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MEMORANDUM REPORT #M-132:PROPOSED PROGRAM FOR FLAT WALL EMULSION PAINTS

This will bring together all of the known leads for the improvement of Speed Easy, to serve as a starting point for further work on this subject when the necessary manpower is available. It is felt that such improvements are badly needed, especially in anticipation of possible competition from the Hercules formula described below. Leads for improvements in both wet erosion resistance (washability) and appearance (streaking resistance) are available and our product should be brought up to date as soon as possible, consistent with other objectives.

Summary:

1. An improvement in wet erosion resistance is available through either the "split phase" pigmentation technique or the use of colloidal silica in place of part of the extender. Either method, however, involves a substantial increase in cost and it may be that the use of more rapid drying oil phase vehicles may offer a more economical improvement. Such vehicles included dehydrated castor oil alkyds, ketene oils, and bodied oil - PE alkyds. A sample of an emulsion flat recently submitted for test by Hercules combined good brushability with excellent wet erosion resistance. It is not known whether the GR-S latex or the Dresinol (proprietary emulsion vehicle) is responsible for the latter, and the cost picture is not known.

2. The use of colloidal silica offers the possibility of formulating a protein free product combining, for the first time, good brushing and good wet erosion resistance, with the obvious advantages of freedom from protein.

3. Color streaking is still a problem in Speed Easy. Wesco has formulated a series of color pastes, for shading purposes, which we have not yet tested but which are reported to give streak-free deep tints. Such products are already sold by Sears Roebuck and by U. S. Gypsum (Texolite). They should be tested and duplicated if possible. The effect of pigment volume and vehicle absorption of the pigment in the white shading base should also be checked.

Details:

Wet Erosion Resistance:

1. The "split phase" formula (P-100-P-54917) described in Research Report Nos. 835 and 815 shows a 4- to 5- fold improvement over the present Speed Easy in wet erosion resistance, a significant improvement in application properties, and an increase in self sealing which helps to diminish tendency towards streaking of the second coat. The cost as calculated in January 1946 was 12 cents higher than that of the conventional Speed Easy. Of this cost, 7 cents was due to material cost and 5 cents to processing. An attempt to lower the manufacturing cost by dispersing the prime pigment in the finished emulsion in one milling operation rather than in the resin phase in a separate operation was unsuccessful, but more work on this point is needed. The following program is suggested:

a. Disperse the prime pigment in the finished emulsion at higher or lower viscosity. Investigate the use of "flushing agents" (intofiers). Apply the "low viscosity casein" principle developed by C. W. Shay (Book #3155, page 169, #3235 page 15).

b. Study possible correlation between this finished emulsion pigmentation procedure and the similar procedure which has been used successfully in emulsion gloss paints (Book #3284 page 172 and following).

c. Investigate lower cost ingredients such as:

Soya protein for all or part of casein
Linseed oil or soya bean oil acids for Isoline
Mineralite Mica for Aratone
Cheaper vehicles such as tall oil acylated phenolics.

d. Study pigment volume ladders to determine whether the product is formulated at a high or a low point on the hiding vs. pigment volume curve. See Research Report #878 for theory.

e. See Research Report #835 for other leads.

2. Patent applications under cases Sveda and Shay I and Horning and Shay I (Book #3235) cover the use of colloidal silica in Speed Easy. A four fold improvement in wet erosion resistance in the conventional formula is available, but at a cost of 26 cents per gallon (S. G. to J. M. 6/3/47). When the Speed Easy program is reopened the possibility of providing colloidal silica at a lower cost should be taken up with Grasselli.

3. Faster drying vehicles, some of which are specific to emulsion paints, should be reexamined. These include DCO alkyds, bodied oil-PE alkyds, ketene oils and possibly acylated phenolics. A U. S. Gypsum patent, #2,379,402, covers the use of dehydrated castor oil and should be examined before we procede too far in this direction.

4. A sample of an experimental flat, SR-41969 received from Hercules, shows a 10 to 20 fold improvement over Speed Easy in wet erosion resistance, and satisfactory brushing properties as nearly as can be determined from small scale applications. (Book #3320 pages 39, 49, 63, 121 and 183) It contains one of the Dresinols and a small amount of GR-S type 3 latex. Its properties have been duplicated with Dow latex #512. We do not know whether the excellent water resistance is caused by the Dresinol or by the latex; undoubtedly the very low pigment volume (42%) contributes in part. Further work indicated includes evaluation of the Dresinols and of rubber like latices.

5. The effect of lowering the pigment volume, even at a sacrifice in hiding power, should be investigated and considered.

Color Streaking:

1. The color pastes developed by Wesco and those sold by U. S. Gypsum (Texolite) and Sears Roebuck should be tested in medium and deep tints and analyzed and duplicated if they show promise.

2. In connection with the development of solution type architectural flats (Research Report #871), a color streaking similar to that seen with Speed Easy was found, with certain high oil absorption extenders, at high pigment volume ranges. This indicates that further extender and pigment volume studies in Speed Easy are needed.

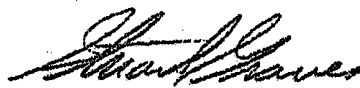
3. Disclosures in patent #2,404,463 should also be investigated.

Protein Free Speed Easy:

In all of the protein free flats which we have made, the high wetting agent content required to give satisfactory brushing properties has resulted in poor wet erosion resistance. The use of colloidal silica as per Graves and Shay Case I (Book #3235) offers a possible lead for a better balance of these properties. No stabilizer for the colloidal silica is required in a protein free paint, and it might be possible to obtain a better coat picture than in standard Speed Easy.

The Dresinols contain low casein content, if any. They should be evaluated in further detail.

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