

PAOLI LABORATORYRESEARCH AND DEVELOPMENT REPORTPERIOD OF JANUARY 1963 THROUGH JUNE 1963TABLE OF CONTENTS

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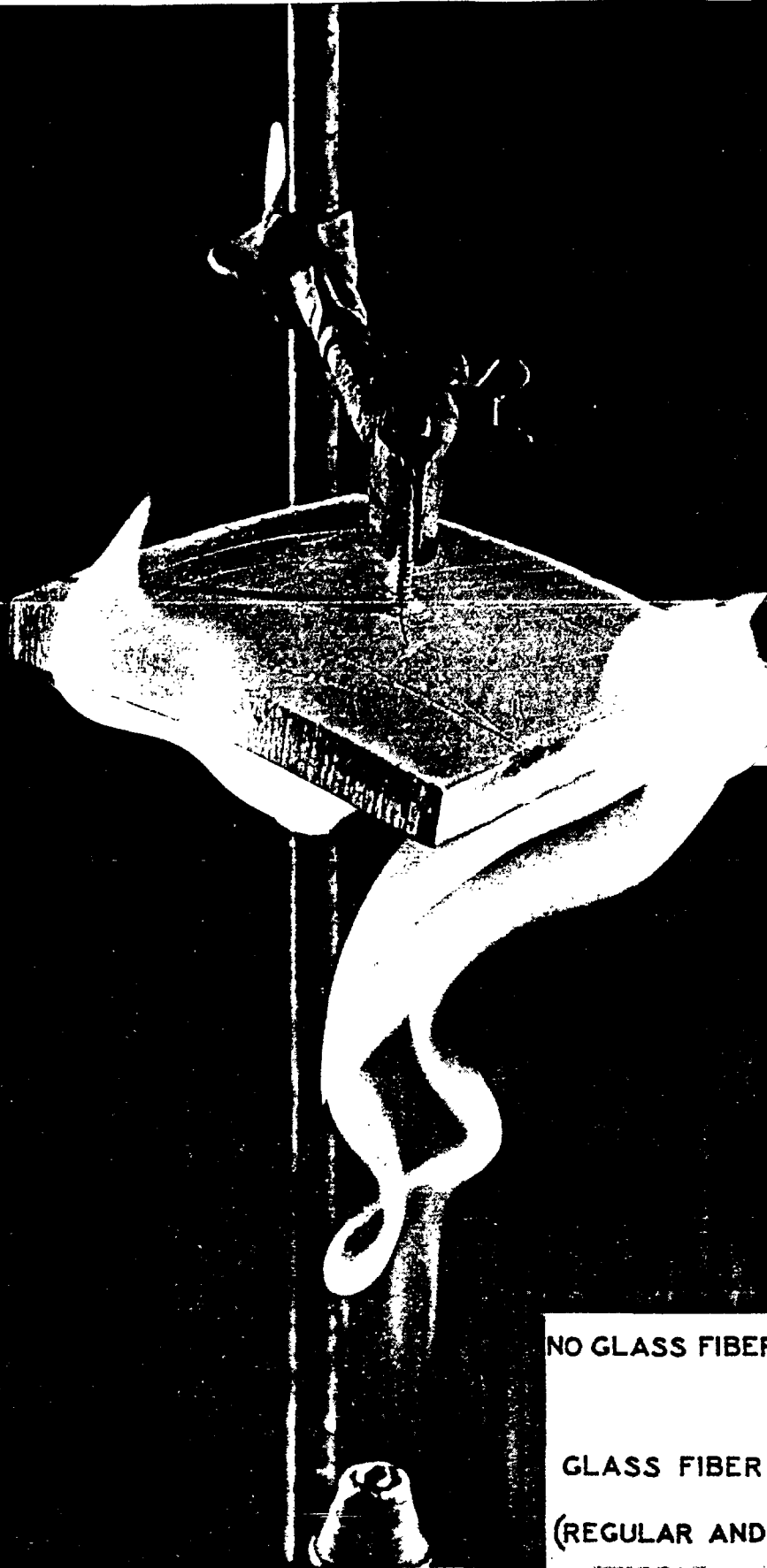
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1800° F. BURNER FLAME ENDURANCE



NO GLASS FIBER - 15 MIN. TO
COLLAPSE

GLASS FIBER - 8 HRS., NO
FAILURE
(REGULAR AND FIRESTOP AMT.)

FORWARD

This report covers the activities and accomplishments of our research program for the past six months. No basic changes in organization have occurred during this time. We have, however, begun to assign projects to a single individual rather than dividing the responsibility between two people. The former approach was being utilized until such time as the new men had gained sufficient experience and had become familiar with our procedures. At least one priority project has been assigned to each man as well as other projects of lesser priority. Each man is responsible for maintaining progress in his assigned projects. Assistance is provided where necessary by contacting the group leader.

A budget was put into effect in January 1963 in order to make available a record of the total expenditure for R&D and the amount spent for each project. The budgeted versus actual expenditures are being reported quarterly. These will be studied to determine whether our emphasis is being placed in the proper areas and whether our money is being spent wisely. This year's figures should give us a good basis for preparing next year's budget.

The field testing stage of our development programs was revamped during the past 6 months. There have been a number of instances where we have gained little or no information from trials. Another problem has been the difficulty we have had in obtaining field tests. We have brought this problem to the attention of the Sales Department and solicited their cooperation in planning a more effective field testing program. After several discussions, it has been decided to institute a standard procedure for requesting, conducting and reporting results of field trials. To simplify the reporting, a standard report form and follow-up form have been prepared. We trust that these measures will enable our field testing to be conducted more efficiently in the future.

Included in this report are the market performance of products developed through research, patent information, and some pictures illustrating the effect of glass fibers in gypsum. The latter are to be used in promotional literature. The major portion of the report is, of course, devoted to the progress of the various projects.

