BRIDGE OWNERS FORUM

DRAFT MINUTES OF MEETING BOF14 – MONDAY 10TH JANUARY 2005 CLARENCE COURT, BELFAST

PRESENT

Dr Campbell Middleton (Chairman)	CUED
Mr Ronnie Wilson	DRD(NI)
Mr Brian Bell	Network Rail
Mr Peter Brown	CSS
Mr Peter Hill	Humber Bridge
Mr Rod Howe	British Waterways
Mr Awtar Jandu	HA
Mr Jim Moriarty	LUL
Mr Andrew Oldland	DfT
Mr Tudor Roberts	Welsh Assembly
Mr Bill Valentine	Scottish Executive
Mr Paul Fidler	CUED
Mr Stephen Bradshaw (Secretary)	DRD(NI)

APOLOGIES

Graham Cole (CSS), Edward Bunting (DfT), John Clarke (BRB)

1. INTRODUCTION

The Chairman welcomed all members to the meeting and Geoff Allister, DRDNI - Roads Service, Director of Engineering. He explained to the group that following the morning session 'Introduction of KPI's' by Awtar Jandu, the afternoon session would be an open agenda, to promote wider discussion and common themes, following past reviews of research.

Geoff Allister welcomed the BOF to Northern Ireland. He and outlined the structure and role of Roads Service as the sole roads authority in Northern Ireland. There is no split between local authorities and national agencies as there is in other parts of the UK. The Roads Service is organised with an internal client that procures work from two internal providers. There is no political pressure to outsource these functions provided the Roads Service provides Value for Money. A recent audit showed that the Roads Service did indeed provide good value for money. The Highway Structures Unit has recently been awarded ISO 9001 accreditation and other units are expected to follow.

There then followed an informal discussion on the decline of the 'intelligent client', and the problem of retaining good engineers in infrastructure-owning organisations. Geoff outlined how the Roads Service has good links with the local universities, has input on university degree courses, including providing placements for the middle part of sandwich degrees, and tries to be involved in engineers' career development from the time they leave school.

2. MINUTES OF MEETING BOF 13 – 28TH SEPTEMBER 2004

The following amendments were highlighted to the draft minutes of the previous meeting:

Item 4 spelling change 'Neil Louden' to 'Neil Loudon,'
Item 7, Paragraph 2 'BSI have not agreed'
Item 10 'morning of 10th January'

3. KPI'S – PERFORMANCE MEASURES

Awtar Jandu gave a presentation (which is available on the Bridgeforum website) on the Highways Agency's proposals on measuring performance in areas of their business, focusing on Structures. The project has taken two years and £190,000.

The Highways Agency has a £1.9 billion turnover and manages £17 billion of bridge assets. In any organisation of this size it is necessary to have some means of measuring how well the organisation is performing.

Although there are already performance measures in place for pavements, there were no such measures in place for bridges.

The proposal suggests using the following four criteria to measure performance:

1. Condition PI - a measure of physical condition.
2. Availability PI - a measure of the reduction in the service level.
3. Reliability PI (risk) - ability of the structure to support traffic.
4. Structures Workbank - cumulative cost of all the work identified for and arising from inspections, assessments and other needs.

Items 1 to 3 would be based on a score from 0 to 100, and the Structures Workbank would be the monetary cost for the backlog of work.

The definition of the Condition PI borrows heavily from the Bridge Condition Indicator developed by the CSS and should be familiar to bridge-owning organisations and relatively easy to implement. The Condition PI is only intended to be a measure the current condition of the bridge stock. It does not predict the possible future condition.

The Availability PI is derived from measures such as the number of lanes closed, duration of closure and the length of alternative routes – it need only be calculated for those bridges that actually have restricted availability.

The Reliability PI is a function of the probability of failure and the consequences of failure.

The Structures Workbank measure is based on the size of the backlog of work that has been planned and costed, but not completed.

Following the presentation the main issue raised during discussions related to the Reliability PI and the inclusion of the Live Load Capacity graph. Some felt that the probability of failure was not representative and could be used inappropriately. In particular it should not be confused with, or used as, a measure of the safety of a bridge. It was also felt that the Reliability PI is needlessly complex if it is intended only as a measure of the performance of a bridge-owning organisation.

There was a discussion of what the objective should be for the Condition PI, should it be to maintain the bridge stock in a steady state, or attempt to improve it? Brian Bell commented that Network Rail have a statutory duty to demonstrate a year-on-year improvement to the rail regulator.

Ronnie Wilson also suggested that to maintain confidence in the inspection and maintenance work functions, they should be carried out by separate organisations or be subject to audit.

