The STEEL PROTECTION CONSULTANCY Ltd.

REPORT

CLIENT	**Atkins**			CLIENT'S REF. NO.	**5088418**
PROJECT	**Forth Road Bridge, Access Walkways Project**			SPC PROJECT NO.	**1716 B**
LOCATION	**Forth Road Bridge, S. Queensferry, Edinburgh**			CONTRACTOR	**Raynesway**
REPORT NO.	**2**	VISIT DATE	**29 SEP 10**	REPORT DATE	**01 OCT 10**
INSPECTOR					

DISTRIBUTION :-

ATKINS Iain Wesley (Tech. Dir.), Andrew Kavanagh (Proj. Mgr.), David Bishop (Site Engineer)

SPC David H. Deacon, Will Deacon

● **1** Attended site at the request of Mr. Wesley to quantify the extent of lack of adhesion noted during the 27 Sep 10 visit.

● 2 On arrival, Atkins and Raynesway site personnel advised that :-

• 2.1 Raynesway had decided to remove all coatings applied to date (leaving sample patches in widespread locations for examination during the 04 Oct 10 inspection by Mr. D.H. Deacon) and this work was already in progress.

This rendered pointless any attempt to quantify the extent of the defective coating, and it was agreed that the writer would continue onsite and assist in further examination to try to determine the cause of the lack of adhesion.

• 2.2 It had been determined that surface cleaning preparatory to primer application had been performed using solvent wipe rather than degreaser.

• 2.3 International Reps had performed an inspection 28 Sep 10 and given their opinion (written report not yet available) that the lack of adhesion was due to the presence of solvent on the surfaces prior to primer application

● 3 SUMMARY OF INSPECTION RESULTS

• 3.1 Inspection was performed to stripped areas by means of probing/ removal of coating, visual examination, illuminated magnification (approx X3) and surface swabbing.

In the absence of any suitable solvents (Raynesway having exhausted their limited supply of GTA220), surface swabbing could only be performed dry or with water, hence results are very limited and no conclusions could be drawn as to e.g. types of contaminants.

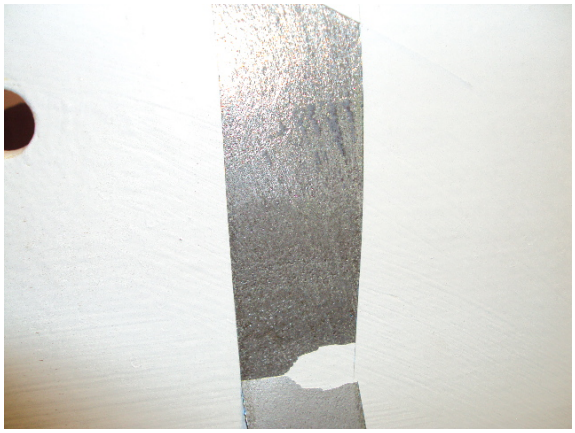
• 3.2 Location of tests :- around the North Tower, Main Spans, East and West sides on various areas already partially stripped and 10 additional locations on Demags and Cross Girder, Web and Flange surfaces.

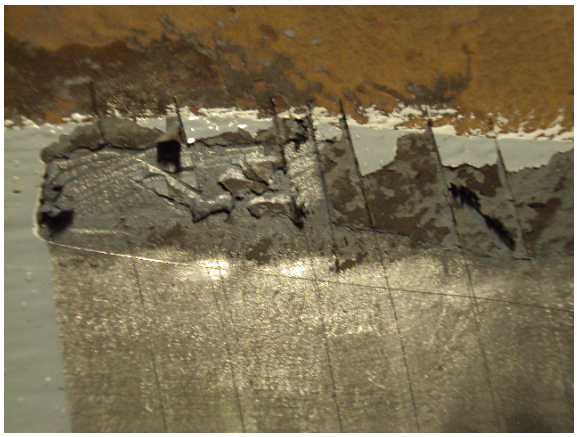
• 3.3 It was clear that the lack of adhesion was widespread and general.

• 3.4 As various stripped areas are larger and some have been exposed for up to 48 hours, it is now clear that the substrates are not bare steel but overcoated with metal spray, presumed to be of zinc. Points of breakdown and rusting were noted.

