

BRIDGE OWNERS' FORUM

MINUTES OF BOF31

Held at Keynes Hall, King's College Cambridge

on

Tuesday 11th May 2010

PRESENT

Campbell Middleton	CM	Cambridge University Engineering Department (Chairman)
Brian Bell	BB	Network Rail
Graham Bessant	GB	London Underground
Peter Brown	PB	Association of Directors of Environment, Economy, Planning and Transport (ADEPT)
Graham Cole	GC	Association of Directors of Environment, Economy, Planning and Transport (ADEPT)
Martin Dills	MD	British Railways Board (Residuary) Ltd
Paul Fidler	PF	Cambridge University Engineering Department
Peter Hill	PH	Large Bridges Group and Humber Bridge Board
Rod Howe	RH	British Waterways Board
Neil Loudon	NL	Highways Agency
Jim Moriarty	JM	Technical Secretary
Graeme Muir	GM	Society of Chief Officers of Transportation in Scotland
Andy Philips	AP	Welsh Assembly Government
Stephen Pottle	SP	Transport for London
Bill Valentine	BV	Transport Scotland
Paul Williams	PW	London Bridges Engineering Group

INTRODUCTION

The Chairman opened the meeting by defining the three primary goals BOF 31 were to consider:

- Risk based inspections research
- The Parliamentary Standing Committee progress on the Cumbria flooding
- The future way forward for BOF and bridges research

The Chairman reminded the meeting that 9th May was the 30th anniversary of the Sunshine Skyway bridge collapse in Florida. Photographs of the reconstruction are available at the Wikipedia website (http://en.wikipedia.org/wiki/Sunshine_Skyway_Bridge). A poignant reminder that collapses do occur.

Peter Brown and Graham Cole announced that the County Surveyors' Society had changed its name to the Association of Directors of Environment, Economy, Planning and Transport (ADEPT)

The Chairman welcomed Jim Moriarty who was standing in for Richard Fish as Technical Secretary for this meeting.

1 APOLOGIES FOR ABSENCE

Graeme Brown	Department of Regional Development (Northern Ireland)
John Clarke	British Railways Board (Residuary) Ltd
Albert Daly	National Roads Authority – Ireland
Richard Fish	Technical Secretary
Paul Foskett	Department for Transport
Robert Humphries	County Surveyors Society Wales
Richard McFarlane	London Bridges Engineering Group

2 PREVIOUS MINUTES – BOF 30 (19th January 2010)

Item c(iii) on page 5 should read “Best Practice for Specifying Long Life Road Surfacing for Bridges”

Otherwise, the minutes of BOF 30 were accepted and signed as being a true and correct record. It was agreed that a copy could be placed on the BOF website

3 ACTIONS FROM PREVIOUS BOF MEETINGS

From BOF30

BOF30 – Section 4 BOF/DfT meeting

The Chairman has not as yet met with John Dowie of DfT to discuss the future of BOF

ACTION: Chairman

BOF30 – Section 5a(i) Bridge inspector competence and training

The report for Phase 1 of this work has been posted on the BOF website

BOF30 – Section 5a(ii) Masonry parapets

The work being undertaken on masonry parapets by NR and ADEPT will be reviewed by each party

ACTION: Brian Bell (NR) & Brian Poole (ADEPT/Durham CC)

BOF30 - Section 5a(iii) Non-metallic reinforcement

A project report was tabled at the meeting. Project ongoing – outstanding for construction details of trial deck to be issued to BOF and for Sue Taylor of QUB to be invited to a future BOF meeting

ACTION: Albert Daly

BOF30 - Section 5a(iv) Carbon composites for strengthening of metallic bridges

First formal meeting arranged for this month. Notes of this meeting to be circulated to BOF

ACTION: Brian Bell

BOF30 – Section 5a(v) Automated bridge inspections

Noted that the draft specification is now available on the BOF website.

