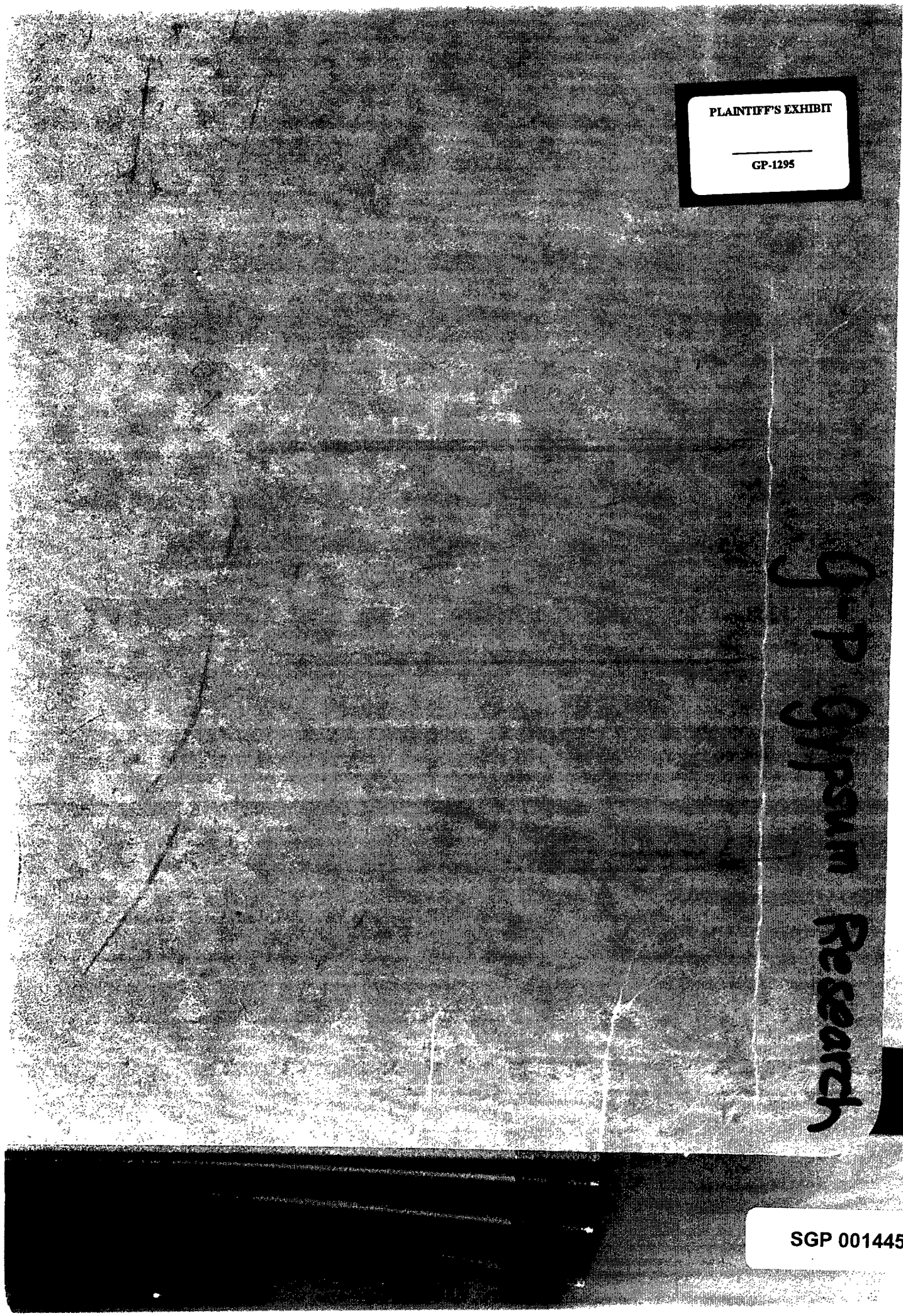
PLAINTIFF'S EXHIBIT
GP-1295
GP Gypsum Research
SGP 0014458

G E O R G I A P A C I F I C

G Y P S U M R E S E A R C H

JANUARY TO JULY

1971

SGP 0014459

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SUMMARY

New products developed through Gypsum Research contributed $655,594 gross profit to the Division in the first half year.

The G-P elevator shaft liner system and Pre-Dec wallboard for mobile homes are two new developments which proved to be good profit makers. We have leap-frogged our competition in providing one of the most economical methods for enclosing elevator shafts in high rise buildings. Jobs using our system are in progress in Portland and Chicago, and Sales tells us that others will follow. In addition to the substantial volume of gypsum in the shaft wall, it provides an inside track to sell other products for the interior partitions in these buildings. Pre-Dec has been responsible for $145,110 profit in the first half of 1971. This is an excellent example of our ability to sell a low cost commodity for which there is an existing market. The manufacture of Pre-Dec is being considered at other plant locations in addition to Acme.

Our entry into the panel and stud adhesive business has met with some problems of acceptance by users of solvent type products. This can be a profitable business for us, so an all-out effort is being made to improve the market acceptance.

Some brand-new developments are just beginning which should keep the momentum going. At the suggestion of Alex McCaskill and using the commodity approach, we are investigating the possibility of manufacturing a low cost vinyl covered wallboard. The objective is to increase the sales and profits from our captial investment in laminating equipment. Another recent development and a potential new outlet for gypsum board is a so called "exterior gypsum wallboard." This product serves as a base for the application of an acrylic coating on the outside of a building. We are working with Kelly-Moore, who supplies the acrylic coating, to evaluate this new exterior finish. Pictures of the gypsum board/acrylic texture finish are shown on pages 8, 9, and 10.

Under product improvements, a new line of wall and ceiling textures is being introduced. The new textures have been well received in the market and the raw material cost is substantially lower. The slow transition from casein/limestone to vinyl/gypsum joint compounds at Acme is about 80% complete. Now instead of facing a decision of whether to continue manufacturing joint system at Acme, a larger and more efficient operation is being planned.

The royalty return from Firestop licensing has grown to about $250,000 annually. The increase in royalties has been due to our continued

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development of Firestop products, management's enforcement of the patent, and stricter building code requirements for fire protection. The basic Firestop patent expires in 1973, but we have another patent which will issue shortly and sustain a significant portion of our Firestop royalty potential for another seventeen years. We have licensed The Celotex Corporation under our shaft wall patent application and this will add to our future royalty income. The sales of G-P Firestop products has continued to grow, and at a faster rate than our competition, so the royalites make additional profit on the sales of our competitors.

