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

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Report No. A-61

Date June 2, 1953

REPORT TO THE DIRECTOR OF RESEARCH FROM Rock Wool 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 dust, eliminating the use of a primer, and improving the blowing machine.

Recommendations

- It is recommended that the following projects be given priority numbers and constitute the program for Thermocoustic development:
1. Determine the ability of product emission primer. If desirable, eliminate the use of primer. If not, complete the investigation of other products for high quality emission.
 2. Develop a machine to remove the dust involved in the spray operation.
 3. Develop a new 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. G. Stanberg. It has never been detailed due to the lack of clarity and definition of sales requests. Inevitable attempts to rectify the situation have produced no tangible results.

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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 F. H. Stump 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. Reliability of Type I wool vs. Thermacoustic performance.
It is essential that Thermacoustic be readily available to insure the development of maximum bond strength and good coverage. Prior to this study the availability of Type I wool was thought to be dependent upon its oil content. It was proved, however, that oil content does not necessarily affect availability. 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 availability.

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. R. L. Warner, 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 30 sec. it was found that the uniformity of mixing was within the accuracy of the test method (2.1%).

The Product Manufacturing Procedure was revised when the new equipment was installed and a mixing time of 35 seconds was specified (50 sec. max.).

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

a. Dustiness of the product

It is believed that dustiness 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 Thermacooustic jobs are of such a nature that a small, well trained crew is sufficient, the above might lose some of its significance.

However, perhaps a more important factor is the attitude of the General Contractor and/or the Architect and Engineer. They must consider

- (1) the best time of other trades who cannot or will not work during the application, (2) contamination of air conditioning equipment, etc.
- (3) contamination of the clean-up operations, and (4) disturbance to other occupants of the building if it is a reconstruction job.

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

On the basis of the recent competitive survey, Cold Bond Thermacooustic was equal to, or better than the other two products tested. However, under T-12 it was reported that Thermacooustic applied to joint backing 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, Thermacooustic is rated generally superior to other products of a similar nature. Improvements can be made, however, which will increase this superiority. Three suggested projects for research toward this end are:

- A. Determine the utility of asphalt emulsion primer. If possible, eliminate the use of a primer entirely. If not, complete investigation of other primers to replace asphalt emulsion.
- B. Develop a process to remove the dust involved in the spraying operation.
- C. Develop a new blowing machine.

a. Discussion of each item 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 Thermacooustic jobs. It would then be possible to select certain representative jobs on which portions of the area to be sprayed could be left unprimed. 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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3. "Complete the investigation of the use of a latex primer instead of a regular asphalt emulsion".

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

4. "We need some development of a new kind of Thermacoastic machine".

If the "green light" is given on this project, F. P. Woomer is willing and able to tackle it. Research cooperation would of course be extended.

5. "The current price of Thermacoastic is .12/lb. and our chief competitor price is .09/lb. We should be actively working to reduce our cost as much as this kind of competition".

One possibility along this line is currently under consideration, i.e., the removal of the fiberglass and the associated fiberglass action of Portland Cement. This would result in a savings of \$0.003/lb. Another possibility of cost reduction is milling stick asbestos (6a2-5712). The remaining ingredients seem to be at the lowest cost possible. The new manufacturing facilities should reduce the labor cost, and other savings may be possible from a production standpoint.

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

This requires organized official tests. There is no apparent need for Research.

"We need noise reduction coefficients for the following conditions:

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

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

This request requires clarification. We would interpret this to mean Thermacoastic applied to fiberglass and tested on 1/2" backing. Our sets of test panels being required. (Our contract under item 6 applied here - a wall). (Official tests).

7. "We need a synthetic elastic or latex spray material which can be sprayed over Thermacoastic for exterior construction, to be water proof and paintable, and also what effect it may have on the noise reduction coefficient".

The Acoustical Sales Department states that they have several suggestions concerning products that would provide the desired result. Samples could be obtained and evaluated if the project was given priority.

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

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