

The STEEL PROTECTION CONSULTANCY Ltd.

REPORT

To Tech. Dir., W.S. Atkins

CC Director, SPC Leighton Buzzard

SPC

From SPC Inspector

Date 28 SEPT 10

Subject **FORTH ROAD BRIDGE ACCESS WALKWAYS, PAINT QUERY**

CLIENT	W.S. Atkins	CLIENT'S REF. NO.	
PROJECT	Forth Road Bridge, Access Walkways Project	CONTRACTOR	Raynesway
LOCATION	Forth Road Bridge, S. Queensferry, Edinburgh	SPC PROJECT NO.	1716 B

• **1** In response to email request from Mr. Wesley, attended site 27 Sept 10, meeting Messrs. D. Bishop & D. Kerracher (WSA) and M. Nicholson (Raynesway Foreman/ Inspector).

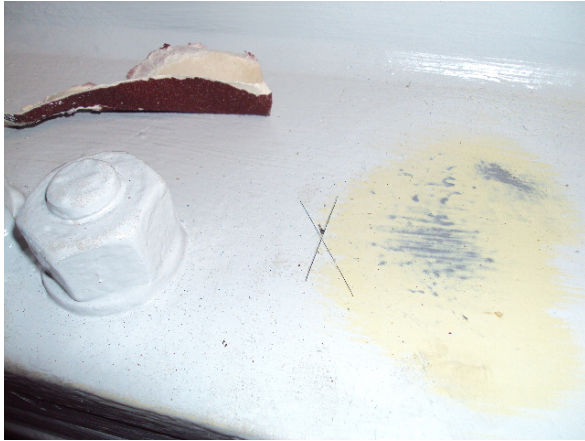
• **2** **INVESTIGATION OF DISCOLOURATION**

- Inspected the general area of the reported discolouration (N. Tower, Main Span, W. Carriageway, Demag Grillage Beams beneath Main Expansion Joint) and was advised that all the affected surfaces had been freshly overcoated during either 25th or 26th Sept with 3rd coat Item 116 Grey (over Item 115 Aluminium and Item 116 Green Beige).
- This material was checked by thumbnail pressure and was found to be only partially cured with some areas (of both 25th and 26th Sept material) still being wet.
- Solvent wipe (International GTA 220 Thinners) was performed at approx. 6 locations with all showing incomplete cure and transfer of colour. At the majority of locations a 1-minute wipe removed coating back through the second coat to expose the Aluminium primer beneath.

(Note : all photos can be enlarged by dragging the bottom R.H. corner)



- Light surface abrasion was attempted at a couple of locations but was not proceeded with because of the softness and chewiness of the coating.
- Cross-cut adhesion tests were performed which, although some areas of sound adhesion were found, in many cases gave a complete adhesive failure at the Steel / Aluminium Primer interface. At some areas of disbondment, partial areas of discolouration were present either on the steel surface or the underside of the paint flakes, it was not possible to determine if these had been overlying dust or residues of previous coating.



- Due to the possible implications of these results, by agreement, further adhesion tests were performed at other locations – SEE ● 3 BELOW.

CONCLUSIONS

It was reported by site personnel and apparently borne out by photos at site that the areas of discolouration coincided with locations where water had run down from overhead. If this is the case, this would represent a localised remediable defect. Mr. Nicholson reported that the affected areas were lightly surface abraded to remove affected material, before overcoating.

● 3 **ADHESION TESTING**

Cross-cut adhesion tests (approx 20 total) were performed at 4 locations :-

1. N. Tower, Main Span, W. Carriageway, Demag Grillage Beams beneath Main Expansion Joint
2. N. Tower, Side Span, E. Demag bays
3. N. Side Span, Remote Access, LDB 6 E.
4. N. Side Span, Remote Access, LDB 2 W.

Location 1 (L 1) was the site of the investigation of Paint Discolouration, see ● 2 above

L 2 was reportedly recently completed

L 3 & 4 were selected as being completed approx 2 weeks previously. Thumbnail checking of these surfaces gave some indications of incomplete cure.

SUMMARY OF ADHESION TEST RESULTS

The following were noted during testing :-

- In L 1 & 2 (as noted at ● 2 above), some areas were of sound adhesion, but a large proportion of tests showed complete adhesive failure at the Steel / Aluminium Primer interface, some of these with areas of discolouration beneath.
- For L 1 & 2, in the tests on topsides of bottom flanges (horizontal surfaces), there was only one test which gave a satisfactory result.
- In L 1 & 2 areas of complete detachment, the steel substrate surface was noted to vary from smooth to deeply deformed – due to this variation, it was concluded that surface profile was unlikely to be the primary cause of poor adhesion.



- On some of the failed test areas, it was possible to peel coating back by hand (Note : the r.h. photo above and the following 2 photos show the same area at different stages of probing).



- At detached areas, there was no noticeable smell of e.g. curing agent or solvent.
- L 1 & 2 web (vertical) surfaces gave satisfactory results in approx 25% of cases.



- In L 3 & 4, coating had been performed only as patch coating around nuts on web faces, hence all tests were performed on vertical surfaces. All tests gave satisfactory results.



CONCLUSIONS & RECOMMENDATIONS

- That the noted lack of adhesion of the coating gives serious concern for the expected life of the coating system
- That further examination is required to determine the cause and extent of the problem (including all coatings applied on the project to date), and remedial action required
- That the contractor and paint supplier should be requested to perform an examination and present their results.

• 4 OTHER POINTS NOTED

- The noted slowness of curing would almost certainly be improved, with both qualitative and progress benefits, by the sensible use of indirect space heating.

===== END OF REPORT =====