on the market today.

2. Batch

A. Carbon Modified K-10 Batch

Approval was received from Marketing to carry out an extended trial of carbon block modified K-10 batch. This study will determine whether elimination of mold oiling is possible, provided an internal lubricant is added to the batch. One block train is currently being cycled without oiling. As of February 1 the train had been cycled ten times and still looked good. Final results from this study should be available in late February.

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B. 700 Pound Dust Batch

J. Halser, of Berlin Process Control, summarized and issued in report form all of the data from 700 pound dust batch formulations poured at Berlin in recent months. These data, coupled with R & D data from Granville trials, all indicate the so called 700 pound dust batch (400 pounds of Berlin process dust and 300 pounds of Jeffrey hammermilled offware) will produce a high quality product, which fully meets the CAS.

The plant is in the process of preparing a 901 to cover the purchase of a Jeffrey hammermill and supporting dust handling equipment. In the meantime, arrangements have been made to have substantial quantities of offware processed through a Jeffrey hammermill. This will permit extensive 8 and 16 hour trials of the 700 pound dust batch to be conducted at Berlin so as to verify process performance and product quality under plant conditions.

C. Prehardenable K-17 Core

Extensive research has been directed toward a prehardenable K-17 batch. A cement modified batch was developed, which fully meets UL product requirements and the CAS except for compressive strength. A search of UL records confirm the fact compressive strength is not a part of the current UL procedure. A summary report on prehardenable K-17 batch will be issued by February 15 by R & D. A meeting of Marketing, Manufacturing, Toledo Quality Control and Process Control, R & D and Product Testing personnel must follow for future action on this program.

D. K-10 Block Batch

It has been a known fact for years that batch formulations designed for Kaylo pipe did not always yield good Kaylo block and vice versa. With the greater process flexibility now available at Berlin, development of batch formulations specifically designed for block or for pipe is now possible. A modified version of the 10L-8 batch designed especially for block was placed in production in January. This batch is lower in cost, has an improved visual appearance and yields a product of superior quality.

3. ProcessA. Process Meeting

A comprehensive monthly process and quality review meeting was held at Berlin on January 18, 1968. The next meeting is tentatively scheduled for February 21 to coincide with the next plant trip by the writer. These meetings will provide for regular review and follow-up of all plant and plant-R & D process programs as to status, timing and responsibility.

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B. Bulk Storage

In December 1967 the plant went full time on the 8 bag (752 pound) cement batch identified as 10L-8. This batch formulation contains a substantially higher percentage of Portland cement than quicklime. Plans are to switch in early February one of the bulk systems from quicklime to Portland cement with a possible daily savings of over \$40. Installation of a third bulk system (in our plans for near future) to handle quicklime will bring daily savings over \$70. (Note: Plant Engineering informs me a third system can be added to the present bulk system at minimum cost, a fourth system to handle diatomaceous earth would be quite expensive.)

C. Water Control - Batch

For years the Berlin process has been plagued with density control. The main cause for this problem has been water measurement. Recently, the problem has been compounded by the practice of adding cement to the asbestos tank, causing build up in the tank, which affects the accuracy of the present water measuring system. Purchase of a water meter is under consideration. Locating a meter, which will yield the accuracy needed to control water solids of Kaylo batch, is currently underway. An alternate method of measuring water even more accurately than commercially available meters can be studied by Plant Engineering, Plant Process Control and R & D. Results of this study will be reported in February.

D. Waste Slurry

Plant audits conducted by R & D last summer and fall indicated one of the major causes for variability of batch properties, processing and product properties was use of waste slurry. Substantial improvements have been made recently at the plant in the handling and holding (now under constant agitation) of waste slurry. A study will be undertaken shortly to gain even better control over waste water composition and solids. A piece of equipment commercially available and now in use by the water treating and process industry for separating solids from water will be investigated. From an economic standpoint, we must continue to use waste slurry. At the same time reduction of its effect on batch consistency, processing and product quality is of the utmost importance to the plant operation.

E. Vacuum Stripping

A major Kaylo process problem, which has existed from day one, has been stripping of flatware. A concept known as 'vacuum stripping' was suggested years ago as a means for overcoming this problem. In January, Berlin plant maintenance and engineering personnel on their own initiative built and successfully tested a prototype vacuum stripping device for flatware (core and block).

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E. Vacuum Stripping (Cont.)

Once it is installed on the line, we can expect a reduction in block and core offware. NEM caused by chips remaining under the false bottom plates and chipped and broken corners should be reduced substantially. Pouring rates should also increase since stripping continues to be one of our current throughput bottlenecks.

F. Prehardening

Meetings were held with Toledo General Engineering personnel to review process problems relating to prehardening of Kaylo. General Engineering will conduct studies at Berlin directed toward collecting data as to rates of prehardening, temperatures required and alternate methods for heating the molds and batch to reduce prehardening time. During these meetings Kaylo R & D passed on to General Engineering a number of suggestions relating to modifications which could be made to the existing prehardeners to make them even more effective. These modifications could also be incorporated into the design of the new prehardeners to be installed on pouring line 3.

G. Graphite Treated Molds

Dr. C. L. McKinnis of the Kaylo R & D Lab has evolved a new concept for eliminating the need for oiling of molds. It involves the application of a molecular layer of graphite to the metal surface of the mold. The current thinking is to apply this coating in the mold shop at the time the train is being cleaned. Initial lab data shows promise. Arrangements have been made with M. Hardwick to evaluate this concept at Berlin under plant conditions, possibly in late February.

