BRIDGE OWNERS FORUM

BOF 72: TUESDAY 7 February 2023

via MS Teams and in THE SEMINAR ROOM, CIVIL ENGINEERING BUILDING, WEST CAMPUS, CAMBRIDGE

PRESENT:

In person:

Tim Arianpour	TfL (LUL)
Graham Cole	HRIG
Andy Featherby	C&RT
Paul Fidler	CUED
Richard Fish	Technical Secretary
Tomas Garcia	HS2
Colin Hall	Network Rail
Keith Harwood	ADEPT
Nicola Head	TfL
Jason Hibbert	Welsh Government
Neil Loudon	National Highways
Ioannis Mavvidis	DfT
Hazel McDonald	Transport Scotland
Cam Middleton (Chairman)	CUED
Eloy Tabares	EWR
Paul Thomas	Railway Paths Ltd.
Sue Threader	Rochester Bridge Trust

Guests:

Steve Crummey	HS2
Farhad Huseynov (part)	CUED
Ed Layland	C&RT
Paul Livesey (part)	CROSS
Alastair Soane (part)	CROSS
Hideo Takano	National Highways

Virtual:

Hugh Brooman	LoBEG
Kris Campbell	Department for Infrastructure – Northern Ireland
Liam Duffy	Transport Infrastructure Ireland
Jason Hibbert	Welsh Government
Osian Richards	CSS Wales

Guests:

David Hornblower (part)	National Highways
Michael Linskey	SSE

NB These minutes are recorded in the agenda order and not necessarily in the order in which the items were taken in the meeting.

1. Welcome

This meeting marked the return of BOF Chairman, Cam Middleton, following his sabbatical year. The Chairman thanked everyone for managing so well in his absence but singled out particular thanks and praise for Sue Threader who had chaired the previous two meetings.

He noted another excellent turnout and welcomed those attending in person to the west campus civil engineering building. He pointed out that this venue had had to be used for this meeting due to a double booking at Kings College: he confirmed that BOFs 73 and 74 should be back at Kings.

2. Introductions and Apologies

After round table and on-screen introductions, the Chairman invited guest attendees to give a brief overview of their career to date and engineering interests.

Ed Layland was attending from the Canal and River Trust where he now works in the structures team with Andy Featherby. After graduating from Liverpool University in 2017, he had joined WSP working mostly on Network Rail framework contracts before taking an opportunity to work on a design and build project in Melbourne, Australia

Steve Crummey works with Tomas Garcia on HS2. Steve had graduated from Durham University in 2006 and then worked for Gifford in Chester on bridges and heavy structures. He then moved to Crossrail, then worked in Australia and Hong Kong before returning to the UK.

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

Malcolm Cattermole	Forestry England
Trish Johnson	Big Bridge Group
Ian Norriss[1]	Environment Agency
Martyn Thomas[2]	SSE

Henry Dempsey had hoped to attend virtually but did not do so.

[1] NB Ian has now re-joined BOF as the EA representative.
[2] Michael Linskey was substituting but attending remotely.

3. Matters Arising from BOF 71 Minutes

As now established practice, Richard Fish confirmed that the accuracy of the BOF 71 minutes had been approved by email and that they were now on the BOF website.

He then referred to the BOF 71 Action Update sheet that he had issued with the agenda:

Action 3: Technical Approval and Carbon Reduction
Neil Loudon confirmed that this should be an item for BOF 73 which Hideo Takano would lead.

ACTION 1: Richard Fish/Hideo Takano

Action 5: Report into Eastham Bridge Collapse in May 2016
Keith Harwood reported that he had recently submitted an FoI request to Worcestershire CC.[3]

Action 14: A465 Mutual Investment Model
This item had been due to be taken at BOF 71, but the presenter had been called away. Jason Hibbert suggested that it should still be considered for a future agenda, as and when space permitted.

