

PLAINTIFF'S EXHIBIT

GP-1306

SIX MONTHS REPORT
PRODUCT DEVELOPMENT &
TECHNICAL SERVICE DEPARTMENT

~~JUN~~ DEC
January thru June 1976

SGP 0014726

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SIX MONTHS SUMMARY

New products developed at the Tigard Gypsum Lab during the past five years contributed \$296,611 to gross profits and \$1,539,212 to net sales during the last half of 1976. The cost savings programs completed during this period are estimated to generate \$162,000 in annual savings in 1977.

New Products

The Firedoor project continues to command considerable attention. Some quality improvements were made that provide better handling characteristics and assure satisfactory performance in the 100,000 cycle door slam test. The possibility of a 1½ hour door is coming closer to reality as the pilot testing of doors with special gypsum edge banding continues.

The formulation of asbestos free joint compounds are still a high priority. A new substantially less expensive asbestos free ready mix is being adopted after a successful trial period. Asbestos free casein joint compounds and elimination of fibrous talc (considered as asbestos by OSHA) from wall texture are ongoing investigations.

A new heavier Pre-Dec coating has been formulated, but more drying capacity is needed before it can be manufactured.

Manufacturing Services

A competitive wallboard survey resulted in recommendations which should raise the level of our quality. An extended ready mix formula has been adopted by Akron, Chicago and Marietta and will save about 10¢ per five gallon pail. A new less expensive glass fiber type was tested and approved.

A serious spoilage problem in ready mix was investigated and action has been taken to correct the problem. The overall matter of preservation of ready mix is being reviewed in order to gain better protection at the lowest possible cost.

We have cooperated with Manufacturing in the evaluation of the lignosite/landplaster accelerator system which all plants are using and the addition of retarder which some plants are using. Although it is difficult to quantify the advantages, there is no question that there are varying degrees of benefit to operations using this accelerator system.

A lower cost Pre-Dec paint is being developed and there is a potential savings of \$2/M square feet.

Sales Services

The additional shear tests on Pre-Dec ceilings requested by Sales were completed in order to comply with the latest HUD mobile home requirements.

Competitive surveys on textures and asbestos free ready mix have pointed out our strengths and our weaknesses. As a result, some work is being done to upgrade our polystyrene ceiling texture.

A special ready mix was formulated for the Baltimore market in August and since then ten truckloads of the special formula have been sold.

We are arranging to co-sponsor some fire tests of the I-Stud shaft wall system. If successful, they could expand our use of the system to promote the sale of wallboard products.

Recruiting & Training

Our recruiting and training program for plant quality supervisors has continued with the transfer of Jack Sullivan to Fort Dodge and the hiring of Wayne Ciccarelli. Also, Acme and Sigurd have recently hired applicants who came out of our screening process.

SIX MONTHS SALES & PROFITS FROM NEW
PRODUCTS DEVELOPED WITHIN THE PAST FIVE YEARS

<u>Product</u>	<u>Sales Volume</u>	<u>List Sales</u>	<u>Gross Profit</u>
Sentinel Wallboard (all)	781	\$ 70,996	\$ 7,729
Polystyrene Texture	6,138	22,249	4,684
Firedoor Cores (Raw)	1,760	23,005	6,179
Firedoor Cores (Banded)	7,514	187,850	67,887
Fire Retardant Wood	36,862	12,549	3,855
Asbestos Free Vinyl Topping (Chicago and Marietta)	114,867	211,778	27,595
Asbestos Free Vinyl Bedding (Chicago and Marietta)	12,520	25,300	3,657
Asbestos Free Vinyl Triple Duty (Chicago and Marietta)	75,617	143,442	12,878
Asbestos Free Vinyl All Purpose (Chicago)	3,620	6,756	679
Modified Casein Topping (Akron and Chicago)	140,982	297,097	78,839
Modified Casein Bedding (Akron and Chicago)	23,401	48,052	9,910
Modified Casein All Purpose (Akron and Chicago)	137,680	291,486	73,049
Asbestos Free Ready Mix (all)	49,068	<u>198,652</u>	<u>(330)</u>
Totals		\$1,539,212	\$ 296,611

