

SECOND SPECIAL REPORT ON LEADED ZINC EXPOSURES

SUPPLEMENTARY TO:

BULLETIN RC-64 August, 1941

BULLETIN RC-68 March, 1942

SPECIAL REPORT ON LEADED ZINC EXPOSURES April, 1944

Prepared by: J. W. Chapin

January 31, 1945

ALLIED RESEARCH LABORATORIES

CHICAGO, ILLINOIS

0007-SWP-044706

farthest advanced, but all contrary indications from other sources are taken into consideration.

The Florida panels have now completed 41 months' exposure, Chicago, 46 months and Coffeyville 45 months.

Composition of Paints Tested

Rex 4/1, 1-4-40 Basic Formula

Loaded Zinc	44.8% by weight of pigment
Zinc Oxide	29.1%
Basic Lead Sulphate	15.7%
Titanium Dioxide, 2030 T	14.3% " " " "
Asbestine	22.8% " " " "
Basic Lead Carbonate	18.1% " " " "

Vehicle - Regular (5091) treated linseed type;
3 gallons bodied linseed.

The only departure is in a special lead titanate formula (panels 4536-7), using 53 pounds or 5% of lead titanate replacing part of 2030 T on a cost basis.

With some exceptions, the tint series tests the same loaded zincs, zinc oxides and white leads in the following basic pigmentations:

Material	Lead Titanate type	Non-Chalk color, Special, TiO ₂ Type	Panels 4628-9
Basic Carbonate or Sulphate	10%	10% acicular, 9.8%	
Loaded Zinc, 35/65	45%	46%	45.2%
Asbestine	20%	30%	29.5%
Lead Titanate	25%	-	5.0%
Non-chalking TiO ₂ , 2031	-	14%	10.5%

Identification of Special Materials

A. Loaded Zincs

Lehigh 635 - 35/65 type, acicular ZnO in a mechanical mix,
New Jersey Zinc Company

Lehigh 60 - 35/65 type, co-fumed, low oil absorption,
New Jersey Zinc Company

0007-SWP-044707

- Azo 55 L - 35/65 type, probably co-fumed, American Zinc Sales Co.
- E.P. 70/30 - 70% lead sulphate, 30% zinc oxide, Eagle-Picher Lead Co.
- 412 - Ozlo 55/65, co-fumed.

B. White Leads

- Nat'l HTS - High tinting strength basic lead carbonate.
National Lead Co.
- S-W HTS - High tinting strength basic lead carbonate, our special.
- S-W Q.P. - Quick Process, basic lead carbonate, our 18 dry.
- 9 dry - Basic lead sulphate, non-acicular, Eagle-Picher Lead Co.
- NAHLS - Acicular basic lead sulphate, National Lead Co.

C. Zinc Oxides

- ZZZ-33 - Azo acicular, American Zinc Sales Co.
- ZZZ-11 - Ditto, slightly greater acicularity.
- ZZZ-22 - Ditto, highest acicularity.
- St. Joe - Non-acicular, St. Joseph Lead Co. (Green Label #46).
- XX-50 - Horse Head medium coarse particle size,
non-acicular, New Jersey Zinc Company.
- XX-503 - Horse Head large particle size, non-acicular,
New Jersey Zinc Company.
- XX-92 - Horse Head small particle size, non-acicular,
New Jersey Zinc Company.

Summary of Results

Part I. Mechanical Mixtures

St. Joseph #46 is definitely the poorest zinc oxide, Azo ZZZ-33 slightly best in general durability. But ZZZ-11 and ZZZ-22 (only one sample of each tested) now seem nearly equal to ZZZ-33. Horse Head XX-503 is definitely inferior; XX-50 is nearly as poor as St. Joseph #46.

National acicular basic lead sulphate is definitely poorest of the white leads. It is still difficult to rate the other white leads,

0007-SWP-044708

but 18 dry probably deserves a slight edge.

Mechanically mixed leaded zincs are still obviously inferior to the co-fumed.

Tint Series

Again the outstanding differences in the tints (referring mainly to appearance characteristics) are between the 1895 and 2031 types, rather than between co-fumed and mechanically-mixed. As to durability factors, co-fumed materials are quite definitely superior.

