

BRIDGE OWNERS FORUM

MINUTES OF BOF 69: TUESDAY 1 FEBRUARY 2022 THE BEVES ROOM, KINGS COLLEGE, CAMBRIDGE AND VIA ZOOM

PRESENT:

In Person:

Bill Bryce	SSE
Malcolm Cattermole	Forestry England
Graham Cole	Heritage Railways Infrastructure Group
Paul Fidler	CUED
Richard Fish	Technical Secretary
Tomas Garcia	HS2
Jim Hall	CSS Wales
Keith Harwood	ADEPT
Nicola Head	TfL
Trish Johnson	Big Bridge Group
Neil Loudon	National Highways
Hazel McDonald	Transport Scotland
Campbell Middleton	CUED (Chairman)
Paul Thomas	Railway Paths Ltd.
Nick Trump	Welsh Government

Guests:

Mark Cox	DfT
Brian Duguid	NZBG (Part)
Michael Fels	VicTrack/Eloque (Part)
Cam Rose	VicTrack/Eloque (Part)

Via Zoom:

Jim Booth	RBT (Part)
Nick Burgess	TfL/LUL
Henry Dempsey	SCOTS
Liam Duffy	TII
Andy Featherby	C&RT
Colin Hall	Network Rail
Jason Hibbert	Welsh Government
Daniel Healy	Infrastructure Northern Ireland
Osian Richards	CSS Wales

Guests:

Cameron Archer-Jones	NZBG (Part)
Tercia Jansen van Vuuren	CUED (Part)

1. Welcome

The Chairman welcomed everyone to BOF 69 which was our first truly hybrid meeting with members attending both in person in Cambridge and others joining virtually. He praised the efforts of Paul Fidler and his PA, Vanessa Dolphin, for setting up the room and the technology for the meeting to work in this way. He also suggested that for those attending in person that the usual Covid precautions should be observed as far as possible throughout the meeting.

Turning to the agenda, the Chairman noted the two substantive items - Net Zero/Carbon and the VicTrack SHM - which had meant that some other planned items had been rolled forward to future meetings.

2. Introductions and Apologies

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

Tomas Garcia	HS2
Sue Threader	Rochester Bridge Trust (Jim Booth substituting for the afternoon session)

Richard also noted that no word on attendance had been received since the initial meeting invitation from:

Jasdeep Bhachu	LoBEG
Gary Kemp	DfT
David McKeown	Environment Agency (new EA BOF representative)

The Chairman welcomed Mark Cox to the meeting, explaining the long-standing relationship with the DfT, going back to 2000 and the discussions he had had at that time which had led to the formation of BOF. He invited Mark to give a brief introduction:

Mark is a Chartered Civil Engineer with a bridges background and is the Department's Engineering Policy Manager, working in the infrastructure team and charged with promoting engineering and the concept of an intelligent client. He was also engaged in the net zero agenda, with an emphasis on whole life carbon. His previous relevant experience had been with consultants (Atkins – with their Hampshire CC framework contract – and Aecom). Although only temporarily in this role at DfT, Mark agreed to ensure that links with BOF were strengthened.

3. Matters Arising from BOF 68 Minutes

The Chairman noted that the accuracy of the BOF 68 minutes had been approved by email and that they were now on the BOF website.

He referred to the BOF 68 Action Update sheet that had been issued with the agenda:

Action 1: HRA Representation on BOF

Graham Cole reported that, although the Historic Railway Association had yet to commit to BOF membership, he had recently been appointed as an “advisor” and had been invited to speak at their conference in March. He also noted that his correct affiliation was now the Historic Railways Infrastructure Group. He agreed to give an update on developments at BOF 70.

ACTION 1: Graham Cole

Action 3: Ongoing Actions from Previous Meetings

Richard Fish apologised that this had not been completed but agreed to prepare something for BOF 70.

ACTION 2: Richard Fish

Action 4: IABSE Group looking at Bridge Collapses

Richard Fish had heard nothing more on this issue but he had spoken to Alastair Soane whom he had invited to attend BOF 71 to give an update on CROSS.

ACTION 3: Richard Fish

Action 5: Bridge Inspector Competency Schemes Comparison

Richard Fish also apologised for this action not having been completed but agreed to prepare something for a future meeting.

