

BRIDGE OWNERS FORUM

MINUTES OF MEETING BOF 61: WEDNESDAY 15 MAY 2019 AT THE CEC, FORTH BRIDGES

PRESENT:

Bill Bryce	SSE
Nick Burgess	TfL/LUL
Henry Dempsey	SCOTS
Liam Duffy	Transport Infrastructure Ireland
Andy Featherby	Canal and River Trust
Richard Fish	Technical Secretary
Tomas Garcia	HS2
Philip Gray	TfL
Colin Hall	Network rail
Keith Harwood	ADEPT
Trish Johnson	Big Bridge Group
Neil Loudon	Highways England
Hazel McDonald	Transport Scotland
Campbell Middleton	Cambridge University Engineering Department (Chairman)
Paul Thomas	Railway Paths Ltd.
Paul Fidler	CUED
Guests:	
Brett Archibald	Transport Scotland
Jason Cheetham	Transport Scotland

1. Welcome, Introductions and Apologies

The Chairman welcomed everyone to the meeting and reflected on the previous day which had seen an excellent set of site visits to some of the most iconic bridges in the UK. He thanked Richard Fish and Hazel McDonald for their efforts in organising such a successful trip. He also asked for thanks to be passed to the relevant people in Network Rail and Amey for their contributions. The Chairman also credited Ewan Angus of Amey for an excellent presentation on the FRB and QC SHM systems. Ewan had agreed that this could be uploaded to the Members Only section of the BOF website.

ACTION 1: Paul Fidler

He also welcomed Brett Archibald and Jason Cheetham of Transport Scotland who were guests at this meeting; the suggestion of organisations bringing other, sometimes junior, members of staff to BOF meetings had been discussed at the Annual Bridges Conference and was something the Chairman wished to encourage.

After general introductions, the Chairman specifically welcomed Network Rail's Colin Hall, who had replaced Rob Dean as BOF representative, to his first meeting. Keeping with tradition, Colin was invited to say a few words of introduction:

After a spell with URS/Aecom, Colin explained that he had been with Network Rail for five years, working closely with Rob. He had a broad experience in bridge design and maintenance and a special interest in asset management. His main task at present was to review and revise the standard for bridge examinations in the context of new framework contracts. This also extended into the challenge of data collection and translating the data into workable information, not least through the application of machine learning. The aim was to improve evaluation such that resources could be targeted to the most needy bridges.

Richard Fish noted that apologies had been received from the following:

Jim Hall	CSS Wales
Daniel Healy	Department for Infrastructure, Northern Ireland
Jason Hibbert	Welsh Government
Sue Threader	Rochester Bridges Trust

He noted that, again following conversations at the UK Bridges Conference, the Rochester Bridges Trust had expressed a desire to join BOF and this had been put in place. Bridge Clerk, Sue Threader, hoped to be able to attend BOF 62.

Richard Fish also confirmed that Kevin Dentith, Chair of the ADEPT Bridges Group, was considering taking the second BOF ADEPT place himself. (*Post meeting note: now confirmed*)

The Chairman suggested that an open invitation to BOF meetings should be extended to UKBB Chair, Liz Kirkham.

ACTION 2: Richard Fish

2. Reflections on Site Visits – Tuesday 14th May

The Chairman reprised his earlier comments but invited thoughts from the meeting before extending discussion into related issues, including SHM, data storage and accessibility and procurement:

Henry Dempsey commented on the impressive SHM systems incorporated into the Queensferry Crossing but questioned how they might age. There were now potentially

three aspects to be maintained: the bridge, the technology and the IT support. He noted similarities with the systems in the Clyde tunnel which also relied on outside parties but had also revealed problems with links between sensors and the IT systems.

Although Amey were the incumbent agent for QC and FRB, Hazel McDonald and Jason Cheetham confirmed that the Pearl IT system and the data was in Transport Scotland's ownership. Trish Johnson queried the volume of data that had to be stored, pointing out that it was vital that historic data had to be archived for future reference. Hazel confirmed that this was a TS requirement.

Philip Gray reported that TfL were soon to commission a new lifting footbridge over the Thames which would be fully equipped with SHM.

Keith Harwood pointed out that all bridge owners were at different stages and it was essential that issues were shared so that we could learn from each other. Paul Thomas agreed, noting one of the benefits of BOF as being the opportunity for smaller owners to learn from others.