Questions were also raised on the way in which future condition, service life and the likelihood of upgrading of a structure would be taken into account.

Awtar announced that the KPI documents would be on the CSS website for discussion and use. The chairman requested that the group put together feedback in this area to Atkins through the Highways Agency and to consider how best to implement and use Performance Indicators.

ACTION: All

Tudor Roberts advised the Forum that there would be a demonstration by Atkins of the Welsh Assembly Bridge Management pilot scheme in early February in London.

Peter Brown reminded all present that guidance documents from the work by Atkins for CSS on the Performance Measurement of Highway Structures were available on the Bridges Group area of the CSS website (www.cssnet.org.uk).

4. TRAINING FOR BRIDGE INSPECTORS

The Chairman asked the Group to consider the development of a National Accreditation Scheme for Bridge Inspectors. In general the group agreed that this was a worthwhile project. Brian Bell suggested that in order to meet the differing needs of various owners, a suite of NVQ qualifications might be appropriate based on and tied to the Bridge Management Manual. Brian Bell suggested that the Construction Industry Training Board (CITB) should be involved.

It was noted that there is a Pavement Qualification in the works that has been driven by the London Borough of Barnet.

It was suggested that a sub-committee consisting of Brian Bell, Tudor Roberts, Awtar Jandu, a CSS representative, and Rod Howe could be set up to take things further.

ACTION: Brian et al.

5. BRIDGE MANAGEMENT

At the start of the afternoon session, the Chairman suggested members split into four sub-groups, each to consider possible ideas for development of methods or technology that would be of use in bridge management. The following topic areas were proposed for discussion:

- Inspection and Monitoring
- Assessment
- Repair and Maintenance
- New Build

There was no immediate interest in discussing new build. Following separate discussions, the three sub-groups presented the following findings:

Inspection and Monitoring
(Brian Bell, Paul Fidler, Peter Hill, Andrew Oldland, Bill Valentine)

The consensus of the group was that that instrumentation can be expensive and difficult to install. There is always a danger of gathering data with no real understanding of what it means. Brian cited an example of an instrumented bridge in which the single biggest factor affecting the readings is the outside temperature. In the case of arch bridges more understanding would be needed before attempting instrumentation. The group did acknowledge that instrumentation can be of use in site-specific circumstances, such as detecting wire breaking in cables on the Humber Bridge.

The group felt that, in general, inspection regimes are effective and should be used to pick up on any serviceability problems, with sensors used to detect problems that could lead to catastrophic failure modes.

The group put forward a list of things it would be nice to have, or to be able to detect or monitor:

- The rate of corrosion of ferrous materials (and how much metal is actually left)
- Method for detecting (unwanted) voids in concrete structures
- Delamination of FRP from substrate
- Real time scour measurement (current methods using a sliding collar require a person to be on the bridge)
- User-friendly hand-held monitors (usable in the field by a technician, ideally with green (OK) and red (Not OK) lights)
- Direct measurement of stress (not inferred from strain)

The Chairman asked about the possible use of X-Ray or Infrared Thermography techniques to detect voids or delamination of FRP. He also asked if anybody had considered the use of PIV (Particle Image Velocimetry) for measuring strains.

Brian commented that new technologies that would be useful often come from other sectors and that the difficulty lies in finding out about. He was aware of a technique being developed to detect corrosion in the radial reinforcement of car tyres which might also be applicable to concrete. This technique is being developed in a chemical engineering department. Tudor mentioned the need for monitoring systems for masonry walls. Any system needs to process data in a manner that triggers a warning or response for critical events.

Assessment
(Ronnie Wilson, Rod Howe)

Following a recent audit from the Highways Agency, there have been questions raised into the entire assessment and strengthening programme, a large proportion of the strengthening work being based on conservative assessments. The group believe the following to be possible solutions:

1. Independent body (external or in-house) to audit actual assessment failures. This would require extra funds from DfT. DoRD(NI) used to check/audit approx. 10% of their bridge assessments but this is not done now.

2. Procedural Controls – Consultants involved in Assessments, which subsequently fail, should not be involved in Strengthening Works.

One possibility would be to have a specialist bridge group at DfT. Need an "informed" client. Ronnie Wilson commented that the 6 yearly Principal Inspections are in effect audits of the 2 yearly visual inspections.

Repair and Maintenance
(Peter Brown, Awtar Jandu, Campbell Middleton, Jim Moriarty, Stephen Bradshaw)

The group suggested that products and techniques such as Concrete Repair/ Plate Bonding/ Maintenance Painting had already been well developed. Nevertheless there remains low confidence in the outcomes of many concrete repairs. Failures are mainly due to Quality Control during application, possible solutions relate to supervision and procurement.

