BOF 18 – 23 May 2006

Highways Agency's New Research Projects 2006/07

1. Mossband Viaduct testing (Neil Loudon)

A74 Mossband Viaduct in Cumbria is planned to be demolished during 2006/07 and replaced. It has numerous half-joints in the bridge deck, and it is planned to undertake testing of some them during the demolition process. A previous proposal to test Holmfield Bridge last year had to be dropped as the testing arrangements did not fit with the contractor's demolition proposals. Mossband Viaduct half-joints are already in poor condition and have monitored for several years. HA have an ongoing programme and strategy for managing half-joint bridges, however data on their performance in a deteriorated condition is limited. We do have access to work undertaken by the Scottish Executive on the Kingston Bridge in Glasgow.

Output

Information on the testing of the half-joints would be used to inform the ongoing strategy of the national management strategy of other half-joint bridges on the HA network (approx. 1000)

2. Optimum Maintenance Strategies for Structures (Awtar Jandu)

Appointment of a suitable Contractor to build on the work already undertaken and undertake further development, trial testing on a small sample of structures and then developing a model for the whole network. A comparison of the actual costs of maintenance undertaken and the costs estimated through the optimisation process. The actual costs would be a "bottom up" process where as the optimisation would be a "top down" process. This will provide the necessary loop for continuous improvement to bring closer these two processes.

Output

Development of robust maintenance plans that take account of the benefits of undertaking preventative works rather than concentrating of addressing essential safety related works only. Input in Spending Reviews to justify structures maintenance expenditure. Maintenance of the asset would be carried out at optimum level at minimum whole life costs. A structured planned and programmed process that would minimise traffic delays due to maintenance activities. Improved safety on the network for customers and workforce.

3. Performance of impregnants (Neil Loudon)

The advent of European Standard EN1504 has meant that a range of hydophobic pore-lining impregnants are now available on the UK market.

However it is unclear how effective they are in-service as regards long term durability. Improved knowledge about the in-service performance of impregnants.

Output

By using the results to inform an update to the Highways Agency standard BD43 and the SHW. Less maintenance and improved durability of structures

4. Development of single pack coating systems as an alternative to 2-pack coating systems currently specified by the HA. (Lucia Fullalove)

2-Pack coating systems are technically sound in theory, but in practice appear to have problems. They require application in a narrow band of suitable atmospheric conditions and are not tolerant of low temperatures, moisture or inexperienced applicators. With more and more coating system failures in service becoming apparent that may be directly linked to the atmospheric conditions they were applied in or, incorrect use by the applicator, painting is becoming over complicated. If a new generation of single pack coatings can be developed in conjunction with the paint manufacturing industry that are EPA compliant and have similar performance potentials to 2-pack coatings, then a significant number of premature paint failures to HA structures may be avoided in future. Development of EPA compliant single pack coatings suitable for long term substrate protection of HA structures. This would be in partnership with interested paint manufacturers and require lab accelerated weathering testing and natural weathering testing.

Output

Successful coating systems would either replace or be an alternative to the coating systems currently specified in HA documents. Less maintenance time to repair failing (2 pack) coating systems, quicker future maintenance through use of easier to apply coating systems.

Recently completed R & D Projects

ATM Monitoring Trials - Stage 2
These results will be used to create a profile of the structural response which will be compared with the initial design assumptions. This will give a measure of confidence that the durability of the structure and in-service performance of the equipment attached will not be affected
Work complete - Report issued

EUROPEAN STANDARDS- Wind Loading on Traffic Signs
Design of signs has traditionally been done for a single wind pressure of 1.5 Kn/sq m. The intention is to provide a similar wind loading for design for most signs with advice identifying exposed areas where full wind loading calculations would be needed. This will avoid disproportionate work in designing signs for wind loading. Designers are also free to carry out designs to EN 1991, however it was felt that these were unnecessarily complex for small structures like signs. This work included some ‘simplified methods’ for

design, giving advice on load/deflection category etc. Additional work was being done to provide advice on foundation design, that was never covered by BS 873
Work complete - report issued, draft BD for minor structures being compiled for TPB

Early application of waterproofing
A number of different waterproofing systems were applied to concrete of different ages ≤ 28 days (and mix designs) and compared with the performance of the same system applied to the current specification, to discover if early application with reduce the life of the system.
From these results a strategy can be developed for determining the optimum time for application.

Work complete - draft report issued to manufacturers for comments prior to final report being published Mid June

Bridge deck waterproofing systems: the effect of membrane stiffness on the strains induced in surfacing
This data would be used to identify the factors that affect the performance of waterproofing systems and assist in preparing the most appropriate specification for surfacing of different type and thickness. Premature failures of surfacing would be reduced, reducing maintenance costs, the disruption to road users and the associated traffic delay costs.
Work complete - draft report issued to manufacturers for comments prior to final report being published Mid June

Effectiveness of Washing Bridges

Work completed

16 May 2006