

BRIDGE OWNERS FORUM

MINUTES OF MEETING BOF 53: TUESDAY 18 JULY 2017 AT THE BEVES ROOM, KING'S COLLEGE, CAMBRIDGE

PRESENT

Graham Cole	ADEPT	
Rob Dean	Network Rail (Acting Chairman)	
Liam Duffy	Transport Infrastructure Ireland	
Richard Fish	Technical Secretary	
Keith Harwood	ADEPT	
Nicola Head	Transport for London	
Jason Hibbert	Welsh Government	
Neil Loudon	Highways England	
John McRobert	Transport Northern Ireland	
Paul Thomas	Railway Paths Ltd.	
Paul Fidler	CUED	
Campbell Middleton	Chairman & Cambridge University Engineering Department (CUED)	Additional Item only
Mark Bew	Digital Built Britain	Additional Item only

1. Introductions and Apologies

As acting Chairman, Rob Dean welcomed everyone to BOF 53, explaining that BOF Chairman, Cam Middleton, was only recently back at work on a part time basis and not yet ready to resume full BOF duties. Richard Fish announced that Cam would be attending the meeting as part of an additional item when Dr Mark Bew of Digital Built Britain would give a short presentation on BIM. *NB This item is recorded as 13a in these minutes but took place just before lunch.*

The relatively low attendance was noted and attributed to the later than normal scheduling of the meeting clashing with summer holidays, as well as other commitments. Apologies had been received from the following:

Nick Burgess	London Underground
Henry Dempsey	SCOTS
Andy Featherby	Canal and River Trust
Tomas Garcia	HS2
Wayne Hindshaw	Transport Scotland
David List	Large Span Bridge Group
Jacqueline Mynot	CSS Wales
Stephen Pottle	WSP

Richard Fish reported that Jacqueline Mynott was about to leave Caerphilly Borough and joining Rhondda Cynon Taff Borough Council. She was as yet unclear as to whether she could continue to represent CSS Wales on BOF.

2. i) BOF 52 Minutes: Accuracy

The minutes were accepted as an accurate record and can be uploaded to the BOF website.

ACTION 1: Paul Fidler

2. ii) BOF 52 Minutes: Matters Arising

Action 1 (& 7): Liaison with Hemming Group

Richard Fish reported that he had had occasional contact with Adrian Tatum but agreed to keep in touch.

ACTION 2: Richard Fish

Neil Loudon expressed the view that any magazine article on BOF's work, in particular Grand Challenges, should be on the condition that we could exercise some editorial control.

Action 4: Grand Challenges

All diagrams etc. have yet to be uploaded to the BOF website.

ACTION 3: Paul Fidler

Action 6: BOF Profile

Agreed that the BOF use of social or professional media needed careful consideration. Richard Fish felt that the preferable option was a BOF Twitter account but would discuss with the Chairman.

ACTION 4: Richard Fish

Action 8: Grand Challenges Budget

Although Stephen Pottle had suggested crowd-funding as a possible contribution to a Grand Challenges budget, it was agreed that we should wait until it was clear

how Grand Challenges was likely to develop before fixing a budget and seeking possible funding sources.

Keith Harwood suggested and others agreed that relying on individual BOF members or their organisations to do GC work in their spare time was not sufficient. Neil Loudon noted that we should not rely on DfT funding routes for any research projects flowing from the GC initiative but suggested that all options should be kept open. Possible engagement with CIRIA was also discussed; Neil Loudon noted that they had the contacts and the networks and their input into the Safety Critical Fixings project had worked well and had certainly facilitated promotion and publicity.

Recognising that one of the key areas in delivering the three “what” Grand Challenges was scour, Graham Cole suggested that this would be a good subject to start with and recalled that a scour specific BOF meeting had previously been proposed. Discussion reflected the earlier conversation on CIRIA and also extended to ongoing research at Exeter University (where Network Rail, RSSB, ADEPT and BOF sit on the steering group) as well as Network Rail’s experience with Lamington Viaduct. Liam Duffy felt that scour monitoring needed to be addressed and Rob Dean explained that this was a big issue for Network Rail, post Lamington.

