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Approved For Distribution **NATIONAL GYPSUM COMPANY**
RESEARCH LABORATORIES

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Report No. 4-61
Date June 2, 1953
REPORT TO THE DIRECTOR OF RESEARCH FROM Rock Wall **LABORATORY**

TITLE: Progress Report: Re-investigate Thermocoustic and Develop Product For Greater Market

REQUESTED BY: W. H. Harding

INVESTIGATION APPROVED BY: W. H. Harding

WHAT IS WANTED: Develop Thermocoustic for a greater market. **A 04808**

WHY WANTED: To promote the development of Thermocoustic.

**Progress
REPORT:**

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Conclusions

Gold Pond Thermocoustic is equal to or better than competitive products tested in the recent survey. It could be desirable, however, to improve the product by reducing the dist. of the air, the use of a primer, and improving the blowing machine.

Recommendations

- It is recommended that the following projects be given separate priority numbers and constitute the program for Thermocoustic development:
- Determine the utility of exhibit emission primer. If desirable, eliminate the use of primer. If not, complete the investigation of other methods for reducing exhibit emission.
 - Develop a machine to remove the dist. involved in the spray or operation.
 - Develop a blowing machine.

DISCUSSION

This project was placed on the research agenda on July 2, 1952, according to the "Request for Research project", dated 5/13/52, by D. J. Stanberg. It has never been detailed due to the lack of clarity and deficiency of Sales requests. Repeated attempts to rectify the situation have produced no tangible results.

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Summary of Researcher's Activities

No work had been done on the project prior to L. W. Fletcher's association with the Company on July 16, 1952. The period from July 16, 1952, to August 16, 1952, can be considered as orientation and indoctrination. During this time, the literature and files were reviewed and a rough draft of a final report on work done by L. W. Stumpf was edited and revised. This report has not been issued up to this date.

In lieu of a specific program the period from August 16, 1952, to the present was devoted to more or less general research which is described briefly in chronological order below:

1. Wettability of Type I wool vs. Thermacoustic performance.

It is essential that Thermacoustic be readily wettable to insure the development of maximum bond strength and good coverage. Prior to this study the wettability of Type I wool was thought to be dependent upon its oil content. It was proved, however, that oil content does not necessarily affect wettability. Furthermore, from the standpoint of oil content, it was found that it would be practically impossible for the plant to manufacture Type I wool which would be unsuitable for Thermacoustic on the basis of wettability.

2. White paint for Thermacoustic.

This is item 1 of the specified objectives in Sales Request for Research Project previously mentioned.

It was verified that Sales' requirements could be met by paint rather than a white fiber over-spray. Tests proved that a white paint coat could be applied immediately after the Thermacoustic had been applied without adverse results. It was learned in a visit with C. H. Wall in Philadelphia, that this practice is ordinarily followed by his applicators.

The Product Specification and Product Supplement were revised accordingly.

3. Uniformity of Mixing.

Due to the anticipated increase in Thermacoustic sales and the obsolescence of the existing equipment, it was decided that new manufacturing facilities would be constructed. J. J. Gagner, Alexandria Plant Engineer, was responsible for the design and requested assistance in determining the type of mixing action best suited for the product.

A method of assaying the uniformity of mixing in the existing equipment was developed. Several batches of Thermacoustic were prepared varying the mixing time and simulating the new production method. At a mixing time of 50 sec. it was found that the uniformity of mixing was within the accuracy of the test method (± 1%).

The Product Manufacturing Procedure was revised when the new equipment was installed and a mixing time of 35 seconds was specified (± 5 sec. cycle).

4. Evaluation of Fiberfrax

Thermacoustic was manufactured in which Fiberfrax was wholly, and in part, substituted for Amosite. To date the product in which Fiberfrax was substituted for 75% of the Amosite has been partially evaluated. The results indicate that Fiberfrax is inferior to Amosite and it was reported that it is considerably more expensive. The press of other work has delayed completion of the evaluation, however, it is believed that no additional work need be done in order to reject Fiberfrax as a replacement for Amosite.

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JUDGE [illegible]

It is essential that all persons be given some sort of training as a part of their normal life. The average worker has had no contact with proper materials and in most cases finds the dust very annoying. It cannot be expected to leave the life of an individual with a connection with the dust problem in its worst form. It is also given little attention in any way on a regular basis. The dust is not a health hazard, but it is a nuisance. The dust is not a health hazard, but it is a nuisance. The dust is not a health hazard, but it is a nuisance.

On the basis of these and other later tests, the present position is that the use of a primer is not required for satisfactory thermocouple performance. More tests will be required before the specifications can be developed. Recently a test was started in which some thermocouples were thermocyclically treated - annealed, oxidized, and cooled, imitating the treatment which would be given in actual use. No failures have been observed in tests as yet of about 1000 cycles.