*ESTIMATED COST SAVINGS
TO BE REALIZED IN 1977

Conversion to M Glass Fiber	\$ 75,000
RM Savings for 1 Gallon Ready Mix	6,685
Extended Ready Mix at Akron, Chicago & Marietta	65,484
Revision of Chicago Ready Mix Formula (Sericite Reduction)	5,528
Revision of Chicago Asbestos Free Vinyl (Extended)	<u>9,214</u>
Total	\$ 161,911

*Based on 1976 shipments

NEW PRODUCT DEVELOPMENT SECTION

SGP 0014732

NEW PRODUCT DEVELOPMENT1. Firedoor Cores

Most of the recent effort has been to improve the strength and quality of the core so it will pass the 100,000 cycle slam test. Cal-Wood Door Co. had conducted some slam tests experiencing failure after only 3,000 cycles. Our testing of doors with production cores did better, but still fell well short of the 100,000 cycle test that is in the tentative standard. Compressive strengths and densities were well within our specification so we began to measure tensile strength, comparing the value to the Kaylo (Calcium silicate) core. We found that our core had a significantly lower tensile strength than Kaylo. Additional binder increased the tensile strength and finally an increase from about 1.5 lbs. to about 2.0 lbs. per core gave tensile values very close to Kaylo. Cores were made with increased binder and doors for slam testing were processed from these cores. Three doors tested survived the 100,000 cycle test with little or no deterioration. On November 1, the level of binder was arbitrarily increased on the basis that the higher quality core would perform better, which the slam tests ultimately proved to be true. The level has since been reduced to 1.8 lbs. without substantially reducing the tensile strength. Two other quality aspects of the core being studied are the adhesion of the veneer to the treated edge banding, and the adhesion of the end grain of the rail to the side grain of the stile. The latter problem causes rejects during the sanding when the lack of adhesion permits the end rail to break away.

Slow progress is being made on the 1½ hour door. In addition to the gypsum edge banding, treated particle board will be tried. Doors tested thus far with the gypsum edge banding are about five minutes short of the 1½ hours. The top rail is the problem and it may be necessary to eliminate any wood there and have only the gypsum edge band. There is also some question whether fire retardant wood is necessary since the wood is gone by the end of the test anyway. Future pilot testing should give us the answers and hopefully put us in a position of recommending a test at Warnock-Hersey.

In preparation for a future firedoor plant in the midwest, we have written to Underwriters' Laboratories for an application to get the same coverage as we have at Warnock-Hersey plus a 1½ hour rating. The U.L. tests for the 1 hour rating are estimated to run \$10,000 and to get the additional 1½ hour rating and coverage for the special edge banding would run about another \$13,000. In view of the huge expense and also the time consuming process and difficulty in working with U.L., we want to be certain the U.L. rating is necessary before proceeding. On the other hand, U.L. tests take a great deal of time to arrange, so if they are needed, we should begin as soon as possible.

2. Asbestos Free Ready Mix

In addition to the change to asbestos free ready mix in 1 gallon pails, there has also been a transition to more demand for asbestos free ready mix in five gallon pails. Presumably the asbestos free ready mix is being accepted, but we would only hear comments from shipments of five gallon pails. Two plant problems have been viscosity control and at Milford there was difficulty achieving a lump free mix. The use of Type III cement has lessened the viscosity problem and a smaller batch size corrected the lumpy mix at Milford.

The new asbestos free ready mix with Galactasol and Minugel instead of Methocel and Attagel has been tried at all the plants except Acme and the trials have all been favorable, so the formula change will be made as soon as the supply of Methocel and Attagel are used. The new formula will have 20¢ per pail lower raw material cost and be within about 6¢ per pail of the standard asbestos ready mix raw material costs. Acme's regular ready mix formula already contains Galactasol so there is not much opportunity for cost reduction. Their current asbestos free has a 30¢ per pail higher raw material cost than the regular.

3. New Pre-Dec Pattern

Sales has asked us to come up with a different pattern for Pre-Dec, preferably a coarser texture. Inasmuch as this coating will contain more material and be more difficult to dry, the cost would be higher, so an objective was set at \$5/M over our present Pre-Dec cost. A paint formula with a coarser sand has been formulated and simplified to lower the per gallon cost and make it easier to dry. A substantially heavier pattern can be produced with this paint. Two trials were made at Acme, but in each case there was insufficient drying capacity and the coating bubbled instead of drying. Acme has additional infrared drying units to install, so another effort will be made at that time.