Although a number of invited speakers were proposed at the meeting, it was agreed that any suggestions should be emailed to Richard Fish by 31st July. He would then draft an agenda for half of the October BOF 54 meeting and share with the Chairman.

ACTION 5: All/Richard Fish

(Post meeting note: the 31st July deadline above can be extended to 25th August)

In Passing, John McRobert expressed some concerns with BD 97 and agreed to put these in writing to Neil Loudon.

ACTION 6: John McRobert

3. to 5: Grand Challenges

Rob Dean summarised the present position in that the 12 themes had been established but that BOF needed to progress to the next step which was prioritisation. He reported on Stephen Pottle’s suggestion of a “Dragons Den” idea in which theme leads should pitch their ideas for projects to support their theme. Neil Loudon described the proposal: which was to limit each “pitch” to three or four minutes, followed by two minutes discussion and then a vote. He supported this with a short presentation which outlined a possible format which each pitch should follow. John McRobert pointed out a possible flaw in that a good pitch for a poor subject might outweigh the reverse.

After further discussion, Rob Dean suggested that the relatively poor attendance at BOF 53, as well as the time pressures mentioned earlier in the meeting, meant that this approach was unrealistic.

In view of the need to progress the initiative it was agreed to consider an off-line approach. Richard Fish reminded that meeting of the agreed three “whats” and the three “hows” headline Grand Challenges that had already been agreed:

What:

- Preventing structural failures
- Extending the life of existing structures
- Building bridges that will perform better

How:

- Embracing innovation and embedding technology
- Securing a competent, diverse workforce
- Sharing knowledge and best practice

It was agreed that these should not be unpicked but should be the basis against which any proposals should be measured. Neil Loudon also pointed out that there was an urgency to have reached some prioritised projects as and when DfT issued their call for items for research from UKRLG.

Among a number of options discussed, Jason Hibbert referred to a simple prioritisation process that had successfully been employed on the A55 tunnel works and could easily be adapted to Grand Challenges. It was agreed that Jason should provide this for consideration by Rob Dean and Richard Fish and, if deemed appropriate, issued to BOF members for completion in advance of BOF 54.

ACTION 7: Jason Hibbert/Rob Dean/Richard Fish

(Post meeting note: the agreed GC project proforma was issued on 27th July with a return date of 25th August 2017)

Future input into Grand Challenges by Stephen Pottle and WSP was discussed and Rob Dean agreed to speak to Stephen about this.

ACTION 8: Rob Dean

6. Key Issues identified from Previous BOF meetings

a) Highways England Review of Bridge Inspections

Neil Loudon gave a presentation that had been prepared for Highways England senior managers. Neil agreed to release a “sanitised” version of the presentation and the Executive Summary of the report in due course.

ACTION 9: Neil Loudon

Of HE's 20,350 bridges this audit covered 700 bridge inspections from around the country. This was part of the HE's national Structures Inspection Improvement Programme. It was anticipated that the audit would be repeated on a three-yearly cycle.

The audit itself consists of 80 questions, with a five-point grading, but examined only inspection reports and not the quality of the inspections themselves. There had been noticeable improvements since reports had first been reviewed in 2015 which Neil attributed to the fact the profile of bridge inspections is becoming higher and that service providers knew that they were likely to be audited.

The following points were among the headlines from the audit:

- Inspection dates: ie was the inspection carried out earlier or later than the due date? Here, there was some improvement.
- Time taken to upload the report: again, some improvement.
- Was the right inspection undertaken? ie General or Principal. There were instances where this error had occurred.
- Had the element inventory been reviewed? Again, not always.
- Had headroom been measured as required at Principal Inspections by BD63? Often neglected. (Neil also reported that bridge headroom issues were under discussion within HE, not least following the M20 footbridge collapse last year as a result of a high load collision.)
- Had all significant defects been photographed? There was no improvement here and even, on occasions, the use of old photographs from a previous inspection

Neil also noted that HE was now moving to build up in-house inspection teams as and when new Area contracts were awarded. His Structures Delivery Teams were also tasked with internally auditing one inspection per Area per month.