1. Utility of Archival Religion Films
 Technical Service Team #119, concerning the acceptability of Team 121 Acoustic film as a primer for thermocouples was responsible for initiating this study. It was found that no standard method for evaluating the performance of acoustic evaluation was available. In addition, the need for a primer of any type was not readily apparent.

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However, perhaps a more important factor is the attitude of the General Contractor and/or the Architectural Engineers. They must consider (1) the best time of year when the work or will not work during the application, (2) consideration of all conflicting equipment, etc., (3) consideration of the sleep-out operations, and (4) agreement to the removal of the building if it is a reconstruction job.

For these and other reasons, reduction of the dust content of Thermacoustic is the greatest single improvement that could be made in the product. Let it not be concluded, however, that Thermacoustic is peculiar to this factor. "Dustiness" is a characteristic of all sprayed-on insulations tested to date.

On the basis of the recent competitive survey, Gold Bond Thermacoustic was found to be or better than the other two products tested. However, under Field it was reported that Thermacoustic applied in solid coating is not competitive in regard to noise reduction. Steps are being taken to remedy this situation and it is believed that the required official test results will be obtained.

Until such time as competitive tests prove to the contrary, Thermacoustic is rated generally superior to other products of a similar nature. Improvements can be made, however, which will increase the superiority. Three suggested projects for research toward this end are:

- A. Determine the utility of acoustical emission, etc. If feasible, eliminate the use of a primer entirely. If not, complete investigation of other primers to replace acoustical emission.
- B. Develop a process to remove the dust particles in the spraying operation.
- C. Develop a new blowing machine.

A discussion of each item is in order.

- A. Enough work has already been done on this project to warrant a feeling of optimism regarding the elimination of the primer. Sales was asked to cooperate to the extent of furnishing information on all future Thermacoustic jobs. It would then be possible to select certain representative jobs on which portions of the area to be sprayed could be left unsprayed. In this way a history of field data could be compiled. As yet Sales has taken no action on this request.

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The importance of the above would be greatly lessened on small scale installations where the crew is familiar with its machine. On jobs of the magnitude of the Army Finance Center, however, a specialized machine is required.

2. Distasteful of the product

It is believed that distasteful was one of the major causes of the failure of this job. The inexperienced workmen quickly lost interest in the job when they discovered the adverse conditions under which they were forced to work. Their eyes became irritated and they were annoyed with the necessity of wearing a mask. Experienced applicators, of course, know how to avoid the majority of the dust and learn to "live with" what is unavoidable. Considering the fact that the majority of Thermoseal jobs are of such a nature that a small, well trained crew is sufficient, the above might have been of less significance.

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the possibility along this line is currently under consideration, and the removal of the Douglas has no structural significance within of Portland Terminal. This would result in a savings of \$0.00/1b. Another possibility of cost reduction is utilizing steel substructure (62-5712). The remaining ingredients seem to be at the lowest cost possible. The new manufacturing facilities would reduce the labor cost, and other savings may be possible from a production standpoint.

6. Fire tests on Thermocouple when it is applied directly to steel.
(The hour rating - 1 inch thick).

This requires specialized official tests. There is no equivalent word for Research.

We need noise reduction coefficients for the following conditions:

- 1/2" thickness, solid back and insulation.
- 3/4" thickness, solid back and insulation.
- 1" thickness, solid back and insulation.
- 1-1/2" thickness, solid back and insulation.

All we have is the 1-2" thickness in insulation and the 1/2" and 3/4" in solid backing.

This request requires clarification. It would interest me to know Thermocouple applied to vinyls and tested in 27 minutes. The cost of test panels being required. Our current work time is 27 minutes here - a week. (Official test).

5. We need a synthetic elastic of later every second which can be arranged over Thermocouple for external construction, to be water proof and paintable, and also what effect it may have on the noise reduction coefficient.

The Acoustical Cable Department states that they have several suggestions concerning structures that would protect the stored result. Some can be obtained and evaluated if the project was given priority.

9. For future work, we may require types of Thermocouple necessitating a change of formula. We should begin working on this possibility now.

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3. "Complete the investigation of the use of a laser printer instead of a regular asphalt emulsion".

This project is more or less tied in with the present printer study. If it can be shown that a printer is not necessary in the majority of cases, this project will be academic.

4. "See need some development of a new kind of Thermacut machine".

If the "Green Light" is given on this project, R. P. Weaver is willing and able to tackle it. Research cooperation would of course be extended.

5. "The current price of Thermacut is .12/1b. and our chief competitor price is .09/1b. We should be actively working to reduce our cost as much as possible."

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