

BRIDGE OWNERS FORUM

MINUTES OF BOF 66: TUESDAY 26 JANUARY 2021 ZOOM MEETING

PRESENT:

Bill Bryce	SSE
Nick Burgess	TfL/LUL
Malcolm Cattermole	Forestry England
Henry Dempsey	SCOTS
Kevin Dentith	ADEPT
Liam Duffy	Transport Infrastructure Ireland
Richard Fish	Technical Secretary
Colin Hall	Network Rail
Jim Hall	CSS Wales
Keith Harwood	ADEPT
Daniel Healy	Infrastructure Northern Ireland
Jason Hibbert	Welsh Government
Neil Loudon	Highways England
Hazel McDonald	Transport Scotland
Campbell Middleton	Cambridge University Engineering Department (Chairman)
Ian Norriss	Environment Agency
Steve Patrick	Big Bridge Group
Paul Thomas	Railway Paths Ltd.
Sue Threader	Rochester Bridge Trust
Paul Fidler	CUED

Guests:

Alastair Soane (Part)	SCOSS
Bill Harvey (Part)	Bill Harvey Associates
Graham Cole	Heritage Railway Association
Hamish Harvey (Part)	Bill Harvey Associates
Brijesh Pandey	TfL
Martyn Thomas	SSE
Keir Wilson	Transport Infrastructure Ireland

1. Welcome and Meeting Outline/Protocols

The Chairman welcomed everyone to BOF 66, the third virtual BOF meeting, pointing out that the date was also Australia Day. He welcomed the excellent attendance, noting

that this had been sustained at the levels of previous BOF Zoom meetings. He reiterated the usual meeting protocols, including the use of the chat box, comments from which had been successfully incorporated into the minutes of BOF 65.

The continuation of the new format for the meeting agenda was noted although it was agreed that BOF should not lose sight of the need to align our work with the UN SDGs.

ACTION 1: Chairman/Richard Fish

The Chairman then emphasised the focus of the morning items on competence with guests Alastair Soane and Bill Harvey who would be sharing their thoughts. He also noted that Hamish Harvey would be observing the competence discussions.

2. Introductions and Apologies

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

Andy Featherby	C&RT
Nicola Head	TfL
Trish Johnson	Big Bridge Group (Steve Patrick substituting)
Osian Richards	CSS Wales (Jim Hall substituting)

Nick Burgess reported that Nicola Head had had to make a late apology as she had suffered an adverse reaction from a Covid vaccination.

Richard Fish also reported that no replies to emails ahead of this meeting had been received from Jasdeep Bhachu (LoBEG), Tomas Garcia (HS2) and Steve Berry or Gary Kemp (DfT).

The Chairman welcomed Jim Hall, again representing CSS Wales, Steve Patrick representing the Big Bridge Group and the return of Graham Cole who was officially observing this meeting as the representative of a possible new member, the Heritage Railway Association.

The Chairman noted that the suggestion of colleagues of BOF members observing the meetings was as popular as ever and asked today's guests to introduce themselves:

Brijesh Pandey is a Structures Engineer, having been working in Nicola Head's team since 2014. With a Masters in Structural Engineering from Dundee University, Brijesh had previously worked for Woking Borough Council, Atkins and the Highways Agency before joining TfL.

Martyn Thomas, a Chartered Civil Engineer, is a senior structures engineer working with Bill Bryce at SSE where he is responsible for the management of 400+ bridges. He graduated from Loughborough in 2003 and worked for Veryards and Amey before joining SSE, seven years ago. One of Martyn's interests is the repair of concrete bridges, including the use of cathodic protection.

Keir Wilson became Chartered in 2015 and used to work for Mouchel in the UK on bridge design and asset management before moving to Ireland where he initially worked as a designer for a precast concrete supplier before joining Liam Duffy at Transport Infrastructure Ireland. He is responsible for about 1,000 bridges in the Munster region.

The Chairman repeated his welcome to all three and hoped that they would find the day to be beneficial. He then invited Steve Patrick and Graham Cole to give their introductions:

Steve Patrick is the Structures Asset Manager for Connect Plus M25 and has the Dartford crossing among his responsibilities. He had worked on the design and construction of the QE2 bridge before joining the, then, Dartford River Crossing operating company from where he had been TUPEd a few times to the present agency. Steve had previously worked for Freeman Fox and Cementation/Trafalgar House. His topics of interest were the management of moving elements of bridges: joints, bearings etc. as well as data management.

As the representative of the CSS (later ADEPT) Bridges Group, Graham Cole had been a founder member of BOF. He was previously the Chief Bridge Engineer for Surrey County Council but had been an independent consultant for the last nine years. Graham is the Chief assessor for the LANTRA BICS and had run some bridge inspector training courses at the University of the West of England (UWE). He had several heritage railways among his list of clients and was hoping to represent the Heritage Railway Association (HRA) on BOF. Graham noted that there were 160 such railways in the UK all of which were losing income as a result of Covid and facing increased costs, notably as there was no longer coal being mined in the UK and imports were having to be shipped from Russia.