BOF30 – Section 5c(i) Bridge inspector competence and training – Phase 2

Noted that the original proposal, specification and the minutes of the first project steering group meeting of 22nd December 2009 are now on the BOF website and were tabled at the meeting

BOF30 - Section 6 Possible changes to BOF constitution and brand

See item 8

BOF30 – Section 7b(i) HA emergency response procedures

Noted that the HA Area Management Memo (AMM) is available on the HA website.

BOF30 – Section 7b(ii) UK temporary bridge capacity

See item 5

BOF30 - Section 7c(i) Network Rail scour experience

Noted that Brian Bell's presentation is now available on the BOF website

BOF30 – Section 7c(ii) PLA river bed survey

Action outstanding for Graham Bessant to be invited to report on this facility at a future BOF meeting.

ACTION: Chairman

BOF30 – Section 7c(iii) BOF position on national flooding emergencies

See item 5

BOF30 – Section 8 International Bridge Forum feedback

IBF minutes and feedback are now available but not yet issued. To be considered at BOF 32

ACTION: Chairman

From BOF28

BOF28 - 4a. CIRIA

The Chairman has written to Chris Chiverrell of CIRIA and a reply was awaited. Noted that reports are freely available for download but, for example, the Masonry Arch report states that it is for Core Members only. The Chairman is to progress for a blanket

approval. The Chairman is also to raise with DfT (as a project funder and possibly intellectual property owner) to pursue and clarify.

ACTION: Chairman

BOF28 - 4c. Research project minutes

No minutes of Project Steering Groups (PSG) had been received. It was agreed that Convenors should ensure that minutes are forwarded to the Technical Secretary (copied to the Chairman and Paul Fidler) for distribution, although the actual drafting of minutes should be the responsibility of the contractor.

ACTION: Project Steering Group Convenors

The Chairman also agreed to pursue and clarify with DfT re the contract requirements

ACTION: Chairman

BOF28 - 4g (i). NDT of Macalloy bars

The NDT of Macalloy bars project has been rejected by DfT and is to be considered at the relevant BOF meeting for prioritisation and funding alongside other projects.

ACTION: Brian Bell / BOF Members

BOF28 - 4g (ii). NDT of Macalloy bars

Pending the outcome of the above action, Peter Brown will be the ADEPT representative on the Macalloy Bar project Steering Group.

ACTION: Peter Brown

BOF28 - 4k (i) Decision Support Tool

The Chairman had e-mailed Greg Perks the previous evening regarding the Decision Support Tool project being managed by UKBB. A reply is awaited

ACTION: Chairman

BOF28 - 4k (ii) Decision Support Tool

Stephen Pottle issued the Phase 1 Report of the DST project at the meeting for placing on the BOF website.

ACTION: Paul Fidler

BOF28 - 4k (iii) Decision Support Tool

At BOF 28 Stephen Pottle also reported on the LoBEG DST linked to their Bridge Management software and suggested that Paul Williams should report on this at BOF31. The Chairman will invite a member of LoBEG to report on their version at a future BOF meeting.

ACTION: Chairman

BOF28 - 8c (i)b Bridge related research projects

Stephen Pottle agreed to take over the action to ask Atkins for a summary of all their recent bridge research related contracts, including risk based inspections.

ACTION: Stephen Pottle

BOF28 - 8c (ii)e Contractual and procurement issues

Agreed that this is not worth pursuing further

BOF28 - 8g (i) US scanning tour

The material from the US scanning tour has either been distributed or posted on the web site. A full report is expected and the Chairman will chase this.

ACTION: Chairman

BOF28 - 8g (ii) International collaboration

Following the success of the US delegation's visit to Finland, the Chairman has e-mailed the Chair of UKBB regarding the need to improve international collaboration. A reply is awaited.

ACTION: Chairman

BOF28 - 8g (iii) International collaboration strategy

The Chairman and Technical Secretary (RF) have met to develop a Strategy for International Collaboration with identified objectives and a convincing business case. Further dialogue with funding bodies is planned.