ACTION 2: Richard Fish/Jason Hibbert

4. Thoughts on Sabbatical Year and Feedback from AustRoads Bridges Task Force.

The Chairman reported mostly on his trips to Australia, one of which had given him the opportunity to attend the two-day AustRoads Bridges Task Force meeting. He had also attended a three-day bridge conference and he would arrange for the papers from both to be uploaded to the BOF website.

ACTIONS 3 & 4: Paul Fidler

His over-riding impression was that all countries are facing the same challenges and attempting to find the same solutions. This supported his long-standing interest in improving international collaboration.

In terms of specific projects, the Chairman highlighted the Heavy Vehicle Access Management System (HVAMS) in Tasmania which was similar to the UK's ESDAL. The system was calibrated with various vehicle configurations against a database of all Tasmania's bridges. Vehicle operators are very supportive, and it is now being taken up by other Australian states. A website enables route planning via a mapping system but the key to its success is the availability and accessibility of information to all parties.

[3] *Post meeting note: Keith has now received this and it will be covered at BOF 73.*

The Chairman also reported on Weigh-in-Motion (WiM) technology in New South Wales: unlike traditional WiM, this relied on a device inside vehicles measuring axle weights through their suspension systems as well as being linked to a GPS tracking unit. With bridge capacities also understood, this allowed heavier vehicles to be used on key routes with benefits in terms of both the economy and carbon.

He also reflected on developments in real time performance of bridges through sensors and monitoring. In Western Australia, with a high volume of very heavy mining trucks, there appears to be experience of fatigue failure of concrete bridge decks. This hitherto unexpected phenomenon has also been recorded in Japan and the Middle East and the Chairman questioned whether this should be discussed at a future meeting.

ACTION 5: Chairman/Richard Fish

The latest initiative focuses on having enough, accurate data with the emphasis on quality not quantity. Of equal importance is understanding ownership of data with an implicit cultural change which meant that some parts of the organisation had to let go of data when it was needed by others.

Summarising these various points, the Chairman questioned whether bridges are being fully utilised? With the corollary that, if they were, would we not be seeing more failures?

Returning to the AustRoads Bridges Task Force, the Chairman noted that it covers all aspects of bridge management, including the development of codes and standards, so it was hard to make direct comparisons with UK governance as it covered the equivalent of all of National Highways, devolved governments, UK Bridges Board and BOF.

Lastly, the Chairman referred to the VicRoads/Eloque project on fibre optic sensors that had been presented at BOF 69 in February 2022. Whilst in Victoria he had asked to see results from monitoring, but none could be produced, and visited one of the bridge sites, where the monitoring was not as sophisticated as would be the case in the UK. It transpired that the company had gone into liquidation and the CEO could not be located, both with significant reputational damage. The Chairman considered that the venture had been too ambitious and the wrong company partners had been chosen: a case of over-promising and under-delivering.

In response to questions having been invited, Tomas Garcia asked how close the UK expertise was to delivering what had been promised in Victoria. The Chairman referred to Item 8 on the agenda which was producing excellent results. He acknowledged, however, that monitoring rail bridges was more straightforward than road bridges. Tim Arianpour recalled a CUED project about 10 years ago to install fibre optic sensors in concrete piles. The Chairman replied that these were still operational, but he reflected that, overall, the construction sector was lagging behind others such as aerospace and offshore.

Sue Threader asked about the approach to carbon in other countries. The Chairman considered the UK work to be the best that he had seen. Ioannis Mavvidis asked about design codes in Australia and whether there was a tendency for bridges to be over designed? The Chairman replied that theirs was a similar design philosophy, based on limit states, to the UK.

In conclusion, the Chairman returned to his point about the need for improved international collaboration and suggested that another international BOF meeting should be considered, such as that held in 2009.

ACTION 6: Chairman

5. CROSS Update

The Chairman welcomed Alastair Soane and Paul Livesey from CROSS. Whilst Alastair had been a regular attendee at BOF meetings, this was Paul's first having recently joined CROSS. Both gave presentations which they agreed could be uploaded to be BOF website.