Neil also advised that the State of Bridge Infrastructure work, being undertaken by WSP, was soon to report: the initial indicators showed a mix of some improvements and some deterioration in the measured metrics.

During discussion, John McRobert felt that such audits often depended on the type of question asked and how it was presented. Rob Dean noted Network Rail's approach in which one area would audit another. Neil explained that this had been considered by HE but discounted due to the various types of contracts in place across the country.

b) CIRIA Research Programme

Richard Fish explained that he had included this item on the agenda following discussions at UKBB on what was perceived to be CIRIA's opportunism in identifying research initiatives. Rob Dean recalled that their work on deterioration modelling was one such area but suggested that this had been identified by CIRIA

partly through the wide network of contacts and their own horizon scanning under the general heading of Resilience.

Neil Loudon reported that the CIRIA Hidden Details report had now been published and also that HE was considering how the findings should be implemented. He also reported that the Safety Critical Fixings work would also be published by CIRIA.

On the subject of deterioration modelling research, Rob Dean reported that he chaired the CIRIA steering group and had shared an outline of BOF's work to date. He saw the CIRIA project as being broader but shallower than the one BOF had promoted and would only give an overview of the current status with no significant recommendations. Among the membership of the steering group were other asset owners, clients with only a few or even no bridges. Rob extended an invitation to BOF members to join the group and Keith Harwood expressed an interest. Liam Duffy noted that TII had a representative on a CIRIA group looking at geotechnical assets.

It was agreed that CIRIA should be invited to attend a future BOF meeting and Rob Dean agreed to send Richard Fish contact details for Kieran Tully.

ACTION 10: Rob Dean, Richard Fish

c) Network Rail Retaining Wall Failure

Rob Dean reported on a number of recent Network Rail incidents:

i) Barrow Upon Soar

Rob gave a short presentation on the collapse of a road over rail bridge wingwall at Barrow upon Soar which had been the subject of a RAIB investigation and report. Historic inspections of the bridge had noted a depression in a footway and a bulging of the masonry parapet. Investigation works were underway, by means of vertical coring from the footway, when the wall collapsed. Fortunately, the coring rig operatives had been able to jump clear, and no-one was hurt, but it was clear that a water pipe had been in the footway and had not been located prior to drilling. What was not clear was whether the water main was a cause or effect; ie had it been leaking and causing the footway to subside as material was washed out or had it been hit by the drill? Rob explained that RAIB had taken the view that it was the latter.

Rob pointed out that this incident raised several issues from the awareness of underground services to the pressures on reviewing engineers who were time limited in terms of the number of reports they were supposed to consider per day. Rob recommended that the RAIB report, available on line, should be read in full.

During discussion, the level of responsibility of inspectors/examiners was raised; for example, should they only report symptoms or should they also make a diagnosis? What was the role of monitoring and how should trigger points be

identified? And how should trends be recorded and noted? Rob reported that Network Rail were developing guidance on examinations and monitoring practice and agreed to issue these when available.

ACTION 11: Rob Dean

Paul Thomas noted that RAIB advice was always aimed at the asset owners but the attention of utility companies should also have been drawn to some of the conclusions, especially in incidents such as this. It was agreed, however, that liaison with now private sector statutory undertakers was not easy.

ii) Lime Street Cutting

Rob also reported on an incident in February this year, mentioned at BOF 52, at the Lime Street Cutting in Liverpool. This was a 2m high wall built on top of a 10m deep cutting. Recent Visual Examinations had not been able to access the rear of the structure but, when the wall collapsed and 200 tonnes of debris fell onto the track, it was found that additional fill and portable storage had been added to surcharge the wall. It was revealed that the land behind the wall had been sold in 2004 although a 3m wide strip had theoretically been retained. Whilst it was probable that other issues such as high rainfall and illegally discharged waste water had contributed to the collapse, the question remained of how Network Rail can pick up activities in adjoining land that could put the railway at risk.

