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STATE OF CALIFORNIA
BUSINESS AND TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

DND

71-30

REPORT OF SANDBLAST CLEANING ON SIGN STRUCTURE FABRICATION BY ALTIUS CO. LOS ANGELES FOR CONTRACT 04-174364

JUNE 1971

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June 1, 1971

REPORT OF SANDBLAST CLEANING ON SIGN STRUCTURE FABRICATION BY ALTIUS CO., LOS ANGELES FOR CONTRACT NO. 04-174364

On May 25, May 26, and May 28, 1970, representatives from the Materials and Research Department cut 3" circular samples from four sign structures. The samples were taken from the center portion of the depth of the sign structure webs. The sign structures were:

#1: Warren Freeway Route 13. Sign #S8843M (12 samples removed)
#2: 98th Ave. Southbound Route 17. Sign #S161* (3 samples removed)
#3: Marina Blvd. Northbound Route 17. Sign #S4453M (6 samples removed)
#4: Route 24 Westbound. Sign #S6085. Turn off to Route 13 Hayward. (3 samples removed)

Only two of the above sign structures were fabricated by Altius Company. These were 98th Ave. Southbound Route 17, Sign #S161* and Marina Blvd. Northbound Route 17, Sign #S4453M.

The objective of this study was to determine if the cold rolled steel used by Altius Company in the fabrication of the box beam signs for this contract had adequate or grossly insufficient sandblast cleaning prior to painting.

The first step in this study was to prepare laboratory samples of various degrees of sandblast surfaces so photographs at approximately 40X could be taken for comparison. These are shown in the first six exhibits, numbers 1 through 6, as follows:

Exhibit No. 1

A 40X magnification of an area on the sandblasted cold rolled sample prepared by Altius and sent to the Sacramento Laboratory by Mr. J. W. Robertson, head of the Los Angeles Branch Office. This sample was said by Altius to be representative of this company's sandblast cleaning of the signs in question.

This picture shows a satisfactory sandblast surface. It is probable, however, that the sand was a finer particle size when compared to Exhibit No. 2, as can be readily seen by comparing the two exhibits No's. 1 and 2.

Exhibit No. 2

A 40X magnification of a thoroughly acceptable well sandblasted sample originally prepared at the Sacramento Laboratory of the Materials and Research Department.

*Sign #S161 is marked incorrectly. Should be S163 as noted on the plans.

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Exhibits No. 3 to No. 5 Inclusive

These represent on a 40X magnification various degrees of sandblasting on samples of Altius 16 gauge cold rolled steel performed at the Sacramento Laboratory of the Materials and Research Department. Exhibit No. 3 demonstrates a lesser degree of sandblasting but still satisfactory. Exhibits No. 4 and No. 5 represent inadequate and unacceptable sandblasting. Exhibit No. 5 being of poorer quality than Exhibit No. 4.

Exhibit No. 6

A 40X magnification of Altius 16 gauge cold rolled steel having no sandblasting.

Notes:

a. The sandblasting of the specimens prepared at the Sacramento Materials and Research Laboratory was done with grade 20, Clementina sand utilizing a No. 4 nozzle and 100 psi air pressure.

b. For convenience, an approximate scale of 0.01 inch increments was prepared at 40X magnification. This enlarged scale appears at the edge of Exhibits No's. 1 through 6 so that approximate measurements of the sandblast profile pattern widths could be made.

The next step was to study and photograph the six samples cut from Sign No. S4453M on Northbound Route 17 at Marina Blvd. and compare these surfaces to the laboratory prepared reference samples shown in Exhibits No's. 1 through 6. The following eighteen exhibits, No's. 7 through 24, document this step:

Exhibit No. 7

Sign No. S4453 Marina Blvd., Route 17 Northbound. Drawing showing approximate location of six 3" samples taken from the flat plane of the corregated surface in the approximate center of the vertical height of the sign.

Exhibit No. 8

Shows the six samples as cut from the structure.

Exhibit No. 9

Sample No. 1, inside surface of the sign structure, showing the inorganic zinc silicate coating intact with no apparent visible failure; however, when a knife blade is pressed on the coated inorganic zinc silicate surface, the inorganic zinc silicate coating flakes off.