ACTION 7: Paul Fidler

Alastair gave a brief overview and recent history of CROSS[4]: SCOSS (Standing Committee on Structural Safety) had been founded in 1976, and the original CROSS (Confidential Reporting on Structural Safety) in 2005. In 2021, CROSS (now Collaborative Reporting for Safer Structures) was relaunched, having added fire safety issues following Dame Judith Hackett's inquiry into the Grenfell tragedy. Alastair reprised his thesis on precursor events, as presented at previous BOF meetings, noting that CROSS was obliged to investigate all incidents, except construction fatalities which remained with the HSE.

Referring to recent issues, Alastair noted a recent preponderance of fires triggered by lithium-ion batteries in Electric Vehicles (EV), including electric bikes and scooters. He also reported on Reinforced Autoclaved Aerated Concrete (RAAC) as widely used in buildings in the 1960s and 1970s. He cited examples of collapsed beams, noting that 34 hospitals in the UK are known to have RAAC roofs. The problem was how to inspect such structures and how to identify warning signs.

Alastair then highlighted alerts which were in the pipeline, including the over-reliance on computer modelling of structures, aging concrete structures (including the collapse of RC balconies and canopies) and fire safety. He noted the links between CROSS and ICE, in particular the In Plain Sight report[5] led by past president Peter Hansford. He also reflected on the new Building Safety Act, specifically with respect to High Rise Residential Buildings (HRRB – buildings over 18m tall), although noting some confusion between high rise and high risk in the acronym. It was estimated that there

[4] Collaborative Reporting for Safer Structures UK (CROSS-UK) (cross-safety.org)
[5] In Plain Sight: assuring the whole-life safety of infrastructure. Final report | Institution of Civil Engineers (ICE)

were about 12,500 such buildings that the Act requires to be prioritised and assessed within the next five years. The question was: how? Each will require a Safety Case Report covering risks associated with fire, structural issues, as well as low probability and high consequence, and unforeseen, risks. Every report will need to be signed off by a suitably qualified professional engineer. It was noted that HRRB reporting will be mandatory with a regulator likely to be CROSS.

Alastair also noted progress at an international level where CROSS Australia had recently been joined by New Zealand and improved links to Germany where there was already a well-established proof engineer system in place. In the USA, the 2021 collapse of the Champlain Towers, a 40-year-old apartment block in Florida was being investigated by the head of CROSS USA, Glen Bell. This was a major piece of work which would take between three and four years with a budget of $30 million – just for the investigation.

Alastair concluded with some key over-arching lessons:

- The fact that similar issues keep recurring.
- Inadequate communications.
- General lack of competence.
- Deterioration and degradation of structures.
- Changes in design trends.
- Over reliance on computer analysis.
- An overall shortage of experienced engineers.
- A pressure on fees.
- Too many examples of poor supervision.

Questions on Alastair's presentation began with Paul Thomas who queried the significance of the age of Champlain Towers; was the fact that it was 40 years old a factor in its collapse? Alastair replied that rates of deterioration would vary but noted the coastal environs of this site.

Steve Crummey recalled the Liverpool Arena car park fire in 2018 and asked whether EV batteries could have been a contributory factor. Alastair related his first-hand experience of this incident but added that EV charging points in car parks were a growing concern. Tomas Garcia asked if this might extend to charging points in residential areas. Alastair replied that this was not unlikely but noted that there was no regulation in place.

Paul Livesey's presentation covered some specific issues and cases, and the lessons which should be taken from them, as summarised overleaf:

Topic	Issues
General computer software issues	There seemed to be an antipathy towards comparative hand calcs to at least determine if the answers "felt" about right. This emphasised the need for independent checking and/or review by experienced engineers.
Removal of structural columns during renovations	This case demonstrated the need to appoint competent contractors and that they should be properly supervised.
Incorrect/dangerous design of a retaining wall	This case had some serious design errors based on incorrect assumptions which again demonstrated the need for competent designers, not just relying on software output.
Boundary wall collapse	This was a blockwork wall which had been under-designed, again an issue of competence.
Stunts on bridges	There were concerns over public safety after examples such as cyclists attempting to cycle *over* tied arches. Such activities should be part of a risk assessment at the design stage.
Balcony walkway collapse in 2014	This had been found to have been attributable to rebar being placed in the *bottom* of a cantilever. This showed a lack of quality control and supervision. (NB There had been a similar occurrence in Angers, France, which had led to four fatalities).
Retrofitted cantilever to a cavity wall	Again, this demonstrated a lack of professional input including as part of any pre-works investigation or survey.

