

10/8/65

October 6, 1965

Mr. J. M. Brierly
Sandia Corporation
Livermore Laboratory
Post Office Box 969
Livermore, California

Dear Mr. Brierly:

Attached is a proposal for "Investigation of the Effectiveness of Organic Adhesives and Coating Materials Developed at Mound Laboratory" which encompasses the work discussed by you and Dr. Hartzel during his visit to Sandia on September 28, 1965. This study which would be performed by the adhesives group under Dr. Hartzel's direction, can be initiated immediately since most of the equipment needed is available from the study conducted for you during FY-1965. The cost for this work for the remainder of FY-1965 would be \$10,000, which includes initiation of all experiments and completion of those not requiring long storage times.

Dr. Hartzel has made an inventory of the salt parts remaining from our previous study for Sandia. We have on hand 30 round and 6 square shear plates. There are also a few plates bonded into test laminates which might be of use to this proposed study.

If you have any questions concerning this proposed study, please contact Dr. R. E. Vallee or Dr. L. W. Hartzel.

MOUND DECLASSIFICATION REVIEW	
1ST REVIEW DATE: <u>7/12/65</u>	DEFINITION (CIRCLE NUMBER(S))
AUTHORITY: <input type="checkbox"/> AOC <input checked="" type="checkbox"/> ADC <input type="checkbox"/> ADD	1. CLASSIFICATION RETAINED
NAME: <u>Richard Grove</u>	2. CLASSIFICATION CHANGED TO: _____
2ND REVIEW DATE: <u>7/18/8000</u>	3. CONTAINS NO DOE CLASSIFIED INFO
AUTHORITY: <u>Richard Grove</u>	4. COORDINATE WITH: _____
NAME: <u>Richard Grove</u>	5. CLASSIFICATION CANCELLED
	6. CLASSIFIED INFO BRACKETED
	7. OTHER COMMENTS: _____

Very truly yours,

G. Richard Grove, Director
Research Department

ERG/db

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6 - R. E. Vallee - Mound

PROPOSAL FOR THE INVESTIGATION OF THE EFFECTIVENESS
OF ORGANIC ADHESIVES AND COATING MATERIALS
DEVELOPED AT MOUND LABORATORY

L. W. Hartzel and R. E. Vallée

1. Effect of aging under dry conditions on the plug tensile strength of laminates bonded with adhesives SA-F-13, SA-F-31 and SA-F-63.

These tests would consist of preparing thirty plug tensile laminate specimens bonded with each adhesive (90 in all) and maintaining them under very low humidity conditions (about 20 ppm of water) for periods ranging up to 48 months. The average tensile strength of five laminates bonded with each adhesive would be determined after 3, 6, 12, 24, 36 and 48 months.

2. Effect of bonding clean salt plates after their exposure to 10 per cent relative humidity conditions for 24 hours.

This test is designed to simulate actual fabrication conditions; pieces are machined under anhydrous conditions then allowed to stand in a 10 per cent relative humidity atmosphere for some time before being bonded. Salt plates would be cleaned carefully under dry conditions, then exposed to 10 per cent relative humidity conditions for 24 hours. Without further treatment, the plates would be bonded into plug tensile laminate specimens using adhesives SA-F-13, SA-F-31 and SA-F-63; five specimens would be prepared for each adhesive formulation. After standing under dry conditions for two weeks, the average tensile strength of the specimens bonded by means of each of the adhesives would be determined.

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3. Effect of long time exposure to a specific relative humidity atmosphere on the plug tensile strength of bonded laminates containing coated and uncoated salt plates.
- a) Thirty uncoated salt plates would be bonded into plug tensile laminate specimens with each of these adhesive formulations SA-F-13, SA-F-31 and SA-F-63 under dry conditions (90 in all). The bonded laminates would then be subjected to a given relative humidity atmosphere for periods up to four years. The relative humidity condition will be specified by Sandia Corporation. Five laminates will be tested for plug tensile strength after 3, 6, 12, 24, 36 and 48 months exposure and the average tensile strength determined.
 - b) As in a) above, except that salt plates would be coated with SA-f-13 and/or SA-f-63 and allowed to cure before being bonded into laminates with adhesive formulations SA-F-13, SA-F-31 and SA-F-63.
4. Effect of diffusion of non-compatible adhesive formulations components through compatible coatings causing rupture of the salt plate.

A difference in the rupture strength of a coated salt plate laminate bonded with an adhesive incompatible with salt plates and that of an uncoated salt plate bonded with a compatible adhesive SA-F-13 was noted in previous work, i.e. 1600 vs. 2200 psi, both failures taking place in the salt plates. The difference in value implies that some diffusion through the coating has occurred which weakens the salt plate itself. To determine whether such diffusion takes place, the following procedure will be followed:

Five salt plates will be coated with SA-f-13 and allowed to cure. The coated plates will then be bonded into plug tensile laminate specimens with adhesive SA-F-13 and the average tensile value determined. If this value is approximately 2200 psi, it may be assumed that some diffusion occurs when an incompatible adhesive is used to bond coated salt plates.