ACTION 4: Richard Fish

Graham Cole noted that he would be able to give a report on a meeting he had held with CSS Wales representatives on their scheme, under agenda item 6.

Actions 6: TII Sustainable Procurement Guidance

To be taken at a future meeting.

ACTION 5: Liam Duffy/Richard Fish

Action 7: A465 Mutual Investment Procurement Model

To be taken at a future meeting.

ACTION 6: Jason Hibbert/Richard Fish

Action 8: BridgeCat

Richard Fish gave an update on his efforts to find any further information on BridgeCat, but with no success. Keith Harwood agreed to investigate whether any links remained with Cumbria CC who had participated in the initial trials.

ACTION 7: Keith Harwood

Neil Loudon believed that a final report had been issued to DfT and Mark Cox offered to check this.

ACTION 8: Mark Cox/Richard Fish

Action 11: Historic Rail Estate and BOF

Neil Loudon explained National Highways’ position that only one representative should attend BOF (and similar meetings, such as UKBB). He suggested, however, that Fiona Smith could attend as a guest for specific items as she had done at BOF 68.

Action 15: Papers on Bridge Condition and Failures

Richard Fish noted that only Graham Cole had recommended relevant papers; these he had forwarded to BOF members in the email dated 21st December 2021.

Action 20: AustRoads Task Force – Bridge Technology Task Group

The Chairman noted that there were no volunteers to participate in our ongoing relationship with this group but he and Richard Fish agreed to continue to liaise. Richard Fish offered to check on dates of their upcoming meetings.

ACTION 9: Chairman/Richard Fish

Action 24: BCI Review

Nicola Head reported that this was underway within LoBEG and agreed to give an update at a future BOF meeting.

ACTION 10: Nicola Head/Richard Fish

Action 25: Performance of GRP Replacement of Timber Decks

Paul Thomas agreed to present on this at a future meeting.

ACTION 11: Paul Thomas/ Richard Fish

Action 26: Clifton Bridge Carbon Counting

Trish Johnson agreed to present on this at a future meeting.

ACTION 12: Trish Johnson/ Richard Fish

Action 27: Suicide Prevention

It was agreed that this was a significant issue and that a future agenda item should consider a review of current best practice from all BOF members, including the initiatives at Clifton Bridge which had been briefly aired at BOF 68.

ACTION 13: Trish Johnson/All/ Richard Fish

4. Implementation of CIRIA Guide C764 – Hidden Defects

Neil Loudon gave a presentation which he agreed could be uploaded to the BOF website.

ACTION 14: Paul Fidler

Neil gave the background to C764, published in 2017, which had originally been commissioned as a result of the Stewarton Bridge collapse in 2009.¹ Neil also gave examples of other bridge collapses, or near-misses, which had occurred in the interim:

¹ [Derailment of a freight train near Stewarton - GOV.UK \(www.gov.uk\)](http://www.gov.uk)

from high profile failures, such as Polcevera Viaduct in Genoa, through to some emergency interventions, such as the closure and retrofitting of additional post-tensioning to the A52 Clifton Bridge in Nottingham. He also noted the relevance of the Grenfell Tower fire, not least in terms of the need to better understand and evaluate risks in dealing with hidden components and the competence of those responsible for decisions throughout the design, construction and maintenance phases.

Neil explained that C764 covered both hidden *elements* and hidden *defects*. It sought to consolidate available knowledge and best practice, using risk mitigation throughout the full life of the asset. The risk-based approach followed a process of identification of either a hidden element or defect, ensuring that these were correctly recorded, and reviewing the risk. The process might require additional, targeted inspections and specific evaluations but would eventually lead to a prioritisation methodology for a bridge stock.

Neil posed the following specific questions with respect to the National Highways SRN but noted that they were equally applicable to the bridge stocks of all owners:

- How many hidden assets are on the network?
- What defects exist?
- Which ones are safety critical?

Hidden assets covered various materials: steel (e.g., inside boxes, fatigue prone details etc.), concrete (e.g., half-joints, hinges, post-tensioning etc.), masonry and timber, as well as more generic details such as bearings, expansion joints and fixings. Although Neil's presentation raised other questions, he advised that National Highways were intending to move from a reactive mode to being proactive as part of a broader asset management strategy which would have to include improvements in inspections with respect to trends in condition and deterioration. Safety critical structures might need an enhanced inspection regime. Alternative means of inspection might also be considered, such as using UAVs *inside* boxes: Neil reported that a trial had been undertaken (which actually identified previously unknown, free water inside the box). He agreed to issue the report when available and to present on this at a future meeting.