As we have seen, research is important to develop new and more profitable outlets for gypsum products. Equally important is the timing of the development and the provision of facilities to manufacture the product. In most instances, our timing has been good, but in some cases it could have been better. The shaft wall, Pre-Dec, and gypsum joint compound projects all appear to have been well timed. The improved texture line is several years late and it will take a big sales effort to take full advantage of the work that has been done. In most cases we should be researching the product years before the market develops - so that when the demand occurs, the product has been fully tested and is ready. It would help if we had more market information than is currently available. Such knowledge would make our efforts more effective and improve our timing to maximize the profits from new developments.

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ANALYSIS OF SALES & PROFITS FROM NEW PRODUCTS

January Through June 1971

Unit	Product	Sales Volume	List Sales Amount	Gross Profit Amount
MSF	Denscote Base (All)	8,208.4	$ 297,424	$ 26,892
Tons	Denscote Plaster (All)	1,447.7	82,949	15,417
MSF	Tile Backer Board (All)	6,203.1	411,880	153,925
MSF	1/4" Sound Deadening Board	3,150.8	101,658	21,696
MSF	Radiant Heat Panels (All)	124.4	49,083	(7,759)
MSF	Pre Dec Wallboard	8,381.8	476,707	145,110
MSF	Pre Dec Ceiling Tile	2.1	184	53
MSF	Shaft Liner Panels	108.6	19,597	1,521
M Lin. Ft.	"T"-Spline	43.7	6,898	1,367
M Lin. Ft.	"L"-Runner	10.0	930	132
M Lin. Ft.	"J"-Channel	9.0	1,606	80
Pails	Ready Mix	515,413.4	1,599,292	226,006
Cartons	Ready Mix	2,572.1	7,028	62
Tons	Triple Duty	2,198.2	289,976	54,979
Tubes	Panel Adhesive	89,724.0	32,135	11,703
Tubes	Drywall Adhesive	6,924.0	5,055	1,242
Tons	Bestex A (All Plants)	675.5	89,384	642
Tons	Bestex B (All Plants)	48.2	7,969	374
Tons	Bestex C (All Plants)	278.0	43,977	351
Tons	Bestex D (All Plants)	167.1	25,677	(885)
Tons	Speedset	172.5	26,749	2,035
Each	Thermostats	218.0	1,318	362
Pounds	Insulated Nails	204.1	1,571	289
	TOTAL:		$3,579,047	$655,594

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NEW PRODUCT SECTION

Mastic Adhesives

Our entry into the adhesives field got off to a rocky start when the panel adhesive did not receive good acceptance because it did not have the quick tack property that solvent adhesives have. Efforts to quickly incorporate this quick grab property into our adhesive were inadequate. We find that in applying pre-finished paneling, the installer often relies on the adhesive to hold the panel in place rather than nails. This should have come out in the field evaluation over a year ago, but we were unable to get field tests through the branches. The adhesive we have is satisfactory for the application of gypsum board, but the big market is for a panel adhesive. An intensive program is underway to develop a high tacking product that will be acceptable as a panel adhesive.

Gypsum Firedoor Filler

The fire test of the gypsum firedoors made at Curtis was held in February. The gypsum door passed the fire resistance portion of the test but failed the hose stream by a few seconds. Instead of the 1-hour Class B rating we were seeking, we received only a 3/4-hour Class C rating. It does not appear that there is much value to the Class C rating. The 1-hour rating can probably be achieved on a second try by applying the knowledge gained from the first test. It has been decided to see if we can get some commitments from some of the door manufacturers as evidence that there is sufficient volume to justify another fire test. In order to do this we have shipped six gypsum door cores to each of two door manufacturers. We plan to have them make doors with these cores. We will furnish a price for the gypsum cores to these manufacturers and also to Curtis, who has already made some gypsum doors. If it looks like there is sufficient interest from these manufacturers, we can proceed to contact others. If there is not, we will be inclined to abandon the project.

Following are photographs of wood banded gypsum cores being processed into doors:

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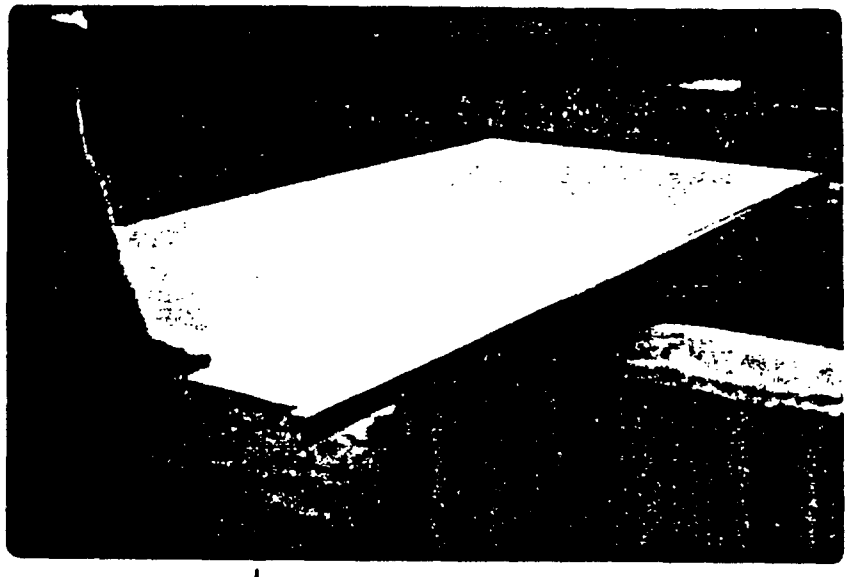
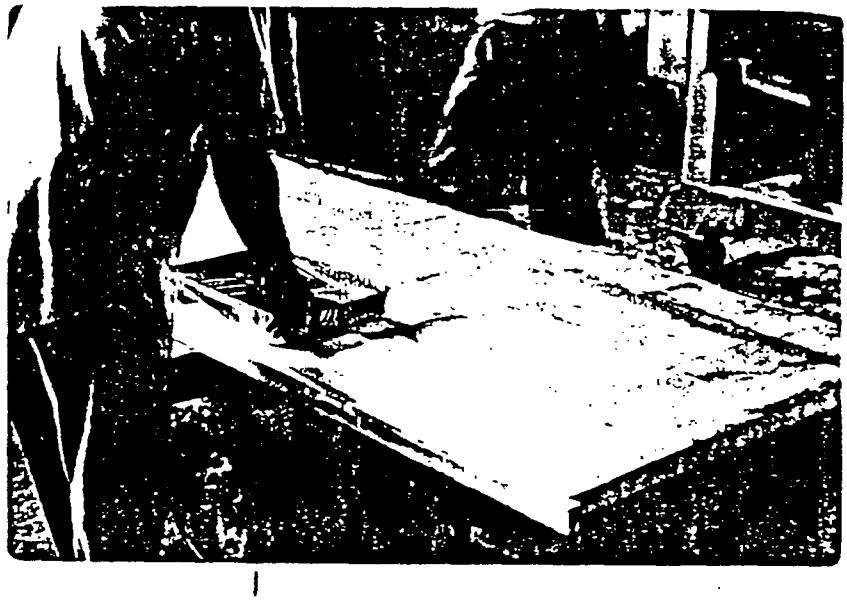