MARKET PERFORMANCE OF NEW PRODUCTS

JANUARY THROUGH JUNE 1963

1. FIRESTOP 120 CEILING TILE

Amount Sold	--	122,000 sq. feet
Dollar Sales Volume	--	\$16,215
*Gross Profit	--	\$ 5,349

2. GRABIT MASONRY ADHESIVE

Amount Sold	--	9 Tons
Dollar Sales Volume	--	\$ 1,739
*Gross Profit	--	\$ 1,019

3. ONE DAY JOINT COMPOUND

Amount Sold	--	634 Tons
Dollar Sales Volume	--	\$113,953
*Gross Profit	--	\$ 33,063

Total Sales Volume of New Products -- \$131,907

Total Gross Profit of New Products -- \$ 39,431

*Estimated by Ardmore Cost Department

PATENT INFORMATION

Patents Issued: None

Patents Applied For: Method of Processing Synthetic Gypsum

Patent Applications Being Prepared: One Day Joint Compound
Grabit Masonry Adhesive

PROJECTS COMPLETED

I NEW PRODUCTS

A. Stud Adhesive - R & D 201

Objective: Develop a satisfactory source for an adhesive for attaching gypsum wallboard to wood or steel framing.

Investigation: Over a dozen different candidates were tested in the Lab before a product manufactured by the Borden Co. was finally selected for field performance evaluation. The Borden adhesive was selected because -

- 1) it passed all the tentative Gypsum Association Specifications
- 2) it is satisfactory for both wood and metal framing
- 3) it is a water thinned adhesive thereby reducing or eliminating toxicity, fire hazard, and clean-up problems of competitive stud adhesives
- 4) it is priced in the \$1.50 per gallon range which is the price objective given to us by Sales

This Borden Stud Adhesive was field tested with favorable results in every instance. In some cases the contractor offered to buy the product from us as soon as we had it available.

Result: The request for this new product was first approved then revoked. It was decided that there was not sufficient profit in the product in view of low priced competitive stud adhesives appearing on the market. Prices of stud adhesive products being furnished to our competitors are being explored. This is now in the hands of Sales and Purchasing and no further work on our part is contemplated.

B. Foam Glass Pellets From Owens Corning - R & D 210

Objective: This has been a joint venture with Owens Corning to develop (1) a 1" insulating gypsum wallboard - (2) a one-hour fire-rated 1/2" gypsum board, or (3) a lighter weight gypsum board by incorporating Owens Corning's foam glass pellets in the core of gypsum board.

Investigation: After a series of boards were made and tested it was found that the pellets did not impart the insulation value that Owens Corning had anticipated. This ruled out the possibility of an insulation board or a one-hour fire-rated board. The economics of the lightweight board were

PROJECTS COMPLETED

unfavorable as the cost of the pellets we were using could not be counter-balanced by savings in stucco and freight. This information was presented to Owens Corning along with the suggestion that they develop a lighter weight pellet. Our reasoning was that the lighter weight pellet would displace more stucco and increase the weight reduction for each pound of pellets used. This would have improved the economics. Owens Corning accepted the suggestion and indicated that they could develop a lighter weight pellet.

We continued to inquire about their progress on the development of lightweight pellets and each time we were advised that they had encountered one problem or another.

Result: We finally heard that Owens Corning's pellet project had been halted for the time being and we could not expect to receive anymore pellets in the near future. After some months have passed, we have heard nothing further and some statements have been made by their representatives which indicate to us that their pellet program has been completely discontinued. In view of this turn of events, the project has been inactivated.

C. Acoustical Tile - R & D 246

Objective: Develop a 1/2" - 2'x4' acoustical tile.

Investigation: Three approaches were taken to find a means of inhibiting the sagging tendencies of this acoustical product. They were: (1) increase the weight of the tile, (2) increase the glass fiber content of the tile, and (3) to incorporate a small amount of Portland cement into the core of the tile. Neither of the first two methods showed a significant reduction in the amount of sag. The third method showed some promise in the Laboratory but two plant runs with various amounts of Portland cement in the core failed to duplicate the Laboratory results.

Result: No means has been found to overcome the excessive sag of the 1/2" - 2'x4' acoustical tile, so at the present time, we do not know how to accomplish this. No further work is planned.

PROJECTS COMPLETED

II IMPROVED PRODUCTS AND PROCESSES

A. Super Firestop - R & D 241

Objective: To develop a 5/8" Firestop board which will permit 1½ and 2 hour fire ratings when used on the under-side of concrete and bar joist, (incombustible), floor and ceiling constructions. The 1½ hour rating was previously achieved so the 2 hour rating was our remaining objective.

Investigation: A board with twice the normal amount of glass fiber achieved the 1½ hour rating and missed 2 hours by only 8 minutes. According to the Portland Cement Association, each 1/2" of concrete would increase the rating by 20-30 minutes. On this basis, we constructed the same assembly previously tested at Underwriters except the concrete deck thickness was increased from 2" to 2½".

Result: The construction lasted 2 hours - 20 minutes, which easily gave us the 2 hour rating. The Gypsum Association also lists a 2 hour rating for 5/8" type X board over a 2½" concrete and bar joist construction, but we still have a distinct advantage. Their construction requires 40% more supporting members, (furring channels), and over 50% more screw fasteners. This difference gives us a competitive edge over all other companies in promoting and selling this construction.

In view of this successful result, it has been decided to make all of our Firestop with the increased amount of glass fiber. This gives us a board of outstanding strength in addition to the fire rating and will enable us to capitalize on this in our advertising and promotion. We expect to offset the additional cost of the glass fiber in Firestop by savings in other board products which is discussed under "Glass Fiber Reinforcing" on page 10.