From the chat box:

Malcolm Cattermole noted that a new coal mine in Cumbria had recently been granted planning consent although it was still the subject of some controversy.

3. Matters Arising from BOF 65 Minutes

Richard Fish noted that, in terms of accuracy of the minutes, this had agreed via email as had been decided at BOF 65 and they were now on the BOF website.

The Chairman referred to the BOF 65 Action Update sheet that had been issued with the BOF 66 agenda:

Action 2: Grand Challenges and BOF in the Media

Richard Fish confirmed that he was still hoping to be able to write an article for CIHT's Transportation Professional magazine and was also writing the occasional letter for

publication. The Chairman noted the success of the BOF Twitter feed (417 followers) and encouraged everyone to use every opportunity to promote and publicise the Grand Challenges and/or BOF or to advise Richard Fish as appropriate.

ACTION 2: All/Richard Fish

Hazel McDonald warned that employer organisations' social media rules needed to be adhered to when giving any personal opinions.

Action3: TRIB

The Chairman gave a brief resumé on the history of TRIB which had been established in 2018 to promote innovation and technology in the Transport sector. One of its outputs had been the Network Rail new footbridge design competition. The development of bridge KPIs was also on the TRIB agenda with the focus on project delivery. He recalled that TRIB members had attended BOF 62 in November 2019 when they had been impressed by the various BOF initiatives in this area. As he had a position on the TRIB Steering Group, the Chairman agreed to continue to liaise between BOF and TRIB.

ACTION 3: Chairman

Action 4: BOF Website

The Chairman noted that, although there was no immediate fix, he remained committed to continuing to try to resolve this issue and deliver an improved website.

ACTION 4: Chairman

The Chairman also noted problems with the CIHT hosted website for the UKRLG and Boards which meant that minutes of meetings could not be accessed. Keith Harwood understood that this was being addressed but it was agreed that the matter should be raised at UKBB.

ACTION 5: UKBB Members

[Post meeting note: This was raised at UKBB on 18th February 2021 and the advice given is that this has now been resolved.]

Action 8: Learning from Lockdown

The Chairman considered, and it was agreed, that summarising the lessons of working during the pandemic would still be a useful exercise.

ACTION 6: Chairman/Richard Fish

Actions 26: Research Funding Options

Alternative options to the present system relying on DfT to be raised at the next UKBB meeting.

ACTION 7: Chairman/Richard Fish

[Post meeting note: This was also raised at UKBB on 18th February 2021 but with no conclusion reached.]

4. SCOSS/CROSS Update

The Chairman welcomed Alastair Soane to what had now become his annual attendance at BOF. Alastair agreed that his presentation slides could be uploaded to the BOF website.

ACTION 8: Paul Fidler

Alastair began by reviewing the genesis and development of SCOSS and CROSS with the former having been established in 1976 and the latter in 2005. For the latter, up to December 2020, about 1,000 confidential reports had been received, processed, anonymised and published as invaluable knowledge sharing for the benefit of the profession and the public alike. CROSS now had international equivalents, notably CROSS-US where Glen Bell was the Director as well as CROSS-AUS. A new CROSS website is to be launched in March 2021. Alastair gave a breakdown of sources of CROSS reports:

Construction	39%
Design	36%
Operations	23%
Demolition	2%

He noted that the confidential reporting on operations may not reflect the actual level of concerns as it was probably the case that there were fewer construction professionals working in this sector. Demolition was a similar situation but Alastair expected this figure to increase.

Listing the top causes of structural failure from CROSS reports, Alastair noted that the main culprit was organisational culture not being instilled by senior management.

Alastair then focused on the FIU footbridge collapse in 2018 which had been the subject of a SCOSS Alert published in December 2020. The report drew on publicly available information from the US National Transportation Safety Board (NTSB) investigations:

[SCOSS Alert - Lessons Learned from the 2018 Florida Bridge Collapse During Construction \(structural-safety.org\)](https://www.structural-safety.org/SCOSS-Alert-Lessons-Learned-from-the-2018-Florida-Bridge-Collapse-During-Construction)

Alastair also mentioned the IABSE Task group 1.5 - Bridge Collapses: Cases and Causes - and noted that greater participation from the UK was wanted. It was agreed that the possibility of BOF helping with this should be explored.

ACTION 9: Chairman/Richard Fish

Alastair also touched on his pre-cursor concept, issues arising from the Covid pandemic and tower block tragedies culminating in the Grenfell fire in 2017 which had led to the Hackitt Review, the new Building Safety Bill and a new Building Safety Regulator.

Concluding his presentation, and emphasising his points about people issues, Alastair produced the quote below by John Smeaton (1724 to 1792):

“Stone, wood and iron are wrought and put together by mechanical methods, but the greatest work is to keep right the animal part of the machinery.”