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Exhibit No. 10

This is a 40X picture of an area in Sample No. 1, inside surfaces, (Exhibit No. 9) where the paint was chipped off. This shows an inadequate sandblast surface as compared with the sandblast Exhibits No. 1 through No. 5.

Exhibit No. 11

Sample No. 1, outside surface of [illegible] structure, showing coating failure through the diameter of the [illegible] sample. When chipped with a knife, the coating flakes off easily.

Exhibit No. 12

This is a 40X picture of a chipped area on Sample No. 1, outside surface, (Exhibit No. 11) showing an inadequate sandblast surface.

Exhibit No. 13

Sample No. 1, outside surface, is a sample of an inorganic zinc silicate paint chip showing back or contact surface to the steel displaying little or no sandblast tooth. The back surface of the paint is relatively smooth.

Exhibit No. 14

Sample No. 3, inside surface, showing coating failure. This coating surface flakes very easily with a sharp instrument.

Exhibit No. 15

This 40X picture of Sample No. 3 inside surface (Exhibit No. 14) shows the steel surface beneath the flaked off paint. When compared with the sandblasting standards Exhibits No. 1 through No. 5 one can readily see the insufficient sandblast cleaning.

Exhibit No. 16

Sample No. 3, outside surface. This picture shows the coating somewhat intact, but again when pressed with a knife blade the coating chips off easily due to poor adherence to the steel surface.

Exhibit No. 17

Picture 40X of Sample No. 3, outside surface (Exhibit No. 16), shows the steel surface with somewhat more sandblast cleaning than Exhibit No. 15, but still not sufficient.

Exhibit No. 18

Sample No. 5, inside surface. Picture taken at approximately 2.4X showing complete failure of coating. This coating can be removed very easily by rubbing with one's fingernail or wire

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brushing, etc.

Exhibit No. 19

Sample No. 5, inside surface, taken at approximately 2.4X. This is the same sample as Exhibit No. 18 with all the paint coating removed to show the underlying steel surface condition. The steel surface as one can see was just partially sandblast cleaned.

Exhibit No. 20

This is a picture of an acceptable sandblast surface. This picture was taken at approximately 2.4X, the same magnification as for Sample No. 5, so one can compare visually how the surface should look when compared to Exhibit No. 19.

Exhibit No. 21

Sample No. 6, inside surface. One can see complete crazing of the coating. This coating can be removed very easily showing the steel surface with insufficient sandblast cleaning.

Exhibit No. 22

40X picture of an area on Sample No. 6, inside surface, (Exhibit No. 21) showing evidence of very little sandblast cleaning.

Exhibit No. 23

Sample No. 6, outside. The outside surface coating shows better appearance and evidence of somewhat better adherence, however, it will flake when cut with a knife blade. It is believed the vinyl top coating along with a little better sandblast cleaning on the outside of the sign structure contributes to a better looking surface. However, the steel surface is still not adequately sandblast cleaned.

Exhibit No. 24

40X picture from a chipped surface of Sample No. 6, outside, (Exhibit No. 24) showing evidence of the sandblasting which is a little more pronounced than on the inside of the 3" sample.

The third step was to study and photograph the three samples cut from Sign No. S161 on Southbound Route 17 at 98th Ave. and compare these surfaces to the laboratory prepared reference samples (Exhibits No's. 1 through 6). The following ten exhibits, No's. 25 through 34, document this step:

Exhibit No. 25

Drawing shows approximate locations in the center of the sign structure panel where the three 3' samples were taken.

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Exhibit No. 26

Shows the three samples as taken from the structure. This picture shows all inside surfaces and one can see the coating failure from the sample surface's.

Exhibit No. 27

Sample No. 1, inside surface. One can see complete crazing or failure of the coating. This coating can be removed very easily showing a steel surface with insufficient sandblast cleaning.

Exhibit No. 28

Sample No. 1, inside surface (Exhibit No. 27). The 40X picture of the paint chipped surface of the sample showing evidence of an insufficient sandblast cleaning.