Absence of many Florida panels greatly handicaps the drawing of conclusions as to durability at present. With regard to checking and cracking, the 1895 type as a group does not seem greatly different from the 2031 type, but there are considerable variations within each group. National acicular sulphate is the poorest white lead in both; National HTS and 18 dry seem definitely better as used with 2031, while the others show only slight variations, apparently determined by the zinc oxides involved. St. Joseph #46 Zinc Oxide again seems poorest, but the advantage of Azo ZZZ-35 over XI-505 and XI-50 in this category is not as clearly marked as in the whites.

The Chicago panels still offer a great contrast to the others in fading and dirt-collection. Both 2031 and 1895 types are still holding a heavy mask of chalk which means very bad fading. The underlying color of the 1895 type, however, is preferable to that of the 2031 type. Dirt is definitely worse on the 2031 type. At Coffeyville and Florida, less chalk is now held on the panels; here 1895 seems slightly better in tint-retention. Dirt differences are slight, but there is no indication favoring 1895. In other words, on the panels which represent an advanced stage of self-cleaning, lead titanate seems to hold on to a slightly greater residual film of dirt than 2031.

0007-SWP-044709

Part II. Co-fumed Leaded Zincs

A. Regular Types, White.

The general superiority of the co-fumed materials in resistance to checking and cracking has been mentioned in the preceding section.

412 seems to be the best leaded zinc, in general durability and, contrary to the situation at the time of the previous study, Lehigh 635 seems next best. Azo 65 L and Lehigh 60 are very similar and nearly equivalent to Lehigh 635.

National acicular basic lead sulphate is clearly the poorest supplementary white lead in this group, but it is almost impossible to choose at present between the other three (all carbonates).

B. Special Type Formulas, White

The 5% lead titanate specials again rate very well at all locations. The Eagle-Picher 70/30 specials are still in good condition, but there is a definitely greater tendency toward checking than in the case of the orthodox leaded zincs. XX-92 is still the poorest zinc oxide used in this special type, with Azo ZZZ-38 probably best.

C. Regular Types, Tinted

Because of the lack of Florida tests, failure is of little importance as yet. These co-fumed samples ran more nearly uniform in fading and dirt than the mechanical mixtures, with very little difference due to the various supplementary white leads. In fact, as to fading alone, there is no choice whatever between the lead titanate and 2031 types. At Coffeyville, where self-cleaning is more advanced, there is little if any choice as to dirt, but at Chicago lead titanate again seems to result in the retention of serious dirt for a longer time. The variation in individual cases (leaded zincs and white leads) is now too slight to evaluate, either as to fading or dirt.

0007-SWP-044710

D. Special Formulas, Tinted

The Eagle-Picher formulations correspond almost exactly to the regular leaded zincs in tint-retention. As to dirt, they offer a clear-cut confirmation of the trend toward worse dirt with lead titanate, seen in the regular formulations. The 2031 type shows more evidence of incipient checking and cracking than the 1895 type.

The special 1/5 1895, 2/3 2031 blend, both with 412-13 dry and Lehigh 335-13 dry, seems now exactly the same as the most satisfactory samples of the 2031 type co-fumed formula in appearance characteristics, and is fully as good in durability.

Examination at 41 Months Florida Exposure, Whites

<u>Panel No.</u>	<u>Test Materials</u>	<u>Chalk</u>	<u>Check</u>	<u>Crack</u>	<u>*** Dirt</u>	<u>Gen'l Appear.</u>
<u>Part I - Mechanical Mixtures</u>						
4500 F	ZZZ-33 and Nat. HTS	VB	C	(C)	S	F
4501	St. Joe and Nat. HTS	"	A	VB	S	(F)
4502	XX-503 and Nat. HTS	"	(C)m	(E)	(S)	F
*4541	XX-50 and Nat. HTS	"	S m	VB	"	"
4503	ZZZ-33 and S-W Q.P.	"	A	S m	"	"
4504	St. Joe and " "	"	"	VVB	S	VP
4505	XX-503 and " "	"	C	(C)	(S)	G
*4542	XX-50 and " "	"	S m	VB	"	F
4506	ZZZ-33 and NABLS	"	(C)	B	S	(F)
4507	St. Joe and " "	VVB	A	VVB	"	"
4508	XX-503 " "	VB	S m	B	"	F
*4543	XX-50 and " "	VVB	A	VB	(C)	P
4509	ZZZ-33 and 9 dry	VB	C	(C)	S	F
4510	St. Joe and 9 dry	VVB	A	VVB	G	P
4511	XX-503 " " "	VB	(C)m	S	S	(F)
*4544	XX-50 " " "	VB	A	VB	(C)	P
4512	ZZZ-33 and S-W HTS	"	(C)m	(G)	S	F
4513	St. Joe " " "	"	A	VB	"	(F)
4514	XX-503 " " "	"	S m	B	"	(F)
*4545	XX-50 " " "	"	"	VB	"	F
4516	ZZZ-11 and Nat. HTS	"	B	Cm	(S)	F
*4517	ZZZ-22 " " "	"	"	(C)m	S	F

