

BRIDGE OWNERS FORUM

MINUTES OF MEETING BOF 58: TUESDAY 6 NOVEMBER 2018 AT THE BEVES ROOM, KING'S COLLEGE, CAMBRIDGE

PRESENT:

Graham Cole	ADEPT
Rob Dean	Network Rail
Henry Dempsey	SCOTS
Liam Duffy	Transport Infrastructure Ireland
Richard Fish	Technical Secretary
Philip Gray	TfL
Jim Hall	CSS Wales
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
Elfyn Williams	Welsh Government
Paul Fidler	CUED

1. Welcome, Introduction and Apologies

The Chairman welcomed everyone to the meeting, especially those attending for the first time: Trish Johnson, Bridgemaster at Clifton Bridge and Philip Gray, Transport for London. Philip was standing in for Nicola Head during her illness; the Chairman asked Philip to pass on best wishes from the meeting to Nicola, wishing her a full and speedy recovery.

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

Nick Burgess	LUL
Andy Featherby	C&RT
Daniel Healy	Department of Infrastructure – Roads and Rivers (NI)
Jason Hibbert	Welsh Government (Elfyn Williams substituting)

Keeping with the tradition of new members of BOF introducing themselves and to air their immediate interests and concerns, the Chairman invited Philip and Trish to do so.

Philip outlined his career to date, starting with his first degree from Trinity College, Dublin in 2000 and followed by a Masters in 2006 also from Trinity. After working for consultants in Ireland, he moved to the UK also working for consultants, before joining TfL in 2014. He is now a Team Leader in the Surface Structures division which also covers marine structures such as piers on the Thames. He is also the TfL representative on the ADEPT Bridges Group and a member of the steering groups on the projects for Safety Critical Fixings and Arch Bridge Assessment Standards. His principle concerns were concrete deterioration and the lack of funding and professional capacity for bridge maintenance.

Trish explained that the Big Bridge Group had yet to decide on their BOF representative but this would be made clear after their next meeting. She was a graduate of the University of Salford and spent her sandwich year with Flint and Neil on the Severn Bridge strengthening. Trish also worked for Parkman and other consultants mostly on concrete bridge assessments as well as taking a Masters degree in engineering management. She worked on the M4i Rethinking Construction initiative before joining Mouchel running firstly the Bristol, then the Trowbridge offices. Her next move was as SW ICE Regional Director before going back to the Severn River Crossings as Head of Engineering and Maintenance. She found the Clifton Bridge opportunity too hard to resist, joining in 2016. Here, her concerns were budgetary by virtue of the fact that Clifton relied totally on toll revenue and also suicide prevention with some 150 incidents a year. From the maintenance perspective, her next challenge was to paint the suspension chains in the next two or three years with the associated problems of access and environmental considerations.

The Chairman asked whether there were any concerns regarding fatigue in the suspension system. Trish explained that some work was being undertaken by Bristol University through UKCRIC but she was mostly concerned with the movement (or lack of it) at the saddles.

The Chairman noted that several of the newer BOF members had not been given passwords to access the members only area of the BOF website. Paul Fidler will issue these.

ACTION 1: Paul Fidler

2. BOF 57 Minutes

a) Accuracy

Despite some confusion over which draft of the minutes had been issued it was agreed that the v2 version was a true record of the meeting and could be uploaded to the BOF website.

ACTION 2: Paul Fidler

b) Matters Arising

Action 1: Presentations from BOF 57: Arch Bridges

Those of Graham Cole, Bill Harvey and Matt Gilbert had been uploaded to the BOF website but those of Matt DeJong and Adrienn Tomor were still awaited.

Actions 2 & 3: Devolved Government input into DMRB rewrite.

Neil Loudon confirmed that this was in hand. Progress on the DMRB would be covered later in the meeting.

Action 6: BOF LinkedIn Page

Not yet established. Richard Fish noted a solid growth in Twitter followers to @BridgesForum

Action 7: GDPR and the Uploading of BOF Member Photographs

Permission forms will be issued.