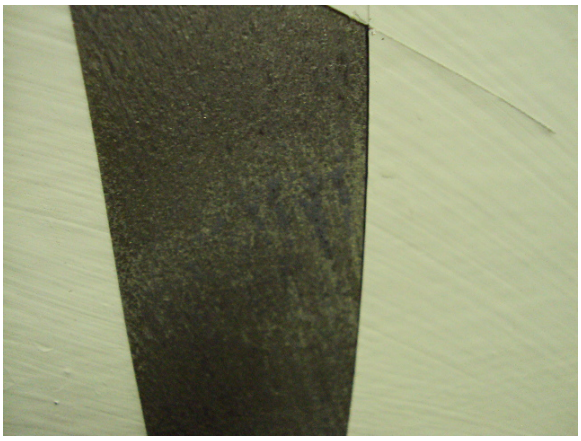
• 3.5 Surface preparation varied widely, with different areas showing :-

- areas substantially deformed by scabbler
- other surfaces scabbled with power wire brushing
- some surfaces prepared by wire brush only, resulting in a highly polished surface (contrary to specification).





• 3.6 On many of the surfaces (exposed metal and/ or underside of paint flakes) which had been exposed for some time, it was noted that there was a thin film of yellowish grey-green contamination. Water swabbing had little or no effect on this material which was concluded to be non water-soluble and the discolouration that was lifted was presumed to be recent dirt.



• 3.7 Some areas were noted with varying amounts of old coatings adhering to the substrate

In this context, it should be noted that the Form HA/ P1 specifies application to "... bright steel or bright metal coating ...", while Procedure Document Ref. 5088418 DOC OUT 0054, Sections 3 (New Steel to Existing Steel), 4 (Bolted Connections) and 5 (Repair of mechanically damaged areas on New Steel) include reference to overcoating of sound existing coatings. In the latter document, the intention is presumably that this should apply to damaged areas and feathering edges but not to substantial areas and the presence of sizeable areas of previous coating would therefore be contrary to specification – clarification might be helpful.

• 3.8 On removal of some of the larger samples, it was noted that there was a definite odour, believed to be solvent.

● 4 CONCLUSIONS

• 4.1 That International Paint's conclusion that the lack of adhesion is due to solvent entrapment is probably the principal cause.

• 4.2 Further to 4.1 above, that the wide variation of surface preparation, in particular the polishing of surfaces by power wire brush, is contrary to specification and is probably a contributory factor.

• 4.3 A further contributory factor could be the inclusion, and possibly distribution over the surfaces by solvent action, of residues of previous coatings.

Further, if power wire brushes and/ or cleaning cloths have been used on adjacent feathering edges (particularly if these include non-convertible paints), then used on exposed metal surfaces, this could lead to transfer of contaminants.

● 5 SITE MEETING

Following the inspection there was a meeting with FETA Bridge Engineer Mr. Tracy and the Atkins & Raynesway Project Managers, in which, while noting that no final decision would be taken until the 04 Oct 10 inspection, the following were discussed :-

- Raynesway proposed procedure for recoating :- Degrease, Water Wash, Re-abrade, Apply Primer. - It was pointed out by the writer that, rather than the proposed wiping down with water-filled rags, copious water washing is required after degreasing. Raynesway are considering use of pressure washer, but expect considerable delay waiting for washed surfaces to dry. FETA mains water could be available.
- Raynesway are considering Blast cleaning – While technically preferable for adhesion and successfully used by FETA personnel, this could have logistic and other (e.g. overblast damage) drawbacks.
- Raynesway are considering paint application by Airless Spray – Practical difficulties (e.g. paint wastage, overspray) [Not discussed – also contrary to spec HA/ P1, except for Finish Coat].
- It was pointed out that Raynesway's reporting could be clearer and more informative e.g. report for 21 Sep 10 indicates that, till midday, ambient conditions were out of spec but were within spec at 1600, however there is no indication of the time that paint application started.

● 6 OTHER

It was agreed that the writer should attend the planned 04 Oct 10 inspection.

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