The Chairman suggested that the next step was to extend SHM into a larger stock of smaller bridges. Henry Dempsey suggested that there should be a *de minimis* span, possibly dependent on form and material, below which instrumentation was unnecessary. Alternatively, a small sample of bridge types could be measured in order to inform the larger stock of similar bridges. Keith Harwood agreed, noting that bridge condition data was the most important and, although most engineers acknowledged that the CSS/Atkins BCI system was somewhat clunky, the next development should be low cost sensors all linked to a central dashboard with the capability of identifying and reporting defects. Neil Loudon recalled that defect recognition had been part of Ewan Angus' earlier presentation and Colin Hall reported that Network Rail were close to achieving this.

The Chairman reprised his long term vision for major bridges in which a digital twin linked to powerful SHM could provide not only early recognition of symptoms but also live diagnosis for the performance of the structure. This was linked to the current "Smart City" initiative and Henry Dempsey noted that Glasgow was a participant in this.

Tomas Garcia questioned the legal situation with data, citing an example in which the Basque Local Government had been making excellent use of data in managing its assets. This data, however, was open and accessible and a third party had successfully sued the Authority over its prioritisation of resources. Neil Loudon noted that there was a similar risk in the UK and Highways England had received Freedom of Information requests for raw data on their entire stock from "data journalists" after the Genoa collapse.

The Chairman turned to the subject of procurement and his view that many of the problems arising during the life of a structure had their genesis in the fact that lowest

tender prices were always chosen. In this, he included Queensferry Crossing which had effectively been a fixed price contract and in which legal and contractual issues were likely to continue for many years to come. He advocated strong *engineering* leadership which should be integral with the procurement process plus performance measurement, also from an engineering perspective, in order to inform future tender lists.

Liam Duffy recalled that this had been part of a conversation during the previous evening's dinner and agreed to investigate Ireland's procurement options, outside of national requirements and report to a future meeting.

ACTION 3: Liam Duffy

Hazel McDonald reported that Transport Scotland had just begun a review of procurement and contract issues associated with major transport infrastructure and agreed to give an update on this at a future BOF meeting. Neil Loudon suggested that reflections from an engineering perspective might also be part of this.

ACTION 4: Hazel McDonald

Trish Johnson suggested that lowest and highest tenders should be discounted before making a decision. Henry Dempsey agreed, suggesting that clients needed to be aware that a contractor had "bought" a project. Hazel McDonald noted that the effect of the quality and price initiative had now diminished as most tenderers knew how to meet quality thresholds meaning it was back to price only. Philip Gray advised that TfL had recently introduced a "behaviour" metric, including from historic contracts, as part of their tendering procedure.

Neil Loudon reflected on the "political" pressure that clients had to face which focused on time and money and, as a consequence, the quality of the engineering tended to suffer. Neil also questioned past decisions regarding the acceptance of a contractor's alternative design, citing a specific case on the original M25 construction which had a subsequent legacy of problems. Brett Archibald echoed this view from a Transport Scotland perspective and Hazel McDonald advised that TS were still required to use the ICE 5th Conditions of Contract, as directed by the Scottish Government, despite the NEC being in wide use for the last 20 years. Richard Fish recalled that the NEC had originally been drafted to include the various initiatives from the 1990s: Latham, Egan, M4i, Demonstration Projects etc. and there had been many early NEC contracts with risk sharing and pain/gain but this no longer seemed standard practice.

The Chairman reported on a site visit he had recently made to a London school construction site which was a great example of how off-site construction had enabled savings in time and cost; in part due to the fact that the client had relaxed their original requirements.

Jason Cheetham raised the issue of the reluctance of some contractors to hand over information, vital for the bridge manager, once works had been completed. Despite the fact that this was a contract requirement, it seemed that there was often insufficient retention to ensure that this happened.

Tomas Garcia advocated early engagement with the supply chain such that they had full visibility of projects in the pipeline. This would particularly be the case should modular construction become the reality.

Concluding this part of the discussion, the Chairman welcomed any further procurement initiatives which could be included in a discussion at the next meeting.

ACTION 5: All

3. BOF 59 Minutes (29th January)

a. Accuracy

It was agreed that the minutes were an accurate record of the meeting and could be uploaded to the public area of the BOF website.

ACTION 6: Richard Fish/Paul Fidler

b. Matters Arising

Action 2b: BOF Website Photographs

Permission forms to be issued to new BOF members.

ACTION 7: Paul Fidler

Actions 4, 5 and 12: BOF Themed Meetings

A number of options were aired, including resilience, sensor technology and application and scour, but it was agreed to defer decisions until BOF 62.

ACTION 8: Richard Fish

Action 6: Chloride Study

Liam Duffy briefly described the results of this work but agreed to arrange for it to be issued.

ACTION 9: Liam Duffy

Action 7: Bridge Inspections

This referred to the original Atkins work which had led to the development of BICS but it was concluded that it would now be only of historic interest.