The Chairman thanked Alastair for his presentation and, noting its relevance to the competence theme, invited questions.

Referring to the FIU and the extent of structural cracking that had been observed prior to collapse, Paul Thomas questioned why no action had been taken to close the road below or prop the bridge. Alastair cited the facts that, not only had there been very poor leadership and communications, but also that there had been too many people looking at the same problem and assuming there was someone else to would make decisions.

Bill Harvey recalled his early days working on the Humber Bridge, when he had spotted broken welds on a temporary platform to be placed at the top of one of the towers. Reporting this to the RE, he had been told that the platform should be safe and any repairs would hinder the programme. Fortunately, Bill had had the opportunity to mention this to a FFP Partner and the welds were repaired. It later transpired that, due to a shortage of welders, painters had been drafted in to help with the welding.

The Chairman questioned the requirements of the CDM Regulations which he believed had helped to clarify roles and responsibilities. He also reflected on previous BOF issues such as the need for independent checking of designs and the importance of supervision along the lines of the traditional Resident Engineer.

Colin Hall emphasised the importance of good communication in order to ensure the accurate transfer of information from office to site. His view was that the pressures of time and cost had a tendency to override the need for competence at all levels.

Neil Loudon agreed that there was currently a need for more supervision on site, not least to look after the client’s interests. He also cited the Works Examiner role which was similar to that of the RE but, above all, Neil echoed Alastair’s point that the concentration should be on people issues and behaviours, rather than the present focus on paperwork. He was aware of recent comparisons of non-compliances within Highways England contracts which was largely attributed to people factors. Finally, Neil noted that there were ongoing discussions in HE regarding the importance of an independent designer and a review of the quality of construction was being mooted.

Taking up the theme of the need for independent design and checking, Alastair Soane returned to the FIU where, although the root cause of the collapse had been the design, there had also been inadequate checks and third-party reviews. He pointed out that the checker was on a very low fee and suggested that low fee equated to low expectations. Alastair also believed that a checker should be *more* competent than a designer. Bill Harvey suggested that the FIU was basically a steel structure being designed in concrete

and the fundamentals were wrong; a case of the architect's tail wagging the engineer's dog?

Neil Loudon raised the question of independent checking now that designs were becoming ever more digital. In defence of the UK approach, Neil also referred to the 2005 collapse of the De la Concorde bridge in Montreal. Although 20 to 25 causes had been identified during the investigation, a contemporary check by Highways England had found that about 75% of those would have been identified as part of the UK Technical Approval process.

The Chairman questioned why there was no equivalent of the German *Statiker* or Proof Engineer. Alastair replied that a similar role was under consideration in the UK.

Henry Dempsey suggested that check regimes should be proportionate depending on the scale of the project, much as required for bridge categories in CG 300. He agreed, however, that there was a need for more supervision on site.

The Chairman concluded this part of the discussion and again thanked Alastair for stimulating the debate.

5. Some Thoughts on Competence

The Chairman invited Bill Harvey to give his presentation entitled "When Competencies Replace Competence" which Bill agreed could be uploaded to the BOF website.

ACTION 10: Paul Fidler

Starting with a photograph of Clifton Bridge, Bill explained that his commitment to be a bridge engineer had begun at the age of seven (67 years ago!) His themes were the importance of distinguishing between knowledge and understanding, and to know one's limitations. He quoted Richard Feynman, "*For successful technology engineering must take precedence over public relations for nature cannot be fooled.*", and the motto of The Royal Society "*Nullius in Verba*" (Take nobody's word for it – question everything or we are doomed to learn nothing!)

Bill then highlighted some practical examples, firstly of his work on the existing skewed arch viaduct widened as part of the Ordsall Chord project in Manchester. One span had been covered with a lining for cosmetic reasons after cracks had been identified and thereafter was a case of out of sight, out of mind. Bill's work had identified considerable lateral movement whilst a train passed over the viaduct and later removal of the lining had revealed considerable progressive deterioration.

Turning to competence in measurement, Bill's emphasised that monitoring should be comprehensive and able to give answers to the questions that needed to be asked. He then showed a video clip and stills which captured the collapse of a viaduct spandrel at Nine Elms in London during works over Christmas 2020:

[Watch: Wall collapses during Network Rail work on Nine Elms viaduct - New Civil Engineer](#)

Bill also showed photos of other rail bridge wingwall or parapet wall failures, some of which had been caused by the simple action of repeatedly raising ballast levels without consideration of the effects on the structure.

Bill then showed a series of masonry arch failures or defects all of which had either been missed or wrongly interpreted in terms of cause and effect. He also questioned whether of pinning masonry arches was the appropriate solution, suggesting that relative stiffness was a far more important consideration than strength.