The Chairman thanked both Alastair and Paul and invited questions and comments.

Richard Fish noted that issues such as poor supervision and quality control, lack of competence and procurement which pushed down fees, had regularly been aired at BOF meetings for many years. Tomas Garcia agreed, noting that an intelligent client was another essential requirement. Neil Loudon reflected that even the intelligent client concept was being eroded by over-reliance on self-certification by contractors and suppliers on design and build schemes. Paul Livesey agreed, adding that the traditional role of the Clerk of Works no longer seemed to exist. Osian Richards noted the demise of engineers as heads of departments in local authorities where inexperienced directors were being asked to apply judgement in engineering matters.

Paul Thomas questioned whether these examples were in the minority and hoped that large contracting organisations could be relied upon to act professionally. Sue Threader

countered that client site supervision was a worthwhile investment proving good value in the longer term.

Richard Fish suggested that a cultural shift was needed. Paul Livesey agreed, noting that Dame Judith Hackett had proposed exactly that in her report into the Grenfell fire tragedy. Tim Arianpour suggested that competence should be implicit in design codes which could be over-formulaic. As an example, he contrasted the approach in New Zealand standards which required an appreciation of load paths and redundancies. Eloy Tabares agreed, adding that more time needed to be spent on conceptual and preliminary design when load paths could be established. Steve Crummey agreed with these points and added that newer graduates seemed to have an aversion to hand calculations and sketching. He suggested that the Steel Designer's Manual should be essential reading once they joined a design office.

Richard Fish referred to cases of professional misconduct which he had seen as part of his position on the ICE Professional Conduct Panel: a large proportion were one-man/woman consultants who took on projects for which they had no experience, for ridiculously low fees and without agreeing a formal brief with their clients. This also raised questions of compliance with the Code of Conduct and wider ethical issues. The Chairman asked if any such cases had led to individuals being removed from the Institution. Richard recalled that there had been about five in the last ten years or so but added that the Institution of Structural Engineers took a harder line with respect to professional misconduct.

Hazel McDonald asked how these trends could be reversed, hoping that the new Building Safety Act might be the answer. Paul Livesey thought that it would make a difference but feared that this might take a generation to see real change. Kris Campbell added that the engineering profession needed to be better respected rather than, all too often, having their advice ignored.

The Chairman thanked Alastair and Paul for their contributions and invited them to stay for as much of the rest of the meeting as their travel plans allowed.

6. Defective Precast Beam Issues

This item had been arranged to follow that of CROSS (for obvious reasons) and included presentations from Keith Harwood and from National Highways, for whom David Hornblower joined the meeting remotely. It was agreed that both could be uploaded to the members only area of the BOF website.

ACTION 8: Paul Fidler

Keith described the A602 Dane End bridge, presently under construction utilising precast U-beams with a span of 20 metres. Although the contractor had placed the order with a reputable and fully certificated supplier, once installed a number of defects were noted including obvious cold joints halfway up the webs of most of the beams, with extensive honeycombing. The extent of the cold joint on one beam was

later traced along the full length of the beam in question and, at one end, appeared to be just some 20mm above the soffit. On another project similar beams were supplied, but by a different but equally reputable manufacturer, and most of the them had missing shear links.

The contractor had embarked on a programme of testing and investigation in an attempt to prove that the beams were acceptable, but eventually had agreed to replace them. Keith summarised the issues as poor workmanship, poor supervision, inappropriate curing and a mix design aimed solely at enabling a quick turnaround. He also emphasised the points that the defects had not only been covered up but also the reluctance by the contractor to accept that this was a significant problem.

