



FORTH ESTUARY TRANSPORT AUTHORITY

**INVESTIGATION OF
EXISTING MAIN CABLE ANCHORAGES**

Notes of Output for

RISK WORKSHOP

20 July 2010

ATTENDANCE

The following individuals attended the meeting.

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| Barry Colford | Forth Estuary Transport Authority Forth Estuary Transport Authority Flint & Neill Ltd Ammann & Whitney Transport Scotland |
| Colin Clark | W.A. Fairhurst & Partners W.A. Fairhurst & Partners W.A. Fairhurst & Partners Facilitator |

ACTIONS / COMMENTS FROM WORKSHOP

The Investigation of the main cable anchorages will be limited to the Intrusive Investigation of the South anchorages only. At the commencement of the workshop FRB issued a copy of their board paper titled 'Main Cable and Anchorage Update' dated 26 Feb. 2010 to all present.

The following actions arose from the discussions:

- FRB / WAF to review contractor procurement strategy, possibly consider competitive dialog
- WAF to consider options for future inspections of the tendons when developing the design.
- WAF to develop options for dealing with identified potential hazards.
- WAF to review the method of initial separation of the strands as it may be difficult to install wedges because the strands will deflect when the wedges are hit. WAF to develop construction cost estimates.
- FRB to obtain readings of water levels from the piezos installed in the existing boreholes adjacent to the Forth Road Bridge anchorages.
- FRB to arrange an advance intrusive survey of the viaduct piers foundation (S3) to determine level of underside of foundation and medium on which it is founded.
- FRB to decide a level of further involvement of the peer review panel in the project and requirements for independent checking of proposals.
- FRB to develop communication strategy and a decision making process for closing the bridge in the event of a serious incident.
- PS to provide details of Selenium-Based Digital Radiography technique.
- FRB to consider level of insurance that is practical/necessary for the contractor to provide

DECISIONS MADE / AGREEMENTS REACHED

- It was decided that the socket restraint systems proposed to prevent sockets falling or 'flying' should a tendon break during the investigation and damaging elements of the main cable and their anchorage would not be fitted. The logic behind this decision is that the external works are being undertaken in a controlled manner with measures proposed to minimise the risk of damage to strands which could result in a failure. To install restraining frames within the anchorage chamber require major works in and around the strands and anchorage shoes of the main cables. Although this risk can be defined and managed the potential for damage of the main cable and its anchorage is still high and the works to install the restraint system would be costly. When considered in conjunction with the mitigation measures being proposed for the external work the consensus was that the risk of a strand failure was low.
- Peer review panel will be continuously involved through out all stages of the project including construction period.
- Further risk workshops would be required once a contractor has been identified and he begins to work up his detailed risk registers for each activity.

GENERAL DISCUSSION

- Taking a sample of strand forming a tendon and its subsequent reinstatement was discussed. The object of taking a sample was to allow visual inspection of the internal wires of the strand and provide confirmation of any NDT undertaken on the strands. Techniques to splice the strands were also looked at in order to provide possible methods of repair to strands should they become damaged. The consensus resulting from the meeting was that should a sample be taken then it would be preferable if the strand removed was considered as 'sacrificial' with either the strand not being replaced. This approach would lessen the need to verify the connectivity of any spliced in section of strand.

RISK REGISTER

The risk register was develop and accepted by all attending parties.