Action 11: UAV Inspections

Henry Dempsey reported that the Glasgow City Council drone inspection trial by Jacobs had been put on hold following the security scare at Gatwick Airport but was now hoped to take place in November.

Action 17: Eastham Bridge Collapse

Not discussed (*Post meeting note: On behalf of BOF, Richard Fish submitted an FOI request to Worcestershire County Council asking for reports into the collapse and this will be discussed at BOF 62*)

ACTION 10: Richard Fish

4. BOF 60 Minutes (13th March)

a. Accuracy

It was agreed that the minutes were an accurate record of the meeting and could be uploaded to the public area of the BOF website.

ACTION 6: Richard Fish/Paul Fidler

b. Matters Arising

Action 1: BOF Meetings

After discussion it was agreed that BOF meetings should remain as at present, including the additional meeting held ahead of the Annual Bridges Conference as long as the organisers repeated their offer of a room etc.

ACTION 11: Richard Fish

Action 3: Additional BOF Members

The Chairman wished to maintain BOF at an appropriate size to ensure there was healthy debate at meetings although he acknowledged that there were other owners who were not represented.

Discussion extended into possible additional members and Richard Fish noted the following who had either been short-term members or had previously been invited or considered:

- LoBEG
- Transport for Greater Manchester
- Irish Rail
- Translink (Northern Ireland Rail)
- Forestry Commission

It was agreed that LoBEG, having been a key player in the early years of BOF, was an obvious absentee and Philip Gray agreed to raise their future membership at the next LoBEG meeting.

ACTION 12: Philip Gray

Action 4: Benefits of BOF

The Chairman recalled a document, updated a number of times over the years, that served to set out the benefits of BOF membership to existing and potential members. It was agreed that this should be located.

ACTION 13: Chairman/Richard Fish

Action 5: BOF Marketing

Not discussed in detail although Richard Fish noted that Helena Russell, the previous editor of Bridge Design and Engineering magazine was now free-lance and might be in a position to offer some *pro bono* advice. He agreed to make contact.

ACTION 14: Richard Fish

5. Grand Challenges – Update

Keith Harwood presented, and the meeting accepted, the completed pro-formas for the five Grand Challenges, populated with as much information that was available. More facts were needed but it was intended that they should be as final as possible before being presented to UKBB on 23rd May. Once agreed there, it was anticipated that UKBB Chair, Liz Kirkham, would present them at UKRLG. It was agreed that additional facts should be sent to Keith by 20th May so that updated documents could be considered by UKBB.

ACTION 15: All/Keith Harwood

The Chairman emphasised the importance of this work, hoping that it would enable bridge related research to become better focused. Richard Fish recalled the original intent which was either to inform those looking to undertake research or to test the relevance of any proposal coming from a research body.

Trish Johnson suggested that it was difficult to keep on top of all ongoing research topics, noting that often neighbouring universities were not aware of each other's programmes. The Chairman noted that research updates from BOF members was a standing agenda item but also reported that he now sat on the Transport Research Innovation Board which reviewed all current research topics. Neil Loudon suggested that an overview was needed in order to avoid gaps as well as overlaps and also remarked that promulgation and implementation strategies were just as important as the project itself.

It was also agreed that Richard Fish should summarise ongoing research as had been reported at recent meetings for discussion at BOF 62.

ACTION 16: Richard Fish

6. Feedback from Annual Bridges Conference – 14th March

The Chairman suggested, and the meeting agreed, that the conference had been a great success and the BOF influence was stronger than ever. Both the Technical Secretary's presentation and the Pecha Kucha led by Keith Harwood were considered to have been very well received.

Richard Fish reported that he had asked for audience feedback on presentations from the conference organisers but this had not been forthcoming. He agreed to ask again.

ACTION 17: Richard Fish

The Chairman proposed that topics for next year's conference should be considered and either forwarded to Richard Fish or brought to BOF 62.

ACTION 18: All

It was also agreed that José Sánchez, the new editor of Bridge Design and Engineering, should be approached to see if an article on Grand Challenges might feature in the magazine.

ACTION 19: Richard Fish

Other future conferences that might be of interest were noted:

- Institute of Asset Management, June, Liverpool.
- Cambridge Centre for Smart Infrastructure, July, Cambridge
- New York City Bridge Conference, August, New York.