0007-SWP-044711

Examination at 41 Months Florida Exposure, Whites (Cont.)

Panel No.	Test Materials	Chalk	Check	Crack	Dirt	Gen'l Appear.
<u>Part II - Co-fumed - A. Regular Types</u>						
1519 F	412 and S-W Q.P.	VB	(S)	Tr	S	F
4520	Lehi 635 and S-W Q.P.	"	A	C	"	(F)
4521	Lehi 60 " " "	"	"	S	"	F
4522	Azo 35 L and " " "	"	(S)m	(S)	(S)	G
4523	412 and S-W HTS	"	A	A	(C)	G
4524	Lehi 635 and S-W HTS	"	(S)m	(S)m	(S)	"
4525	Lehi 60 " " "	"	(S)m	(S)	S	"
4526	Azo 35L " " "	"	S m	(C)m	S	(G)
4527	412 and Nat. HTS	"	(S)	S m	S	G
4528	Lehi 635 and Nat. HTS	"	Tr m	(C)	S	G
4529	Lehi 60 and " " "	"	A	(B)	(S)	G
4530	Azo 35 L and " " "	"	C	(C)	S	(G)
4531	412 and NAHLS	"	C	(S)m	S	F
4532	Lehi 635 and NAHLS	"	S m	VB	"	(G)
4533	Lehigh 60 " " "	"	B	(B)	"	G
4534	Azo 35 L " " "	"	D	(B)	"	F
<u>B. Lead Titanate Special Type</u>						
4535	412 and S-W Q.P.	"	A	A	(S)	G
4536	Lehi 635 and S-W Q.P.	"	A	S m	(S)	(G)
<u>C. Eagle-Picher Special Types</u>						
4537	XX-92 and E.P.	"	A	VVB	(C)	P
4538	ZZZ-11 " " "	"	(B)	(C)m	S	F
4539	ZZZ-22 " " "	"	(B)	C m	(S)	F
4540	ZZZ-55 " " "	"	(C)	S m	(C)	F

Examinations

<u>Chicago - 46 Months</u>						<u>Coffeyville - 45 Months</u>					
Panel No.	Chalk	Check	Crack	Dirt	Gen. App.	Chalk	Check	Crack	Dirt	Gen. App.	
<u>Part I - Mech. Mixtures</u>											
4500	B	A	A	C	(F)	B	S m	(B)	S	F	
1	B	A	(C)	(C)	(F)	VVB	S m	VB	S	(F)	
2	B	A	A	S	F	B	S m	(B)	S	F	
*4541	B	(S)m	S m	(C)	F	B	A	VB	(S)	F	
4503	B	A	S	(S)	F	B	A	S	(S)	F	
4	B	A	S	S	F	B	A	VB	S	(T)	
5	B	A	S	S	F	B	A	VB	S	(F)	
*4542	VB	A	Tr	(C)	F	B	A	VB	(S)	F	

0007-SWP-044712

0007-SWP-000114082

Examinations - Cont.

Chicago - 46 Months

Panel No.	Chalk	Check	Crack	Dirt	Gen. App.
-----------	-------	-------	-------	------	-----------

4506	B	A	A	(S)	F
7	VB	C	C	(C)	(F)
8	B	A	(S)m	S	(F)
*4543	VB	Sm	(S)m	(C)	F
4509	B	A	S	S	S
10	B	A	S	(C)	(F)
11	B	A	(S)	S	F
*4544	B	A	A	(C)	F
4512	B	A	(S)	S	F
13	B	S m	(C)	S	F
14	B	A	S	C	P
*4545	VB	S m	(S)m	C	(F)
4516	B	A	S	S	(F)
**4517	B	A	A	(S)	F