4. Wall Texture

Our wall texture contains a fibrous talc considered by OSHA to be under the same regulations as asbestos. An all-out effort is being made to find a substitute for the talc. Diatomite seems to offer some possibilities, but viscosity stability is still a problem. Stabilizing the viscosity through pH control is being tried.

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MANUFACTURING SERVICES SECTION

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MANUFACTURING SERVICES1. Wallboard Accelerator

Some vibratory ball mill grinders were tried to see if they would be more efficient than our accelerator ball mills, but they weren't. It apparently would take a much larger vibratory ball mill than we tried which would be prohibitively expensive. We have recommended instead that plants which require more grinding capacity should install two ball mills in series.

Some plants have also adopted the use of retarder in conjunction with the lignosite/landplaster. This is of particular advantage for plants that calcine continuously. The retarder reduces the initial stiffening and reportedly lowers evaporation and improves quality. Further work on the accelerator system will be done at the plant level.

2. Competitive Wallboard Survey

The third in a series of competitive evaluations of $\frac{1}{2}$ " wallboard was conducted in August. On the basis of the tests conducted our board showed good bond and formation properties but had lower core hardness and weaker flexural strength than competition. It was recommended that paper weight be increased to provide greater strength and that caliper be reduced without any weight change so the net effect will be greater core hardness.

A concurrent survey of water resistant tile backing boards was made which showed all but one competitor with better water resistant properties than G-P.

Future surveys at approximately six month intervals are planned to keep us aware of our general quality status in the marketplace. We will eliminate some of the less important tests in the next survey but perhaps have the plants submit samples from two different markets if that is feasible.

3. Ready Mix Spoilage

Akron, Acme and Marietta have all gone through a serious ready mix spoilage problem. We originally thought it was due to inadequate clean-up of the mixing and filling equipment. While this was probably a factor, Acme proved to us that in their case the primary cause of the spoilage was the introduction of sorbitol, which is a sugar used to counteract the previous year's major problem of boric acid intolerance. Sorbitol is apparently a favored bacterial nutrient and either more protection or less sorbitol will be necessary to prevent a recurrence. The level of sorbitol has been reduced and retained samples as well as several test series are being closely monitored to be sure the problem has been rectified.

4. Ready Mix Preservatives

Independent of the spoilage problem, an evaluation of ready mix preservatives is continuing. Specifically, we are searching for non-mercurials that will be both economical and effective. One candidate that appears to have promise is a liquid preservative called Proxyl.

Currently, the plants are using either Dowicil (non-mercurial powder) or either Troy or Cosan's phenylmercuric acetate dispersed on a dry powder. It would be better economically if we could use the liquid phenylmercuric acetate. The mercurials and effective non-mercurials such as Proxyl, are hazardous to handle, however. An enclosed system for dispensing liquid preservatives is being investigated to provide a completely safe method for metering these toxic materials so we can take advantage of the economics and be in a position to eliminate mercurials if that becomes necessary.

5. Plant Asbestos Surveys

The measurement of airborne asbestos to be sure the plants meet the levels allowable by OSHA are continuing. However, we have reduced these to once a year rather than every six months. The relaxation of surveys was proposed on the basis that past measurements at all plants show that we are below the two fiber per cc OSHA limit.

6. Lower Cost Ready Mix

Akron, Chicago and Marietta have adopted the extended formula in which additional limestone was added to incrementally reduce the other dry ingredients. The formulas have been changed to reflect this and the savings will amount to about 9¢ per pail. The Acme formula is already quite low in raw material cost and does not lend itself to a filler extension and Milford's operation makes it a doubtful candidate for the extended formula.

Still another cost saving generated at Chicago was a reduction in the amount of sericite mica used. This will save 3¢ per pail.

7. Lower Cost Dry Vinyl Products

A similar raw material savings has been made in the asbestos free dry vinyl products at Chicago by extending them with additional limestone. The raw material costs were reduced by 5¢ per bag.

8. Glass Fiber

Trials of a chopped M fiber which is less expensive than the regular roving have been underway. The chopped fiber has to be fed through the pulp system and although initial runs looked favorable, it was found that there was simply too much disintegration of the fiber.