B. Laminating Compound - R & D 209

Objective: Modify our present laminating compound formula so that it will dry faster and bridge areas between laminated boards even though they are not in perfect contact.

Investigation: A formula was developed which satisfied the above requirements and also resulted in a 50¢ per bag cost reduction. The new formula was field tested and found to be satisfactory in all respects.

Result: The new formula has been substituted for the old product in our line. Sales has seen fit to use the cost savings realized to reduce the price of the product. This makes our laminating compound more competitive with joint compounds which competitors sell for laminating. In the period covered by the report we sold 5107 bags of Laminating Compound as compared to 3517 bags in the comparable period in 1962. This indicates that the price reduction and product improvement are favorably affecting the sale of Laminating Compound.

C. Applying Statistical Quality Control to Our Operations - R & D 239

Objective: To determine whether our operations can be improved through statistical quality control methods.

Investigation: A survey by Battelle Institute showed that statistical analysis might be most effective in determining our board weight and kettle batch setting time variations. All plants have been instructed in preparing their own statistical reports.

Result: This statistical analysis of board weights and kettle batch setting times has been adopted and is providing information which will help us pinpoint problems in these important areas. It is also a means to compare the operation of one plant against another. This project has been handled by the Process and Control Department.

D. Dust Collector for Kettle and Hot Pit at Blue Rapids - R & D 238

Objective: To enable the kettle to be vented so that moisture can be removed without creating a dust problem.

Investigation: A Wheelabrator bag type dust collector was installed and some minor modifications made.

Result: This equipment is performing as intended and Ardmore has been advised that the expenditure can be transferred from R & D to the Blue Rapids plant.

III SALES AIDS

A. Two Hour Fire Rated Solid Non-Load Bearing Partition R & D 251

Objective: Test a partition consisting of 3 layers of 5/8" Firestop to achieve an inexpensive 2 hour fire rated construction for use around pipe chases and elevator shafts.

Investigation: The partition was designed and 2 fire tests were conducted at Ohio State. The first partition lasted 97 minutes and a second partition with One Day Joint Compound over the joints failed at 90 minutes.

Result: Any means we could devise to extend the rating to 2 hours would make the partition prohibitive in cost. This was requested by Sales and it was suggested that a 2" solid partition which the Gypsum Association lists at 2 hours be promoted for use around pipe chases and elevator shafts. Our suggestion was accepted and the project has been dropped.

B. Two Hour Fire Rated Double Solid Non-Load Bearing Partition - R & D 252

Objective: Develop a 2 hour fire rating for a partition consisting of a layer of 1" core board and a layer of 1/2" face board on each side of a 3" core space.

Investigation: The partition was designed and tested. It lasted for 2 hours 15 minutes, so the desired 2 hour rating was achieved.

Result: This was requested by Sales for a high rise job in Detroit. This gives us the 2 hour fire rated partition for this job as well as for future high rise jobs.

C. Effect of Glass Fibers in Gypsum Wallboard - R & D 210

Objective: Develop data and information to be used in Bestwall's and Owens Corning's advertising to promote the advantages of glass fiber in gypsum wallboard products.

Investigation: This project was brought about through a request that we produce some information to be used in Owens Corning's promotional campaign and another request from our Sales Department that similar information be prepared for Bestwall's advertising literature. The latter is specifically intended to assist in the promotion of our improved Fire-stop. It was decided that demonstration type tests, which could be photographed, would be the most effective for advertising use. We first took Polaroid photographs of our test methods, then arranged for the Advertising Dept. to have their photographers take professional pictures of these test set-ups. Some of these photographs accompany this report.

Result: We believe that the resulting pictures dramatically reveal the advantage of glass fibers in enabling a gypsum wallboard core to withstand various forms of abuse from impact, shock, nailing, and fire. Owens Corning is using some of our information in their campaign and we have the photographs to incorporate in our own literature. We trust that this information will implement our efforts to increase board sales.

PROJECTS NEARING COMPLETION

1. Thincoat Plaster - R & D 219

Objective: To develop a competitive thincoat lath and plaster system.

Status of Investigation: The original objective was to have one product for both smooth and textured surfaces. Such a product was developed and field trials were commenced. It became apparent during our field testing that smooth finishing properties were more important and textured finishes appealed only in certain markets. In view of this a second formula was developed in which the texturing properties were sacrificed in order to improve the smooth finish application. This product was found to be much more acceptable for those who desired a smooth surface. The former product will be retained for use where textured surfaces are desired. A number of successful field trials have been completed and we have recommended that both products be released for sale in limited markets. Our thincoat plasters have certain advantages over other thincoat products, and can be priced competitively while still maintaining a favorable profit margin.

Paralleling the thincoat plaster development were our efforts to impart the proper suction characteristic to our T. C. pinholath. This has been resolved to the point where all plants are capable of producing a satisfactory lath to be used with our thincoat plaster. Advertising photographs taken during one of our field trials are included in this report.

2. Ready Mix Joint Compound - R & D 211

Objective: To develop a ready mixed or paste type joint compound to be competitive with other similar products on the market.

Status of Investigation: Several field trials of a product containing a dry binder system have been conducted. Other than a few adverse comments on workability, the performance of the product has been satisfactory. On the basis of the trials, we received orders for 1500 pails of the product. The economics of our ready mix are still not completely favorable, and we are striving to improve this situation. We are somewhat limited in this direction because the fixed costs of the container and the freight represent a large percentage of the cost of the product. This leaves the formula and the processing for us to work on. We are even limited here as the improvement in both of these areas is limited since certain possibilities for cost reduction will require large initial expenditures for equipment. Judging from the emphasis Sales has given this project, it appears imperative that we continue to seek a practical solution to the problem. Our present thinking is that if we could install a small operation with minimum expenditure, it would enable us to effectively assess the market potential as well as possible cost savings. This would require that Management approve a low profit item, even if only on a temporary basis. Based on this experience, the market potential would then dictate the wisdom in considering certain equipment expenditures necessary to improve the profit margin.