The Chairman thanked Bill for his presentation, and for his paper which he had prepared and had been issued ahead of the meeting, and asked if some of the failures such as at Nine Elms should have been identified during inspections. Bill suggested that inspections (or examinations) had become too process orientated and the human element neglected. There had been a number of issues with respect to Nine Elms but others, such as the lining of the Ordsall arch, were indicators of a complete lack of understanding of basic structural behaviour. But, in a masonry arch, where there is movement there will be a crack. And, if the intrados is lined, the exact location of a crack cannot be determined. Above all, Bill suggested that engineers needed to be trained not to just look but to *observe* and to *think* and question *why* defects are present.

Paul Thomas welcomed Bill's views on the importance of inspections and pointed out BOF's initiatives to raise the profile of inspectors and to prove their competence.

Referring to the circumferential cracking below a spandrel which indicated separation, Liam Duffy agreed that stitching was inappropriate. He cited Graham Tilly's book "The Conservation of Bridges" which advised that stitching the crack would only lead to parallel cracking further inside the arch. Bill suggested that the practice in Germany should be followed for bridge repairs: do nothing that cannot be undone.

Hamish Harvey questioned whether inspections were checked by peers or more senior inspectors. Neil Loudon noted that Highways England undertake or commission between 10,500 and 11,000 inspections a year and sample checks are mostly limited to content and process. He suggested, however, that the most important issues were to consider trends and to take a more strategic view. He was also concerned about the inability to inspect those elements that were both hard to access and structurally critical.

Bill Harvey suggested that there could be a benefit of having an elite group of, say, ten inspectors who could be charged with auditing inspections on site or to be called in when a second opinion was needed. Keir Wilson questioned what a suitable sample size might be: was 10% enough? He supported the audit approach rather than a check which tended to be a box ticking exercise. Neil Loudon commented that the HE client team had audited up to 10% of inspections with mixed results and fed back the need for improvement. He acknowledged, however, that it was easier for an organisation

such as HE where budget and procurement pressures were not as great as for smaller owners. Hazel McDonald noted that Transport Scotland had three layers of inspection check, as well as a recent additional identifier for bridges with critical elements such as half-joints, post-tensioning etc. Firstly, the TS unit bridge managers review reports from operating companies before accepting them. Then a Performance Audit Group conducts quality audits on about 5% of inspections reports and finally another member of the TS staff also undertakes reviews of a small number of reports from each unit.

Henry Dempsey suggested that the options for auditing and checking inspections had to be dependent on the owner. Kevin Dentith agreed and recognised the differences in scale between Councils and resources available. He acknowledged that his own authority, Devon, was big enough to have an in-house inspection team where all inspections were checked by a Principal Engineer and there are independent checks for Principal Inspections.

The Chairman returned to Neil Loudon's comment on procurement and suggested that low price equalled low quality. Bill Harvey agreed and blamed client organisations for accepting unrealistic bids.

The Chairman thanked Bill for his contribution to the debate and welcomed his observations on the next agenda item.

6. Competency Frameworks and BICS

The Chairman briefly reprised BOF's early interests in developing bridge inspector competence which had eventually culminated in the LANTRA BICS. He noted the other schemes which were in use and thanked Jim Hall for issuing the CSS Wales scheme after BOF 65.

Graham Cole reported on a virtual meeting with LANTRA which he had attended along with Neil Loudon and Hazel McDonald. He outlined the latest position on the current uptake of the scheme but agreed to formally issue the statistics.

ACTION 11: Graham Cole/Richard Fish

[Post meeting note: The LANTRA report was issued with the first draft of these minutes on 18th February 2021.]

Graham also explained recent changes which had been made, including the modularisation into masonry, concrete and steel bridge inspections. He accepted, and it was generally agreed, that the overall performance of the scheme, and that of LANTRA, had not been as good as had been hoped.

Asked for his views on competency frameworks, Alastair Soane referred to the wider work being undertaken post-Grenfell to improve and maintain competency levels throughout the construction sector. Hazel McDonald mentioned the BSI Flex 8670 draft out for consultation which was being fast-tracked. Hazel was a member of the

CB2 committee which had already commented on it and she agreed to forward the 8670 draft for issue so that BOF members had the opportunity to respond to the consultation. Hazel noted that, although the document was generally building orientated, it did set out a framework for competency schemes.

ACTION 12: Hazel McDonald/Richard Fish/All

[Post meeting note: This was issued with the BOF 66 Actions v1 on 1st February 2021.]

Alastair concluded by suggesting that bridge owners asked themselves two questions should they ever be involved in a bridge collapse on the scale of Grenfell: what would the redtop newspapers say? And, more importantly, what would a judge say?

At this point, the meeting adjourned for lunch but not before the Chairman thanked Alastair and Bill for giving their time and for their contributions to the discussion.

7. Reflections on Morning Session on Competence

Discussion here mostly continued from Item 6 on LANTRA BICS.