Part II - Co-fumed - A. Regular Type

4519	B	A	A	S	F
20	"	"	C	C	(F)
21	B	A	C	C	P
22	"	"	A	(S)	(F)
4523	"	"	(S)	S	F
24	"	"	A	(S)	F
25	"	"	Tr	S	(F)
26	"	"	Tr	S	F
4527	"	"	S	(S)	F
28	"	"	Tr	(S)	F
29	"	"	A	S	F
30	"	"	A	S	F
4531	"	"	A	(S)	F
32	"	"	Tr	S	F
33	VB	"	A	S	F
34	VB	"	A	S	F

B. Lead Titanate Special Type

4535	VB	A	A	S	F
36	B	A	A	S	F

C. Eagle-Picher Special Type

4537	B	A	C	(C)	F
38	B	A	(S)	S	F
39	B	A	Tr	(C)	F
40	B	A	(C)	(C)	F

Coffeyville - 45 Months

Chalk	Check	Crack	Dirt	Gen. App.
-------	-------	-------	------	-----------

B	A	VB	(S)	(F)
VB	A	VB	(S)	F
B	(S)m	VB	(S)	(F)
VB	A	VB	(S)	F
B	S m	(B)	(S)	(F)
B	(S)m	VB	(S)	F
B	S m	B	(S)	(F)
B	S m	VE	(S)	F
B	(S)m	(D)	(S)	F
B	A	VVB	(S)	F
B	S m	B	S	(F)
B	S m	VE	(S)	F
B	S m	(C)	(S)	G
B	A	C	S	G
B	A	(C)	S	G
"	A	S	S	G
"	A	S	(S)	G
"	(S)m	(B)	(S)	(F)
"	(S)m	(S)	(S)	(G)
"	Tr m	(C)	(S)	(G)
"	(S)m	C	(S)	(G)
"	(S)m	(S)	(S)	G
"	Tr m	(B)	(S)	F
"	A	C	(S)	G
"	A	B	S	F
"	A	(C)	(S)	G
"	(C)	C	(S)	(G)
"	A	VB	S	(F)
"	A	B	(S)	(G)
"	A	(B)	(S)	(G)
B	A	S m	(S)	(G)
B	A	S	(S)	(G)
VB	A	VVB	S	P
B	(S)m	(B)	S	G
B	S m	(C)	(S)	G
B	(C)	(C)m	(S)	G

0007-SWP-044713

*Actual exposure time only 37 months.

**Panel 4515 omitted. This panel is identical with 4519 in all respects.

***On the whites, mildew has practically disappeared; erosion on the Chicago set has become noticeable in a few cases.

General Notes:

1. No flaking on any panels.
2. All Coffeyville panels show hail marks; no serious failure due to them so far.

Examination of Tint Series - Florida, 41 Months

Panel No.	Test Materials	Chalk	Check	Crack	Mildew	Fade	Dirt	Gen. App.
<u>Part I - Lead Titanate Type</u>								
<u>A. Mechanical Mix</u>								
4547 F.	ZZZ-33, Nat. HTS	(B)	(B)m	S m	S	B	(S)	F
4548	St. Joe. " "	"	(B)	B m	(S)	B	VS	"
4549	XX-50, " "	"	C	B m	(S)	B	VS	"
4550	XX-503, " "	"	(B)	C m	(S)	B	(S)	"
4551	ZZZ-33, 18	(B)	(B)m	C m	(S)	B	S	"
4552	St. Joe, 18	"	"	"	"	"	"	"
4553	XX-50, 18	(B)	(C)m	(B)m	Tr	VB	VS	"
4554	XX-503, 18	(C)	(C)	S	Tr	"	(S)	"
4555	ZZZ-33, NAEBS	"	"	"	"	"	"	"
4556	St. Joe, " "	"	"	"	"	"	"	"
4557	XX-50, " "	B	B	(B)m	Tr	B	(S)	"
4558	XX-503, " "	"	"	"	"	"	"	"
4559	ZZZ-33, 9	"	"	(C)m	Tr	B	(S)	"
4560	St. Joe, 9	"	"	"	"	"	"	"
4561	XX-50, 9	(E)	C	(B)m	Tr	B	(S)	"
4562	XX-503, 9	"	"	"	"	"	"	"
4563	ZZZ-33, S-W HTS	C	(B)	C m	Tr	B	(S)	"
4564	St. Joe, " "	B	B	(B)	Tr	"	"	"
4565	XX-50, " "	B	C	(C)	Tr	"	"	"
4566	XX-503, " "	B	C	C m	Tr	"	"	"
4568	ZZZ-11, Nat. HTS	C	(C)	S m	Tr	"	"	"
4569	ZZZ-22, " "	C	(B)	S m	Tr	"	"	"

0007-SWP-044714

*Actual exposure time only 37 months.