PROJECTS NEARING COMPLETION

3. Glass Fiber for Wallboard Reinforcement - R & D 210

Objective: To be able to approve several types of glass fiber, particularly 799 (Muzzy Mix) for use in our wallboard.

Status of Investigation: From this evaluation of fiber types we found that types 710, 804, and 799 all were better than the 863 we were using because of improved dispersion characteristics, and that 799 was a special improvement because it offers greater reinforcing value per lb. of fiber. This evaluation has progressed to the point where all of the glass fiber used in our board is either 710 or 799. This work then became intermeshed with an investigation being conducted by the Manufacturing and Process and Control Departments to evaluate the effect of paper fiber. It was found that the regular amount of 799 glass fiber was equivalent to the standard amounts of paper fiber and 863 glass fiber. Some trial runs were made at Wilmington, but due to cutting problems with 799 fiber, an increased amount of 710 fiber was used and the paper fiber eliminated. Doing away with the paper fiber appears to permit machine speed increases on the order of 10% without changing the characteristics of the board. This will be carried further at other plants. In the meantime, 799 glass fiber is still a superior fiber and we are continuing with our effort to enable all plants to use it. Improved quality or further cost savings, or both, are inevitable through the use of the 799 binder glass fiber.

4. One Day Texture Problem - R & D 243

Objective: To find a means of eliminating the need for a primer over One Day Joint Compound prior to texture application.

Status of Investigation: The sale of One Day has been limited because we have had to recommend a primer prior to any joint system texture application. National Gypsum has issued a similar precaution because of the same drawback to their setting type joint system. Two approaches have been studied. The first is to develop a texture which will do its own priming, and the second is to develop a topping which will alleviate the necessity for priming regardless of the texture used. After considerable experimentation, a texture has been found which we believe will eliminate the need for the primer. The development of a topping for use over One Day has not been completed as yet. We are proceeding with field trials of the texture as quickly as possible, since we feel this will greatly enhance the sale of One Day Joint Compound.

5. Accumulation of Fire and Sound Test Data - R & D 249

Objective: To gather all available fire and sound test data on the various constructions and put it into a usable reference form.

PROJECTS NEARING COMPLETION

Status of Investigation: This information has been gathered from various sources and sorted into categorical form. We are now having a card file prepared and may put the information into booklet form as well. This will provide a single file that we can refer to for locating competitive tests, as well as gathering information for fire or sound tests we are considering.

6. To Evaluate Methods of Grinding Molding & Industrial Plasters -
R & D 250

Objective: To find a method to overcome dusting and mixing problems of industrial plasters made at Wilmington, and to grind other industrial plasters at Blue Rapids.

Status of Investigation: A trial of the Entoleter grinding equipment indicated that it would impart the desired characteristics to the molding plaster. Based on our trial and previous use of the Entoleter in the gypsum industry, this piece of equipment was ordered for the Wilmington plant. The equipment has just been received, installed and put into operation. Test runs will be conducted and followed to determine whether this will enable us to manufacture a satisfactory molding plaster at the Wilmington plant. If the expected improvements are realized, the purchase of an Entoleter will be recommended for the Blue Rapids plant.

PROJECTS ON WHICH WORK IS UNDERWAY

1. Extrusion Method for Forming Gypsum Board Products - R & D 21

Objective: To evaluate this process as a means to manufacture a gypsum board of more consistently uniform weight and caliper.

Status of Investigation: The extrusion process was tried at New Orleans. The uniform caliper was achieved but the operation gave too many problems, particularly with 1/4" and 3/8" board. The chief problem was keeping build-ups off the extrusion equipment. Since this equipment is stationary, it is difficult to keep clean and slurry build-ups occur which cause paper breaks. Another approach, also disclosed in our patent, consists of forming board between moving belts on short pulley centers. The next step is the design of equipment to permit the evaluation of this alternate method of extrusion.

2. High Expansion Densite for Patterns - R & D 132

Objective: To develop a high expansion Densite suitable for use as a casting plaster for Kirksite Dies used in forming automobile bodies.

Status of Investigation: A reasonably satisfactory formula was developed and a new test method developed to give comparable results with the shop-test method used by customers. Aging tests are in progress and are favorable thus far. One refinement desired is to maintain an upper limit of expansion of 1/8" per foot. This is not critical for some customers, but is for others.

3. Special Densite for Ram Process Pottery Mold - R & D 132

Objective: To develop a special pottery plaster to be suitable for use in the ram pottery making process.

Status of Investigation: The formulation of this product involves increasing the porosity of the product while maintaining sufficient compressive strength and a smooth, hard surface. Several formulas have been considered and each time they have been found to be inadequate for one reason or another. We are continuing to seek a satisfactory pottery plaster formula for this use.

4. Densite Tooling Plaster - R & D 132

Objective: To improve on K-71 tooling plaster to meet the requirements of the aircraft industry.

Status of Investigation: The reformulation has been completed and field testing is underway. The various security regulations of the aircraft industry have prevented us from keeping in close touch with the trials but, thus far, indications are that the product is receiving good acceptance.

PROJECTS ON WHICH WORK IS UNDERWAY

5. Water Repellent Treatment for Sheathing Paper - R & D 203

Objective: To find a lower cost repellent than the Quilon we now use, one which will apply easier, and one which will offer better repellency.

Status of Investigation: We tried a two-component water repellent which gave excellent laboratory results but poor plant results. Two silicone types have been tried, one of which offers some encouragement. This product, which is Dow Corning's Syl Off-22, will be evaluated more extensively.