ACTION: Chairman / Technical Secretary (RF)

Various options to promote international collaboration were discussed including mutual secondments and a tri-annual international forum. Noted that for the rail industry collaborative organisations such as UIC and ERRIC already exist. Note that the website for new European Union funded projects is FP7UK.org.

Neil Loudon also agreed to circulate a HA list of website links

ACTION: Neil Loudon

BOF28 – 10 Australian Guide to Bridge Technology

Noted that the Australian Guide to Bridge Technology (7 volumes) is now available on the Australian website. See http://www.austroads.com.au/interest_bridges.html

From BOF27

BOF27 – 5 BOF Terms of Reference

Noted that the BOF Terms of Reference have been approved by the UKBB and are posted on the BOF website.

BOF27 – 9 Concrete repair

It was agreed that the proposed presentation on Concrete Repair by Stuart Matthews be scheduled for BOF32 in September, with BOF31 (May) focussing on risk based inspections.

ACTION: Chairman

BOF27 - 10c Masonry arches

Noted that the CSS report on Masonry Arch Bridges is now posted on the BOF website.

4 BOF RESEARCH PROJECTS UPDATE

a. Revision of BS6779 Part 4 (Masonry Bridge Parapets) – Brian Bell

Started April 2009 with a planned duration of 12 months. Progress has been slow due to health problems with the Sheffield University sub-contractor and is now 6 months behind programme. A first draft has been circulated to the Project Steering Group and a telephone conference held on 11 March. The BOF Chairman is to speak to Andrew Oldland re the status of the project as the contract is with DfT

ACTION: Chairman

b. Bridge deck slabs with non-metallic reinforcement – Albert Daly

An interim report is now available.

Final report and formal meeting due at the end of the month.

c. Carbon composites for strengthening steel structures – Brian Bell

This work is with Herriot Watt University. The student arrived in January and has commenced work. The April meeting was cancelled and is being rearranged for the last week in May.

d. Automating bridge inspections – Stephen Pottle

A draft specification has been circulated. Stephen Pottle asked for responses to be sent to him.

Work is behind programme but four bridges have been selected for testing the systems. An updated report will be available for inclusion with the minutes

e. Scanning of HA Research Reports – Neil Loudon

The Chairman and Paul Fidler are to visit HA at Bedford for a meeting with Neil Loudon

ACTION: Chairman / Paul Fidler

f. Bridge Inspector Qualification (Part II) – Stephen Pottle

Tenders were received back Friday 7th May and have been distributed to the Project Steering Group. It is planned to place the contract at the end of May.

ADEPT have increased their contribution to £20k.

Memorandum of Agreement between funding bodies to be drawn up.

ACTION: Stephen Pottle

g. Status of Projects submitted to Bridges Board in Oct 2009 – Paul Foskett

- (i) Bridge Inspector Competence and Training (Phase 2)
- (ii) Review of Road Restraint Systems for Local Roads
- (iii) Best Practice for Specifying Long Life Road Surfacing for Bridges
- (iv) Design, Maintenance and Inspection of Concealed Metal Connectors and Bearing Pins in Moving Bridges
- (v) Life-time considerations of FRP Strengthening of Bridges

Paul Foskett was unable to attend the meeting and a report had been received from Andrew Oldland. To be considered at BOF 32

5 REPORT ON PARLIAMENTARY SELECT COMMITTEE – CUMBRIA FLOODING

The Transport Committee evidence re “The Impact of flooding on bridges and other transport infrastructure in Cumbria” is now available on the Parliamentary website (www.parliament.uk). Noted that the committee focus was on engineering rather than emergency response.

HA have drawn up an action plan to include:

- i. Update BA74 –Scour – an update had already been planned and action is that there is an operational programme in place
- ii. A study in Area 2 (Gloucestershire) re flood data, climate change and asset data. This is to be widened to include local authority assets.
- iii. Assessment of the impact of dam failures

A discussion followed on the availability and deployment of temporary bridges which included:

- iv. Procurement, outline technical approval for a range of spans and widths, availability, technical issues and Eurocode implications.
- v. The Chairman proposed BOF should compile a schedule of temporary bridging available but it was suggested that military stocks are all deployed and HA do not hold a stock. Noted that Workington temporary bridge was sourced from Holland.
- vi. It was agreed that the Chairman should send a note to the Bridges Board suggesting that temporary bridging be included on the agenda for the next meeting.