Sanding the Core



Priming the Core
with Diluted Adhesive

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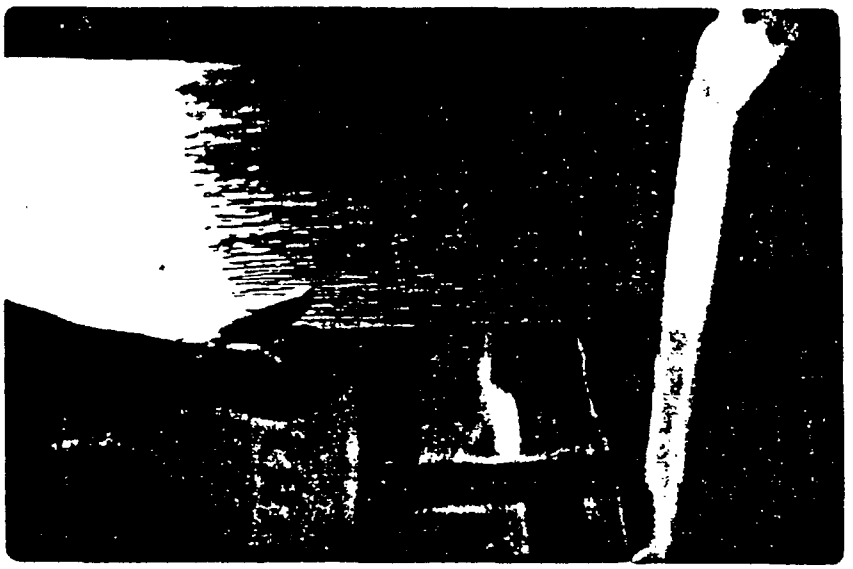
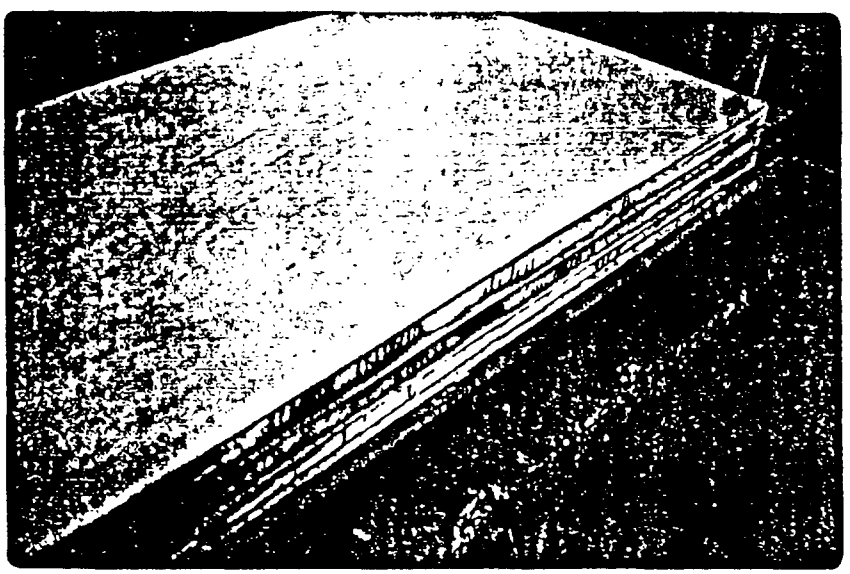


Applying the Adhesive
to the Skins



Stacking before the Cold Press

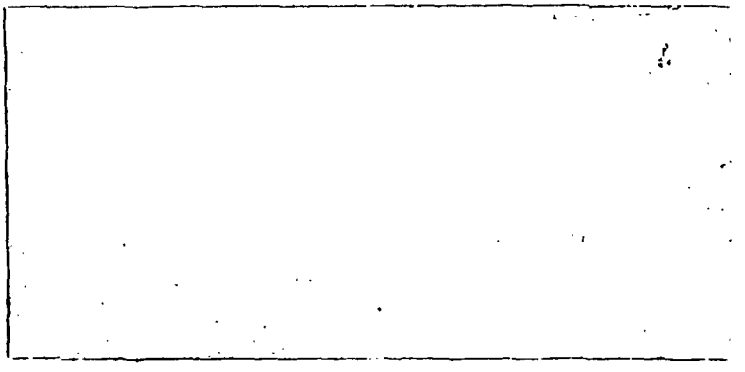
SGP 0014468

Pre-Dec Wallboard

The development of Pre-Dec has continued along several lines:

1. Improvement of the Existing Product

The color and touch-up properties were enhanced by the addition of a wetting agent. A new type sleeve has been found for the coater which is giving more uniform coating and better wear properties. A swatch of the Pre-Dec coating is shown below.