6. Synthetic Resin Base Joint Compound - R & D 211

Objective: To develop synthetic binder joint compounds which will have longer pot life, better shelf life and lower shrinkage than our present casein binder products.

Status of Investigation: An additional reason for our interest in this product is that the synthetic binder formulas are far less complicated than their casein counterparts and synthetic binder is inherently of more consistent quality than can be obtained with casein. The result would be a reduction in inventory required, a simplification of the manufacturing process, and possibly fewer problems that continue to occur in our present operation.

Two factors are delaying a successful outcome of our efforts to come up with a satisfactory synthetic binder, dry powder joint compound. One is the difficulty in obtaining satisfactory bond at low temperatures, and the other is the somewhat higher cost of the synthetic resin formulations. We will continue to seek means of overcoming these problems.

7. Resin Base Joint System Texture - R & D 211

Objective: To formulate a dry texture which can be mixed with perlite and sprayed onto masonry ceilings as a one coat decoration.

Status of Investigation: All of our tests in the Laboratory were successfully concluded 6 months ago. A batch of this product was manufactured, but we have been unable to have any field trials arranged. This is being taken up with Sales to see whether the project should be dropped, or if there is still interest, to have the field trials arranged. The project was originally requested by Sales.

8. Accessories for Hummer System - R & D 209

Objective: Develop a 2-1/2" thick laminated gypsum rib that can be used with 1/2" face boards in order to compete with metal stud systems.

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PROJECTS ON WHICH WORK IS UNDERWAY

Status of Investigation: We have undertaken this development to further the acceptance of Hummer Systems and to displace metal studs where possible, so we can sell both the ribs and the face board. A 3" wide x 2-1/2" thick rib has been found to give a completely satisfactory partition. 50 of these ribs have been fabricated at Ft. Dodge and we have requested that field trials be arranged.

9. Synthetic Gypsum R&D 221

Objective: To find a means for utilizing synthetic gypsum for plaster and wallboard manufacture.

Status of Investigation: Approval has been received to proceed with the pilot plant installation to thoroughly evaluate synthetic gypsum at New Orleans. The details for the equipment have been worked up and the orders for this equipment have been placed.

10. Prefabricated Panels with Gypsum Ribs - R & D 223

Objective: To develop a prefabricated sandwich panel unit to be used in non-load bearing partition construction.

Status of Investigation: Our pre-fab panels fabricated at Ft. Dodge were installed in each of two houses at Bettendorf, Ia. and Sioux Falls, S. D.. In each case, the installation proceeded smoothly and the finished partitions were considered quite satisfactory. Both contractors were interested in the panels and expressed a particular desire for us to furnish the components from which they would build the panels. We have requested that a commercial job be found where we can install a long run of panels as all of the previous installations have been confined to short partitions. Sales has indicated a desire to delay action on this project until the results of U.S.G.'s and National's promotion of their prefabricated panels are known.

11. Smooth Trowel Finish - R & D 228

Objective: To develop a one material finish to be used as a substitute for lime-putty/gauging plaster white coat over basecoat plaster.

Status of Investigation: Only a smattering of exploratory work has been done on this product due to its low priority and the backlog of other work.

12. 1" Core Board - R & D 229

Objective: This project was reactivated by Sales with their request for prescored core board with a special taper edge.

PROJECTS ON WHICH WORK IS UNDERWAY

Status of Investigation: Some special equipment was ordered for Acme and subsequently, the desired specifications for the board were changed. The proposed trial of this special 1" core board is unsettled at the present time.

13. Radiant Heating Panels - R & D 235

Objective: To develop a gypsum board panel with radiant heating properties.

Status of Investigation: After examining the radiant cable type and conductive coated type panels we have concluded that the conductive coated panels offer the best possibility because of their greater versatility. We set out to expand our evaluation of the conductive coated panels with Electronics Discovery Corp., a manufacturer of the conductive coating. As soon as we requested some material to work with, they advised that we would have to sign a disclosure which they prepared. The disclosure was forwarded to the Ardmore Legal Dept. and subsequently to Synnesvedt & Lechner. This disclosure was too limiting for us to sign and Synnesvedt is to rewrite the disclosure and re-submit it to Electronics Discovery. Another company, Chemelex Corp., makes a conductive coating material and has a number of patents covering the product and its use. However, Chemelex has signed an exclusive agreement with U.S.G., and are not free to work with anyone else. This project will be held up until we can get some expression from the Legal Dept. as to how we can proceed.

14. Volumetric Stucco Feeder For Grand Rapids - R & D 240

Objective: To purchase equipment to feed stucco volumetrically to the board machine pin mixer in an effort to make board weights more uniform.

Status of Investigation: A number of problems have developed in attempting to use this equipment. The manufacturer of the stucco feeding equipment has now offered to make certain modifications designed to improve the performance. Grand Rapids has been asked to make some modifications in their own equipment. Following this the stucco feeding equipment, with modifications, will be reinstalled and retested.

15. Dry Lightweight Roofdeck Unit - R & D 242

Objective: To develop a lightweight roofdeck unit which will have good insulating properties and be competitive with Tectum & Insulrock.

Status of Investigation: A laminated unit consisting of polyurethane and gypsum board was our first effort. This proved to be too costly because of the high price of the urethane required. A number of other ideas were discussed and some of them explored. All except one has been discarded. The remaining approach consists of a foamed gypsum slab reinforced with synthetic resin and glass fiber and having a paper covering. Quite a bit of work needs to be done to fully explore this idea.

PROJECTS ON WHICH WORK IS UNDERWAY

16. Further Uses For "Grabit" - R & D 244

Objective: To determine whether Grabit can be used successfully to adhere gypsum board to expanded polystyrene insulation slabs.

Status of Investigation: We have determined that, properly applied, Grabit will bond gypsum board to polystyrene. We have prepared a tentative specification and recommended a field test.