David Hornblower's presentation also covered beams as well as other precast elements. He showed examples of beams which had arrived on site with poorly repaired defects and some with visible inclusions in the concrete. David also noted box culvert units which were neither square nor flat-faced and some with toggle joints which were also defective, making it impossible to pull units together. He also highlighted similar defects with precast arch units, parapet plinths and reinforced earth copings. David also pointed out that, due to Covid, some of the precast elements had been manufactured early: even before design and check certificates had been issued!

Osian Richards remarked that he had also had similar problems with precast box culvert units. Colin Hall said that he had been made aware of similar precast beam issues on Network Rail bridges.

The Chairman expressed a feeling of shock, shared by the meeting, that such things could happen. Kris Campbell pointed out the ethical issues of contractors and suppliers trying to "get away with" defects rather than helping to resolve them. The Chairman equated this practice to fraud.

Steve Crummey was aware of similar issues on Crossrail where the client had been forced to increase the level of supervision at precasting yards. He confirmed the practice of contractors trying hard to prove that beams were acceptable despite being outside their specification.

Tomas Garcia highlighted another case of poor quality precast concrete for which demolition and replacement had been recommended. This had been resisted by the contractor and the decision was then escalated to the top of the respective organisations where it had been over-turned. Hazel McDonald suggested that, whilst this example was disappointing, it was important for top management to understand the implications and to offer support to engineers on site. Hazel also related similar examples from Scotland, specifically precast copes for retaining walls. She noted, however, that in major infrastructure schemes Transport Scotland bridges branch, as the eventual manager and maintainer, didn't have influence on the construction supervision requirements and only had the opportunity to view the structures at the handover

inspections. Defects were often not resolved due to contractual issues that her team have no control over, meaning they are left to manage them.

Liam Duffy questioned how widespread this problem might be. Although he sympathised with contractors and site staff who were under huge pressures to avoid programme delays, he conceded that Transport Infrastructure Ireland also suffered from low levels of supervision.

As a way forward, Neil Loudon suggested that local Trading Standards departments should be informed, and incidents also reported to the Precast Concrete Manufacturers Association. Neil also confirmed that issues of quality had regularly been aired in National Highways and all too often concluded with the same old 4Ps mantra – People, Product, Process and Procurement. Alastair Soane advised that a new Office of Product Safety was to be established which would cover examples such as these. Ioannis Mavvidis stressed the need to develop better supervision for off-site manufacturing as it was essential to embrace this form of construction in order to maintain carbon reduction advantages. The Chairman agreed that supervision had to be adequately resourced and highlighted the similarities between this and the previous item. Osian Richards noted, that early in his career, he had personally supervised off-site works but now not even the main contractor does this. Eloy Tabares suggested that supervision should be part of the design responsibilities, removing the disconnect and making the process more seamless.

The Chairman closed the item by reiterating his concerns and questioning 1) how we should judge the extent of the problem and 2) how the failings in quality assurance certification could be addressed. He suggested that the ORR might be informed and also asked Alastair and Paul to keep these issues on CROSS's agenda. He asked everyone to report on similar issues and to raise concerns at every opportunity.

ACTION 9: All

7. Investigations into Highway Bridge Collapses

This item was not taken due to time constraints but will be discussed offline, and later with CROSS.

ACTION 10: Richard Fish/Hazel McDonald

8. Staffordshire Rail Bridge Monitoring

The Chairman introduced a member of his Cambridge team, Farhad Huseynov. He noted that this item had been in BOF's pending tray for some time but considered it well worth sharing. Farhad gave a presentation which he agreed could be uploaded to the BOF website.

ACTION 11: Paul Fidler

Farhad explained that the project had sought to identify where there were additional reserves of strength in a bridge and to what extent there was structural under-utilisation. The two sites were Norton and Chebsey bridges in Staffordshire which had been built in 2014. The former was a composite half-through bridge and the latter, precast concrete. Instrumentation had been installed in 2015 and the first phases of the project completed in 2017. The next, ongoing, phase was to link the results to a digital twin, calibrated by some weigh-in-motion sensors. Results so far had proved that there were considerable reserves of strength with the most highly loaded element only utilised to 87%.