Hazel McDonald reported that the Steering Group had challenged LANTRA over the poor communication issues, although she accepted that this had not been helped by LANTRA having to furlough staff. There had also been problems with the on-line application system which, although these now appeared to have been resolved, had made things difficult for those who were already in the system. On-line rather than face to face interviews also seemed to have worked well and could be seen as a positive from the pandemic, resulting in time and cost savings. The Transport Scotland position was that BICS was now a requirement for all of the Operating Companies.

Neil Loudon agreed that there was a need for both BICS to be re-energised and for inspectors to make progress with their e-portfolios. Neil noted that, although there had been some issues with Highways England inspections, not least Covid related, there was an overall improving picture in Highways England where BICS remained a requirement.

In Northern Ireland, Daniel Healy reported that BICS was now a requirement for external providers but not as yet for in-house inspectors where there was a reluctance among senior managers due to the cost and the ongoing churn of staff.

From the chat box for this item:

Jason Hibbert: BICS is a requirement for the Welsh Government. We are working with our two trunk road agents on the timescale for full implementation.

Kevin Dentith gave credit to BOF and UKBB for recognising the need for, and promoting, bridge inspector competence. He also welcomed the role that BICS had played in raising the profile of the wider subject of competence for inspectors. It was

unfortunate, however, that the BICS roll-out had coincided with year on year budgetary reductions that local authorities had had to manage. Kevin's view was that the BICS costs in this context partly accounted for the poor take-up of the scheme by ADEPT members. Consequently, other options had needed to be considered which had led to the Devon CC Scheme, which Kevin considered to be comparable with BICS, and those from CSS Wales and SCOTS.

Jim Hall advised that he had been enthused by the BICS concept which met his personal aspiration that bridge inspection should be seen as a career option. He also expressed his concern in the progressive deterioration of professionalism in local authorities, now at the point where there are very few professionally qualified and chartered engineers in senior management positions in local government. He was aware of examples where this lack of senior managers' awareness made it difficult to convince them of both the need and the budget allocation. Jim had issued the CSS Wales scheme after BOF 65 and repeated his assertion that it was also comparable with BICS. Graham Cole asked if it was cheaper than BICS; Jim confirmed that it was not, as assessors' time from neighbouring authorities had to be accounted for.

From the chat box for this item:

Sue Threader: Does anyone have a view on how much capacity (in terms of accredited inspectors) in the consultancy sector? We would like to make BICS accreditation a requirement, but will I be able to find inspectors when I need them?

Malcolm Cattermole: A recent tender in FC for a 3yr contract for PIs & GIs of our higher risk bridges had 10 responses, none of whose inspectors were BICS accredited. The best bid was from a company whose MD has been an advisor to LANTRA.

Hazel McDonald: UKBB has circulated a questionnaire for owners to set out what works and what doesn't in BICS. It's looking at the suitability of the attributes and the attainment ratings. You should have received a copy from Justin at CIHT: BICS competencies and attainment ratings survey <https://www.surveymonkey.co.uk/r/BICS> Deadline is 29th Jan but speak to Justin at CIHT if you require an extension.

The Chairman thanked Jim for allowing the CSS Wales Scheme to be shared and welcomed the idea of a comparison with BICS.

[Post meeting note: Discussion on this topic continued after the meeting and Richard Fish was asked to request the release of the ADEPT and SCOTS schemes so that objective comparisons could be made.]

ACTION 13: Richard Fish

8. UK Bridge Governance: Status Quo or Rethink?

Richard Fish had prepared a short paper/thought piece which addressed the following:

- Some reflections on the current arrangement of three national bridge groups: ADEPT, BOF and UKBB.
- The lack of a professionalism at a senior level in those charged with making key decisions on risk (quoting from John Buchan¹)
- Whether there is a need for more independence in being able to influence governments on the urgency to invest in our bridge stock.

The Chairman welcomed these ideas, reiterating the comparison made in the paper between the pandemic messaging between SAGE and Independent SAGE. He also suggested it reflected the SCOSS position of independence which Alastair Soane had described.

Kevin Dentith suggested that working groups to UKBB could be seen as being more independent, as could the role that he had in liaising with the RAC Foundation on their annual survey.

It was agreed that these topics should continue, and Richard agreed to take the paper to UKBB.

ACTION 14: Richard Fish

[Post meeting note: Although on the UKBB agenda for the meeting on 18th February, the item was deferred until the next meeting on 19th May 2021.]

9. Future Bridge Management Systems: Mapping out a Vision

This item had initially been intended as a way of comparing pros and cons of existing systems (BOF 65 Action 5) but following discussions with Richard Fish, Keith Harwood had prepared a short presentation on what is needed rather than what we have. The slides are to be uploaded to the BOF website.

ACTION 15: Paul Fidler

Keith noted that there about ten software providers, both multi-asset and bridge specific, although some organisations had chosen to develop in-house systems. The management of data was mixed but links to more recent developments in GIS and sensor technologies were minimal. Similarly, there was little or no use being made of AI or machine learning. Keith suggested that more work was needed to develop these ideas, both as possible collaborative research and at a future themed BOF meeting.