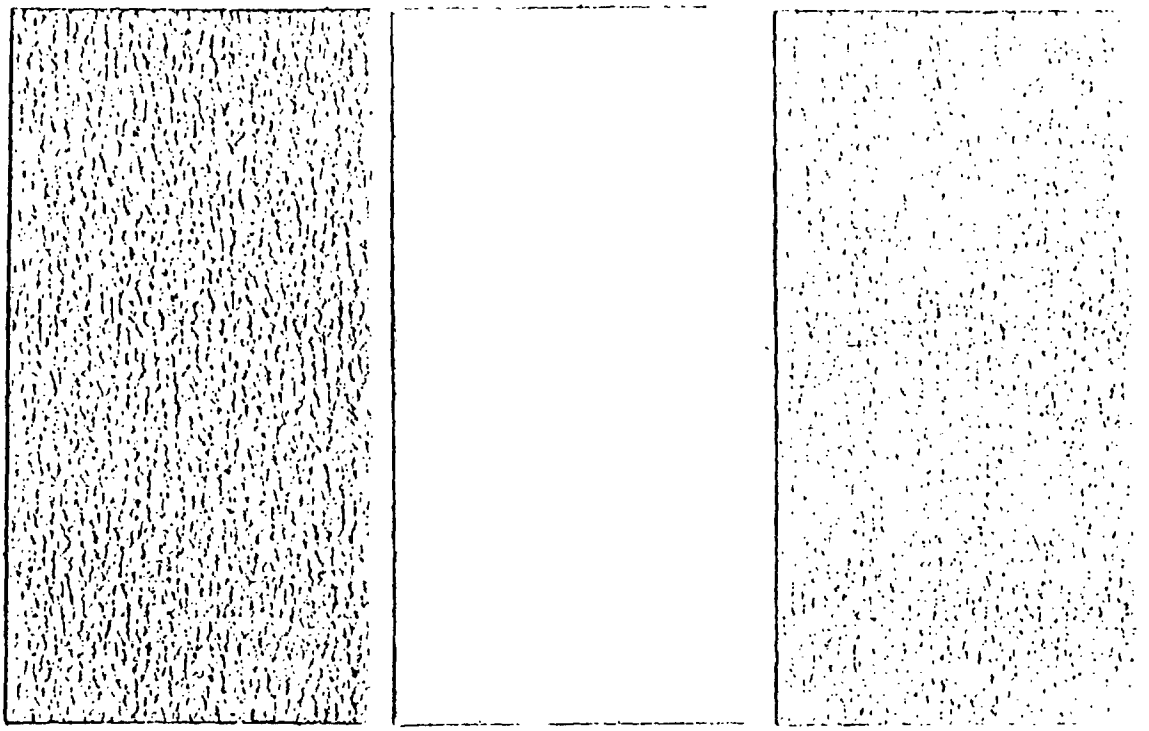


2. Expanding the Product Line

Sales advised that there was a need for a ceiling product which would eliminate the rosette fasteners. In response to this request, a heavy textured Pre-Dec was developed which could be installed with nails or screws and the fastener heads concealed with the touch-up paint. The problem is that we do not have enough drying capacity for this heavier coating. A quantity will be coated and air dried (to prevent bubbling of the paint which occurs in the existing dryers). These boards can then be used to assess the potential before investing in special drying equipment.

Also at the request of Sales, a gold, a green, and a beige Pre-Dec have been developed having a finer texture. We believe the color Pre-Dec will be used on walls, and, if it is, the finer texture will be more suitable. Colored Pre-Dec samples follow:

SGP 0014469

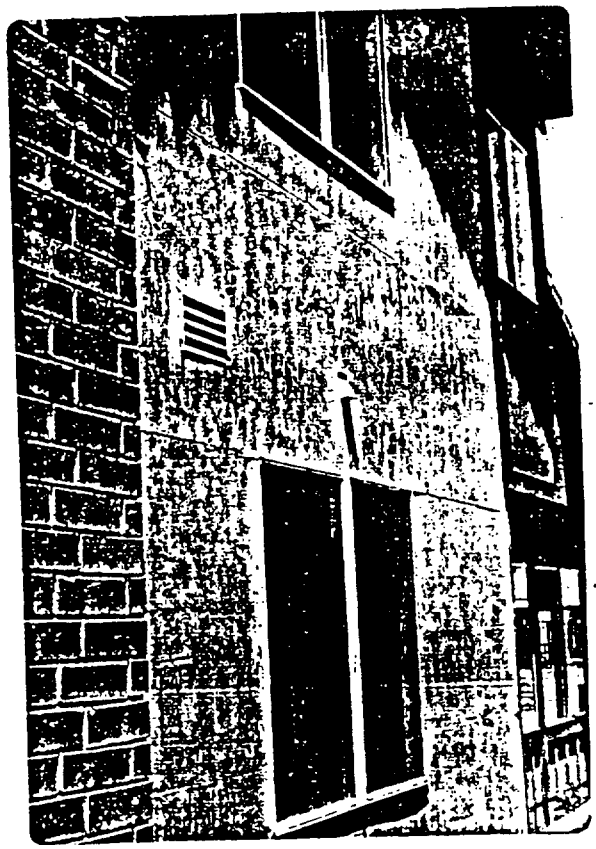


Gold Beige Green

Exterior Wallboard

We have become aware of a new use for gypsum wallboard. This new application is a base for a spray-on acrylic coating for building exteriors. It is being substituted for Portland Cement exterior stucco which is common in California and elsewhere. The following photographs depict the various steps in the application of the board and the coating and some of the finished houses:

SGP 0014470



Wallboard Nailed to Framing



Sealer Applied; Nails Spotted; Joints Taped and Covered

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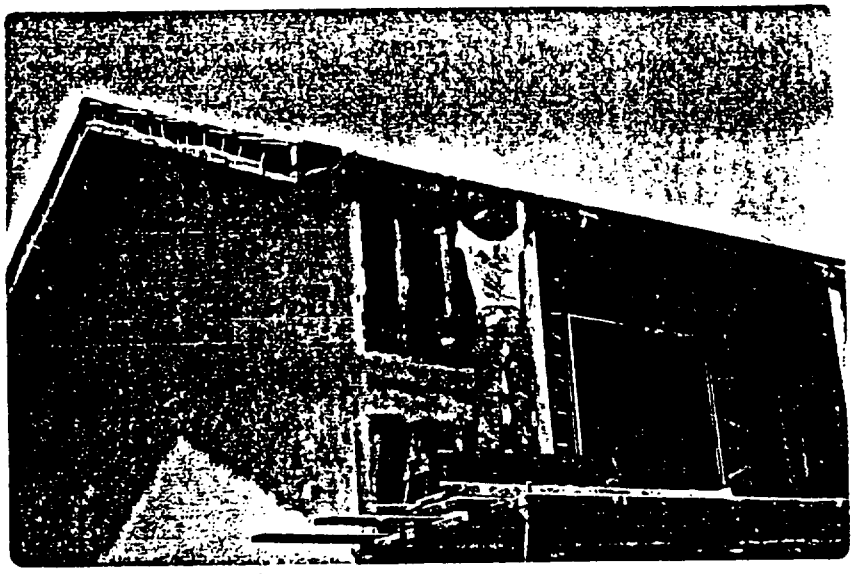