Exhibit No. 29

Sample No. 1, outside surface. The outside surface coating shows evidence of somewhat better adherence; however, it will flake when cut with a knife blade. Here again we believe the vinyl top coating along with the slightly better sand blast cleaning of the outside of the sign structure contributes to a better looking surface. However, these surfaces are still not adequately sandblast cleaned.

Exhibit No. 30

40X picture of the chipped surface of Sample No. 1, (Exhibit No. 29) outside surfaces, showing evidence of insufficient sandblast cleaning.

Exhibit No. 31

Sample No. 3, inside surface. This picture shows the coating on the sample completely deteriorated. The brown area is the rusting under the paint coating and the light or shiny area shows evidence of insufficient sandblast cleaning.

Exhibit No. 32

40X picture of the surface of the Sample No. 3, inside surface, (Exhibit No. 31). Here again when comparing sandblast surfaces one can readily see the insufficient sandblast.

Exhibit No. 33

Sample No. 3, outside surface. Here the paint appearance looks good, but when chipped with a knife the paint flakes off showing the insufficiently sandblast cleaned surface.

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Exhibit No. 34

Sample No. 3, outside surface, (Exhibit No. 33). This is a 40X picture of an area on the sample where the paint was flaked off by the use of a knife. This shows insufficient sandblast cleaning.

On March 10 and 11, 1971, at the request of Mr. Jerry Oliver, Senior Bridge Engineer, [illegible] Dept. representatives cut 3-inch round samples from four sign structures as follows:

1. Hegenberger Rd., Route 17 Southbound, Sign No. 4139.

2. Marina Blvd., Route 17 Northbound, Sign No. S44534.

3. Marina Off Ramp West and Davis St. Northbound, Route 17, Sign No. S44611.

4. Marina Blvd. East, Route 17 Southbound, Sign No. S44653.

Three samples were cut from Sign No. 4139, Route 17 Southbound at Hegenberger Rd. The following five exhibits, No's. 35 through 39, document the study of these samples:

Exhibit No. 35

Drawing shows the approximate location of the three 3" samples taken on the flat plane of the corrugated surface in the approximate center of the vertical height on Sign No. 4139, Hegenberger Rd., Rt. 17, Southbound. Sample No. 1 reported as painted and peeling, 7 mils of paint. Sample No. 2, reported as blasted and repainted, 1.5 mils of paint. Sample No. 3 reported as not blasted or repainted, 3 to 4 mils of paint.

Exhibit No. 36

Sample No. 1, inside surface, 40X picture on an area of the sample chipped with a knife showing the inadequate sandblasted surface as compared to a good sandblasted surface.

Exhibit No. 37

Sample No. 1, outside surface, is a 40X picture of an area on the sample showing insufficient sandblast.

Exhibit No. 38

Sample No. 2, inside surface, 40X picture of an area showing the tight adherence of the coating to the sandblasted surface. As one can see in the picture the cut marks from a knife blade and still all the paint has not been removed from the surface of the sample. One can also see in the background that the sample

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had been sandblasted sufficiently and the resistance of the paint to removal by chipping with a knife shows evidence of a satisfactory job in this area.

Exhibit No. 39

Sample No. 3, inside surface, 40X picture of an area where the paint chips easily by cutting with a knife and one can see an insufficient sandblast surface.

Four 3-inch diameter samples were cut from Sign No. S4453M at Marina Blvd., Route 17 Northbound. This was a sign that had been repaired by the Contractor due to failure of the paint system after delivery to the jobsite. The sandblasting and repainting repair was performed in the field on a spot basis. The following nine exhibits, Nos. 40 thru 48, document the study of these samples:

Exhibit No. 40

The drawing shows the approximate location of the four 3-inch samples that were cut out of the flat plane of the corrugated surface in the approximate center of the vertical height of the sign structure No. S4453M, Marina Blvd., Route 17 Northbound.

Exhibit No. 41

Sample No. 1N, inside surface, 40X picture showing a fair sandblast cleaning on one-half of the 3-inch sample.