From Network Rail's perspective, Colin Hall commented that, whilst the project had delivered some useful information, both were new bridges and he struggled to see how there might be a fit within an asset management regime.

The Chairman invited other questions. Tomas Garcia wondered whether the results could be extrapolated to multi-span bridges. Farhad agreed that continuous bridges would be more challenging as the numbers of sensors would have to increase significantly. Tomas noted the additional complications such as having to factor in differential settlement effects.

Eloy Tabares asked if measurements had been taken when two trains crossed on a bridge. Farhad noted that this had happened but only with relatively lightly loaded passenger trains. Utilisation factors, however, remained low. Eloy also suggested that local effects at smaller elements or connections would need to be taken into account before conclusions could be reached.

The Chairman thanked Farhad for his presentation and noted other benefits from the project such as validating assumptions on prestress losses in beams from construction through to installation, and improved understanding of transverse distribution and fatigue effects.

9. Vehicle Weights and the Heavy and High Load Grid

Hideo Takano gave a presentation on this item which he agreed could be uploaded to the members only area of the BOF website.

ACTION 12: Paul Fidler

Hideo referred to meetings in September 2022 and January this year between DfT and National Highways. The latest meeting had also included representatives from Transport Scotland and the Welsh Government. No decisions had yet been taken on whether routes should be added, adjusted, or removed from the heavy load grid but DfT were concerned about possible implications, such as a need to upgrade.

Hideo also mentioned other initiatives, including possible longer and heavier vehicles, an increased weight for diesel tankers, and a possible revision to EU authorised weights and dimensions. Each of these was partly linked to the decarbonisation of freight

transport and the need to embrace electric and zero emission freight vehicles. Hideo recognised, however, that were some significant issues which would have to be addressed.

The Chairman thanked Hideo for his presentation and invited questions. Keith Harwood expressed some concern on all these points on behalf of local authorities, pointing out that nearly all journeys not only start and finish on local roads but also that some use local roads for the majority of the journey. Hazel McDonald noted that DfT appeared to have dropped the "48 for 48[6]" proposal due to a lack of industry interest.

Eloy Tabares asked if any changes were being considered for the high load grid. Hideo replied that National Highways were fairly relaxed on this as the number of bridge bashing incidents on the motorway and trunk road networks was relatively small at between 20 and 30 per year.

Hideo concluded by adding that a study was about to commence on the extent of overloaded vehicles based on data coming from weigh-in-motion sites and weigh bridges. He agreed to report on this at a future meeting.

ACTION 13: Richard Fish/Hideo Takano

10. Compendium of Bridge Management Documents

Keith Harwood gave a short presentation on this item which he agreed could be uploaded to the BOF website.

ACTION 14: Paul Fidler

Keith reminded the meeting of the paper from Richard Fish considered at BOF 68 in October 2021. Keith had now picked up the baton and had produced a list which included documents not readily available online and those which had been superseded but were very helpful when managing older bridges. The intention was to create a compendium to be featured on the new BOF website, with links to document locations, which would be accessible to all bridge owners and managers, some of whom may be unaware of older documents.

Hazel McDonald questioned the status of CIRIA documents, some of which such as the proposed revision to the Bridge Detailing Guide, were highly relevant and we needed to be sure that the latest CIRIA documents were included. Keith replied that this was part of his review and CIRIA documents would be part of the compendium. Graham Cole offered to assist with the review and highlight any which were obviously out of date. Suggestions for possible updates could then be fed back to CIRIA.

ACTION 15: Keith Harwood/Graham Cole

Keith also reported progress in enabling local authorities to access Network Rail standards free of charge. He also noted that UKRLG were considering proposals for a

[6] 48 tonne intermodal freight trial: consultation document - GOV.UK (www.gov.uk)

new website which would also act as a host for relevant documents. Keith agreed to provide updates at future meetings.