ACTION 15: Neil Loudon

Neil also noted that NH were going to developing a bespoke National Structures Programme (NSP) for hidden defects which would incorporate the implementation of C764 as well as utilising best practice and new innovative methods. NH were also committed to sharing their knowledge in this area with other owners. Specific advice would soon be issued on post-tensioned structures, scour, suspension and stay cables, half-joints, hinges, jack arches and fatigue prone structures. There was also the specific issue of safety critical fixings for which a new standard was being drafted and another NSP being considered.

The Chairman thanked Neil for his presentation and invited questions and comments. Paul Thomas directed a question to Colin Hall, asking what the Network Rail position

was on removing ballast in order to inspect steelwork below or jack arches. Colin expanded on NR's work post-Stewarton, which had focused on the identification of water traps in deck details under ballast. They had also investigated metallic elements embedded in masonry (including jack arches) and concrete and concluded that the most severe corrosion was to be found at the interface. This had led to a decision that breakouts were not only unnecessary but also that reinstatements could actually be more of a maintenance liability than the hidden defect.

On the subject of the use of UAVs, Nick Trump reported that Mott MacDonald had trialled their use with thermal imaging cameras to detect areas of potential drumminess or delamination. Although there had been no formal report, he offered to share images at a future BOF meeting.

ACTION 16: Jason Hibbert/Nick Trump

Neil Loudon reported that NH had also undertaken similar trials as part of a Principal Inspection. Nick Burgess noted that he, too, had used thermal imaging to identify areas of dampness in tunnels. Graham Cole reported that the technique had been used by Bath University on dry stone walls supporting the Ffestiniog railway in order to detect stones acting as headers. He agreed to try to locate a paper on the subject.

ACTION 17: Graham Cole

The Chairman noted the present disconnect between bridge owners and the research community and bemoaned the demise of the TRL which had previously provided a strong link. He asked Neil Loudon for an update on NH's "moon-shot" research project. Neil replied that this was mainly focussing on methods of detecting corrosion in prestressing tendons.

Liam Duffy returned to the topic of scour, suggesting that more modern bridges, with piled foundations, presented a reduced scour risk as opposed to older masonry arches with generally unknown foundations. Liam also asked for any recommendations for companies who had undertaken Post-Tensioned Special Inspections (PTSI's). Neil Loudon said that this was an area in which experienced specialists should be used and agree to provide a list.

ACTION 18: Neil Loudon

Nicola Head asked if all the various strands of Neil's presentation would be incorporated into a new DMRB standard. Neil replied that there would probably be a series of standards, addressing various categories of risk, such as post-tensioning, fatigue etc. Keith Harwood suggested that a process was needed for prioritising each of the risks against each other. Neil took the view that each owner should address the specific risks facing their particular bridge stock and it was generally accepted that this was a case when engineering judgement should prevail.

Hazel McDonald asked when work was going to start on a standard for Safety Critical Fixings. Neil replied that this should be in the next month or so with a Technical Project Board established. He agreed to elaborate on the programme for publication of the standard at BOF 70.

ACTION 19: Neil Loudon

The Chairman reflected on the importance of this issue, thanked Neil for his presentation and welcomed the ongoing discussions.

5. DMRB and MCHW Update

Neil Loudon presented these updates and agreed that his presentation could be uploaded to the BOF website.

ACTION 20: Paul Fidler

Neil began by summarising the DMRB review which had seen about 100 structures standards reduced to about 60. There were still two to be completed - on scour and the reporting on structural safety.

Structures standards form the majority of those in the DMRB and the MCHW and the intention was to learn from the DMRB experience when reviewing the MCHW, including the use of webinars² to help explain the changes.

The MCHW review was to be completed in the RIS2 period (April 2020 to March 2025), but the programme required drafting to be completed by December 2023 and published, this time as a single entity, no later than March 2025. Technical Standards Committees (TSC) had been established and liaison would take place with devolved administrations. Other considerations would include Brexit (whereby the old CE mark was changing to UKCA), the need to incorporate low carbon materials, and to prepare for the next generation of Eurocodes, expected between September 2027 and March 2028.