Owens/Corning has introduced an M fiber roving which sells for 6¢ per lb. less than the regular G filament roving. Lab and plant trials have been completed showing that the cutting and dispersion properties are satisfactory and the end products (5/8" and 1/2" type x) both meet the proposed ASTM standard. Purchasing will order this M glass fiber roving on all future orders as soon as it is available. There is apparently some temporary hold up in the availability. The annual savings would be \$75,000 based on 1976 glass usage.

9. Lower Cost Pre-Dec Paint

Some effort has been devoted to a simpler formula paint which is estimated to save \$2 per M square feet. We want to conclude this work and conduct a plant trial as soon as possible in view of the potential savings.

10. Analyses

The landplaster, stucco and rock samples which are submitted by the plants for analysis gave mostly expected results. The two exceptions were high salt determinations on some Grand Rapids samples and one month in which Brunswick purity was about 5% lower than usual.

11. Miscellaneous

Other minor projects included evaluation of the new type Denscal from Blue Rapids, testing of lignin wallboard dispersants for Bellingham and attempting to devise a material safety data sheet for formulated industrial products.

12. Waste Gypsum

A sample of waste gypsum from a Japanese desulfurization process was examined and found to be high in purity and to hydrate normally. This process has been proposed to Delmarva Power and Light Co. in Wilmington.

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SALES SERVICES SECTION

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SALES SERVICES1. Pre-Dec Shear Tests

The higher shear values requested by Sales as a result of a change in the HUD requirement were obtained. This involved testing using staples on 4" centers instead of 6" centers. At the same time a shear value was achieved for joists on 24" centers instead of 16" centers.

We hoped to have the tests conducted through the Gypsum Association, but it became obvious that this process would be too slow. As it turned out, the Gypsum Association test program still isn't under way. The new label we will be printing on our Pre-Dec is as shown below:

BROWN WALLBOARD		TYPE
CLASSIFIED BY		GPFS-7
UNIVERSITY MECHANICS INC.®		F
LITTON INC. 13-1101		
HPL BOARD, GYM. FINISH, - COATED SURFACE		
FLAME SPREAD 20 - FUEL CONTRIBUTED 5 - SMOKE DEVELOPED 0		
SHEAR RESISTANCE CLASSIFICATION FOR CEILING CONSTRUCTION ONLY		
TENS. SPACING ↔ 16 IN. O. C. MAX.		
APPLICATION A		APPLICATION C
ULTIMATE SHEAR RESISTANCE, PLF	250	411
SHEAR RESISTANCE 12 HR. LOAD, PLF	125	-
INSTRUCTIONS - FASTEN TO TRUSSES WITH STAPLES (SEE BELOW) AROUND PERIMETER WITH CROWNS PERPENDICULAR TO AND CENTERED ACROSS THE JOINTS AND PARALLEL TO AND 1/4 IN. FROM THE BOARD ENDS, AND 1-1/4 IN. NO. 8 WOOD SCREWS WITH 1 IN. DIAMETER ROSETTES AT 24 IN. ON CENTER IN THE FIELD.		
APPLICATION A - NO. 16 GAUGE STAPLES, 1 IN. LEGS, 7/8 IN. CROWN, SPACED 6 IN. O. C.		
APPLICATION C - NO. 16 GAUGE STAPLES, 1-1/4 IN. LEGS, 1 IN. CROWN, SPACED 4 IN. O. C.		
SEE U.L. CLASSIFIED BUILDING MATERIALS INDEX		
200 SWETH GEORGIA PACIFIC CO. PORTLAND, OREGON		

2. I-Stud Shaft Wall

We have investigated further testing of the I-Stud shaft wall. In view of the difficulty in passing these fire and hose stream tests from both sides, plus the variations such as the stairwell version, make the testing an expensive proposition. Two opportunities to co-sponsor tests are being investigated. One is a small scale test in Los Angeles with Flintkote and Studco and the other is a U.L. test program with Domtar and Westroc. We have already arranged to cooperate in the Los Angeles test since our investment will be minimal there and have requested an application from Underwriters' in the U.S. to determine what will be necessary to enable us to cooperate with Domtar and Westroc in the test program at Underwriters' of Canada.