ACTION 3: Paul Fidler

Action 8: BOF Website

It had previously been agreed that the BOF website was looking tired and dated. Options for resourcing an upgrade would be discussed.

ACTION 4: Chairman/Paul Fidler/Richard Fish

Discussion extended into the need to be able to have access to pre-digital, historic reports from the likes of TRL, including their masonry arch tests from the 1980s. The Chairman also recalled the work that Professor Les Clark had produced in 1995 on concrete bridges, as well as other academic papers, which he believed were not available on-line. Rob Dean noted that the sharing of some data was restricted for security reasons, especially BIM models, and a team was being developed in Network Rail dealing with security issues. Paul Fidler reported that he had attended a recent Centre for Digital Built Britain workshop on digital security and agreed to try to share any slides from presentations from the CPNI speaker (“Paul”). The Chairman questioned whether “Paul” could be invited to a future BOF meeting.

ACTION 5: Chairman

Action 10: Future Manufacturing Research Hub

The Chairman gave a summary of the current position and background into Sector funding allocations for research and the various funding streams:

- Construction Sector: £173m government grant plus matched funding.
- £37m was allocated to the Advanced Building Centre (ABC) focussing on zero carbon housing, with specific catapult projects for off site manufacturing, digital and whole life performance.
- £72m was believed to be allocated to the Transforming Construction Alliance of the Manufacturing Technology Centre (MTC) in Coventry, Cambridge University's Centre for Digital Built Britain (CDBB) and the BRE.
- Other calls were expected from EPSRC promoting research networks.
- The UK Collaboration for Research in Infrastructure and Cities (UKCRIC) was also covering various research initiatives through a number of partnered universities, including Cambridge via CSIC, mainly regarding sensor technology.

The Chairman concluded this overview with his personal opinion that there was a need to link these various funding silos in order to improve the overall value.

Action 11: QUB Project

To be taken at BOF 59.

ACTION 6: Daniel Healy

Action 12: Chloride Study

To be taken at BOF 59.

ACTION 7: Liam Duffy

Action 13: BICS

Neil Loudon reported on discussions that had taken place at UKBB on 18th October. A LANTRA BICS Assessor standardisation day was planned for 7th November followed by a number of regional workshops for potential candidates. Hazel McDonald reported that there had also been a recent workshop arranged by SCOTS.

Henry Dempsey reflected the SCOTS overall view that BICS was too expensive and that Chartered Engineers should be deemed to be sufficiently competent with further certification.

Rob Dean expressed some concerns regarding the LANTRA business model but Neil confirmed that some simplification of the process should help to accelerate the 750 or so registered with the Scheme. He was not aware of any concerns from LANTRA who were pleased with the efforts of the Steering Group members in promoting BICS.

Discussions then extended into the level of risk that bridge owners were taking by not using certified inspectors, particularly in the context of the Polcevera collapse in Genoa and the issues of proving professional competence that were emerging from the Grenfell Tower inquiry. Hazel McDonald reported on a recent survey that suggested that the majority of local authority owners assess competence solely based on CVs but reaffirmed Transport Scotland's commitment to the BICS scheme in the next round of maintenance agency contracts. Elfyn Williams noted that the Welsh Government will insist on having BICS qualified inspectors on their national Motorway and Trunk Road network.

On the subject of risk, Rob Dean warned that there was a tendency to normalise inspections where defects were taken for granted and progressive deterioration was missed. He also recorded Network Rail's long-term commitment to BICS but suggested that it should be modularised to suit particular structural forms and materials. In the next Control Period, Network Rail were proposing to introduce a civil engineering academy to facilitate all types of training. Neil Loudon noted that this approach was to be adopted by Highways England and would introduce a career path for bridge inspectors.

Neil also reported on the recurring issue of poor quality and timeliness of inspection reports which Highways England had uncovered as part of their audit of reports – some 700 per year. Henry Dempsey agreed: Principal Inspections undertaken by consultants were often of variable quality and inconsistent in their findings.