7. Bridge Research Update

The Chairman invited BOF members to give an update on any projects on which they were currently involved.

a. **Transport Scotland:**

- Scour:** Brett Archibald reported on a trial of scour detection equipment, in partnership with Strathclyde University, at Nith Bridge in Ayrshire.
- Wind:** Jason Cheetham reported on work in conjunction with the SSRB on the Queensferry Crossing aimed at raising the wind speed thresholds above which traffic has to be restricted. It would also be a good test for the effectiveness of the wind shielding. Measurements were to be recorded using LIDAR and also possibly by a pressure pad fitted to the side of a bus.

b. **Highways England:**

Neil Loudon reported only on the DMRB rewrite and the replacement for SMIS being developed by Bentley Systems. He also referred to the State of Bridge Infrastructure report which was soon to be presented to Highways England's

senior managers and the ORR. He agreed to present the outcomes to a future BOF in due course.

ACTION 20: Neil Loudon

Noting the ORR had a role with many BOF members, the Chairman suggested that an ORR representative should be invited to a future meeting. The suggested contact was Luisa Freitas.

ACTION 21: Richard Fish

c. **Railway Paths:**

Paul Thomas reported that the Railway Paths project on linseed oil treatment of wrought iron had been shortlisted for a BCIA award.

d. **Network Rail**

- i. **Huddersfield University:** Colin Hall gave an update on this project aimed at defect identification and BIM modelling through high resolution imaging.
- ii. **Granby Terrace:** Colin reported that prestressed beams had been removed from this bridge before being subject to NDT and intrusive investigation.

e. **TfL**

- i. **Masonry Arch Assessment Guidance:** Philip Gray reported on the latest meeting of the CIRIA Steering Group and that the next draft report was due to be published by the end of the year.
- ii. **Risk Based GI Guidance:** Philip also reported on this LoBEG draft guidance which was viewed to be complementary to the Code of Practice. Neil Loudon noted that the DMRB rewrite of BD63 would retain the two-year GI frequency.

g. **London Underground**

- i. **Standards:** Nick Burgess reported that this review was ongoing
- ii. **Reorganisation:** The merger with TfL had identified different approaches to governance within respective organisations and this was now being addressed.
- iii. **Cast Iron:** LUL/TfL were adopting a risk based approach to cast iron structural elements, particularly in the context of bridge strikes.

h. **HS2**

Tomas Garcia reported on HS2 work to refine bridge support offsets in the context of derailments. Rather than adopt the standard of a minimum of 4.5m, HS2 were developing a risk approach which had not been tried in other countries.

i. ADEPT

Keith Harwood noted that ADEPT were leading on the review of the Structures Toolkit and Bridge Performance Indicator Guide with no DfT funding.

j. Cambridge University

The Chairman updated his earlier reports on satellite monitoring to identify potential scour problems and the Construction Innovation Hub that were funding a number of packages, including the use of UAVs.

8. BOF Finances

The Chairman reported that BOF was currently running at a loss and with a deficit both of which had to be addressed. He tabled proposed subscriptions which were generally accepted by the meeting with the continuing principle that larger organisations should pay a higher rate. He confirmed that invoices for 2019/20 would shortly be issued. Neil Loudon suggested that it would be helpful if the previously discussed “Benefits of BOF” document could be issued at the same time.

ACTION 24: Chairman

9. Items for BOF 62 and 63

Previous discussions were confirmed regarding “junior” staff attending BOF meetings with senior colleagues and the Chairman suggested that this should begin from BOF 62. Paul Thomas requested that Railway Paths should be first as he presently had an intern working with him.

ACTION 25: ALL/Paul Thomas

After discussion, it was agreed that Richard Fish should review minutes of recent meetings and formulate agendas for the next two meetings, including the possibility that BOF 63 could be a themed meeting.

ACTION 26: Richard Fish

10. Any Other Business

a) **Lift Bridge Hanger Failure:** Andy Featherby reported this failure and agreed to provide a more detailed report at the next meeting.

ACTION 27: Andy Featherby

b) **Bridge Strike Prevention Group:** Paul Thomas had attended a recent meeting of the BSPG and the Chairman had noted that ADEPT had not attended recently. Keith Harwood agreed to confirm who should be attending.

ACTION 28: Keith Harwood

- c) **Nicola Head:** Philip Gray gave an update on Nicola's recovery which seemed to be progressing well. She would soon begin a phased return to work and might even be attending BOF 62. The meeting asked Philip to pass on the best regards from BOF.
- d) **SHM Research:** The Chairman noted that a CUED PhD student was researching value of SHM and wished to interview bridge clients. It was agreed that BOF members could be contacted.

ACTION 29: Chairman/All

11. Next Meetings

The Chairman noted that the dates of BOF 62 and BOF 63 had been agreed as 5th November 2109 and 28th January 2020 respectively, both at Kings College, Cambridge.

ACTION 30: ALL

12. Close

The Chairman again thanked Hazel McDonald and Richard Fish for making the arrangements for BOF 62 and closed the meeting.

Richard Fish,
BOF Technical Secretary,
15th June 2019