The Chairman thanked Keith for his presentation and invited questions and comments, including any thoughts that members had on their own systems. He reported that he

¹ “The task of preserving the old [bridges] and keeping a watchful eye on the new is a national duty, to which I am glad to think our people are now alive. We have no Pontifex Maximus, but his office is in commission among public authorities and a great magnitude of able engineers.” John Buchan MP, Introduction to British Bridges (An Illustrated Technical and Historical Record). Published by The Organising Committee of the PUBLIC WORKS, ROADS AND TRANSPORT CONGRESS, London, 1933

had recently seen and been impressed by a demonstration of the Bentley Geo-Connect asset management system.

Keir Wilson suggested that any system requires a background of data and there was a basic problem in that most bridges have very little data. The Chairman noted that this was an issue which Cambridge University had been working on and had struggled to gather suitable information. He suggested the Centre for Digitally Built Britain (CDBB) might be able to help scope such a project. He also felt that this was something which TRIB would support and agreed to raise it with the TRIB team.

ACTION 16: Chairman

As requested, others described their present system or development plans as below:

Kevin Dentith: the Devon CC system is primarily highway orientated with a bolt-on bridges module.

Steve Patrick: Connect Plus M25 use Agile Assets but part of their contract concerns long term performance improvements which will include a decision support tool which will automatically flag changes in condition. The company are also committed to digital transformation.

Colin Hall: Network Rail had spent the last ten years developing a new system which would have been out of date before commissioning. They were now selecting a base product on which to build specific platforms.

Nick Burgess: The old LUL system was document based but part of a comprehensive asset management package. There was a commitment to move to a BIM model as part of any new system.

The Chairman noted that only Transport Scotland had a bridge with a BIM model (for Queensferry Crossing). Neil Loudon reported that there had been a further delay in the BIM Level 2 implementation date to 2025. He also noted that this was another area of inconsistency with the various available BIM systems.

The Chairman thanked Keith for his thoughts on the way forward and asked for the subject to remain on BOF agendas.

ACTION 17: Keith Harwood/Richard Fish

From the chat box for this item:

Martyn Thomas: what are people's thoughts on Microsoft azure?

Sue Threader: (On BIM) RBT has not built a new bridge since 1970.

10. Net Zero Carbon – Next Steps

The Chairman emphasised the importance (in every sense) of keeping this item on BOF agendas and saw as it needing to be transformative if there was to be a global shift away from the existential threat from the climate emergency. He suggested that one of the ways of raising awareness within BOF and the wider bridge owning community would be to share examples of good practice.

Sue Threader reported that the recent Rochester Bridges major maintenance had considered the amount of embodied carbon in the project. Sue also noted that one of the main sources of carbon had been from operatives driving to and from site; some 197 tonnes of CO₂. Options for offsetting the project carbon had been considered in comparison to the numbers of trees that would need to have been planted as compensation. RBT had also committed to being carbon-neutral for bridge management and maintenance by March 2022, including the elimination of the use of diesel and a move to electric vehicles and bikes, powered by renewables. The next step was to become carbon positive.

At the request of the Chairman, Sue agreed to present on this at BOF 67.

ACTION 18: Sue Threader/Richard Fish

Jason Hibbert reported that good progress had been made by the Welsh Government on this topic as it fits well with the current administration's political anti-roads agenda. As this was likely to mean more funding for maintaining existing infrastructure, he was trying to develop the current new-build guidance to cover maintenance activities. This would include gross replacement carbon, as well as cost, which was hoped would inform decisions on options for interventions. Jason (or one of his team) agreed to present on this at BOF 67.

ACTION 19: Jason Hibbert/Richard Fish

Steve Patrick noted that Connect plus M25 were considering a similar approach.

Graham Cole referred to pioneering work on this subject in a paper written in 2003 by Kristian Steele and noted the importance of a literature review in order to ensure that there was no unnecessary repetition of earlier work.

From the chat box for this item:

Jim Hall: How do we measure carbon production?

Ian Norriss: We have carbon modelling and a carbon calculator to help us choose the lowest carbon option for construction projects. We have to show evidence throughout our business case development. We also have now moved to whole life carbon planning, rather than just focusing on the construction phase.

Sue Threader: We have decided to focus on carbon in the maintenance and management processes and get them as close to zero as we can first - rather than worrying about the embodied carbon in the structure itself. First target is to tackle what impact we are having now rather than worrying about the carbon from 150/50 years ago. That will come in the future and help to demonstrate the importance of maintenance of existing structures.

Jim Hall: We need a SAVI revision.

Keith Harwood: Interesting suggestion Jim, that SAVI could add carbon calculation for maintenance. I'll look into it!

Jim Hall: Would be nice to have 1 system

11. Updates: DMRB, MCHW, BIM... and Brexit

Neil Loudon gave this update and agreed that his presentation could be uploaded to the members only section of the BOF website.