Neil acknowledged the amount of detail in his presentation, but he suggested that it reflected the volume of work in the MCHW review. The Chairman thanked Neil for the update and invited questions.

Hazel McDonald asked for regular updates at BOF meetings and this was agreed.

ACTION 21: Neil Loudon

Mark Cox queried the present situation with low carbon concrete which he understood could not be used because it was not permitted in the MCHW. Neil replied that this was not the case but the requirement for research into low carbon materials needed to be embraced and embedded into new standards. In the meantime, National Highways would be receptive to Departures from Standard.

² See links in Neil's presentation slides.

6. BICS Update

On behalf of others on the BICS Steering Committee (Hazel McDonald and Graham Cole), Neil Loudon gave a short presentation which he agreed could be uploaded to the BOF website.

ACTION 22: Paul Fidler

Neil summarised the background to BICS which he now referred to as a Community of Practice.³ Neil reprised the issues arising from the Grenfell Tower fire, now enshrined in the Building Safety Bill, and the importance of being able to demonstrate relevant competence. He saw BICS as being ahead of the field in terms of competency frameworks and predicted that others would have to follow the BICS model. The key was the importance of *independent* assessment of competence.

Neil acknowledged that LANTRA's performance had slipped, not least due to Covid and the fact that staff had been furloughed. National Highways, however, had recently appointed WSP to support LANTRA with the scheme. There had previously been changes, such as modularisation, redrafted manuals, improvements to the website and now remote assessment interviews which had improved efficiency.

He noted that national client bodies were supportive of BICS and added that it was now implicit in CS 450.

Hazel McDonald reported that there was no update on numbers from LANTRA but agreed to forward these when available.

ACTION 23: Hazel McDonald/Richard Fish

Graham Cole reported on a meeting that he had had with Osian Richards and Jim Hall on the CSS Wales scheme, the notes from which he had shared with LANTRA as well as Neil and Hazel. He told the meeting that the CSS Wales scheme uses the same competency requirements (from CS 450) as BICS, but one of the big differences is *how* the inspector is assessed. CSS Wales requires interviews and practical test inspections. The other fundamental difference is that there is no charge for the assessment process. Graham concluded that, whilst there must be costs, these appear to be "lost" in terms of accounting. He also questioned whether there was truly an independent assessment; BICS accreditation is by a team of recognised assessors, all of which have been rigorously tested themselves to establish their own competence. All these points will be discussed at the next BICS steering group meeting. Osian Richards agreed with Graham's summary of the meeting and accepted that, whilst a single UK scheme would be the best solution, cost and individual inspectors' time taken to prepare e-portfolios were significant issues for smaller authorities.

³ A community of practice is a group of people who "share a concern or a passion for something they do and learn how to do it better as they interact regularly"

The Chairman directed a question to Mark Cox, asking for a directive from DfT that there should be a fundamental mandatory requirement to require Local Authorities to adopt BICS. Mark agreed to pass on this request when back in London and to assist in the coordination between BICS and ADEPT schemes.

ACTION 24: Mark Cox

Keith Harwood noted that, whilst several ADEPT members had developed their own schemes, other wider asset management processes were being developed under the auspices of the UKRLG Asset Management Board. This was likely to be the way forward adopted by his own authority, Hertfordshire.

Hazel McDonald repeated Neil's earlier point about compliance with the requirements of the Building Safety Bill. She considered that BICS had to be the scheme that clients should insist on for external providers. Henry Dempsey suggested that as yet there was no critical mass of qualified inspectors and therefore consultants did not have the numbers of accredited inspectors even if asked to provide them as part of a contract.

Before concluding this discussion, the Chairman suggested that Henry's point was a classic Catch 22 situation. He then suggested that the above issues should be set out in a paper with a view to use it as the focus for a meeting to be arranged with DfT.

ACTION 25: Chairman/Hazel McDonald/Mark Cox/Richard Fish

7. UKBB Report

Hazel McDonald noted that there had not been a meeting of the UKBB since BOF 68 but the next one was to be held via Teams on 17 February 2022. She asked for any agenda items to be emailed.