**Panel 4515 omitted. This panel is identical with 4519 in all respects.

***On the whites, mildew has practically disappeared; erosion on the Chicago set has become noticeable in a few cases.

General Notes:

1. No flaking on any panels.
2. All Coffeyville panels show hail marks; no serious failure due to them so far.

Examination of Tint Series - Florida, 41 Months

<u>Panel No.</u>	<u>Test Materials</u>	<u>Chalk</u>	<u>Check</u>	<u>Crack</u>	<u>Mil-dew</u>	<u>Fade</u>	<u>Dirt</u>	<u>Gen. App.</u>
<u>Part I - Lead Titanate Type</u>								
<u>A. Mechanical Mix</u>								
4547 F	ZZZ-33, Nat. HTS	(B)	(B)m	S m	S	B	(S)	F
4548	St. Joe, " "	"	(E)	B m	(S)	B	VS	"
4549	XX-50, " "	"	C	B m	(S)	B	VS	"
4550	XX-503, " "	"	(E)	C m	(S)	B	(S)	"
4551	ZZZ-33, 18	(B)	(B)m	C m	(S)	B	S	"
4552	St. Joe, 18							
4553	XX-50, 18	(B)	(C)m	(B)m	Tr	VB	VS	"
4554	XX-503, 18							
4555	ZZZ-33, NAELS							
4556	St. Joe, "							
4557	XX-50, "	B	B	(B)m	Tr	B	(S)	"
4558	XX-503, "							
4559	ZZZ-33, 9							
4560	St. Joe, 9							
4561	XX-50, 9	(L)	C	(B)m	Tr	B	(S)	"
4562	XX-503, 9							
4563	ZZZ-33, S-W HTS	C	(B)	C m	Tr	B	"	"
4564	St. Joe, " "	B	B	(B)	Tr	"	"	"
4565	XX-50, " "	B	C	(C)	Tr	"	"	"
4566	XX-503, " "	B	C	C m	Tr	"	"	"
4568	ZZZ-11, Nat. HTS	C	(C)	S m	Tr	"	"	"
4569	ZZZ-22, " "	"	(B)	S m	Tr	"	"	"

0007-SWP-044715

0007-SWP-000114085

Examination of Tint Series -
Florida, 41 Months - Cont.

Panel No.	Test Materials	Chalk	Check	Crack	Mil- dew	Fade	Dir	Gen. App.
<u>E. Co-tuned</u>								
4567 F	412, 18	(C)	C	(C)m	Tr	B	(S)	F
4570	1523, 18	(C)	C	(S)m	Tr	(S)	(S)	F
4571	Lehi 635, 18							
4572	Lehi 60, 13							
4573	Azo 35 L, 18							
4574	412, S-W HTS	C	C	(S)m	Tr	B	(S)	F
4575	Lehi 635, "	C	"	"	"	"	"	"
4576	Lehi 60, "	(C)	"	"	"	"	"	"
4577	Azo 35 L, "	(C)	"	"	"	"	"	"
4578	412, Nat. HTS	C	(C)	(S)m	"	"	"	"
4579	Lehi 635, Nat. HTS	(C)	"	"	"	"	"	"
4580	Lehi 60, Nat. "	C	"	Tr m	"	"	VS	"
4581	Azo 35 L, Nat. "	C	C	(S)m	"	"	(S)	"
4582	412, NAELS	(C)	(C)	(S)m	Tr	(B)	(S)	"
4583	Lehi 635, NAELS	"	"	S m	(S)	(B)	S	"
4584	Lehi 60, "	"	"	(S)m	Tr	B	(S)	"
4585	Azo 35 L, "	C	"	S m	VS	B	(S)	"
4586	E.P. 70/30, XX-32	B	(C)	C m	VS	B	S	(F)
4587	" " ZZZ-11	C	(B)m	(C)m	VS	B	(S)	(F)
4588	" " ZZZ-22	C	C	(C)m	S	B	S	(F)
4589	" " ZZZ-33	(C)	(C)	S	Tr	B	(S)	F