Graham Cole summarised the position with local authorities, pointing out that ADEPT could only advise and not direct. There is not a high level of BICS take-up, mainly due to the huge difficulties in sustaining maintenance budgets. The corollary of this was that most UK bridge failures are in local authority ownership. Graham also noted that the Code of Practice recommended that a *quality assured* certification scheme should be used to prove competence and that only LANTRA's BICS was able to offer that. Keith Harwood reported that Hertfordshire was adopting a policy of "wait and see" and suggested that this was the position of most ADEPT members.

Paul Thomas took the view that the scale of the stock should be an issue; Railway Paths have about 1300 bridges, all of which are inspected by in-house inspectors in whom Paul has no doubts of their competence. He also noted that he had been using a Greek secondee in his team who had advised that Greece do not inspect their bridges.

Jim Hall reported that CSS Wales had been working with SCOTS regarding the workshops but, as ever, lack of funding was a major concern and it was unlikely that the BICS fees for inspectors would be covered by their employers.

Liam Duffy noted that TII's initial support for BICS had not been endorsed by other client bodies. Although BICS had not been ruled out, the preference seemed to be to rely on training courses.

Philip Gray reported that BICS will be a requirement of all agency contracts with TfL by 2020.

The Chairman concluded this item by emphasising the importance of inspections and again warning of the need to be able to demonstrate competency.

Action 15: Feedback from Annual Bridge Conference

Richard Fish confirmed that he had checked with the organisers who had decided not to seek feedback on presentations at last year's conference.

Keith Harwood noted that he had only received positive feedback on the PechaKucha presentations and had been asked to repeat it at next year's event.

Action 19: Research Development Process

The original DfT/BOF MOU had not been located.

Action 21: Increased Frequency between Inspections

Philip Gray reported that LoBEG were investigating this option. Rob Dean advised that Jacobs had completed some work for Network Rail which concluded that the six year period between Detailed Examinations (DE – the equivalent of a Principal Inspection) could safely be increased. The ORRR, however, had not accepted this change and DEs are to remain at six-yearly intervals.

Neil Loudon reported that, in the aftermath of Genoa, HE had been asked to compare their inspection guidance with Italy's and it had been found that their procedures were fairly lax and minimal. Neil also noted that Atkins had produced a Scoping Study for inspections and agreed that it could be uploaded to the BOF website.

ACTION 8: Neil Loudon/Paul Fidler

Action 22: Environmental Pollution

Linked to the Galvanic Association Millennium Map, this paper indicated areas of the country which were subject to high levels of industrial pollution, or salt laden air some distance inland from coastal regions. Rob recommended that this should be taken into account in specifying protective systems and agreed to issue the document.

ACTION 9: Rob Dean

Action 23: Inspection Reliability

Papers to be issued.

ACTION 10: Rob Dean

Action 24: DfT UAV Trial

Although this had yet to be reported, Rob Dean questioned what problem was being attempted to be fixed by UAV inspections; was it purely visual inspections or was the intention to target areas on which to focus tactile inspections? He suggested that, if UAV inspections were to be commissioned, a very detailed specification was needed to cover all kit and post-processing of data. Trish Johnson expressed concern over the storage and recovery of the vast amount of data collected especially with regard to future-proofing. Rob noted the huge increase in data since Network Rail had been using LIDAR.

Elfyn Williams reported that the Welsh Government had trialled UAV inspections but the results had been disappointing with evidence of deteriorating defects missed which, in one case, had later been the subject of localised failure.

Neil Loudon agreed to contact DfT regarding the outcome of the trial.

ACTION 11: Neil Loudon

Post meeting note: DfT reported that the trial did not in fact take place as there had been concerns expressed by ministers over issues of public privacy.

Action 25: BOF Invoices

The Chairman noted that there had been some issues regarding payment of invoices but these had now been resolved.