ACTION 26: All/Hazel McDonald

8. VicTrack SHM

The Chairman introduced Cam Rose and Michael Fels of VicTrack/Eloque from the State of Victoria in Australia and noted that the fortuitous timing of their short stay in the UK, en route back to Australia from the USA, had enabled this agenda item. He recalled that he had mentioned the VicTrack SHM work at BOF 68 which in turn had followed earlier discussions he had had on the subject with Cam Rose.

He invited Cam Rose to give a presentation which was agreed could be uploaded to the BOF website.

ACTION 27: Paul Fidler

Cam began by setting the context of an aging infrastructure and pointed out the similarities between the Australian position and that in the UK, including the need to keep politicians engaged in bridge maintenance issues, rather than just building new.

He also gave some statistics on the Victoria bridge stock and the current capital investment programme.

He then explained how the Eloque company had been established, following his own research into international providers of SHM – which he found generally over promised and under delivered, as well as creating vast amounts of data which was never easy to translate into useful information. His objective of finding a technology which could detect changes in harmonic performance had led him to PARC, a US company and a subsidiary of Xerox. This in turn had led to the FiBridge optic fibre system which utilised Bragg's Law technology and produced real-time information with embedded fibre optic sensors. Following trials on four bridges, the system was approved by the State government and the Eloque company had been formed. FiBridge had been installed on a variety of assets across Victoria in 2021 and was also about to be trialed in the USA. In Victoria, the government now required all new bridges to have the system installed from day one.

Cam emphasised the level of sensitivity of the system and the wide range of applications, including seismic effects which had been of great interest to CalTrans in California. He suggested that it might be used to make bridge management more efficient by providing evidence of any deterioration trends without the need for hands-on inspections. He also pointed out the carbon benefits as one of the outcomes should be an extended asset life.

The Chairman thanked Cam for his presentation and invited questions.

Neil Loudon asked about the system's limitations. Cam replied that, as it is now, FiBridge does not work on older masonry, nor timber bridges. Also, at present the system has not been used on spans greater than 60 metres. He suggested, however, that all of these areas would be improved upon in the next few years.

Noting that one of the claims was for FiBridge to be able to assess a bridge's live load capacity, Paul Thomas asked about the confidence levels around determining that figure. Cam replied that a full calibration of each element would be needed, possibly using vehicles/axles of known weight, but this should be achievable to an acceptable accuracy.

Hazel McDonald noted from Cam's presentation that Victoria had some 12,500 bridges and asked how many had had FiBridge fitted. Cam replied that this would be about 100 by the end of 2022 and the target was for 2,000 over the following five years. He pointed out, however, that it would not be necessary to fit it to all bridges as there would be some which might be covered by the limitations noted above and others which would not be economically viable. Cam also noted that another factor was the problem of providing a typical cost per retrofit as there were too many variables such as access and system connectivity.

The Chairman thanked Cam for his presentation and suggested that discussions should continue over lunch. Cam asked if he might be given email contact details for BOF members; this was accepted by the meeting and would be actioned.

ACTION 28: Richard Fish

Net Zero Carbon Updates

9.1 Overview

The Chairman welcomed Brian Duguid and Cameron Archer-Jones (both of the Consultants' Net Zero Bridges Group (NZBG)) who attended for this series of items, as did Tercia Jansen Van Vuuren. He then reprised discussions at recent BOF meetings, including the mapping which Tercia had undertaken and presented to BOF 68, and the decision that BOF should work closely with the NZBG, rather than attempt to work in parallel. As well as meetings with the NZBG, Tercia was also helping to coordinate the many carbon initiatives presently being undertaken at Cambridge.

The Chairman suggested that the urgent next steps should be to move towards a consensus on how carbon should be measured and for procurement issues to be addressed. Regarding the former, Neil Loudon suggested that definitions were needed to decide whether the off-site carbon generation and in manufacturing processes should be included. He also noted that, not least from National Highways' perspective, carbon counting had to incorporate all assets. The Chairman agreed that consistency of approach was essential and Tercia noted that there was much work being undertaken on this issue.

9.2 Net Zero Bridges Group

The Chairman then invited Brian Duguid, Chair of the NZBG, to give a presentation on the Group and their work programme. Brian agreed that the presentation could be uploaded to the BOF website.