Trim Masked



Acrylic Coating Sprayed On

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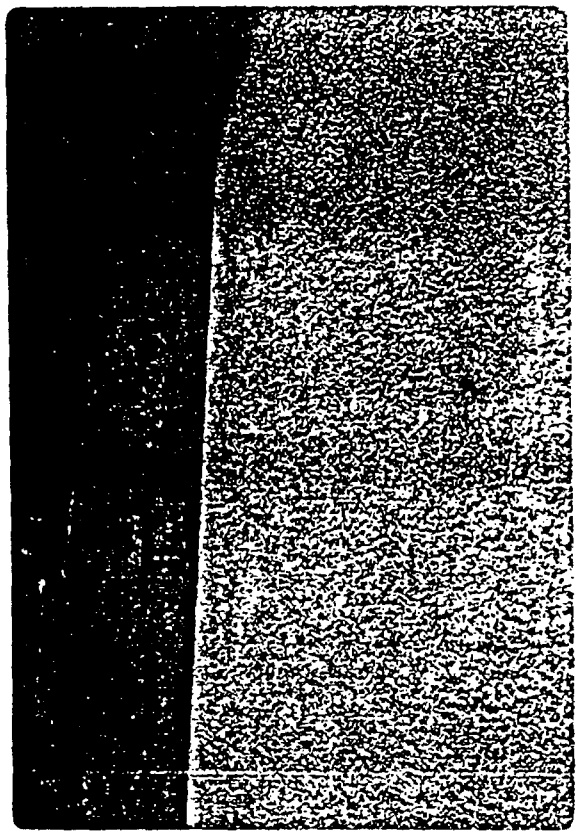


Finish Texture Surface



Completed Houses

SGP 0014473

We are furnishing a so called "5/8 inch exterior board" for this system. The system we are marketing is limited to Kelly-Moore's acrylic surfacing and they are restricting it to certain areas in California. We are starting a testing program to supplement what Kelly-Moore has already done. Exposure panels will be constructed and subjected to our weather conditions in the Northwest. We are also proposing that a full house trial be conducted in the Portland area. If the surfacing and the system proves to be serviceable over a period of years, it could gain wide acceptance. Advantages are low cost, speed of installation, and resistance to discoloration and staining. Our plan is to follow the houses being completed and conduct as many tests as practical so that if the market develops we will have the experience to guide us in determining how to take maximum advantage.

SGP 0014474

IMPROVED PRODUCTS SECTION

Gypsum Textures

Our objective in developing a new line of textures is a) to improve the market acceptance to increase volume, and b) to reduce the raw material cost to improve the profitability. Our only hope to accomplish the cost reduction was to be able to use gypsum instead of limestone as the filler and vinyl or starch instead of casein as the binder. This fit into the over-all program at Acme to eliminate the expensive casein/limestone formulas. We also manufacture texture at Akron where the gypsum is too dark in color so it was necessary to work with limestone here.

The first approach taken was to find a pigment system which would provide the optimum hiding and coverage. Once this was done, we searched for the right combination of the binders, fillers, water retention agents, and aggregates. The initial formula consisted of a vinyl binder. This texture was tested in Memphis and performed well enough that more than a thousand bags were sold. During the field testing, it was found that there was room for even more improvement. The texture required high pressure to break up easily during application and dried out fast making cleanup rather difficult. The textures were re-formulated and a combination of a starch and a gum were used in place of the vinyl binder. This time the texture received even better acceptance in the difficult Memphis market. Trials in the Florida and Denver markets were also favorable and in late June we ceased manufacturing the old casein/limestone textures at Acme, replacing them with the gypsum/starch formulas. In addition to the better acceptance, the raw material cost of the aggretated texture was reduced from $1.85 to $1.05 per 40 lb. bag. The cost of the non-aggregated texture was reduced from $1.07 to $.71 per 25 lb. bag. This takes us from a loss position to a profitable one providing even more incentive to increase texture sales.

Concurrent with the gypsum base textures at Acme, limestone textures for Akron were developed with the same pigment and adhesive systems. These textures are slated to be field tested late this summer. The raw material cost reductions will not be as substantial as those realized at Acme, but they will still be significant. All the textures are color matched so that any cross shipments from Acme or Akron should not cause any problem.

The finishing touch for a complete texture system is to have an expanded polystyrene aggregate. Engineering is working on the layout of equipment to expand and shred this aggregate.

SGP 0014476

Gypsum Joint Compounds

Our efforts to develop a satisfactory All Purpose with a gypsum/vinyl formula at Acme met with considerable resistance in the field. While there was some acceptance, certain markets, notably Memphis and Oklahoma City, would not use the new product. In the meantime, we were losing money on every bag of limestone/casein All Purpose that was sold. The Ready Mix has been successfully converted to a gypsum formula and we have been furnishing it for over a year. Also, the Central Mix had gotten acceptance, but the All Purpose proved to be a different matter. After much re-formulating and re-testing, all of which exasperated everyone involved, a formula was found which has satisfied users in Memphis and Oklahoma City. The same formula has been tested as a Triple Duty (in lieu of the limestone Triple Duty) and again favorable reports have been received. Through persistence, a difficult problem of acceptance was solved. The only remaining casein product to be eliminated is Topping and we are diligently working to develop a suitable gypsum/vinyl substitute. When accomplished, this will complete the transition at Acme restoring the profitability to an operation that had become a losing proposition.

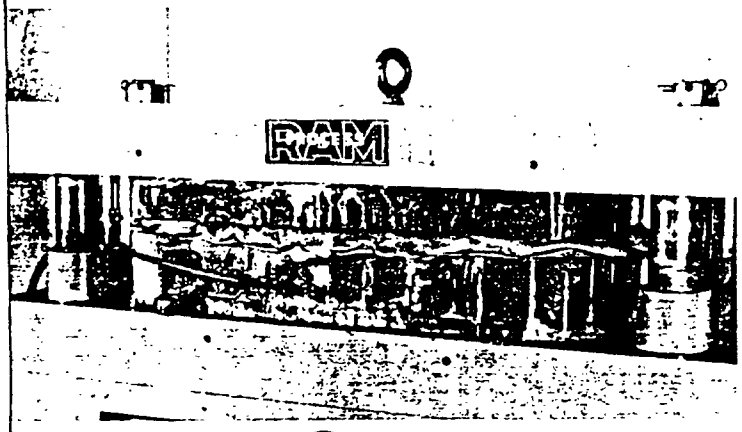
Ram Press Process Plaster

George Fowler, our industrial engineer from Blue Rapids, proposed that we go all out to make our Ram process plaster competitive to U.S.G. It was suggested that we do this by working with the people who manufacture the Ram pottery presses. It was decided to proceed with at least one visit to Ram to see if we were making progress. Before doing this, quite a lot of work was done at Blue Rapids to develop a formula which would be as close to U.S.G's Ceramical as possible. A formula consisting of equal amounts of Densite and Denscal, white Portland cement, gum arabic, and the optimum combination of set control agents was sent to Ram Inc. to be evaluated in comparison with Ceramical. The photographs illustrate the Ram pottery making process.