3. Topics for Future Bridge Related Research and Prioritisation

Richard Fish reported that during discussion of the current UKRLG research programme at last month’s UKBB meeting, Gary Kemp of DfT had indicated that further research funding was likely to be made available for 2019/20. Richard had offered the services of BOF to consider suitable research projects for submission to UKBB and UKRLG in due course.

The Chairman welcomed this news and asked for suggestions.

Keith Harwood noted he had already advised UKBB Chair, Liz Kirkham, that guidance on performance scoring would be needed as an extension to the Deterioration Modelling project and would incorporate the current Highways England work in this area.

Neil Loudon proposed that further work was needed to develop guidance on the use of the recent CIRIA reports on Hidden Defects and Safety Critical Fixings. There was also a need to develop guidance on fatigue prone structures which had been included in the former. Hazel McDonald noted that this would also suit the CIRIA work on NDT and Structural Health Monitoring. The meeting agreed that the CIRIA reports tended to follow a “state of the nation” approach setting out the “what?” questions rather than the “how?”. Rod Dean agreed with the need to

develop “how” policies, especially with regard to hidden defects where intrusive investigations could cause more damage to a structure than had it been left alone. A model of a CIRIA report supported by more specific advice in “daughter” documents was generally accepted by the meeting.

Neil Loudon suggested that more work could be undertaken on identification and quantifying bridge types and “families” of bridges both for prioritisation and for standardising maintenance interventions. This could entail pilots for specific structure type assessments which in turn would identify potential high risk areas. Elfyn Williams reported that the Welsh Government had completed a similar exercise with bridges with concrete hinges.

Trish Johnson proposed that research was best targeted at the known unknowns, giving as an example the work that had been carried out to assess and analyse the natural rock outcrops below the Clifton Bridge.

Neil Loudon reprised a point that he had made at UKBB regarding the need for a seamless, “cradle to grave” approach to bridge management. This was particularly the case for post-tensioned bridges where ongoing risk analyses should be undertaken at each Principal Inspection in accordance with BD54. As an aside, Neil noted that the RAC had listed some 400 post-tensioned bridges that had never been subjected to a PTSI. He also noted the recent closure of the Churchill Way bridge in Liverpool which he understood had been as a result of previously undiscovered corrosion of prestressing strand.

Trish Johnson asked if research into methods of suicide prevention would be beneficial perhaps leading to a best practice guidance document. Neil Loudon reflected on the number of cases in which a coroner had recommended increasing bridge parapet heights at an inquest into a suicide. Henry Dempsey reported that some work in Glasgow on copycat suicides had concluded that parapet height was the mainstay of suicide prevention. Rob Dean reported that Network Rail had completed a study three or four years ago which was now incorporated in internal NR guidance and based on holistic risk management. Rob also noted that HS2 were proposing 2.8m high parapets on their road over rail bridges but this was as much about preventing objects being thrown onto the tracks below.

Bringing the discussion to a close, the Chairman suggested that this item should be revisited at BOF 59 in January which would still allow feedback to be brought to the next UKBB meeting in February 2019.

ACTION 12: All/Richard Fish

4. BOF Grand Challenges – Update

Keith Harwood outlined the latest position with Grand Challenges: five of the six sheets had been completed in draft form albeit to various levels of completeness. The Chairman apologised that he had been unable to complete his task in time for

this meeting, mainly due to recent overseas engagements. Keith emphasised the point that, at this stage, it was important to simply raise the issues and not to provide solutions. Elfyn Williams stated that Jason Hibbert had had some queries on the draft format and Keith agreed to review these along with the other submissions to date and bring them to BOF 59. He also noted that the Grand Challenges should be informing the research topics as discussed under agenda item 3.

ACTION 13: Chairman/Keith Harwood

5. Feedback from UIC Workshop on Masonry Arch Bridges and Progress Report on CIRIA Arch Bridge Guidance

Graham Cole gave a presentation on the recent UIC arch bridge workshop held in Bristol. His presentation will be uploaded to the BOF website.