ACTION 16: Keith Harwood

11. Bridge Inspection Manual Update

Neil Loudon gave a brief presentation on progress with the revised manual which he agreed could be uploaded to the members only area of the BOF website.

ACTION 17: Paul Fidler

Neil referred to the work being undertaken by WSP and thanked those organisations and individuals who had responded to the survey and/or provided defect images. WSP were now drafting sections of the manual which should be completed by December 2023. It was probable that there would be a further consultation on the draft before publication. Updates would be given at future BOF meetings.

ACTION 18: Richard Fish/Hideo Takano

12. BICS Update

Hazel McDonald referred to a progress report from LANTRA which had been issued with the agenda and could be uploaded to the BOF website.

ACTION 19: Paul Fidler

She noted that a Steering Group meeting was to be held later in February and that webinars[7] had been arranged to help candidates with e-portfolios.

The Chairman expressed concern over the relatively low numbers in the LANTRA report and the requirement for annual refreshers. Neil Loudon pointed out that the earlier CROSS item had emphasised the need to improve competence, not least as demanded by the Building Safety Act. Whilst recognising pressures of work, Neil added that it was essential that any interventions were based on reliable inspections, especially as National Highways had some 12,000 inspections taking place every year. He recognised, however, that additional training had to be made available, hence the webinars.

Hazel McDonald advised that discussions had also taken place in that having BICS qualified staff could result in more funding to local authorities for maintenance. In addition, discussions were ongoing with CIHT, and proposed with ICE, to explore recognising BICS as contributing to IEng status.

Sue Threader noted previous discussions that cost might be a factor in deterring prospective candidates from coming forward. She reported that she was continuing to

[7] To be led by Francis McKeown from National Highways

investigate a possible bursary scheme through the Rochester Bridge Trust's charitable aims but that this could only be offered to those who had to self-fund their applications. She agreed to provide updates on this at future meetings.

ACTION 20: Sue Threader

13. BOF Website Progress

Sue Threader and Keith Harwood reported on progress with the website and Paul Fidler gave a demonstration of the various pages and content. A link will be circulated in due course for all members to review the site before it goes live.

ACTION 21: Paul Fidler/Richard Fish
ACTION 22: All

Sue suggested and it was agreed that, once the new site was ready, Helena Russell should be asked if she would critique it.

ACTION 23: Richard Fish

14. Updates on Current Bridge Issues and/or Research

Richard Fish advised that the idea of organisations submitting proformas to report on their various initiatives had not been that successful. He undertook, however, to collate and issue those proformas he had received and asked for any others to be sent to him.

ACTION 24: Richard Fish
ACTION 25: All

The Chairman invited all present[8] to provide verbal updates:

Department for Infrastructure – Northern Ireland

- Kris Campbell referred to his PhD work with Dr Myra Lydon at Queens University, Belfast, on scour prediction and detection. He suggested that this could be an item for a future BOF agenda.

ACTION 26: Richard Fish/Kris Campbell

- Kris also reported on BCI work, again with Myra Lydon and others.
- Lastly, Kris mentioned that he was going to demolish a concrete deck with half-joints which would be a good opportunity to review the extent of defects.

CSS Wales

- Osian Richards reported that CSS Wales are working on ways of enhancing bridge *manager* competence.

[8] Including those attending online. Only those who reported are recorded here.

Welsh Government

- Jason Hibbert noted that the Menai suspension bridge had recently re-opened after the emergency closure presented at BOF 71. Whilst he had received plaudits from senior managers for making the right call to close in the first place, it emphasised the need for engineers to be in top posts, such as a national Chief Bridge Engineer or Chief Highway Engineer.
- Jason also reported on some issues with vibrating hangers on a relatively new bowstring arch over the A465 which had yet to be handed over. He agreed to report on this at a future meeting.

ACTION 27: Richard Fish/Jason Hibbert

Rochester Bridge Trust

- Sue Threader reported on a satellite monitoring project with the University of Kingston and the Italian Space Agency to measure vertical movements.