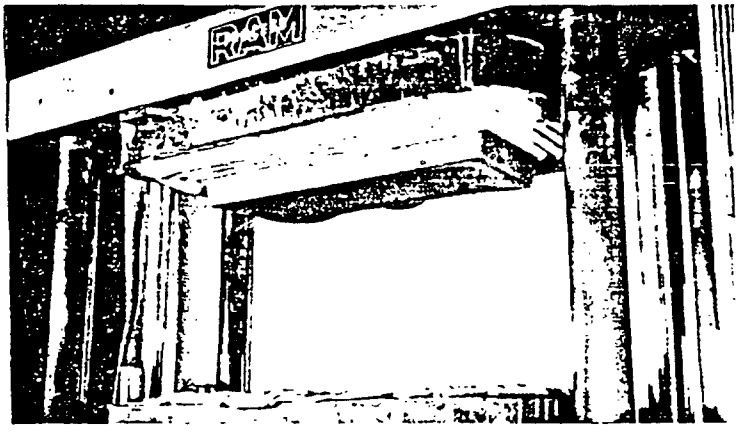
SGP 0014477



Above, the operator places the clay charge on the lower die member and the die is then closed. Below, the lower die member is pressurized by compressed air.



Pressurizing releases the ware from the lower die member and the ware adheres to the upper die member when the die is opened automatically, as shown below.



The top die member is then pressurized releasing the pressed ware into the operator's hands.



SGP 0014478

After a week of mold making and testing at Springfield, it was concluded that our experimental Ram plaster performed as well if not better than Ceramical for the physical mixing and pouring. The product was also regarded equal to Ceramical in the mold performance characteristics of purging and wear. After these encouraging results at Ram, the new formula will be submitted to the various customers' shops to see if the results at Ram are confirmed by good market acceptance. The objective of this project is to develop more pottery plaster sales which are tied in with having a fully acceptable Ram process plaster.

Radiant Heat Panels

It was decided to stay in the radiant heat panel business when Armstrong Cork agreed to sell us 350,000 sq. ft. of Temsheet rather than the 700,000 sq. ft. minimum order they wanted. It was agreed that this purchase would allow a) a better evaluation of the market when business conditions were better, and b) some work to be done to reduce the manufacturing costs of the panel.

A different method of panel assembly has been devised which should save at least $50/M by increasing the rate of manufacture of the panels and streamlining the operation. This would have to be approved by Underwriters', but the methods were first reviewed with the Wilmington plant. The plant is reluctant to make any changes and insists that the low sales volume does not warrant the revision and they can improve the operation on their own. The fact is that we have been manufacturing panels for about two years and lost about $8000 on the operation last year. It appears that there is little interest in doing anything so nothing further will be done.

SGP 0014479

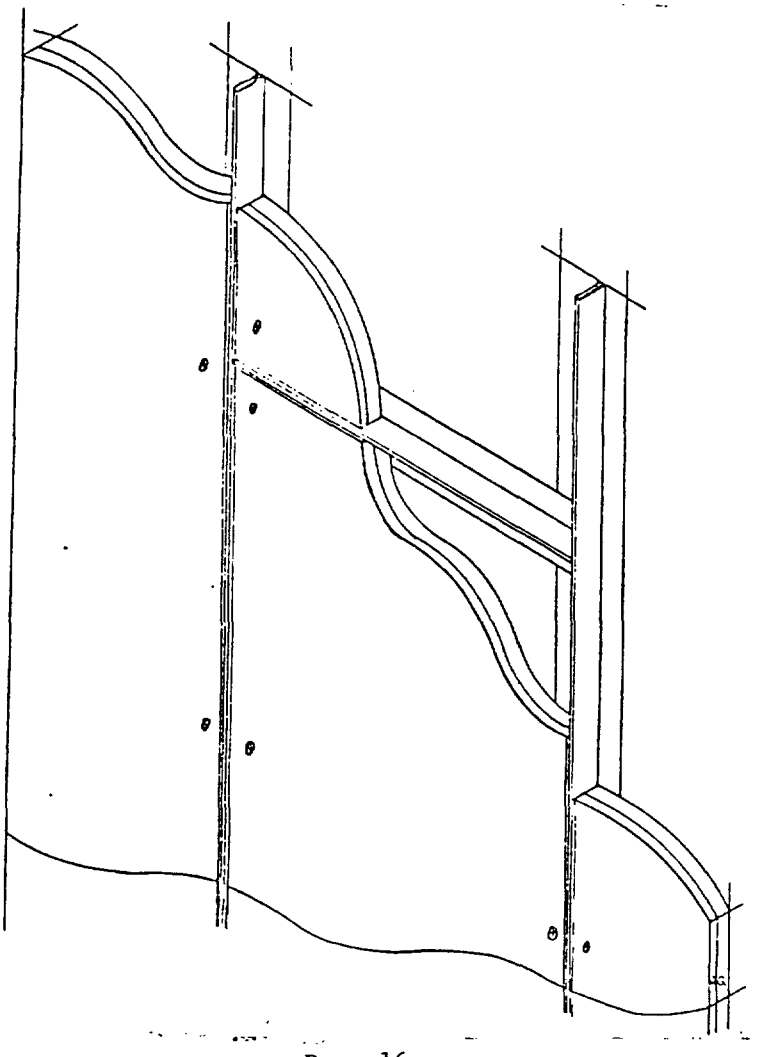
SALES SERVICE SECTION

Shaft Wall System

1. Fire Testing

We did not get the desired 2-hour rating with one 5/8" facing layer instead of two layers of 1/2", but did get 1½-hours which has some limited use. A chase wall version of the basic shaft wall construction passed 2-hours. The next objective is a 3-hour rating. Lab testing has shown that it will take a special 1" board to stay in place for the three hours. One inch shaft liner boards were made on the Tigard pilot machine using the clay formula, and our tests show that this in combination with two 5/8" Type X facing layers will provide 3-hour protection.

