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MEMORANDUM REPORT NO. M-467

Marshall Laboratory
June 2, 1952HOUSE PAINT PERFORMANCE VERSUS EXPOSURE LOCATIONINTRODUCTION:

Because of the recent difficulties in obtaining satisfactory handling of exposure studies at the Canyon, Texas test fences, consideration is now being given to relocating the Southwest test fence from Canyon to Louviers, Colorado where it would be possible to maintain a more strict control of the personnel handling the exposures.

A review of existing data was made in an effort to answer the following questions: (1) Does the Louviers location give the same type and rate of paint failure as Canyon, Texas? (2) Is a Southwest location necessary or can we obtain the same information from our test fences in Hialeah, Florida? An extensive study was made in S-225 in which a comparison of all three locations were made. This study was reported in Research Report #312 and in I. E. C., Vol. 27, page 147, February, 1935. Additional comparisons have been made between the Texas and Florida locations in Series 8380 and 9066.

CONCLUSIONS:

1. From a comparison of ratings after 1 year of exposure, Louviers, Colorado gives about the same rate of failure as Canyon, Texas for both orthodox linseed oil and "Dulux" type paints.

2. For orthodox oil paints the Florida location gives generally the same type and rate of failure as the Texas location, although there are some specific instances as shown in the I & EC report where the results differ quite widely in the two locations.

3. For the more erosion resistant "Dulux" paints, Florida gives slower failure which may be more of the erosion type contrasted with almost 100% flaking failures in Texas.

4. Because of the emphasis on more durable vehicles in house paints, a Southwest location will continue to be necessary for testing of paints over poor grades of lumber.

DISCUSSION:

Series #225 was put out in 1931 and had as its primary

N35450

purpose the determination of paint durability over poor grades of lumber. In this study, each paint was exposed on six different types of lumber and over six different primer systems so that there are 36 panels of each paint in each location. It has been reported that panel variability was very great, but considering the large number of panels involved, a good amount of reliability can be placed on the results. The ratings for this series which are shown in the accompanying tables are on a scale of 0-6 where 0 is no failure, 1.5 is A.S.T.M. #8 flaking, 4 is A.S.T.M. #4 Flaking and 6 is A.S.T.M. #1 flaking. The ratings are for one year exposure and a large majority of panels have reached a significant degree of failure.

In Series #8380 and 9066, the "service life" or time to repaint stage has been estimated from the periodic ratings. The repaint stage is considered to be when the paint has reached either #8 A.S.T.M. Flaking or Erosion, #6 A.S.T.M. Cracking or #2 A.S.T.M. checking.

There is no complete alkyd system in S-8380, so it appears that the Florida location gives as fast or faster failure as the Texas location for all types of paint. However, there are complete alkyd systems in S-225 and 9066 which do not fail as fast in Florida as in Texas. It is therefore evident that so long as we are testing for more durable erosion resistant paints exposure in southwest area will have to be made. Furthermore, an examination of the results of S-225 reported in Industrial & Engineering Chemistry reveals differing results between Texas and Florida when comparing the performance of two similar oil paints. These may be isolated instances, but continuing comparisons must be made before we can rely completely on Florida exposures for orthodox paints.

MARSHALL LABORATORY

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5/27/52

HOUSE PAINT PERFORMANCE VS EXPOSURE LOCATION

1. Durability vs Location

	<u>S-8380</u> <u>Service Life</u>	<u>S-9066</u> <u>Service Life</u>	<u>S-225</u> <u>Rating at 1 year</u>	
Tex.	34.1 mos.	32.6 mos.	1.4	n= 144
Fla.	30.8 "	> 39.1 "	.8	"
Wilm.	29.4 "	--	.6	"
Louviers	--	---	1.4	"

2. Durability vs Type of Substrate vs Location

<u>White Pine</u>	<u>S-8380</u>	<u>S-9066</u>		
Tex.	37.3 mos.	----	.7	n= 24
Fla.	35.3 "	----	.8	"
Wilm.	36.3 "	----	.2	"
Louviers	----	----	.8	"

Red Cedar

Tex.	---	37.5 Mos	.8	"
Fla.	---	41.2 "	.3	"
Wilm.	---		.1	"
Louviers	---		.5	"

S. Yellow Pine

Tex.	31.0 mos,	31.6 "	3.0	"
Fla.	26.2 "	49.3 "	1.7	"
Wilm.	22.6 "		1.8	"
Louviers			2.8	"

3. Durability vs Type of Finish vs Location

<u>L. O. Prep. Pt.</u>			<u>All systems</u>	<u>Oil Reduced</u> <u>only</u>
Tex.	34.6	35.0	1.7 n= 36	2.2 n= 6
Fla.	31.0	37.5	1.6 "	3.0 "
Wilm.	30.1	--	.9 "	.7 "
Louviers	--	--	1.7 "	1.6 "

Alkyd (Primer Only)

Tex.	32.8	35	1.0 "	1.0 "
Fla.	32.0	> 53	.1 "	.1 "
Wilm.	31.5	--	.2 "	.3 "
Louviers	----	--	1.0 "	1.3 "

Lead in Oil

Tex.	29.8	--	--	.7 "
Fla.	14.5	--	--	2.5 "
Wilm.	19.7	--	--	.5 "
Louviers	--	--	--	.7 "

4. Type of Failure vs Location vs Substrate

S-8380			S-9066		
<u>F</u>	<u>C</u>	<u>E</u>	<u>F</u>	<u>C</u>	<u>E</u>
<u>White Pine</u>					
Tex.	9 1/2 (73%)	2 1/2 (21%)	0	-	-
Fla.	6 (43%)	8 (57%)	0	-	-
Wilm.	4 1/2 (32%)	6 (43%)	3 1/2 (25%)	-	-
<u>Red Cedar</u>					
Tex.	-	-	4	0	0
Fla.	-	-	1	2	1
Wilm.	-	-	-	-	-
<u>S. Yellow Pine</u>					
Tex.	11 (73%)	2 1/2 (17%)	1 1/2 (10%) 4	0	0
Fla.	11 (73%)	2 (13%)	2 (13%) 2	2	0
Wilm.	10 (66%)	2 1/2 (17%)	2 1/2 (17%)	-	-

5. Type of Failure vs Location vs Type of Paint

L. O. Prep. Paint

Tex.	10 1/2	1 1/2	0	4	0	0
Fla.	9	3	0	2	2	0
Wilm.	8	3	1	-	-	-

Alkyd

Primer Only

Tex.	7	2	0	4	0	0
Fla.	5	6	0	1	2	1
Wilm.	6 1/2	4 1/2	0	-	-	-

Lead in Oil

Tex.	3	1 1/2	1 1/2	-	-	-
Fla.	3	1	2	-	-	-
Wilm.	0	1	5	-	-	-