Canal and River Trust

- Andy Featherby reported that they were working with Matthew Gilbert from Sheffield University and with Imperial College on 3-D masonry arch analysis.
- CR&T are also helping to develop AI crack recognition software.

Railway Paths

- Paul Thomas reported that he had used a UAV for a Principal Inspection on a large viaduct but only to identify areas of potential defects which could then be inspected at close quarters. This had saved significant time over and above a traditional PI.

TfL

- Nicola Head noted that the BCI scheme was going to be extended to cover marine and building structures.

HS2

- Tomas Garcia reported that HS2 were considering low carbon concretes and UHPFRC.
- He was also reviewing climate change impacts for temperatures and wind speeds.
- He and Steve Crummey were going to present on their bridge optimisation tool at Bridges 2023 in Coventry.
- HS2 were proposing to crash test a concrete bridge parapet. Tomas agreed to report on this at a future BOF meeting.

ACTION 28: Richard Fish/Tomas Garcia

Network Rail

- Colin Hall advised that a scour detection project was due to start in March 2023.

Transport Scotland

- Hazel McDonald confirmed that details were on her proforma but TS were working on Queensferry Crossing and Forth Road Bridge sensor data with University College, Dublin and Edinburgh University.

- Hazel also reported on UKBB activity:
  - The next meeting was to be held on 15th February.
  - UKBB was waiting for news from DfT on research funding.
  - An option for research procurement was to ask for local authorities to lead on specific projects but Hazel understood that there had been some resistance to this.
  - Further applications for BridgeCat were still being sought.

National Highways

- Neil Loudon reported that the first series of the revised MCHW would soon be released for consultation.
- National Highways were modifying some BCI descriptors to be less controversial.
- There were various carbon and net zero initiatives underway.
- Lastly, Neil mentioned one of their Moonshot projects to review how more complex bridges (such those that are post-tensioned or have half-joints, for example) should be managed.
- Hideo Takano noted that National Highways were also reviewing standards with respect to climate change and would be talking to HS2 on this topic.
- Hideo also reported that National Highways were working with Strathclyde University on a scour risk assessment study for different depths of foundations.

15. Bridges 2023, Coventry, 8th & 9th March. Grand Challenge Zero Workshop

Richard Fish hoped that all BOF members had taken advantage of the discounted entry for the conference and workshops.

As anyone who had seen the programme would know, Richard was hosting a workshop on the second day to work towards developing a new, over-arching Grand Challenge Zero (GC0).

Richard also reported on the method by which the winner of the BOF Lifetime Achievement Award would be chosen and urged anyone who had not yet done so to cast their votes. The winner would be announced at the Awards ceremony at the end of the Conference.

16. Any Other Business

- **CS 471:** Hazel McDonald asked when the new DMRB scour standard, replacing BD 97, was to be issued. Neil Loudon replied that this was presently held up by National Highways' Commercial and Procurement teams.

- **BOF 2022/23 Subscriptions:** The Chairman apologised for the delay in these being issued but promised that they would be emailed as soon as possible. He also proposed a 5% increase in figures for 2023/24 which would be issued early in the new financial year.

ACTION 29: Chairman

- **Neil Loudon:** As this was to be Neil's last meeting, pending his retirement from National Highways at the end of March, the Chairman presented him with a card and gift to remind him of his time on BOF. He also thanked Neil for his many contributions to BOF's work over the years. Neil replied, not only with his thanks but also reflecting on the excellent work of BOF which had made it one of the most enjoyable groups on which he had sat in the 50 years since he first joined the then Ministry of Transport as a graduate.

17. Next Meetings

BOF 73: 13th June 2023

BOF 74: 7th November 2023.

Both to be held in Cambridge (but probably with hybrid facilities).

ACTION 30: Richard Fish

18. Close

The Chairman thanked everyone for their contributions to the meeting and wished everyone a safe journey home (apart from those who were already there!).

Richard Fish,
BOF Technical Secretary,
31st March 2023