17. Ceiling Tile - R & D 246

Objective: Determine whether 1/4" 2'x2' ceiling tile has sufficient resistance to sagging to be sold as an addition to this tile line.

Status of Investigation: We have started sagging tests comparing 1/4" tile with 3/8" ceiling tile and 3/8" acoustical tile.

18. Continuous Calcination - R & D 253

Objective: To investigate a means of continuous calcination which can be accomplished merely by converting our present kettles. The aims are increased tonnage and lower fuel consumption.

Status of Investigation: The necessary modifications were made on the #1 Kettle at Blue Rapids to permit us to explore this method of continuous calcination. The kettle has been put into operation and initial indications are that both objectives will be achieved and a more uniform stucco will result. This operation is being continued and board is being manufactured from the output. Further studies of the process will be made before any definite conclusions are drawn.

19. Inverform Paper - R & D 254

Objective: To determine whether any advantages in cost or quality can be derived from the use of this paper.

Status of Investigation: Specifications have been submitted to St. Anne's Board Mill in England and arrangements have been completed for 15 tons of paper to be shipped to our Wilmington plant. This paper will weigh 62-65 lbs./M sq. feet and conform to our specifications for cross directional tensile strength. A trial run of this paper is tentatively scheduled to be made at Wilmington in July.

20. Lightweight Gypsum Wallboard - R & D 255

Objective: To find a practical means to reduce the weight of our board without sacrificing quality.

PROJECTS ON WHICH WORK IS UNDERWAY

Status of Investigation: Competitive board, somewhat lighter than standard weight, has appeared in certain areas from time to time. In addition, we were told that U. S. G. had been using boric acid as a means to make a lightweight board. A thorough investigation of boric acid has resulted in a negative conclusion. We also have previously done some work with pellets, perlite, and other lightweight aggregates, but none of these methods has proved practical. The cost of the aggregate cannot be offset by the savings derived. Larger quantities of foam is another possibility but this invariably produces boards which are too weak. We theorized that if we could reinforce the cell walls of the voids, they would act like an aggregate and permit weight reduction without significantly reducing the strength. It was finally found that certain polyvinyl acetate resins added to the foam did increase the strength of foamed gypsum. The increase in strength is commensurate with the amount of resin used. We are presently in the process of determining whether an economical amount of resin will provide sufficient strength to permit a significant weight reduction to be achieved. This work involves determining foam efficiencies, fineness of cell structure, and evaluation of various resins. It is believed that this investigation is extremely worthwhile. Even if the lightweight board should be found to be impractical, the reinforced foam idea can be applied in other areas where larger quantities of resin can be justified economically. Two possibilities are a lightweight roofdeck unit or a gypsum acoustical tile.

21. 1 Hour Fire Rated Wood Floor & Ceiling - R & D 256

Objective: To develop a 1 hour rating over combustible floor and ceiling construction using our new 1/2" Firestop.

Status of Investigation: This construction failed under load at 48 minutes due to the 1/2" Firestop boards falling earlier in the test than we had anticipated. We will not re-test this construction unless we are able to devise some changes which would significantly enhance our chances of achieving the one hour rating. If accomplished, we would have a substantial competitive advantage. A similar test on incombustible construction should be more easily attainable so the relative importance of this construction will be discussed with Sales.

22. Cooperative One Hour Fire Test Of Hof-Kor Panels - R & D 257

Objective: To test a partition of Hof-Kor pre-fab panels consisting of a paper honeycomb core faced with 5/8" Firestop Eternawall to achieve a one hour rating. Union Bag Co., the manufacturer of the honeycomb, is sharing in the cost of this test.

PROJECTS ON WHICH WORK IS UNDERWAY

Status of Investigation: The first partition tested lacked fasteners at the bevel edge joints and lasted only 34 minutes because the joints opened prematurely. Kolorpin fasteners were used 8" o.c. at the bevel joints in a second partition and this time the partition endured for 72 minutes. Another partition will be constructed for the hose stream test to complete the one hour test requirement.

23. Cooperative Test on Donn Products Clip-On Metal Stud Partition - R & D 258:

Objective: To achieve a one hour rating on this non-load bearing partition consisting of Donn's D-405 stud and 5/8" Firestop.

Status of Investigation: On the basis of an exploratory fire test Donn had made and the potential of this partition, participation in this test was recommended. The first test barely failed to reach the hour failing at 58 minutes. An early failure occurred in the second partition when a board cracked prematurely. Donn Products conducted another test based on a modification we suggested but without our financial participation. This time the rating was achieved. We expect to recommend the promotion of this partition after certain installation problems are corrected.

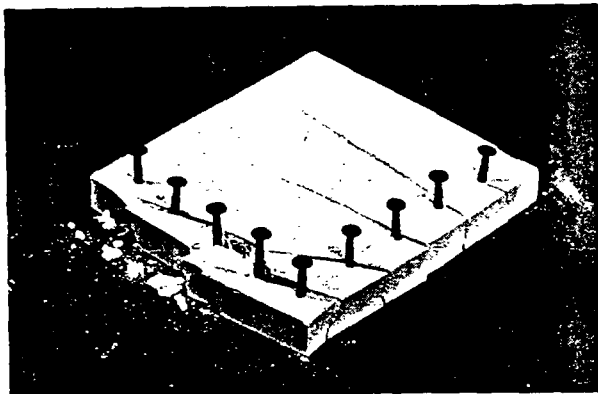
24. Sound Deadening Wall Construction - R & D 260

Objective: To develop information as required for reducing sound transmission by facing a partition with a base layer of insulation board and a outer layer of gypsum board.