ACTION 29: Paul Fidler

Brian explained how the NZBG had begun in an attempt to bring together various net zero strands which in turn were a response to the climate emergency. The Group currently had 15 companies – both engineering and architectural consultants – all of which had committed to the “declare” initiatives. As well as coming together to share ideas, different firms were leading on their own topics. For example, Arup were working on timber bridges, Atkins on FRP, Arcadis on carbon benchmarking and Mott MacDonald on a net zero bridges toolkit. Brian explained that the Group were keen to promote their work and were taking every opportunity to do so by speaking at events (such as here at BOF 69 and also the Bridges 2022 Conference) as well as keeping up to date with the multitude of initiatives and developments. The NZBG had also established a number of task groups to focus on specific issues and were keen to be seen as part of the thought leadership in net zero carbon by actively responding to consultations etc. Brian welcomed the links with BOF, especially the assistance that Tercia had given, recognising the importance of client buy-in to all things carbon. He

noted, however, that there was a wide spectrum of commitment from clients with good and poor examples of practice.

Brian then spoke to the NZBG mind map (slide 18 of his presentation) before summarising the following areas in which BOF might support NZBG and vice versa:

1. Carbon Literacy at all levels
2. Clear timelines for changes in procurement, standards etc.
3. A commitment to PAS 2080
4. A common approach to carbon data
5. A recognition that investing in net zero will require time which should be incentivised
6. Being comfortable with the uncomfortable
7. A commitment to pilots, both in terms of projects and structures
8. A focus on R&D to deliver carbon savings
9. A focus on managing existing assets, albeit with enhanced resilience

The Chairman thanked Brian and again reinforced the support from BOF for the work of the NZBG. He invited questions and comments.

Hazel McDonald began by raising the question of procurement: how could carbon fit into the now well-established quality and price tendering? Brian agreed that more was needed over and above simply asking for carbon management plans as part of a quality submission and noted that at least one private sector client had tendered on a quality, carbon and price basis. Tercia Jansen Van Vuuren suggested that clients should start with a relatively simple approach and later refine it, rather than wait for the perfect system. Cameron Archer-Jones cited his experience with a Scottish local authority tender for a design and build project which had followed that approach. Brian added his view that collaboration and partnering was needed at the conceptual design stage when a real difference could be made.

Jim Booth reprised the RBT approach on their recent refurbishment project which had been just as Tercia had described. He also emphasised the need for consistency in client carbon management and data collection. Tercia also recommended the use of the Built Environment Carbon Database⁴ which was launched in November 2021 and supported by Professional Engineering Institutions. It could be used by anyone engaged in carbon reduction.

Brian acknowledged that there was a problem in taking a long-term approach to carbon in bridge maintenance, especially when the assets were approaching the end of their design life. He also flagged the added complication of having to factor in user carbon when there was a move to decarbonising travel. Paul Thomas saw another obstacle in the political arena where there was still a preference for new build at the expense of maintenance. Clients and owners had to find a way of making maintenance sexy! Cam Rose took up this point, agreeing that the focus should be managing existing

⁴ [Built Environment Carbon Database \(becd.co.uk\)](https://www.becd.co.uk)

infrastructure but based on a sound understanding of its remaining longevity. He also cited the example of Victoria’s Big Build project⁵ to replace level crossings with bridges; there was a view that there was a tendency to over-design with additional costs (both financial and carbon) estimated to be more than 60%. Brian Duguid said that he was aware of similar examples of over-engineered designs, especially in buildings.

Osian Richards noted that procurement issues had been discussed in a recent CSS Wales meeting where smaller authorities were perceived to be at a disadvantage. He agreed, however, that the emphasis needed to be on maintenance and politicians had to be made aware that cutting back in this area increased the risk of a bridge collapse.

Liam Duffy added the practical issue of how to account for carbon when clients such as TII had significant maintenance programmes well underway. As an aside, he described work at the Universities of Cork and Munster which was looking at how to re-purpose the large number of soon to be surplus glass fibre wind turbine blades at the end of their 20-year design life and one such use was to use them as main members in a footbridge. He suggested that this “Blade Bridge” might be presented to a future BOF meeting.

ACTION 30: Liam Duffy/Richard Fish

Finally, with regard to maintenance, Brian Duguid stressed the need for calculating the most effective interventions and urged client bodies to enhance their understanding of carbon issues. He repeated that PAS 2080 (due to be out for consultation in May 2022, prior to updating) should be the document of choice for all parties.