Part II - 2031 T Type

1. Mechanical Mix

4590	As 4547	C	C m	A	(S)	B	(S)	F
4591	As 4548							
4592	As 4549	C	C	(C)m	Tr	VB	(S)	(F)
4593	As 4550							
4594	As 4551	C	(C)	A	(S)	(B)	(S)	F
4595	As 4552							
4596	As 4553	C	C	(S)m	Tr	VB	(S)	(F)
4597	As 4554							
4598	As 4555	C	B	S m	VS	B	(S)	(F)
4599	As 4556							
4600	As 4557	(B)	(B)	B m	Tr	VB	(S)	F
4601	As 4558							
4602	As 4559	C	C	(S)m	VS	VB	(S)	(C)
4603	As 4560							
4604	As 4561	(C)	(B)	S m	(S)	VB	(S)	F
4605	As 4562							

0007-SWP-044716

Examination of Tint Series -
Florida, 41 Months - Cont.

Panel No.	Test Materials	Chalk	Check	Crack	Nil-Gew	Fade	Dirt	Gen. App.
Part II - A - Cont.								
4508 F	As 4565	(F)	(B)	(C)m	(S)	B	S	(F)
4509	As 4564							
4500	As 4565	(E)	(B)	C m	Tr	VB	VS	(F)
4509	As 4566							
4511	As 4567	(B)	(B)	S m	VS	(B)	(S)	F
4512	As 4569	(E)	(B)	S m	(S)	(B)	(S)	F
B. Co-fumed								
4516	As 4567	(E)	C	Tr m	VS	(B)	(S)	F

Examinations

<u>Chicago - 46 Months</u>							<u>Coffeyville - 45 Months</u>						
Panel	Chalk	Check	Crack	Fade	Dirt*	Gen.	Chalk	Check	Crack	Fade	Dirt*	Gen.	
No.						App.						App.	
<u>Part I - Lead Titanate Type</u>													
<u>A. Mechanical Mix</u>													
4517	(C)	A	A	D	B	P	C	A	S m	(B)	(C)	(G)	
4543	C	"	"	B	B	"	"	VS	C m	(B)	S	"	
4549	"	"	"	VB	B	"	"	Tr	C m	(B)	S	"	
4550	"	"	"	VB	VVB	VP	"	Tr	A	(B)	(S)	"	
4551	"	"	"	VB	VB	VP	"	A	A	(B)	(C)	"	
4552	"	"	"	VB	VB	VP	"						
4553	"	"	"	VB	VB	VP	"	Tr	(C)m	(B)	S	"	
4554	"	"	"	B	B	P	"						
4555	(B)	"	"	VB	(B)	P							
4556	C	"	"	VB	(E)	"							
4557	C	"	"	"	"	"	C	(C)	C m	(B)	S	"	
4558	C	"	"	"	"	"	C	(S)m	S m	(B)	S	"	
4559	C	"	"	"	C	"	C	A	A	(D)	(C)	"	
4560	"	"	"	"	"	"	C	(S)m	S m	(B)	S	"	
4561	"	"	"	"	(E)	"	"	A	S m	B	S	"	
4562	(B)	"	"	"	(L)	"	"	A	A	B	S	"	
4563	(E)	"	"	"	VB	VP	"	A	A	(S)	(C)	"	
4564	C	"	"	"	"	"	"	C	(D)	(B)	(C)	"	
4565	C	"	"	"	"	"	"	S	C m	(B)	S	"	
4566	C	"	"	"	"	"	"	A	S m	(B)	S	"	
4567	C	"	"	"	"	"	C	A	A	B	S	"	
4568	C	"	"	"	"	"	C	A	A	B	S	"	

0007-SWP-044717

Examinations - Cont.

<u>Chicago - 46 Months</u>						<u>Coffeyville - 45 Months</u>						
Panel	Chalk	Check	Crack	Fade	Dirt*	Gen. App.	Chalk	Check	Crack	Fade	Dirt*	Gen. App.

Part I - Cont.