3. Special Ready Mix for Baltimore

At the request of Sales a special ready mix was formulated to try to satisfy Vine Street Supply in Baltimore. Several previous attempts had been unsuccessful, but it was decided to try a formula that has been well accepted in Chicago. Apparently Vine Street is now satisfied because we have shipped nine truckloads since the trial in August.

4. Competitive Texture Survey

An analysis of competitive textures accumulated from the various markets was made. These included vermiculite and polystyrene aggregate ceiling types as well as non-aggregated wall textures. We found that our wall texture and vermiculite types were at least as good and in most cases better than all the competitive products tested. However, our polystyrene texture does not have as much coverage as Hamilton, which is a preferred texture on the West Coast. As a result, we will be striving to improve the polystyrene texture.

5. Competitive Asbestos Free Ready Mix Survey

A comparison of asbestos free ready mix products showed that U.S.G. had improved their product but neither U.S.G. nor National has as good viscosity stability as ours. This is the property imparted by asbestos. In short, we have an edge on our competition.

6. Complaints

We became involved in the investigation of two complaints on casein products. One was a lack of adhesion to corner bead which appears to be caused by a corrosion on the bead and the other is a Chicago complaint on cracking, etc., which we feel was caused by cold weather conditions.

We are suggesting that G-P recommend against using topping as a first coat over corner bead and make some specific recommendations in regards to use of joint compound products under cold conditions.

7. Sweets Literature

We participated in the revision of our literature for the 1977 Sweets Catalogue.

INDUSTRY REPRESENTATION SECTION

SGP 0014743

INDUSTRY REPRESENTATIONASTM

We have continued to vote against the proposed ASTM wallboard application standard that would permit using $\frac{1}{2}$ " gypsum wallboard on textured ceilings where the supports are 24" o.c. Some consumer representatives of ASTM tried to have our negative ruled non-persuasive but without success. It will have to be re-balloted at the Sub and Main Committee level to resolve our negative. Hopefully we can get some support to avoid an ASTM standard that would make us vulnerable to sagging complaints.

The proposal of the Houser bench test to identify type x board rather than a full scale test will be submitted shortly. Our $\frac{1}{2}$ " and $\frac{5}{8}$ " type x board meet the proposed standard and we think it is a good alternative to the full scale test now used to determine type x.

Gypsum Association

The major subjects being considered by the Technical Committee are:

1. Shear Values for MH Board

The Association proposes to conduct an engineering study at U.L. using selected shear tests donated by member companies to result in a U.L. listing for all the member companies. The primary advantage of a common listing is that this would be the basis for conducting future shear tests through the Association and thereby eliminate future duplication in testing.

2. Fire Resistance Design Manual

The Manual is being revised again as a part of the continuing program to keep it current. The schedule is to have it ready for re-printing by next Spring.

3. Testing Program

A party wall was tested hoping for 50 STC but fell short of the objective. It has been proposed that a fire test of a suspended gypsum board ceiling under wood joists be conducted. This is apparently a construction that would be desirable to have from a building code standpoint.

4. Sheathing Tests

A racking test program for $\frac{5}{8}$ " type x sheathing is being planned.

5. Research Associate Program

The Fire Section of the Bureau of Standards is planning full room testing and the Gypsum Association representative will no doubt become involved in this as well as the mobile home fire test program.

PATENTS & LEGAL ASSISTANCE SECTION

SGP 0014746

PATENTS & LEGAL ASSISTANCE

1. National Gypsum Patents
3,740,912 & 3,921,346

National Gypsum Company claims that we are infringing the above patents by our promotion of the I-Stud shaft wall system. This is being reviewed with our attorneys, Synnestvedt & Lechner.

2. Lyons Case

We have furnished some information to the Legal Department in this suit against us by a former worker in a metal casting shop claiming that he became disabled by working with our metal casting plaster.

3. Firedoor Core

The patent examiner has rejected all of our claims and it appears that we will have to narrow the claims in order to have any chance of overcoming his objections. We believe that it is wise to pursue the firedoor patent since it now appears that we will expand these operations. It could be particularly valuable if codes are ever changed to require 1 hour doors where 20 minute doors are now specified.

4. Lignosite/Landplaster Accelerator Patent Application

A patent application was filed in October covering the lignosite/landplaster accelerator mixture that all of our plants are using. The patent will be primarily for protection of the idea, but it is conceivable that it would be licensable.