Major problem is the available time for getting on the network to carry out repairs and maintenance thus there would be considerable cost savings and benefits with a reduction of disruption to the network if repair methods could be speeded up. In particular paint systems (reduce from 7 to 5 or even 3 coats), concrete repairs and joint replacement/repairs could be improved.

Areas where research is still required were considered to be:

1. FRP – FRP is relatively well accepted now however there is not much research on its use with cast iron/steel, on early PSC bridges and for shear strengthening on concrete beams.

2. Repair techniques for Masonry Bridge - Appropriate repair techniques for masonry bridges should be listed in CIRIA guide. Brian Bell reported that the

final draft is due in February and it should be available from Summer 2005. Impartial advice on proprietary repair techniques is needed but this issue should be revisited after examining what is in the CIRIA guide.

3. Non Standard Parapets for Local Roads

ESPRC needs to be informed through website and members of BOF views on priorities. BOF members to compare and prioritise projects at the next meeting in June.

ACTION: All

6. RESEARCH PROJECTS

CIRIA Masonry Arch Best Practice Guide
Brian reported that publication of the guide had been delayed by a couple of months.

Existing research proposals for 2004/05.
The current situation is that funding has not been found in the DfT research budget for the two research proposals that had previously been recommended to the Bridges Board by BOF: Management of Older Metal Bridges, and Assessment of Dry Stone Retaining Walls.

Ronnie Wilson reported that at this time CSS has no additional funds available to fund the proposed Dry Stone Wall project.

Research Proposals From Researchers
At BOF12 the group had discussed a further 14 possible research proposals submitted by researchers working in academia. Eight off these had been short listed by the group for possible further consideration. The Chairman explained that he had planned to contact the academics concerned to ask for further information and to confirm that they wished their application to go forward. However, all 14 proposals of the original proposals had been submitted (in error) at the subsequent Bridges Board. The Chairman agreed to ask the researchers for further details so that the short listed proposals can be reconsidered at the next BOF meeting.

ACTION: Chairman

Brian Bell suggested that a subcommittee be set up to work up future costing. Volunteers were Brian Bell, Jim Moriarty and Tudor Roberts. He also reminded the group that draft R&D proposals are required by June 2005.

ACTION: Brian et al.

Andrew Oldham explained that projects could be considered for an October bid to DfT.

Continued Funding For the Bridge Owners' Forum
The Chairman asked whether there was support from the group for a submission to the DfT for further funding for the Bridge Owners' Forum when the current funding runs out in 2006. Any application would need to be submitted by June.

The consensus of the group was that the Forum continues to be a useful vehicle for discussing technical aspects of bridge management and remains distinct from the Bridges Board where more strategic issues are discussed. A request for further funding would be appropriate.

ACTION: Chairman

7. RESEARCH PROPOSALS FROM OWNERS

Evaluation of occupant risk during collision with masonry parapets and boundary walls

This project had originally been proposed by John Collins at BOF13. Tudor Roberts requested support for this project from BOF members. Tudor explained that the scope of the project has widened since it was first presented by John Collins at BOF13. The project would now be in two parts with the first part merely being a statistics gathering exercise to decide whether there is actually a problem. The group response was that this topic was beyond the remit of the Forum.

8. INTERNATIONAL BRIDGE FORUM

The Chairman reported to members that he was planning on organising an International Bridge Forum to be held in Cambridge, provisional dates being 11th to 14th September 2005. The intention would be to invite selected speakers from bridge-owning organisations overseas such as FHWA, HA, and Autostrada. The Chairman will issue an outline Agenda to all members for comment.

Peter Hill Pointed out that the proposed dates conflicted with the bridge-engineers.org conference. The Chairman responded that the dates were fixed by the availability of the facilities at King's College.

ACTION: Chairman

9. OTHER BUSINESS

Demonstration

Tudor Roberts invited group members to a demonstration of software developed by the Welsh Assembly to demonstrate the effective use of resources. A provisional date has been made for 2nd February 2005 and interested members should contact Tudor directly.

Thanks to Ronnie Wilson

The Group thanked Ronnie for hosting the meeting, and for organising a visit to the Foyle Bridge to take place the following day.

10. DATE AND LOCATION OF NEXT MEETING

The Chairman announced that he would be in Australia on sabbatical leave in for the next few months and would therefore miss the next meeting in June. He could still book the usual rooms in King's College if the forum still wished to meet.

It was decided that the meeting should go ahead as the group needs to consider which research proposals to recommend prior to the Bridges Board meeting. The dates of 14th, 21st, 27th June were suggested. Rod Howe suggested meeting in Leeds.

ACTION Rod Howe, Chairman