iii) Burnaby Road, Portsmouth

Rob reported on a badly deteriorated cross girder on this railway bridge which had been identified during a recent examination. He noted that the Wessex area (which includes Portsmouth) had a programme of renewals which was generally three times as large as others.

iv) Claverham Overbridge Strike

This was a masonry parapet collapse following a road traffic collision, similar to that at Froxfield which had been reported at earlier BOF meetings. Rob noted that identification markers, introduced following a recommendation from RAIB, had enabled an emergency call to be made which prevented a more serious incident. He pointed out that the requirement for markers applied to all bridges over the railway regardless of ownership.

v) Brickwork Repairs

Rob showed a photograph of what appeared to be repairs to an arch intrados using engineering bricks carried out by a Network Rail contractor. Another photograph, however, showed that the “repair” was actually a render on which bricks (with coursing and bonding) had been painted. Unsurprisingly, an investigation was underway!

d) Masonry Arch Assessment Guidance Steering Group

Graham Cole reminded the meeting of Matthew Gilbert's presentation at BOF 51 on his proposed arch bridge assessment guidance. A draft was expected in the autumn but a steering group was needed. Although Graham had some names, he would welcome others.

ACTION 12: All

Graham also suggested that Matthew should be invited back to a future BOF meeting to present on the finished guidance. He also questioned the best way of publishing the output; as discussed earlier in the meeting, the option of using CIRIA was mooted. After discussion, it was agreed that a future BOF (55 or 56) should have an arch bridge theme which might also include an invitation to Bill Harvey.

ACTION 13: Chairman/Richard Fish

Neil Loudon noted that the revised guidance had implications for the proposed DMRB re-write that was soon to begin, using consultants. He pointed out that it was likely that new numbering would be introduced but that the present BD 21 and BA 16 were likely to be among the first to be reviewed. Liam Duffy reported that TII had been using the DMRB but had updated various documents for their use.

e) Temporary Bridges – Procurement and Technical Approval

Neil Loudon reported on discussions at UKBB following his suggestion that DfT had not been helpful in developing documentation for the use of temporary bridges. Since then Neil had attended a number of meetings and progress was being made. It is proposed to have a contract with all five UK suppliers and a secure website with all technical information available and a selection facility. The matter was now with the DfT procurement team and HE are providing ongoing technical support.

f) SCOSS and BOF Connections

Richard Fish recalled that SCOSS had been a regular invitee to present at BOF either with John Carpenter or Alastair Soane and suggested that Alastair should be invited to a future meeting. This was agreed.

ACTION 14: Richard Fish

Neil Loudon noted that he was temporarily the HE representative on SCOSS and reported briefly on the last meeting which had largely been devoted to the Grenfell Tower fire. Graham Cole recommended reading the latest NCE editorial which had commented on some major concerns on the UK construction industry which was seen as being driven by procurement and not technical issues. All agreed that wider lessons from Grenfell had to be learned.

7. BICS Update

Graham Cole reported on BICS Committee meetings in February and May but also noted that LANTRA had cancelled an Assessors day which would have been the opportunity for e-portfolio reviewers to share their experiences. A webinar had been proposed but this was not thought to offer the same benefit and this, too, had been cancelled. He was hopeful that another day could be fixed for the autumn. On a positive note, Graham reported that over 400 inspectors had signed up and that five had been certified to date.

Neil Loudon expressed concern that HE inspectors would not be certified by November as he originally had hoped although he still required them to at least have registered on the scheme, especially as a completed e-portfolio was not a requirement for registration.

Neil also reported that the BICS scheme had been shortlisted for an IAM award.