ACTION 20: Paul Fidler

As far as the DMRB is concerned, only two standards remain to be published: structural safety reporting and scour, although there could be revisions to others as and when needed. Eight webinars have been held to explain the changes which had generally been well received.

The MCHW revision is scheduled to be completed by March 2025 and, as opposed to the DMRB, will be published in its entirety as one document.

The Bridge Inspection Manual update will follow a survey of users soon to be undertaken but any future update will be digital rather than in print.

As for Brexit, Neil confirmed that the UK was still well represented on Eurocode committees, but he was aware that the most significant implications would be for materials suppliers – on both sides of the channel.

The Chairman thanked Neil for the updates and invited questions or comments. Kevin Dentith welcomed the opportunity to have a say on the revisions to the BIM. Jim Hall asked about the timing of the DMRB revision to BD 97. Neil replied that this should be in the Spring of 2021 and confirmed that it would include references to the old BA 59 on hydraulic actions which would include an assessment of the effects of debris.

From the chat box for this item:

Steve Patrick: Bridge Inspection Manual, any plan to include Tunnels? Also links to the Performance guidance would be good.

Paul Fidler: Future use of markings in the UK: From 1 January 2022, the CE marking will not be recognised in Great Britain for areas covered by this guidance and the UKCA marking. However, a product bearing the CE marking would still be valid for sale in the UK so long as it was also UKCA marked and complied with the relevant UK rules. Separate rules apply to medical devices.

<https://www.gov.uk/guidance/using-the-ukca-marking>

12.Implementation of CIRIA Guide C764 Hidden Defects in Bridges

As Nicola Head had been a late apology for this meeting and was due to lead on this item it was agreed that it should be deferred to BOF 67.

ACTION 21: Richard Fish/Nicola Head

13.Updates on Current Bridge Issues and/or Research

The Chairman invited contributions from the meeting:

a. RACF Survey Results

Kevin Dentith briefly summarised the background to the annual RAC Foundation survey of bridge owners, including the fact that, since 2016, he (through ADEPT) and Liz Kirkham (via UKBB) had been able to influence some of the survey questions. Kevin reported that he had only received the results from the 2020 survey on the evening before this meeting and, although the information was still being analysed, gave the following headlines:

- There had been 201 responses (out of a possible 211)
- The survey covered about 85,000 bridges, 72,000 of which are in local authority ownership
- 18 authorities were not carrying out General Inspections
- 42 authorities were not carrying out Principal Inspections
- Some authorities were not doing either
- Only 33 authorities were undertaking Stage 1 scour assessments
- Only 15 authorities were undertaking Stage 2 scour assessments
- 26 collapses had been reported (ten full – and seven of these in one authority – and 16 partial)
- Only one authority had been reluctant to share information on collapses
- Many authorities had not carried out PTSIs (NB the survey stated PTISI completion in the last 20 years)

Kevin questioned whether there could be a correlation between the number of collapses and the lack of scour assessments which might be revealed as the survey results were examined in more detail. He also pointed out that scour assessments could be funded from capital budgets which were under less pressure than revenue.

On the issue of not carrying out scour assessments, Richard Fish wondered whether this was a conscious decision or was it a case of bridge managers being unaware of the DMRB requirements. Hazel McDonald asked whether, once a Stage 1 scour assessment had been completed, there was any need to repeat them. Kevin Dentith suggested that this should be a decision taken at each Principal Inspection. Neil Loudon reported that this requirement would be made clear when the new standard is published.

Although some of the results were concerning, Kevin concluded that the survey provided useful evidence in lobbying for increased funding for bridge maintenance.

Jason Hibbert noted that he had invited the RAC Foundation to contribute to the consultation on the Welsh Government's new Transport Strategy and they had been very keen to help in this regard.

b. Feedback from Big Bridge Group meeting

Steve Pattrick reported that the Group had recently met and the following were key points from the discussion:

- Surfacing materials
- Inspection methods including the use of drones
- Cable investigations
- Managing data

c. 3-D Printing

Henry Dempsey described a Glasgow City Council footbridge project with BAM Nuttall where 3-D printing of approach ramps was being considered. He had seen an impressive presentation and agreed to issue a link to the website.

ACTION 22: Henry Dempsey/Richard Fish

d. HoloLens Communication

Sue Threader reported that RBT were trialing this augmented reality system for communication between site and office teams and early results looked promising. Sue agreed to present on this at a future meeting.

ACTION 23: Sue Threader/Richard Fish

e. Scour

Kevin Dentith updated the meeting on the continuing scour research collaboration between Devon CC and Exeter University and the latest concept of debris catchers upstream of a bridge. A full-scale trial was currently underway. Neil Loudon commented that debris volumes could be being exacerbated by the current practice of trying to slow floods with the use of natural methods such as logs or faggots which themselves could add to the flotsam in extreme events. Although delayed by Covid, Hazel McDonald reported that the previously reported proof of concept scour detection trial had been extended to a further three bridges in Transport Scotland's South West area, with SRRB funding.

f. Bridge inspections using tablets

Neil Loudon advised that this was being trialed by Highways England.

g. Wind shielding

Hazel McDonald noted that the SRRB were working on a project to determine the effectiveness of wind shielding on the Queensferry Crossing. A draft report should soon be available on the SRRB website.