ACTION: Chairman

The management of bridge support scour risk was considered and the following points were noted:

- i. The UK RLG are proposing action on surveying of bridges considered at risk (see notes of April meeting)
- ii. An outline proposal entitled “Assessment of Bridge Vulnerability to Flood Damage” is being prepared following the ADEPT evidence to the Transport Committee
- iii. Network Rail dealt with the problem of scour in the 1970s by confirming depths of foundations, assessing maximum scour depth and then implementing a programme of remediation which included deepening foundations, installing scour pads, etc. NR undertake a diver inspection every 3 years or before reopening a bridge which has been closed due to flooding.
- iv. Agreed that the Chairman includes a project to investigate monitoring of bridge support scour as a priority in the BOF list of research subjects.
- v. It was suggested that BOF should be raising awareness of the problem of bridge support scour. Noted that a CIRIA report is available and that the Bridges Board Briefing Note dated 10th May 2010 could be used to reach a wider audience. The Chairman will raise with the Chairman of the Bridges Board.
- vi. The Chairman raised the issue of the hydraulic capacity of bridges over water. Assessment is done for new designs but is not necessarily available for older bridges. Noted that approval from the Environment Agency is required for new bridges or for a constriction to the flow under an existing bridge

ACTION: Chairman (Points iv. and v.)

6 RISK BASED INSPECTIONS

Four presentations of work on risk based bridge inspections were received. The presentations will be made available on the BOF website. Question and answer session followed each presentation and are summarised:

a. Welsh Assembly study.

Presented by Jessica Moss, Stephen Jones and Ryan Jones (Atkins)

Q (SP) Is risk assessment done for each structure or for groups of structures?

A Risk Assessment is done for each individual structure

Q (SP) At what stage is risk assessment done?

A Risk Assessment can be done at any time but preferably it should be part of the General Inspection

Q (SP) Why not consider inspection intervals less than 6 years?

A General Inspections are still done at 2 yearly intervals and Special Inspections are available as needed. If a GI shows deterioration then the risk assessment should be redone. Engineering judgement should still be applied to agree or otherwise the outcome.

Q (NL) Is there a pattern emerging from the outcome ie real problems?

A Agents have just completed the first tranche of risk assessments so it is too early to say yet. It is planned to look at patterns within each agency and then on a nationwide basis.

Q (NL) How might other known concerns about the structure impact on the approach?

A If you know more about a structure then you should be able to predict more about its deterioration characteristics. Elements that are difficult will still be subject to Special Inspections.

Q (BB) How have older structures ie pre motorway age been considered?

A The project is in the process of getting feedback. The original thinking considered all types of structures.

Q (PH) Can the tool be applied to multi-span bridges where the spans are of different forms?

A Each span where of a different construction should be assessed separately. This may well lead to different inspection frequencies for each span but other factors are likely to govern eg the cost of setting up traffic management may dictate that all of the spans should be inspected at the most onerous frequency.

Q (BV) Do you do risk based assessment at every GI which may mean that the frequency moves from 12 years to 6 years half way through?

A Assessment is based on inspection, monitoring and engineering judgement considering any known change in condition eg a change in condition from “good” to “fair” would raise more concern than a stable “fair” condition rating.

Also, there is logistical / programming issue if no PI’s are undertaken over a few years as it would probably be better to maintain a continuous work load.

Comment (NL)

HA are not planning to introduce RBI but if they were they would want to couple with the quality of inspections including inspector competency and training.

Noted that variations in the standard of PIs and GI’ can be significant.