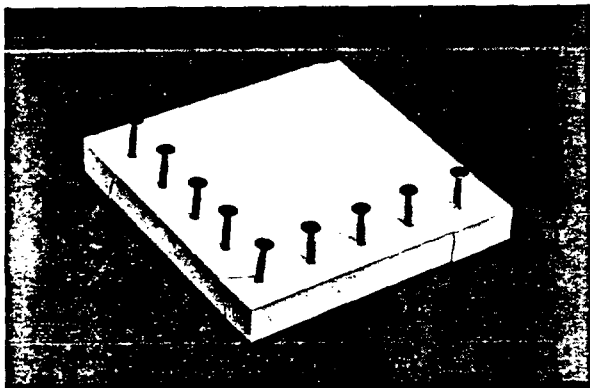
Status of Investigation: Some manufacturers are already promoting a wood stud partition with a layer of 1/2" insulation board and a facing of 1/2" or 5/8" gypsum board. Some work has been done so that we will be able to recommend our own specifications for this installation. We are also making some small scale fire tests to study this aspect of the construction. We are thinking of this development as a means to improve the sound transmission properties of Nummer B System. In the meantime, the Insulation Board Institute in conjunction with the Gypsum Association have a number of sound and fire tests under consideration. We are awaiting the results of these tests before we consider any testing of our own.

C. M. Schmet

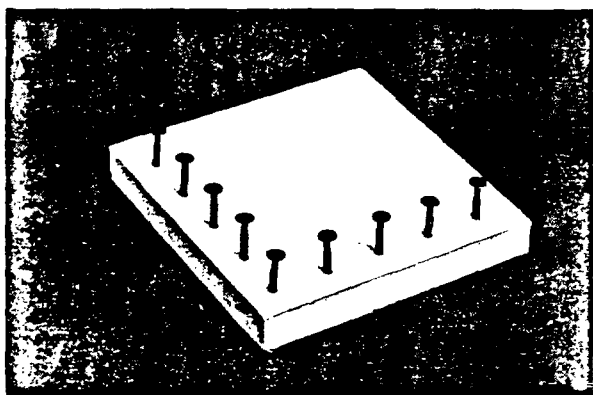
EDGE NAILING



NO GLASS FIBER



AMOUNT OF NO. 799 GLASS FIBER
IN REGULAR BOARD



AMOUNT OF NO. 710 GLASS FIBER
IN IMPROVED FIRESTOP

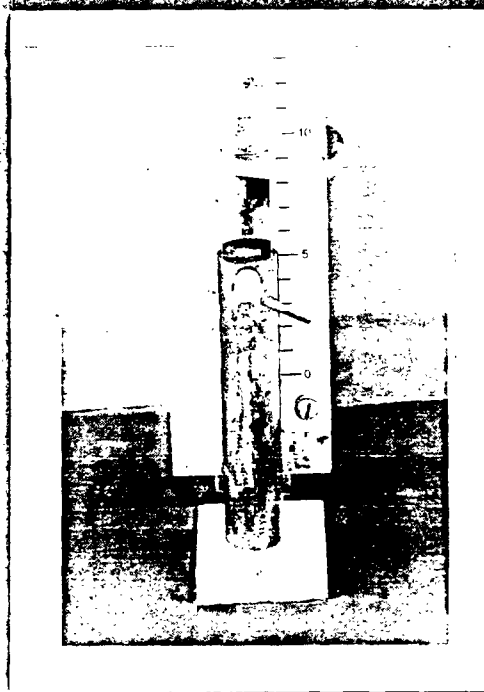
SGP 0014845

PROCEDURE : $1\frac{1}{4}$ " ANNULAR RING NAILS DRIVEN THROUGH
SAMPLE $\frac{3}{8}$ " FROM EDGE AND $\frac{3}{4}$ " APART