<u>E. Co-faded</u>												
4567	(E)	A	A	VB	B	F	C	A	A	(B)	S	(G)
4570	C	"	"	VVB	"	VP	"	"	"	B	(C)	"
4571	(E)	"	"	"	"	"	"	"	"	"	S	"
4572	(E)	"	"	"	(E)	"	"	"	"	"	S	"
4575	(E)	"	"	"	B	"	"	"	"	"	S	"
4574	(E)	"	"	"	"	"	"	"	"	"	"	"
4575	"	"	"	"	(E)	P	"	"	"	"	"	"
4576	"	"	"	"	(E)	"	"	"	"	"	"	"
4577	"	"	"	"	(B)	"	"	"	"	"	"	"
4578	(E)	"	"	"	(B)	"	"	"	"	"	"	"
4579	"	"	"	"	"	"	"	"	"	"	"	"
4580	"	"	"	"	"	"	"	"	"	"	(C)	F
4581	"	"	"	"	"	"	"	"	"	"	S	(G)
4582	"	"	"	"	C	"	"	"	"	"	"	"
4583	"	"	"	"	"	"	"	"	"	"	(C)	"
4584	"	"	"	"	"	"	"	"	"	"	"	"
4585	"	"	"	"	"	"	"	"	"	"	"	"
4583	"	"	"	"	(E)	"	"	"	S m	"	S	"
4587	"	"	"	"	"	"	"	"	A	"	(C)	"
4588	"	"	"	"	"	"	"	"	"	"	S	"
4589	"	"	"	"	"	"	"	"	"	"	"	"

Part II - 2031 T Type

<u>A. Mechanical Mix</u>												
4590	C	A	A	VB	B	VP	C	A	A	B	S	(G)
4591	"	"	"	"	"	"	"	VS	(C)m	"	"	"
4592	"	"	"	"	"	"	"	(S)	(C)m	"	"	"
4593	"	"	"	"	"	"	"	(S)m	S m	"	"	"
4594	"	"	"	"	(B)	P	"	A	A	"	"	"
4595	"	"	"	"	"	"	"	S	(C)m	"	"	"
4596	"	"	"	VVB	C	"	"	S	C m	"	"	"
4597	(B)	"	"	"	"	"	"	A	(C)m	"	"	"
4598	"	"	"	"	"	"	"	A	A	"	"	"
4599	"	"	"	"	(E)	"	"	S	C m	"	"	"
4600	"	"	"	"	C	"	"	C	C	"	"	"
4601	"	"	"	"	D	VP	"	(C)	(C)	"	"	"

0007-SWP-044718

Examinations - Cont.

<u>Chicago - 46 Months</u>							<u>Coffeyville - 45 Months</u>						
Panel	Gen.						Panel	Gen.					
No.	Chalk	Check	Crack	Fade	Dirt*	App.	No.	Chalk	Check	Crack	Fade	Dirt*	App.
<u>Part II - A - Cont.</u>													
4602	(B)	A	A	VVB	C	P	C	A	A	B	S	(G)	
4603	"	"	"	"	(B)	"	"	"	Sm	"	"	"	"
4604	C	"	"	"	C	"	"	(C)	(C)m	"	"	"	"
4605	(B)	"	"	"	C	"	"	Tr m	(S)m	"	"	"	"
4606	"	"	"	"	C	(P)	"	A	Tr m	"	"	"	"
4607	"	"	"	"	C	P	"	(C)	(B)m	"	"	"	"
4608	"	"	"	"	C	"	"	C	(B)m	"	"	"	"
4609	"	"	"	"	C	"	"	S	(C)m	"	"	"	"
4611	"	"	"	"	(B)	"	"	(S)m	(S)m	"	"	"	"
4612	"	"	"	"	"	"	"	VS m	(S)m	"	"	"	"