In discussion, concerns were aired on the need for inspectors to have experience on all bridge types and materials. Neil Loudon noted that Transport Scotland had overcome this issue by inspectors sharing different bridges in different areas. John McRobert said that this point was exacerbated in Northern Ireland where budgets were being cut to the extent that it was almost impossible to fund BD 63 inspections. Graham Cole confirmed that this had also been raised by the TNI representative on the ADEPT Bridge Committee.

8. Feedback from UKBB – 15th June 2017

Richard Fish reported that this had been the last meeting chaired by Dana Skelley before her move to Skanska; nominations for a new Chair had been sought and an appointment would be made by UKRLG. (*Post meeting note: Liz Kirkham has been confirmed as the new chair of UKBB*).

Many of the other UKBB agenda items (BOF Grand Challenges, DMRB re-write, temporary bridges, RAIB reports etc.) had been the subject of discussions which are recorded elsewhere in these minutes.

UKBB had also heard from Kieren Dodds of West Sussex CC on their experience on the use of drones for bridge inspections and challenges around the collection and storage of large quantities of data.

9. Additional Feedback from ADEPT Bridges Committee

Graham Cole provided the following highlights from the last ADEPT meeting:

- Concerns over the demise of BS 6779: Part 4 on masonry parapets;
- A debate on the DMRB re-write;
- A report on the revision to the structures toolkit and the review of benchmarking rates being piloted in Manchester;

- Highways England’s review of how BCI scores and performance indicators should be reported. Keith Harwood noted that he was doubly involved, not only with ADEPT but also with Arup;
- Feedback from the recent court judgement in Scotland in the case of a known failed BACO parapet and a subsequent fatal road accident. The outcome was as yet unknown but it clearly raised issues of parapet inspection and resulting action that should be taken.

10. Research Updates

Rob Dean noted that some issues had been aired earlier in the meeting but, following his Network Rail update, asked the meeting for others:

a) Network Rail

Rob reported that NR were investigating risk based frequencies for Detailed Examinations of between 1 and 18 years, defined by engineering judgement and risk management. Although the Regulator had questioned how decisions on intervals could be evidenced and these were again under review, NR had moved to 18 year frequencies on some masonry arches. Rob agreed to issue a report on the subject.

ACTION 15: Rob Dean

Rob also reported that Network Rail were reviewing Visual Examinations in total and questioning what value they added in terms of compliance and confidence in the state of the bridge stock.

Lastly, Rob reported on a CSIC/Network Rail initiative which was looking at how drones could be used to capture a 3-D model which could then be “walked through” with a virtual reality headset. He was seeking funding for this but welcomed support and interest from others.

b) TII

Liam Duffy reported that TII were looking into the problem of settlement behind integral bridges which appeared to be inconsistent between bridges of a similar age. John McRobert noted that he had also investigated this problem, including some older bridges which would today be described as integral and showed no signs of settlement. He suggested that earlier bridges might have had a higher clay content in the backfill which might lead to the material behaving elastically.

c) Highways England

Firstly, Neil Loudon issued some IABSE flyers and recommended that BOF members should consider joining.

Neil also mentioned the previously discussed CIRIA report on Safety Critical Fixings and pointed out that there would be an opportunity for comment on the draft.

ACTION 16: All

Neil went on to present on three Italian bridge collapses which had occurred over a space of a few months: the first was an abnormal load crossing a bridge with a failing half joint which triggered catastrophic failure. The second was in Ancona when a deck was being jacked up (over live traffic) to improve headroom clearance. Part of the jacking system failed, again resulting in collapse. The last case study was a post tensioned segmental bridge which, although built in 1993, was only opened to traffic in about 2000. This collapse was attributed to a failure in the post-tensioning. Neil concluded by reporting that Italy has *no* bridge assessment standards.

Graham Cole noted that the last collapse would not have been prevented irrespective of bridge inspection frequencies. Neil also referred to the now published Hidden Defects report and questioned how it should be embedded in the management of the bridge stock.

12. BOF Subscriptions

Richard Fish reported that he had been advised that all subscription payments were up to date, with one exception - LoBEG. It was noted that Paul Monaghan had not attended a BOF meeting for some time but it was confirmed that he was still the LoBEG Chair. Richard Fish agreed to discuss with the BOF Chairman.