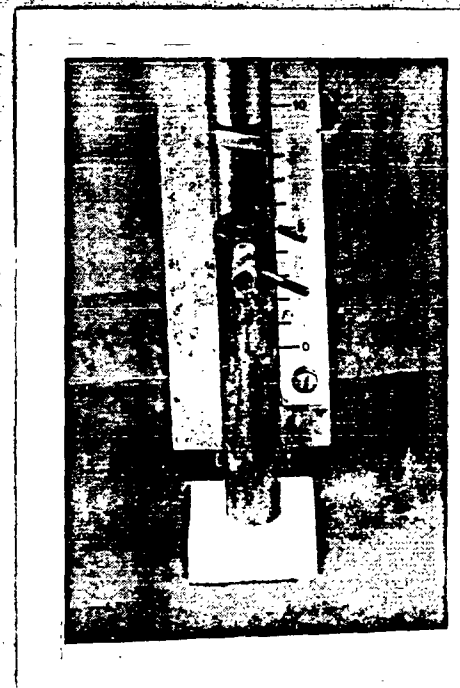
2 FT. LB. IMPACT FORCE



NO GLASS FIBER



AMOUNT OF NO.799
GLASS FIBER IN
REGULAR BOARD

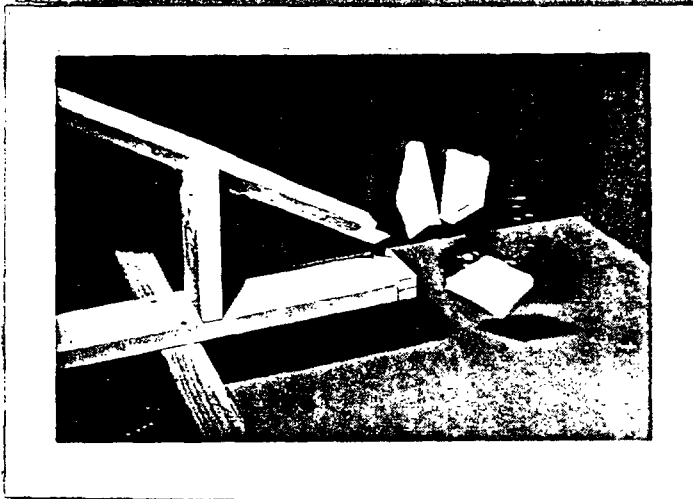


AMOUNT OF NO.710
GLASS FIBER IN
IMPROVED FIRESTOP

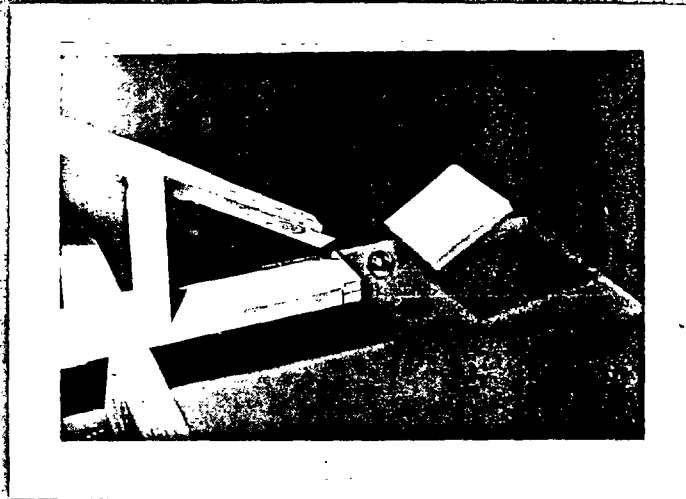
PROCEDURE: SAMPLE STRUCK BY FLAT END
OF A 1LB., 15/16" DIA. CYLINDRICAL
WEIGHT - FREE FALLING FROM
A HEIGHT OF 2 FT.

SGP 0014846

IMPACT BY ROLLING STEEL BALL



NO GLASS FIBER

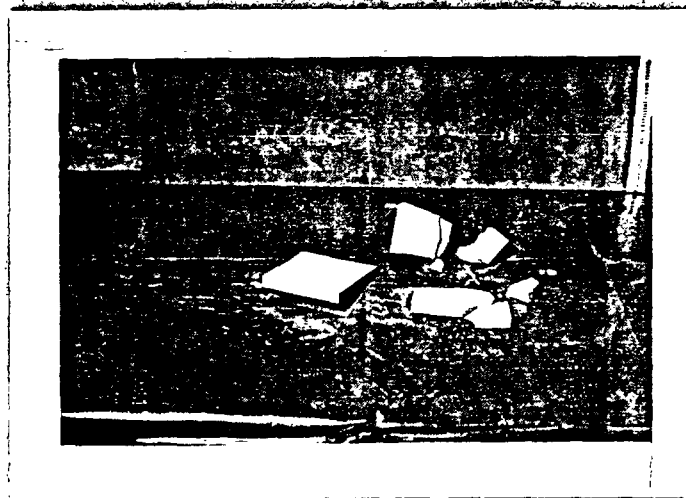


REGULAR AMT. NO.799, SAMPLE CRACKED
FIRESTOP AMT. NO.710, NO DAMAGE

PROCEDURE: UNRESTRAINED SAMPLE STANDING VERTICALLY AND STRUCK IN THE CENTER BY A $1\frac{1}{8}$ " 95 GRAM STEEL BALL ROLLED 6 FT. ON TRACK AT 30° ANGLE FROM HORIZONTAL

DROP FROM 3 FT. HEIGHT

GLASS FIBER



NO GLASS FIBER

REGULAR AMT. NO.799, SAMPLE CRACKED
FIRESTOP AMT. NO.710, NO DAMAGE

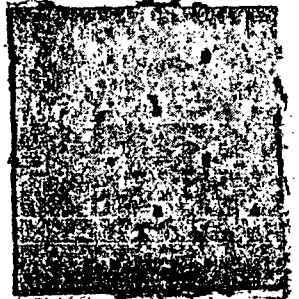
SGP 0014847

PROCEDURE: SAMPLES HELD HORIZONTALLY AND DROPPED FROM A HEIGHT OF 3 FT. FOR A FLATWISE IMPACT ONTO A HARD SURFACE

THINCOAT BASE . . .



Is
Nailed
To
Ceilings,

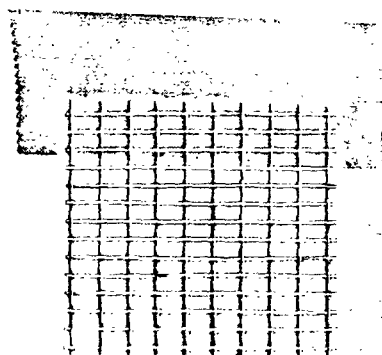


To
Walls,



And
Otherwise
Prepared

THINCOAT FIBER GLASS TAPE . . .



Is
Imbedded

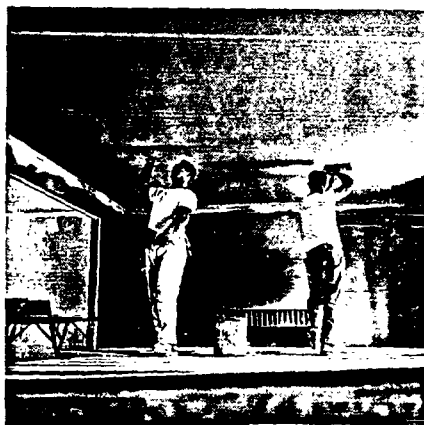


In Flat Joints and in Angles

THINCOAT PLASTER . . .



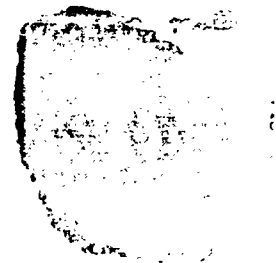
Is
Applied,



Troweled Smooth
On Ceilings,



And Walls,



Job Complete!