We have decided to test at U.L. this time in order to a) label the shaft panels, and b) gain extensions of various design changes. An important facet of the test will be the placement of horizontal joints in the shaft liner panels so they do not have to be full height. The joint is reinforced with a "T" section as shown in the following sketch.



SGP 0014481

2. Wind Load Testing

Since the first series of wind load tests of the basic wall at Wiss-Janney's engineering lab, we have been conducting a number of our own tests in order to determine the best way to add stiffness to the shaft walls and to establish what additional testing might be advisable at Wiss-Janney. We found that 16" wide panels or heavier gauge "T" sections did not significantly improve the stiffness. It was also found that furring the facing sheets with channel would not necessarily improve the stiffness. The best method found was to incorporate a 14 or 16 gauge stud in the chase wall. This wall will be tested at a height of 16' and we will also test the 1½-hour wall and the proposed 3-hour wall at 12'. This should provide a fairly complete set of technical data covering our shaft wall system.

3. Marketing

The shaft wall on the First National Bank Building in Portland is proceeding smoothly and the contractor is very impressed with the installation. The picture below illustrates how the panels are being used.



Installing "L" Runners



Placing Panels by First Inserting in Top "J" Track

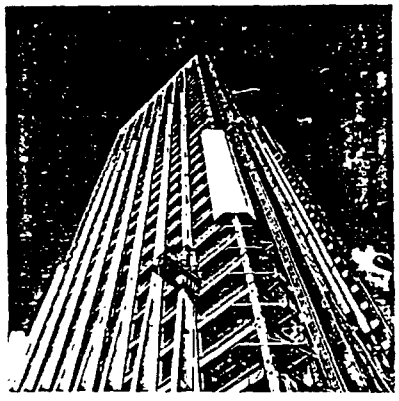
SGP 0014482



Elevator Doors



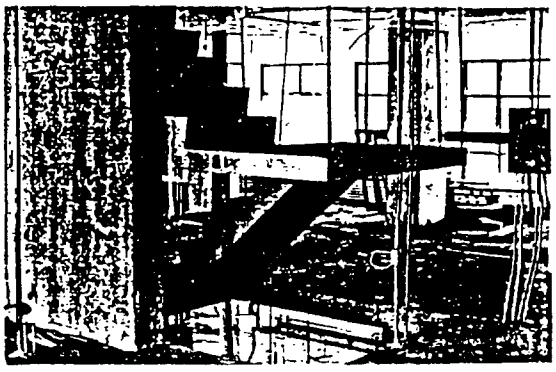
Accommodating Air Duct



Bank Building Exterior

SGP 0014483

Ray Hinkel helped get another shaft wall job started in Chicago, and below are some photographs of this job.



Upper Floor Stairwell



Chase Shaft Wall Will Enclose Plumbing Here



First Floor Stairwell



Apartment Exterior

SGP 0014484

A large display sample of the shaft wall system was built for the CSI convention in Los Angeles. In addition about 200 small shaft wall samples were made in Tigard. We were reluctant to fabricate all these samples, but it was faster and more economical than having them made elsewhere.

Flamespread Rating for Eternawall

At the request of Sales, we are investigating how to achieve a flamespread of 25 for all our vinyl products. At the moment, we have the rating for the fabric backed vinyl, but this represents only a small portion of our vinyl sales. Our listing in the U.L. Building Materials Book shows a 25 rating for vinyl covered board. This is somewhat misleading but was done to compete with other manufacturers who listed only their fabric back vinyl. The requests for flamespread ratings and for certification of ratings of 25 have increased substantially because of tighter fire code requirements. Our objective is a) to achieve the 25 rating, b) to achieve it in a manner that will permit us to manufacture it at no increase in cost, and c) to be able to put the U.L. label on it.

This prompted a series of over 100 pilot tests to evaluate all the factors that would affect the flamespread and to establish which ones would be significant. The important factors were found to be:

a. The source of vinyl film

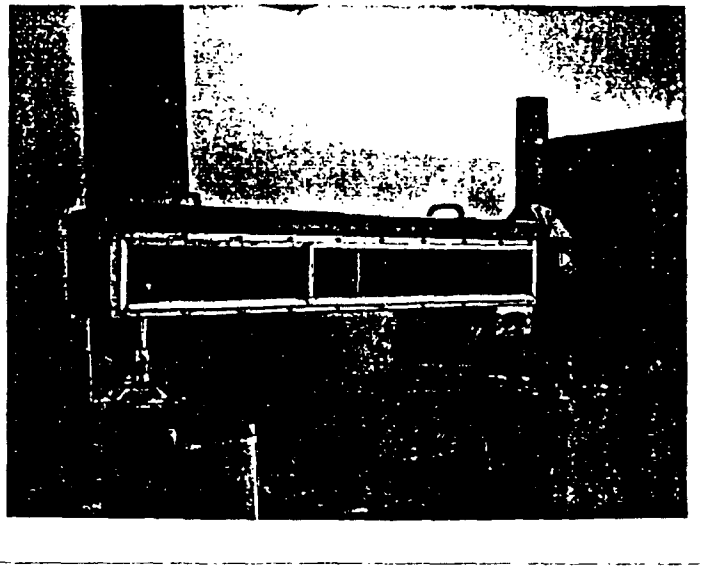
b. The type of adhesive

c. The amount of adhesive

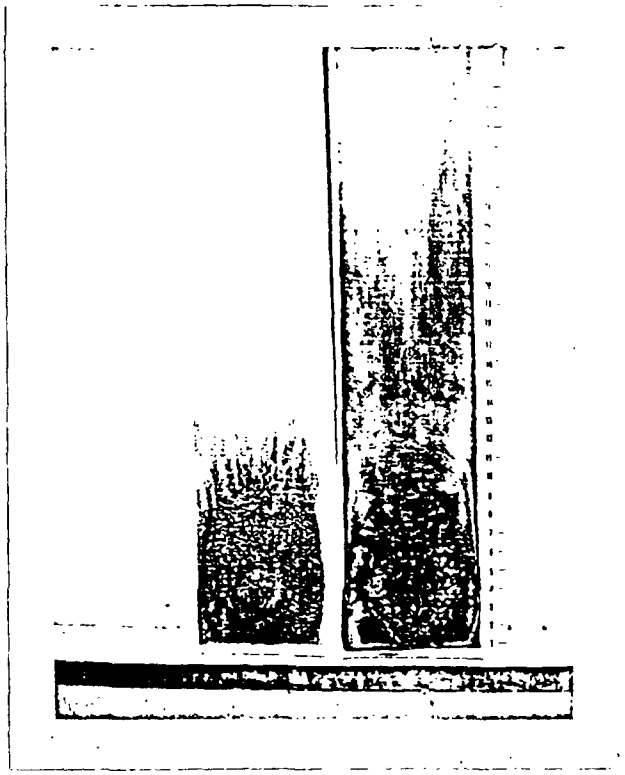
d. The weight of wallboard paper

The pictures on the following page show the flamespread apparatus and test specimens.