ACTION 14: Graham Cole/Paul Fidler

He also reported on progress on the proposed arch bridge assessment guidance which was being developed by Matthew Gilbert including the concept of Permissible Limit State (PLS) assessments. CIRIA had been appointed (by DfT as accountable body) and a Steering Group, including BOF representation, had been established. Although the primary objective was to produce an update to C656, there remained some pressure to influence the DMRB re-write of BD21 and BA16, particularly with regard to the continued use of MEXE. Neil Loudon reported that MEXE will only feature in an appendix in the replacement standard but Graham Cole noted that the new guidance could be used, albeit as a Departure from Standard. Neil Loudon also noted that the DMRB review would also consider a revision to BD101 and hence a revised standard for when assessments are required.

6. Technical Approval of Temporary Bridges

Neil Loudon gave a brief overview of the background behind this issue which had been aired at a number of BOF meetings in the last few years. The proposal was to establish a website with information from all temporary bridge suppliers which would be accessible for any organisation in need of one. Although there had been some procurement issues within DfT and Highways England, both parties were very supportive of the concept which would enhance the UK's resilience capability. The website will be hosted by CIHT and will offer procurement as well as technical advice. DfT will effectively contract with all five suppliers who will populate the website with their own technical data.

The Chairman welcomed this initiative and asked Neil to give a full presentation to a future meeting once the website was in place.

ACTION 15: Neil Loudon

7. Alternative Corrosion Protection for Wrought Iron Bridges

Paul Thomas spoke to a paper that had been issued with the agenda. The author was David Gent of Atkins who had undertaken a feasibility study with Railway Paths as part of his specialisation in wrought iron for his PhD. Paul noted that the maintenance issues of wrought iron structures were often overlooked; traditional grit blasting preparation before painting could cause more damage and even weaken the material.

Trials of linseed oil protection had been carried out in which panels were coated and monitored. The treatment appears to repel water but also tends to soften existing coatings which could be either a positive benefit or a potential weakness. Another advantage for railway Paths was that linseed oil could easily be applied by their large force of volunteers. Paul was hoping to use it on Bennerley Viaduct in the east midlands, a Grade II* listed structure and it was unlikely that Historic England would approve grit blasting. He also noted that the use of linseed oil would not be subject to severe environmental standards although Environment Agency permitting would still be required.

8. Bridge Research Update

a. Highways England

Neil Loudon advised that HE had access to an Innovation Fund which could be used for trials on the network. It was hoped that these might include work on hidden defects, SHMS and the use of technology in inspections which might be in the form of a smart phone App which could interface with HE's asset management system.

As an aside, the Chairman extended this point by suggesting that there could be benefits from joining up on research with all larger bridge owners. It was also noted that asset management databases, which included bridges and other structures, were often driven by respective organisation's IT department's capacity and capability. Keith Harwood also noted that long lead-in times often meant that systems were out of date by the time they were finally introduced.

Discussion was further extended to the control of Abnormal Loads. Neil Loudon reminded the meeting of the ESDAL2 presentation he had given at a recent BOF. A more worrying issue is the number of overloaded vehicles on the roads without any notification. Hazel McDonald reported that the Forth Road Bridge full dynamic weigh-in-motion (WiM) and ANPR systems produced some interesting data. Hazel noted there were seven of these in use in Scotland. Neil Loudon agreed to advise on the number of similar systems on the English motorway and trunk road network and what happens to the data.

ACTION 16: Neil Loudon

Post meeting note: Neil has reported that there no current WiM sites managed by Highways England although one was being planned. There were, however, ten managed by the DVSA. He was not able to divulge details of locations nor the data analysis.

Referring back to Item 3, Trish Johnson suggested that investigation of the overloaded vehicle issue could be worth pursuing as a research project. Rob Dean agreed that collecting data on loading would be worthwhile.

Rob also suggested that the existing AIL liaison group would be best placed to reflect on this issue. The Chairman thought that this subject should be covered at BOF 59 and the Chair of the AIL liaison group invited to attend.