Chicago - 46 Months							Coffeyville - 45 Months								
Panel	Test	* Gen.						Panel	Test	* Gen.					
No.	Mat.	Chalk	Check	Crack	Fade	Dirt	App.	No.	Chalk	Check	Crack	Fade	Dirt	App.	
<u>B. Co-fumed</u>															
4610	As 4567	(B)	A	A	VVB	C	P	C	(S)m	(S)m	B	S	(G)		
4613	As 4571	"	"	"	"	"	"	"	VS m	VS m	"	"	"	"	
4614	As 4572	"	"	"	"	"	"	"	VS m	VS m	"	"	"	"	
4615	As 4573	"	"	"	"	"	"	"	Tr m	A	"	"	"	"	
4616	As 4574	"	"	"	"	(C)	"	"	Tr m	A	"	"	"	"	
4617	As 4575	"	"	"	"	C	"	"	(S)m	(S)m	"	"	"	"	
4618	As 4576	"	"	"	"	(C)	"	"	Tr	S m	"	"	"	"	
4619	As 4577	"	"	"	"	(C)	"	"	A	VS m	"	"	"	"	
4620	As 4578	"	"	"	"	C	"	"	A	(S)m	"	"	"	"	
4621	As 4579	"	"	"	"	"	"	"	"	(S)m	"	"	"	"	
4622	As 4580	"	"	"	"	"	"	"	"	VS m	"	"	"	"	
4623	As 4581	"	"	"	"	"	"	"	"	VS m	"	"	"	"	
4624	As 4582	"	"	"	"	(C)	"	"	A	(S)m	"	"	"	"	
4625	As 4583	"	"	"	"	C	"	"	(S)m	S m	"	"	"	"	
4626	As 4584	"	"	"	"	C	"	"	Tr m	VS m	"	"	"	"	
4627	As 4585	"	"	"	"	C	"	"	VS m	(S)m	"	"	"	"	
4630	As 4586	"	"	"	"	(C)	"	"	S	(C)m	"	"	"	"	
4631	As 4587	"	"	"	"	C	"	"	VS m	VS m	"	"	"	"	
4632	As 4588	"	"	"	"	C	"	"	Tr m	Tr m	"	"	"	"	
4633	As 4589	C	"	"	"	(C)	"	"	A	Tr m	"	"	"	G	

0007-SWP-044719

Examinations - Cont.

	<u>Chicago - 45 Months</u>					<u>Coffeyville - 45 Months</u>							
Panel Test	* Gen.					* Gen.							
No.	Mat.	Chalk	Check	Crack	Fade	Dirt	App.	Chalk	Check	Crack	Fade	Dirt	App.

C. Special Formulas

4628 415-18

using 1/3

1895. 2/3

2051 T C A A VVB C P C Tr m Tr m B S (G)

4629 Same,

but

Lehi C A A VVB C P C Tr m A B S G

635-18

*Mildew readings omitted. There is practically no variation in ratings: S to (C) at Chicago, (S) to S at Coffeyville.

Key to Designations:

A - Absent	V - Very
S - Slight	E - Excellent
C - Considerable	G - Good
B - Bad	F - Fair
P - Poor	() - Less than
m - microscopic	Tr - Trace

Supplementary Observations

There is a further confirmation, on the basis of the series as a whole, of the trend toward failure by cracking. The cases of advanced failure, occurring now in several categories of Florida and even Coffeyville panels, all consist of an extremely bad pattern of long cracks, with some checks in varying stages of deepening into cracks. It is worth noting, however, that not even the worst films have yet shown any signs of flaking; this may indicate that the qualities of the binder and inert are such that good cohesion and adhesion are obtained in spite of varied internal film stresses.

It will be noted that chalking is still heavy on all the whites, regardless of location, but that it varies greatly with location on the tints. Most of the Coffeyville and Florida tints have dropped to a mini-

0007-SWP-044720

much of "considerable" chalking, while many of the Chicago tints, especially on the co-fumed formulas, are still producing and holding noticeably more chalk.

The Chicago whites show a limited amount of erosion or flaking off of the top coat. There seems to be little correlation between this slight erosive tendency and the formula variations, except that, rather surprisingly, the mechanical-mix type seems to show somewhat less of it than the co-fumed.

In general, the changes which may be expected in fading in the future will probably be slight. In fact, the preceding three major reports, Bulletins RC-64 and RC-68 and the report of April, 1944, encompass all the important comparisons as to tint-retention, except that some interest remains in checking the slower-fading Chicago exposures. Dirt continues to be serious on these Chicago tints, and the combination of dirt and "chalk-mask" is obviously a much more serious shortcoming, for all practical purposes, than the comparatively rapid fading at the other locations. It is probably safe to say that few Florida or Coffeyville tints have presented as bad a general appearance at any stage as that of the majority of the dirty, chalky-faced Chicago tint panels during the past year or so.

JWC:AR

J. W. Chapin

0007-SWP-044721