SGP 0014485



Tunnel to Measure Spread of Flame



Specimens Show Different Degrees of Char

SGP 0014486

All of these factors will be taken into consideration in the upcoming series of flamespread tests at Underwriters' Laboratories in Santa Clara. We will test Stauffer and Columbus white stipple 6 mil vinyl. We purchase most of our vinyl from Columbus but the Stauffer vinyl performs better. We will use the National Casein PCVE adhesive which we are using and a formulated adhesive which performs well on the machine, better in the flamespread test, and is more economical. If possible, two different amounts of each adhesive will be tried. We will use 65 lb. paper inasmuch as it was determined that the lighter the paper the better. The U.L. series of flamespread tests should be completed in August.

Monolithic Eternawall

At the request of Sales, a method of making a monolithic or smooth joint for vinyl covered wallboard was developed. This was accomplished by forming a round edge board with a 1" wide .015" deep taper and keeping the vinyl loose (unlaminated) 4" back from the edges of the board. The recommended method of finishing the joints is: a) Apply two coats of 30 minute Speed Set to the joint filling the round edge and taper, b) adhere the flaps in wallpaper fashion with a suitable vinyl wallpaper paste.

These tests were conducted on 25 oz. fabric back vinyl with a color pattern. Sales subsequently found it desirable to purchase and market a 12 oz. white vinyl in order to meet competition. This will give a less satisfactory result than the vinyl originally tested, but it may be acceptable.

Fast Method of Joint Finishing

Sales advised that competition had a method of completely finishing joints in 30 minutes. We were never able to substantiate this when we contacted some of the people who were supposedly using this method. National Gypsum has a system called "Thermoweld" which has limited acceptance. U.S.G. has no system but their Durabond setting type products are the most acceptable in the market. We have two problems: One is to improve the working properties of Speed Set, and the second is to develop a faster method of finishing joints, but not necessarily 30 minutes. In fact it would be better if the total time were closer to one hour.

George Green has developed a setting type product that has a relatively long working life (45 minutes) but hydrates quickly (15 minutes). The working life can be extended without significantly changing the time of setting. Normally to achieve a 45 minute working life would require a set of 1½ to 2 hours because of the stiffening that precedes the set. The stiffening is caused by the early formation of needle-like crystals. This stiffening has been substantially eliminated by a crystal habit modifier which makes rectangular rather than needle shape crystals. This discovery

SGP 0014487

paves the way for a product which will give maximum working time for a quick set material. The next step is to incorporate good application characteristics. We will evaluate a method of finishing much like we use for the Dens-Cote system. In other words, embed glass fiber tape, trowel over the tape, and double back to trowel the joint smooth. If this were successful, it would be a way of finishing the joints in an hour - and essentially in one application.

Low-Cost Vinyl Covered Wallboard

We are investigating low-cost predecorated wallboard laminated with thin vinyl or other inexpensive facing. The objective is to generate more sales for laminated products to fully utilize our laminating equipment. The net result should be lower costs and, therefore, greater sales and profits.

Our approach has been a) to use lower cost vinyl or other decorative films (We have ordered samples of Elm Coated Fabric's 2 mil vinyl, Stauffer's 2 mil vinyl, Permaneer's woodgrain vinyl, and DuPont's Tynec non-woven to evaluate); b) to reduce the adhesive cost (An adhesive was formulated that is over 10¢/lb. less than the adhesive we are currently buying and trials at Fort Dodge and Wilmington have been favorable); c) to increase the operating speed (The new adhesive with its higher tack is permitting speeds of 60-80 ft./min. as compared to standard of about 40-50 ft./min. It may require some additional handling equipment but a 50% increase in speed will help reduce our manufacturing costs.)

Pilot Fire Testing

During the past 5 months, pilot fire tests have been conducted on a corrugated steel/gypsum wallboard roofdeck, a wall with paneling on one side and 5/8" Firestop on the other, and two back-to-back wood stud walls. These tests were to provide information requested by Sales.

U.L. Flamespread Label

We received approval from U.L. to use regular wallboard instead of Firestop to label Pre-Dec and Eternawall. This saves the cost of the more expensive Firestop formula as well as the cost of the fire resistance label. Now only the flamespread label is required.

SGP 0014488

Round Edge Wallboard

Our patent claims have been rejected by the examiner. We plan to rewrite the claims and establish some limits as to the curvature in order to overcome the examiner's objection. We are also preparing a method to accurately measure the degree of roundness. All of this is regarded as important in view of the various round and bevel edges that are being marketed to reduce ridging.

Improved Firestop

Our patent will issue shortly. Our current Firestop patent expires in two years so this will allow us to continue to license some of the Firestop line for another 17 years. As soon as the patent issues, we will advise our licensees and send them a new agreement similar to the old one with a royalty schedule as follows: $.65/M for 1", $.55/M for 5/8", $.45/M for 1/2", and $.35/M for 3/8" Firestop.

Shaft Wall System

Our patent application was filed on March 22 under Serial No. 126,823. We have a license agreement with The Celotex Corporation under this pending patent application at a royalty rate of $5/M.

Gypsum Joint System

An action has been received on this patent application with the usual rejection of all claims. We will have to be more definitive in our description of the adhesive used with the gypsum filler. This is considered an important patent in view of the ever increasing costs of manufacturing joint system with limestone and casein. Revisions will be pursued through Synnestvedt and Lechner so we can have the patent allowed.

SGP 0014489

PATENTS & LICENSING SECTION

INDUSTRY SECTION

ASTM

There are no crucial items on the gypsum C-11 agenda and we only attended because the semi-annual meeting was held in conjunction with the Gypsum Association Technical Committee meeting. We did not attend the E-5 meeting (fire resistance) since the expense for the trip could not be justified.

Gypsum Association

The major accomplishment of the Technical Committee was assembling the Fire Resistance Manual for final review and publication. This manual is a great help to us in promoting our Firestop products since we lack the field contact which our competition has. We have 13 proprietary listings in the manual now, including our three shaft wall designs.

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