[Scottish Road Research Board \(transport.gov.scot\)](http://transport.gov.scot)

h. CIRIA Masonry Arch Assessment Guide

Graham Cole reported that the final draft should be presented to the Steering Group in March 2021 and it was hoped that it might be published this autumn.

14. Bridges 2021 Conference and Awards

Richard Fish reported on recent conversations that he had had with José Sanchez: The dates for the conference had now been set as May 19th and 20th [*Post meeting note: the dates have recently changed again to **May 26th and 27th***] but it was going to be virtual. The organisers had been pleased with the attendance at eBridges Scotland last year (some 1200 delegates) but had found the software problematic. The May conference is to use DigiLounge software, complete with virtual tables, and would probably be a combination of presentations, Pecha Kucha and workshops. Delegates would be charged a relatively modest fee and up to 800 could be accommodated.

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

Richard also reported on the newly introduced awards scheme and the fact that the judging panel consisted mostly of BOF members. He also agreed to clarify the criteria for the BOF Award for Lifetime Achievement to Bridge Engineering in the UK.

ACTION 24: Richard Fish

15. BOF Subscriptions

The Chairman noted that invoices had been issued and the majority paid. Those who were late in paying will be emailed by the Laing O'Rourke Centre admin team. He also referred to two members who had more than one outstanding invoice and confirmed that he would soon be taking a decision on whether to discontinue their BOF membership.

ACTION 25: Chairman

16. Any Other Business

a. Pont Llannerch

Sadly, one of the consequences of the recent Storm Christoph had been the significant flooding in North Wales which had led to the collapse of this bridge. Jim Hall was kind enough to share the experience with a short presentation which he later agreed could be uploaded to the members only area of the BOF website.

ACTION 26: Paul Fidler

Pont Llannerch was a single span arch dating from around 1780 to 1820. Although the arch was slightly misshapen, it had been assessed (using MEXE) at 40t ALL and had also been the subject of a stage 1 scour assessment to both BA 74 and BD 97. The latter had required a stage 2 scour assessment which had been undertaken in the summer of 2020 using divers. The bridge had survived a similarly severe flood event in 2012 although, from older records, it was thought that the alignment of the river had altered during flood events in 1947.

A significant feature was a mature tree in the riverbank just upstream from one abutment which had also been lost in the flood. Jim's hypothesis was that the tree had been taken out before the bridge which had then allowed the flood waters to attack the abutment itself and scour the material behind it leading to the failure. Ironically, works to remove the tree and stabilise the riverbank had been planned for 2021.

Clearly reflecting the views of the meeting, the Chairman thanked Jim for being so candid in describing what must have been a difficult experience both at the time and subsequently. He noted, however, that it was just this sort of knowledge sharing which was essential for all bridge owners. He invited questions or comments.

Paul Thomas asked whether the uprooted tree might have hit and damaged the bridge which in turn had caused the collapse, but Jim did not believe this to have been the case.

Liam Duffy referred to a small volume of grout that Jim had pointed out in the picture of the collapsed bridge behind one of the spandrel walls. It was clear that the historical intent had been to stiffen the fill but, as this appeared to have been mostly clay, the grouting had not been effective. Jim agreed; both in terms of the clay fill and Liam's view that grouting fill was not good practice. Liam confirmed that this no longer happens on TII bridges.

Jim also pointed out other historical alterations, such as the spandrel walls having been rebuilt at some point although with the walls corbelling out from the arch face voussoirs. Jim described this as "road widening by stealth".

b. Welsh Government Transportation Strategy Consultation

Jason Hibbert thanked Richard Fish for responding to this consultation on behalf of BOF, as well as any other BOF members who had responded on an individual basis.

c. Railway Paths Survey

Similarly, Paul Thomas thanked anyone who had completed this survey.

d. London’s Greatest Bridges – Channel 5

Not just because of her starring role, Sue Threader recommended this series hosted by Rob Bell as valuable CPD.

e. Bridge Condition Labels

Neil Loudon referred to a recent article in the Times which had been written following an FoI request. Overall bridge conditions had been taken out of context, partly as a result of the language used in inspection reports. Highways England were now considering amending these from “very good” to “very poor”.

17.Next Meetings

BOF 67 will be on 20th April 2021 and also on Zoom.

BOF 68 will be on 19th October 2021 and hopefully in Cambridge.

ACTION 27: All

18.Close

The Chairman closed the meeting, thanking everyone for their contributions.

Richard Fish,
BOF Technical Secretary,
15th March 2021