Also, as PI traffic management costs are significant it would be desirable to consider also automation of inspection, remote monitoring, etc

Q (CM) How is the decision making process split between Inspectors and Engineers?

The Risk assessment is done by the Inspector and is reviewed by an Engineer. The competence and qualifications of both the Inspector and the Engineer are being considered and are recorded on the assessment form.

Q (CM) Does the Risk Assessment consider historical records – GIs, PIs etc; does it consider the appropriateness of the method of structural assessment and condition factor especially in anticipated rates of deterioration?

A The risk assessment is done on the same basis as inspection are done at the moment eg whether information is available or not thus is common ground and has the same affect.

Q (NL) Is change in condition considered?

The question raised a debate around a number of factors such as consistency of inspections, inspectors’ experience and qualifications, understanding of the structure, the

relationship between special, general and principal inspections and funding or lack of funding.

b. Surrey University study

Sponsored by NR, Steering Group includes RSSB, ADEPT, HA, and LU.

Presented by Saenthan Sathanathan (Surrey University)

Q (SP) How does this work relate to the NR Level 3 Handbook – Handbook for the examination of structures – Part 1c – Risk Categories and Examination Intervals (NR/L3/CIV/006/1c)?

A Noted the status of the document as publication date 5th September 2009 and compliance date 5th December 2009. After the Surrey work commenced the Regulator required a risk based approach. Consultants (TRL) were commissioned to produce a methodology and the Regulator is now considering through a risk assessment of the proposal.

c. Transport for London

Presented by Stephen Pottle

Stephen Pottle summarised the presentation he had given at The Surveyor Conference at the end of March

Q (JMoss) Does the method relate to assessed capacity?

A Sub-standard structures are dealt with as per BD79 and assessed capacity is not considered in the risk assessment. The method manages risk not through bridge capacity but through inspections.

d. Network Rail progress

Presented by Brian bell (NR).

Brian Bell would provide a copy of the presentation to be made publicly available on the BOF website.

e. Concluding debate

Noted that there were common factors in the three methodologies, some considering all inspections and some principal inspections only. It was proposed that there should be joint working to agree a common methodology.

There was concern about having different approaches which could be criticised for not adopting one solution or another. It was suggested that the work should be under the umbrella of the IK Bridges Board to provide common platform.

The Chairman suggested setting up a Risk Based Inspection Working Group with those interested taking a position on the Steering Group. It would be informative to apply the different methodologies to a sample selection of bridges to compare and contrast the output.

The Chairman agreed to organise this and put a proposal to the UK Bridges Board in June. Those interested in joining the Steering Group were:

- ADEPT – Peter Brown
- WAG – Andy Phillips (Chairman)
- TfL – Stephen Pottle
- HA – Ian Sandall (TBC)
- TS – Bill valentine
- LU – Graham Bessant
- NR Brian bell (TBC)

ACTION: Chairman

7. PROGRESS ON IMPLEMENTATION OF CODE OF PRACTICE FOR BRIDGE MANAGEMENT

a. Record keeping / audits

Following a debate on availability of records, the meeting agreed that Bridge Owners each have good records going back 10 years or so and there was 95% probability that inspection records could be accessed.

Bridge maintenance costs were known locally but could not be used for comparison nationally due to the diverse types of contracts used to procure. Bridge maintenance costs are usually grouped and included in overall highway maintenance cost records and were insignificant compared to the total spend. A recent example indicated a 400% difference in the prices for bridge works but these represented only 2% of the contract value. Also, regional variations had a large impact on costs as did the relative costs of traffic management in lightly used and heavily congested areas.

It was generally agreed that the biggest problem with retention of information was when contracts were handed over from one supplier to another. SP suggested there could be benefit in having standard clauses to define best practice for maintenance and handover of maintenance and inspection records.

The benefits of a National Bridge Database were considered. PB suggested that it need only 25 or so parameters or pieces of information. Otherwise, all the information needed to manage bridge structures was available locally going back to the mid 19th century in the case of some bridge owners.