ACTION 17: Richard Fish/Chairman

13. Any Other Business

a) BOF Minutes

Paul Fidler asked if minutes from BOFs 51 and 52 could be uploaded to the BOF website; this was agreed.

ACTION 18: Paul Fidler

b) Peace Bridge

John McRobert reported on resonance vibrations on the Peace footbridge at Derry-Londonderry which was being investigated by Full Scale Dynamics Ltd. who had recommended the installation of tuned mass dampers.

c) Mersey Gateway

Paul Thomas noted that the Mersey Gateway bridge was almost complete and recalled that a presentation at a BOF meeting had previously been suggested. It was

agreed that this was now unlikely to happen in view of the current BOF workload and programme.

13a. Mark Bew Presentation

The meeting welcomed BOF Chairman, Cam Middleton, who attended for this item. Cam in turn introduced his guest for the day, Dr Mark Bew, Chair of Digital Built Britain (DBB).

Mark gave a presentation explaining the need to embrace BIM and digital technology in order to improve the efficiency of the construction industry and to boost the UK economy. He began by giving some statistics: construction around the world was a \$1.6trillion business and in the UK, this was £900bn; UK construction productivity had only increased by 1-2% since World War II; 70 reports on the industry had been written since 1934 and all said there was a problem.

Other highlights of Mark's presentation included the following:

- The importance of benchmarking
- The need to address procurement
- The value of DFMA (Design for Manufacture and Assembly) and other off-site manufacturing
- The importance of an intelligent client (making good, timely, high quality decisions)
- The development of BIM since the introduction of CAD in the 1980s with the Government's Level 2 target being met in 2016
- The push-pull concept: the supply chain pushes and the client pulls
- The link to the Smart Cities initiative
- BIM Level 2 benefits across the public sector has been judged to have saved some 12 to 20% of construction turnover over the last five years

Mark explained the BIM strategy as balancing whole life costing construction costs with social performance: a 1% saving in the latter was enough to cover the total cost of design and construction. He also quoted some statistics on the effect of low construction productivity on the national economy:

- Capex of £89bn, Opex of £122bn and Service Provision of £597bn amounted to 43% of the UK national GDP
- Traffic congestion cost the economy £13.1bn in 2013
- Train delays in Scotland cost the economy £85bn in 2015/16

Mark also announced a new initiative when, on 1st August, DBB was to work with Cambridge University to address some of the following:

- Data sharing
- New commercial frameworks

- A cooperative cultural environment
- Growth (depending on Brexit impacts)
- Security (a CPNI (Centre for the Protection of National Infrastructure) requirement)
- Monitoring structures from satellites

A discussion followed with Rob Dean noting that satellite monitoring might have helped to avoid the problem described earlier at the Lime Street Cutting. Paul Thomas expressed concerns about potential software failure or hacking and also the risk of a low take-up. Mark agreed that there was a need to demonstrate the value of data and also pointed out that the economic growth model was clear: GDP only grows with new infrastructure provision. Neil Loudon considered that more was needed than just data and the sheer volume needed to be properly managed. Mark reported that there was research into new mathematical techniques for digital management and analysis in which UKCRIC were also engaged.

In conclusion, Rob Dean emphasised the value of managing *existing* infrastructure as well as building new, a point which Mark acknowledged.

Rob thanked Mark for his presentation and his response to the discussion. Cam Middleton asked Mark if his slides could be uploaded to the BOF website: this was agreed.

ACTION 19: Paul Fidler

14. Next meeting: BOF 54; 31st October 2017; Cambridge

Richard Fish confirmed the date for BOF 54 and asked Paul Fidler to check room availability for prospective dates for BOF 55 in January and BOF 56 in May 2018.

ACTION 20: Paul Fidler

15. Close

Rob Dean thanked everyone for attending and closed the meeting.

Richard Fish,
BOF Technical Secretary,
4th August 2017