ACTION 17: Rob Dean/Richard Fish

Neil Loudon also expressed concern over the current DfT proposal to investigate the platooning of freight vehicles.

b. Network Rail

Rob Dean reported on the following:

i. RSSB

Although RSSB had led on recent collaborative research programmes, this was now being switched to Network Rail in the next Control Period, amounting to £3.1m over the next five years. There will be four themes:

- Loading compatibility with the European loading model.
- Exploring fatigue in metallic bridges, aimed specifically at estimating remaining life in older bridges. Rob also commented on a failure in Portsmouth earlier this year and agreed to supply details for circulation.

ACTION 18: Rob Dean/Richard Fish

- Panoptic bridge management, loosely based on a 1950s USA project to design a gaol such that as many cells as possible could be monitored by the fewest number of warders.
- Real time SHM.

ii. Engineering Competencies

A project on future competencies to better serve the modern world. Mott MacDonald has this commission and Rob agreed to share the findings in due course.

ACTION 19: Rob Dean

iii. Google Hackathon

Machine learning for identifying masonry problems in buildings based on photographic recognition of defects.

iv. BIM Models from LIDAR

Work at Huddersfield University.

v. Scour

Network Rail are in discussions with a company called Upshot which had surveyed the wreck of the Costa Concordia cruise liner using sonar techniques.

vi. Spheron VR

A Scottish company, L & M Survey Services had demonstrated a survey technique using Ultra HDR on 360° cameras which had even worked inside a tunnel. A presentation could be considered at a future BOF meeting.

ACTION 20: Rob Dean/Richard Fish

c. ADEPT

Keith Harwood reported that the UKRLG project to update the Structures Toolkit had recently commenced. Graham Cole added that the project looking at parapets on local roads had been delayed, pending the DMRB rewrite.

d. Welsh Government

Elfyn Williams mentioned the recent call for support to the BGS work on fluvial scour as requested by Jason Hibbert. Richard Fish confirmed that this had been issued to BOF members.

e. Clifton Bridge

Trish Johnson described a proposal to install hydraulic dampers on the Clifton suspension bridge. This was a COWI submission and had been submitted to the Trustees for approval.

f. Transport Scotland

Hazel McDonald reported that she was working with Strathclyde University on a scour detection project which applied Bayesian network theory. Sensors had been installed on the A76 River Nith Bridge in October.

The Chairman suggested that a future BOF could have a session dedicated to presentations on the outcomes of some of the research projects highlighted at today's meeting.

ACTION 21: Chairman/Richard Fish

g. CUED

The Chairman outline some current CUED research:

i. Scour

The Bradford bridge trial was underway. Gaist had surveyed the river bed and accelerometers had been attached to the bridge piers.

ii. **Satellite Monitoring**

The National Physical Laboratory were measuring the accuracy of movements that could be detected by satellites. The Chairman noted that had Tadcaster bridge been monitored by satellite, prior to its collapse, identified movements could have given sufficient warning of failure. Rob Dean expressed an interest in offering Blackfriars bridge as another trial site.

iii. **Offsite manufacturing**

CIRIA were working on a review of current best practice.

9. Bridge Collapses

Richard Fish presented a table of the eight significant collapses that had occurred since the last meeting, including Genoa.

He also reported on last week's Scottish Bridge Conference in Edinburgh when he had been asked to present on bridge failures. This had been well received with some press coverage in the Scotsman. He was also scheduled to speak on the same subject at the national Bridges Conference in March 2019.

One of the issues he had aired had been the point made at recent BOF meetings on the need to share knowledge of collapses. Richard pointed out that no information, nor lessons learned, had come to light from the collapse of Eastham bridge in Worcestershire in May 2016. Jim Hall reported that even a neighbouring council with a similar bridge had not been able to glean any feedback. A Freedom of Information request was suggested but it was agreed that this might be best done in consultation with SCOSS. Richard agreed to speak to Alastair Soane.