H. SID Cycles

Back in the 1950's it was believed long up and down cycles were necessary to prevent ware 'blow-ups'. In fact, for years a multiple step operation was used to bring the SID cylinder up to pressure. The same in reverse was used to lower the pressure. In the early 1960's experiments were conducted at Granville, which indicated up and down cycles could be reduced substantially without adversely affecting product properties. J. Halser, Berlin Process Control, reduced the up and down cycle to one half hour and one hour respectively in recent years. In January he further reduced the up cycle to 15 minutes and the down cycle to 30 minutes. What does this mean? Capacity of the present SID's has been increased the equivalent of two or more trains per day. Also, we may have gained a foothold on extending the patent protection on the SID process (OCF SID patent has expired). The special process 'tricks' needed to make such short up and down cycles work without blowing up the ware are probably patentable.

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4. Raw MaterialsA. Glass Technology

A meeting was held at Berlin with Glass Technology personnel to determine how and where they could help. A comprehensive review of batch materials used, sources of raw materials and methods of mixing were provided Glass Technology. Areas where Glass Technology could provide immediate help were defined. They include: Locate alternate vendors of lime and silica, chemical analysis of all batch materials as a prelude for writing tighter purchase specifications and analysis of Kaylo batch and product on a regular basis to determine chemical variation for future upgrading and process control.

B. Diatomaceous Earth

The current 10L-8 batch requires substantially less diatomaceous earth than previous batch formulations. Even so, diatomaceous earth is an expensive raw material. We need an alternate source for obvious reasons. Also, indications are a second source will create the competition needed to obtain lower prices. Active programs are underway with both Dicalite and United Sierra. Plant trials of a Dicalite material is tentatively scheduled for February.

C. Amosite Asbestos

A meeting was held with Mr. Cryor, President of North American Asbestos Corporation, concerning fiber length of amosite asbestos. The problem is purchase specs for amosite asbestos are so loose it is difficult to have any basis for rejection. This meeting was prompted by the fact it was the combined 'belief' of plant and R & D personnel K-3 asbestos shipped to Berlin last fall as the equivalent of W-3 asbestos was actually shorter and could have been a possible cause for lower product strength. A basis for evaluating amosite asbestos fiber length and for compliance with a specification also to be worked out is under active negotiation.

Mr. Cryor is also arranging to have amosite asbestos dry milled in either Africa or England for us. All other manufacturers of calcium silicates dry mill their asbestos (we wet grind). Plant trials will be made with the dry milled asbestos as soon as it arrives to determine whether improved product properties are possible.

D. Chrysotile Asbestos

Bauer McNott tests were run at Granville on 4T and 7D asbestos being used at Berlin. Both were found to be meeting our Purchase Specification as to fiber length.

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5. Alternate High Temperature Insulation ProcessesA. Process - New Facility

A comprehensive report is being prepared for Management concerning various processes which must be considered for the new facility and possibly later at Berlin. Various processes, including filter press, bonded aggregate, vertical casting, Crosfield and pan pouring are being reviewed in depth as to advantages and disadvantages of each, capital expenditures needed, throughputs and economics. The R & D report will issue on or about February 15.

B. Crosfield Non-Autoclaved Process

Arrangements were made with the Crosfield people to obtain samples of their product for physical property study and verification and a quantity of their calcium silicate raw material for sample preparation at Granville. As of the date of this report, neither has been received at Granville.

Product Development1. Stress Corrosion

The second 3,000 pound grind of 2399 glass from Philadelphia Quartz was released to Berlin for plant trials. A series of plant trials was made in January directed toward evaluating the batch formulations developed last summer and fall at Granville. These formulations are expected to produce harder stronger ware and lower batch costs. Samples are being shipped to Granville Product Testing Lab for physical, thermal and stress corrosion testing.

The 10L-ST5-1 batch poured on December 28 passed the 6 day stress corrosion test, but was marginal on the 10 day test (3 out of 10 samples cracked). This batch was identical to the one poured and approved last February (1967) by duPont except for the substitution of Philadelphia Quartz 2399 glass for Granville melted 2399 glass. The cause for this variation in results is currently under investigation.

2. 34 Inch Pipe

A substantial percentage of our offware at Berlin is defined as 'short ware'. A request was made last fall to Marketing to change pipe specifications from 35-7/8 inch to 35-3/4 inch and to market a 34 inch product, which could be salvaged from ware with broken corners. Substantial increases in 'packed' ware would be possible if Marketing approved these requests. Marketing rejected the pipe length specification change from 35-7/8 inch to 35-3/4 inch. They did agree, however, to the marketing of cut downs (34 inch). This program of salvaging cut downs was started in late January.

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3. Asbestos

The experimental program on replacement of asbestos by glass was resumed in January under the direction of Dr. C. L. McKinnis. Difficulty was encountered in dispersing chemically treated glass fibers without attrition to fiber length. Ways of circumventing this difficulty are now being investigated. In the interim experimental glass fiber Kaylo batches mixed with conventional equipment are being run to check the resistance of these chemically treated fibers against the corrosive action of the Kaylo batch.

4. Multi-Temp Pipe Fittings

R. F. Shannon and A. S. Kevlin, of I and C Marketing, met with Insul-Coustics on January 17 for purposes of reviewing the technical aspects of producing Multi-Temp pipe fittings. A detailed report will be prepared by Kaylo R & D covering the Multi-Temp process. Tentative plans call for Insul-Coustics to buy basic wool from OCF, mold to shape, saturate with the OCF developed inorganic saturant, dry, trim and package. The fittings will be marketed by OCF.

5. Careytemp

A report of R & D findings as to asbestos content of Careytemp was prepared and released to Marketing. It is surprising to note Careytemp contains almost as much asbestos as Kaylo, yet their boxes do not carry any warning label and no mention of asbestos appears in their literature.



R. F. Shannon

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