The Chairman thanked Brian and Cameron for presenting the work of the NZBG and wished them well in their endeavours. He reinforced BOF’s commitment to help wherever possible.

9.3 HVM⁶ Catapult

Neil Loudon described this initiative which was also badged as the Bridge of the Future.⁷ Although it was at a very early stage, the project was looking for parties to work with, especially infrastructure clients. The advantage would be that the project could be shaped by those early collaborations. The Chairman noted that HMVC attended TRIB and suggested that they might be asked to present to a future BOF meeting.

ACTION 31: Chairman/Richard Fish

⁵ [Victoria’s Big Build](#)

⁶ High Value Manufacturing www.hvm.catapult.org.uk

⁷ [Bridge of the Future](#)

9.4 COP 26 Outcomes

Neil Loudon gave a presentation on COP 26 outcomes, but specifically covering environmental factors for structures, climate change and Net Zero Carbon. Neil agreed that this could be uploaded to the BOF website.

ACTION 32: Paul Fidler

Neil noted the now agreed impacts of climate change and particularly the risks to infrastructure presented by climate related hazards. National Highways has a Climate Adaptation Plan⁸ which sets out the level of resilience needed for their assets, of which bridges are considered to be significant. The risks are all weather or water related but also include interfaces with other assets on the network. The response will include enhanced standards and technical approval with the emphasis on resilience. Changes to standards will include CG 300 (technical approval), CS 469 (scour) and CD 356 (hydraulic actions) but Eurocodes and material durability will also need to be considered. Neil concluded the presentation with a number of yet to be answered questions which demonstrated that the whole issue of resilience is a moveable feast.

The Chairman thanked Neil and invited questions. Hazel McDonald suggested that the priority had to be changes to CG 300 to incorporate the need to address both carbon and resilience. Nick Trump reported that the Welsh government were preparing a National Application Annex (NAA) for CG 300 aimed at making designers consider whole-life carbon issues. Once consultations have taken place with other national bodies, it could be shared with BOF.

ACTION 33: Nick Trump/Richard Fish

The Chairman concluded this item by summarising the present position and urged everyone to follow the examples he was aware of, such as Rochester Bridge Trust and Anglian Water, and start on carbon initiatives and not to wait for a perfect solution.

10. Updates on Current Bridge Issues and/or Research

The Chairman invited updates from member organisations.

a. National Highways

As well as the work already described, Neil Loudon noted that NH were working on the revision to the Bridge Inspection Manual, expected to be published in 2023. Other sections within NH were engaged in digital and future roads projects with industry and academic partners. The Chairman noted that Cambridge University was part of this.

b. Network Rail

Colin Hall reported that Network Rail were working with:

⁸ Under the 2008 Climate Change Act, National Highways have an Adaptation Reporting Power. The current report is ARP3.

- i. Surrey University on developing FE models of higher risk, fatigue prone details
- ii. Waldeck: a continuation of the previous work with Huddersfield University to produce 3-D remote examinations with a view to moving away from set periodic examinations to a risk-based approach.
- iii. Nottingham University on a competency package for asset engineers.

c. TfL

Nicola Head advised that TfL were looking at alternatives to concrete for infilling redundant subways, including the use of polystyrene blocks but had concerns over the inherent fire risk. She welcomed suggestions from others. Keith Harwood noted that Hertfordshire CC had used polystyrene in embankments but not in structures. Any other suggestions should be sent via Richard Fish.

ACTION 34: All/Richard Fish/Nicola Head

d. LUL

Nick Burgess reported that he had been investigating trends in asset deterioration which emphasised the need for consistency in inspections as occasionally some conditions were found to be improving without intervention!

He also referred to the earlier item on VicTrack fibre optics; LUL have a relatively small number of bridges which are instrumented, primarily to detect bridge strikes, but these are also able to identify wheel flats on rolling stock.

e. Transport Scotland

Hazel McDonald advised that Transport Scotland are continuing to fund monitoring on Burnshot bridge, in conjunction with Edinburgh City Council and the SRRB.

TS were also widening the use of scour sensors in their southwest area, expanding the Bayesian network project with Strathclyde University.