8 BRIDGE RESEARCH UPDATE

a. UKBB and RLG

The Bridges Board and Roads Liaison Group have announced that they will not be funding new research but will be focussing on implementation and dissemination

b. Bridge Owners Forum

Funding for BOF is available until April 2011

The assumption, based on the announcement from UKBB, is that BOF will not continue after this date. Options for alternative funding to enable BOF to continue were identified as

- Individual subscription from member organisations
- Commercial sponsorship from consultants and contractors
- An annual conference on a profit making basis.

The option of individual member organisations subscription was considered to be the only one worth pursuing but could be combined with an approach to DfT seeking matching funding. The Chairman agreed to e-mail members asking for reaction to an annual subscription of £2000 each and to discuss with DfT (John Dowie) the possibility of matched funding.

ACTION: CHAIRMAN

Noted that the meeting needs to make a decision 6 months in advance (October 2010) as the Chairman needs committed funding in assigning staff time.

Individual members will, no doubt, need to develop a business case for membership. It was suggested that the value might be expressed as a % increase in maintenance costs of 0.5% to 1%.

c. Network Rail

BB provided an update of research projects with which NR has involvement for inclusion in the minutes:

Completed

- The CIRIA Culvert Design and Operation Guide (C689) has been published

Directly funded

- Newcastle University Treatment of shallow mine workings – still delayed by illness of RA

EPSRC/TSB funded

- (Case award) Surrey University Corrosion of steelwork - progressing
- Leeds University FRP strengthening of metallic structures – still delayed by illness of RA
- University of the West of England & Salford University Masonry arch fatigue – nothing new to report
- Queen's University, Belfast & City University Development of a fibre optic rebar corrosion sensor – Grant awarded late 2009, RA recruitment in hand
- ACTS – Work progressing well
- Lightweight low energy concrete – work progressing but a bit behind schedule
- IMAGINE – Work on civil engineering case study not yet started

EU funded

- Brifag – ongoing
- SmartEN – Official start date Nov 2009 – kick off meeting in April 2010 postponed due to volcanic ash cloud, now being held at the end of May 2010.

Funded by others

- Bristol University fatigue resistance of asset profile bonded to psc beams (Highways Agency, ICE enabling fund) – progress meeting held 29th April to coincide with a construction discussion at the new National Composites Centre. BB was unable to attend due to a prior commitment. NL may be able to update.
- National Physical Laboratory Concrete SHM demonstrator - progressing

CIRIA projects

- Advice to developers on dealing with noise & vibration from transport infrastructure – Final draft with CIRIA publishing
- Construction in the vicinity of abandoned mineworkings just started

In development

- Concrete society – revision of TR55
- CoPatch – EU project on composite patching of civil and marine structures
- Sheffield University/Salford University – Ultimate and permissible limit state behaviour of soil filled masonry arch bridges. EPSRC proposal with £50k NR funding committed
- Bath University – Blast and impact simulator. EPSRC proposal in draft
- Possible EU 7th framework 2011 call - Bridge or railway submission under discussion within UIC

d. Transport for London

SP advised there has been no progress on obtaining funding for the additional work requested on the DfT Asset Information Financial Modelling work and that Atkins had been commissioned to update local design standards

e. London Underground

GB advised that Glamorgan and Kingston Universities have proposed reopening some work which was done 20 or so years ago on the deterioration of concrete bridges. The potential is to update the original work with a further 20 years of experience and robust data.

9. ANY OTHER BUSINESS

The Chairman advised that the September meeting would focus on concrete repairs.

Noted that Richard Fish attended on behalf of BOF the Historical Structures Awards Ceremony

Peter Hill has had the benefit of a technical visit to China re long bridges. PH will report to the members at a future BOF

ACTION: Chairman

10. PROPOSED DATES FOR NEXT MEETINGS

- a. September (BOF32): Tuesday 21st September 2010 - King's College, Cambridge
- b. January (BOF33): Tuesday 11th January 2011 - Venue: TBA