Exhibit No. 42

Sample No. 1, inside surface, 40X picture showing an unsatisfactory sandblast surface on the other half of the sample No. 1N (same surface inside as exhibit No. 41). In otherwords, this sample was cut from the edge of the spot sandblasted area.

No Exhibit

Sample No. 2N, inside surface, re-sandblast cleaned and repainted with 7 mils of paint coating thickness. It was noted at the time the sample was being taken that the surface was exhibiting rust stains. When chipped with a knife and examined, the surface shows an inadequate sandblasting.

Exhibit No. 43

Sample No. 3E, inside surface, 40X picture exhibits a satisfactory sandblast clean surface. Paint still adhering to the sandblast cleaned surface cannot be removed.

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Exhibit No. 44

Sample No. 44, inside surface, [illegible] picture exhibits satisfactory sandblast cleaning. Same condition as for Sample 31. This was an area which had been spot blast cleaned and repainted.

Exhibit No. 45

Report of test on a sample of Dimelock paint photographed at low [illegible] of the film showing the grading of sand on the back of the paint chip. [illegible] about 100X. Sand grain equal about .007-inches. Prepared and reported by Thomas L. Shelly, Associate Chemical Testing Engineer, M & R Sacramento.

Exhibit No. 46

Photomicrograph (approximately [illegible]) of the backside of the paint chip contact surface with the steel, showing the sand grain of .007-inches to illustrate the otherwise smooth surface of contact resulting from insufficient sandblast cleaning. This is the sample reported in Exhibit No. 45. The sample and photograph were prepared under the direction of Thomas L. Shelly, Associate Chemical Testing Engineer, M & R Sacramento.

Exhibit No. 47

This is a picture of a sample of the 16 gage cold rolled steel material used by Altius for the sign structures and sent in by John Robertson, Senior Materials and Research Engineer, Head of the Los Angeles Branch Office. Mr. Herbert A. Rooney, Senior Chemical Testing Engineer, prepared the surface on this sample by wiping the surface with a clean cloth and then applying two coats of Dimelock paint to the surface. In otherwords, the specimen, Sample No. 11, was not sandblasted.

The panel after 35 minutes air drying in the Laboratory was placed in a 100 percent humidity room for about 23 hours, and then placed on the Laboratory roof for 3 days, at the end of which time the paint was peeling and the panel removed from the roof. Exhibit No. 47 shows paint failure on the near side of the sample. Other panels of this cold rolled steel properly blasted in the Laboratory, did not peel and showed extremely tight paint adherence. See panels 16 and 17 which are retained in the Laboratory.

Exhibit No. 48

A photograph of the far side of sample No. 11 showing the paint failure due to the surface conditions. The photographs, Exhibits No. 47 and 48, near and far side, depict the condition that is typical of what was seen on the Altius sign structure panels in various areas by Mr. Herbert Rooney, Senior Chemical Engineer, Materials and Research Laboratory, Sacramento, Mr. Jim Peterson, Assistant Steel Inspector, M & R Office, Berkeley, and Mr. Thomas L. Shelly, Associate Chemical Testing Engineer, Sacramento M & R.

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See copies of attached memorandums dated March 13, 1970 and April 13, 1970 describing the inspection.

The final step was to study some of the samples removed from sign structures that had been fabricated by Temcor, Los Angeles. One of the structures was Sign No. S6085 on Route 24 Westbound, Hayward Turn-off. Three 3-inch diameter samples were removed from this sign. The following five exhibits, No's. 49 through 53, document the study of these samples.

Exhibit No. 49

Locations where three samples were taken out of Sign Structure No. S6085 on Route 24 Westbound at the Hayward Turn-off.

Exhibit No. 50

Sample No. 2, inside surface, shows paint adherence with no visible breakdown.

Exhibit No. 51

Sample No. 2, inside surface (Exhibit No. 50), 40X picture showing satisfactory sandblast cleaning.

Exhibit No. 52

Sample No. 2, outside surface, showing paint adherence with no visible breakdown or peeling.

Exhibit No. 53

Sample No. 2, outside surface, (Exhibit No. 52) 40X picture showing the satisfactory sandblast surface.

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