ACTION 22: Richard Fish

10. Feedback from UKBB

Neil Loudon referred to the DMRB re-write which had been discussed at last month's UKBB: there were 100 new standards which had to be drafted by September 2019 for Highways England internal review and 48 had been completed to date. They will replace about 300 current documents and the new versions will also be shared with Transport Scotland, Welsh Government and Northern Ireland. Three consultants are working for HE on this task.

Discussion extended into the continued use of Eurocodes post Brexit. Neil confirmed that HE had no plans to replace the current standards already in use. The future role of UK representation on CEN committees would be decided in due course depending on the final Brexit terms and conditions. There were also decisions to be taken on product standards and markings.

Graham Cole asked about the proposed changes to BD21 loadings. Neil opted to answer this off-line after consulting with colleagues.

11. Future BOF Meetings

There was a discussion on options for future themed meetings, including Inspections, Monitoring and Data.

There was also a view that a BOF meeting combined with a site visit was probably long overdue with a favoured option being a possible visit to the Queensferry Crossing and Forth bridges in May which was well received.

ACTION 23: Chairman/Richard Fish

As for a possible additional BOF meeting on the day before next year's Annual Bridge Conference, there was general support. Rob Dean suggested that it might be combined with a visit to the MTC in Coventry on the same day. Richard Fish agreed to discuss arrangements for a meeting with the Conference organiser.

ACTION 24: Richard Fish

12. Any Other Business

a. Bridge Bash Monitor

Paul Thomas noted a recent article on this topic in the NCE. The chairman confirmed that this had been an initiative from a CUED student who now worked for Arup. The Chairman agreed to pass on contact details.

ACTION 25: Chairman

Neil Loudon mentioned a Highways England campaign regarding plant being carried on low loaders entitled "Don't Knock It!" which would be promoted at construction plant fairs. Rob Dean also referred to the Network Rail presentation he had given at the last UKBB. It was agreed that Network Rail's Mark Wheel should be invited to a future meeting.

ACTION 26: Richard Fish

b. Masonry Sealants

Liam Duffy asked if others had had experience of a product called Protectit for use on masonry arches with the intention of preventing dirt build-up. Whilst there was no specific experience, concern was expressed that such systems could lock in moisture and restrict the masonry breathability. Neil Loudon noted that Highways England currently had a moratorium on sealants. Rob Dean suggested that the supplier should be asked to provide examples of where the product had been used.

c. Lime

Jim Hall reported on the use of hot lime in lieu of hydraulic lime for masonry repairs following encouragement from CADW (the Welsh equivalent of Historic England). Trials had been very successful with much more consistent results than with hydraulic lime.

d. SCOSS

Bearing in mind the various outcomes from the Grenfell Tower tragedy, Richard Fish suggested, and it was agreed, that Alastair Soane should be invited to a meeting in the near future.

ACTION 27: Chairman/Richard Fish

e. News from the Antipodes

The Chairman gave a brief resumé of his recent tour of Australia and New Zealand, including the extensive use of Ultra High Performance Concrete (UHPC) and redrafting of codes and standards. He reminded the meeting of the need to maintain awareness of developments on the international stage.

13. Next Meetings

The Chairman confirmed the following dates with venues to be confirmed:

- BOF 59 29th January 2019 Cambridge
- BOF 60 13th March 2019 Coventry - TBC
- BOF 61 14th May 2019 Scotland (If agreed this would probably be a two day meeting – 14th and 15th May)

All to note.

ACTION 28: All

14. Close

Before closing the meeting, the Chairman reprised a tribute he had given during lunch to mark the last BOF meeting for Graham Cole as an ADEPT representative. Graham acknowledged that he had attended probably more meetings than anyone else and had thoroughly enjoyed his time as a Boffer, recognising the value of BOF with the opportunities for healthy, robust debate on key topics. The Chairman thanked Graham for his many contributions over the years.

He then thanked everyone for attending and closed the meeting.

Richard Fish,
BOF Technical Secretary,
Drafted 6th December 2018
Revised 5th February 2019