Hazel also gave notice of a forthcoming CIRIA webinar on NDT, scheduled for 9th February.

f. DfT

Mark Cox reported that DfT were in collaboration with Homes England and National Highways in a two-year programme on shared digital carbon architecture, aimed at consistency of carbon recording in line with PAS 2080. He offered to provide an update at a future meeting.

ACTION 35: Mark Cox

g. HRIG

Graham Cole noted that the new CIRIA guidance on the assessment of masonry arches was due to be published in the next few months.

h. Railway Paths

Paul Thomas reported on the highly successful Friends Group which had been set up for Bennerley Viaduct. He suggested that others might benefit from similar groups.

i. Big Bridge Group

Trish Johnson reported that there been no recent meeting of the Big Bridge Group but at Clifton Bridge, she was using VR to consider lighting schemes. The UKRIC research project was also continuing as was the carbon counting study, as noted under Item 3 Matters Arising.

j. Welsh Government

Nick Trump referred to his earlier references on the Welsh Government UAV work and repeated the offer of a presentation, noted under Item 4 above.

k. Transport Northern Ireland

Daniel Healy referred to the recent email that had been forwarded from Dr Myra Lydon at Queens University, Belfast, which could also be considered for a presentation at a future meeting.

ACTION 36: Daniel Healy/Richard Fish

He also noted that QUB were working on deterioration modelling linked to environmental factors.

l. Canal and River Trust

Andy Featherby was considering the use of moniteye⁹ gauges to measure real time crack movements and asked if anyone had experience of their use. Nicola Head said that TfL had used them and offered to contact Andy.

Andy also reported an incident with a swing bridge which had tipped during an inspection. He agreed to provide more information at the next meeting.

ACTION 37: Andy Featherby

m. Working with Academia

The Chairman noted that several organisations were working on research projects with their local universities and asked if Richard Fish could be informed of all such cases so that a record could be kept.

ACTION 38: Daniel Healy/Richard Fish

Osian Richards advised that he had passed on a similar request at the recent CSS Wales meeting.

⁹ [Moniteye](#)

11. Bridges 2022 Conference and Awards

Richard Fish gave an update on the 2022 Bridge Conference which was to be held at the Coventry Building Society Arena (formerly the Ricoh) on 9th and 10th March¹⁰. He gave the code “BRBOFA22” which would enable BOF members to gain a discounted rate when they booked. BOF members would also receive an invitation to a drinks reception on the evening before the conference.

The format would follow that from 2020 with parallel streams of presentations for most of day one with the second day being devoted to workshops. Keith Harwood noted that there was a Pecha Kucha which he was organising and was hoping for a greater variety in presentations this year.

Richard noted that, although the overall awards entries had been reasonably high, submitted names for the BOF lifetime achievement award had been relatively few. In an attempt to arrive at a representative outcome, Richard proposed to issue a shortlist of three names - those who had received the most votes so far this year, and the second most last year - and would request a single nomination from that list.

ACTION 39: Richard Fish/All

12. BOF 70: To be hosted by Rochester Bridge Trust – Outline Programme

Richard Fish gave the following outline programme:

Tues 14th June: Arrive late morning
Buffet Lunch
Presentation by RBT
Site visit
Boat trip
Dinner hosted by RBT

Weds 15th June: BOF 70 meeting. Timing to be confirmed but to conclude by 4pm.

Jim Booth confirmed the above arrangements and added that he was checking the boat trip itinerary which was hoped to view not only RBT bridges but also others over the Medway.

Richard passed on Sue Threader’s advice that hotel accommodation in Rochester was limited but the Travelodge was very close to the venue.

Numbers attending would be needed as soon as possible.

ACTION 40: All /Richard Fish/Sue Threader

¹⁰ [Bridges - Design and Engineering Conference \(tn-events.co.uk\)](https://www.tn-events.co.uk)

13.Any Other Business

None.

14.Next Meetings

BOF 70 Rochester 14th and 15th June 2022
(NB NOT 13th and 14th as per the agenda)

BOF 71 Cambridge 22nd November 2022

15.Close

Before closing the meeting, the Chairman reflected on the last 20 plus years of BOF, the breadth and depth of discussions at today's meeting and the thought leadership which BOF offered and facilitated. He also gave a reminder that the option of bringing additional attendees from an organisation was still very much open and encouraged its uptake.

ACTION 41: All /Richard Fish

Richard Fish,
BOF Technical Secretary,
23rd March 2022