

BRIDGE OWNERS FORUM

MINUTES OF MEETING BOF 45: TUESDAY 27 JANUARY 2015 AT THE WINE ROOM, KING'S COLLEGE, CAMBRIDGE

PRESENT

Campbell Middleton	Chairman & Cambridge University Engineering Department (CUED)
Nick Burgess	London Underground
Graham Cole	ADEPT
Rob Dean	Network Rail
Liam Duffy	NRA (Ireland)
Richard Fish	Technical Secretary
Wayne Hindshaw	Transport Scotland
Rod Howe	Canal and River Trust
Neil Loudon	Highways Agency (HA)
Paul Monaghan	LoBEG
Graeme Muir	SCOTS
Stephen Pottle*	Transport for London
Tudor Roberts	Welsh Government
Paul Thomas	Railway Paths Ltd.
Paul Fidler	CUED
Paul Waterfall**	iMETRUM
Matt DeJong**	CUED
Niamh Gibbons**	CUED

*Morning only

** Part

Introduction

The Chairman welcomed members to BOF 45, acknowledging the change of venue and the different lunch arrangements. He noted the historic significance of the Wine Room and, among others, pointed out the portraits of John Maynard Keynes and E M Forster.

1. Apologies

Apologies had been received from the following:

David Castlo	Network Rail (for whom Rob Dean was substituting)
Jason Hibbert	Welsh Government (for whom Tudor Roberts was substituting)
Barry Colford	Large Span Bridge Group
John McRobert	DRD (NI)

The Chairman noted that Barry Colford had been planning to attend but had to give last minute apologies. John McRobert had advised that he was unable to attend due to budget constraints in Northern Ireland. He welcomed Rob Dean and Tudor Roberts to the meeting in lieu of David Castlo and Jason Hibbert respectively. The Chairman also noted that Eoghain Nagle of Irish Rail had now committed to BOF for future meetings but he was still awaiting a response from Northern Ireland Rail and would consider whether their invitation should be withdrawn.

ACTION 24: Chairman

2. Previous Minutes – BOF 44: 29th October 2014

The minutes of BOF 44 were accepted and it was agreed that they could be placed on the BOF website:

ACTION 25: Paul Fidler

Purely as a point of clarification on Page 9, Item 7, Paragraph 5, Neil Loudon explained that the Highways Agency were now adopting what was known as a “fence to fence” approach which was hoped would benefit both the management and maintenance of all assets on the network and the travelling public. This meant that for any works on any aspect of the network, consideration would also be given to undertake work on other assets: drainage, lighting, safety fences, *bridges* as well as carriageway. Neil pointed out, however, that such additional works would only be considered – not necessarily carried out.

3. Actions from BOF 44

References in the text below refer to the numbered actions on the BOF 44 Action Sheet. Boxed reference numbers relate to the BOF 45 Actions:

Action 2, Temporary Bridge AIP Guidance:

Neil Loudon reported that whilst progress was being made, he needed to impose some time constraints. He would provide an update at BOF 46.

ACTION 1: Neil Loudon

Actions 3 & 4, Automating Bridge Inspections:

Stephen Pottle reported that he had heard no more on this since the last meeting and suggested that it was now a lost cause as there did not seem to be any output from the project. The Chairman expressed his disappointment and frustration at the way that this had been handled by both parties to the contract. It was agreed that the matter should be raised at UKBB.

ACTION 2: Richard Fish

Action 5, ADEPT Soils and Materials Group Report:

Graham Cole reported that he had met with Stephen Child, chairman of the ADEPT Soils and Materials Group who had conceded that the chapter on bridge deck surfacing needed to be rewritten. Graham also noted that the report was not on the ADEPT website.

Action 6, Atkins Study into Bridge Deck Water Management:

Neil Loudon noted that he had sent an email after BOF 44 asking for case studies but this has not been issued to BOF members. Such examples, both good and bad were still welcomed. The Chairman agreed to forward Neil's original email and asked all organisations to offer case studies, which could include maintenance as well as new build sites, to the Agency's Project Manager, Jim Gallagher.

ACTION 3: Chairman/All

Neil explained that the project was due to conclude in April. The Atkins report would be reviewed and could possibly lead to a revision of the waterproofing standard or an IAN. Neil offered to present on the findings at BOF 46.

ACTION 4: Chairman/Neil Loudon

Action 7, Guss Asphalt Surfacing:

Neil Loudon reported that he had also emailed the Chairman on this subject which had given a status report on the use of Guss Asphalt. The Chairman agreed to forward the email.

ACTION 5: Chairman

Neil reported that the resurfacing of Avonmouth Bridge using the material had been inspected and, although he had yet to see the report, he understood that there was evidence of polishing and cracking which was thought to be attributable to the thin steel deck as well as the laying process.

Wayne Hindshaw explained that the material was a polymer modified asphalt which had to be laid in a continuous operation. The exact material varied from site to site as local aggregates were used. Pictures of the Guss Asphalt resurfacing of Kessock Bridge could be viewed on the Transport Scotland website.

It was noted that some absent BOF members, Barry Colford and John McRobert also had experience of using the material.

Action 8, Guest speakers at future BOF meetings

The Chairman reported that he had reviewed all existing suggestions for guest speakers but welcomed others from BOF members. Stephen Pottle suggested that CIRIA should be asked to speak on the Hidden Defects project.

ACTION 6: All/Chairman

Action 10, Hidden Defects in Bridges: CIRIA Research Proposal:

Although acknowledging that this would be discussed in more detail as part of the agenda, the Chairman confirmed that Rod Howe should act as the communication conduit to BOF but also asked for the names of all those who sat on the Steering Group to be circulated.

ACTION 7: Project Steering Group Members

Rod Howe reported on the first meeting of the Steering Group which had been held on 23rd January: there had been a general discussion which mostly had focussed on a list of possible defects. Neil Loudon suggested that the better emphasis should be to consider a list of details, some of which would have potential defects. Stephen Pottle suggested that the Steering Group needed to push the Contractor, Arup/Aecom. The Chairman repeated his view that BOF should be recognised for its role in initiating the research but also noted that he, Graham Cole and Richard Fish had all be included in the Arup/Aecom tender (and not all with their explicit permission).

Wayne Hindshaw reported that Transport Scotland had its own Hidden Defects procedure which he agreed to issue.

ACTION 8: Wayne Hindshaw

Action 11, SCOSS and CROSS

The Chairman repeated his earlier encouragement that all BOF members should sign up for these newsletters.

Discussion extended into the number of cases of premature bolt failures on bridges and other significant structures: the Chairman referred to failed bolts falling from the Leadenhall Building in London which he feared was due to hydrogen embrittlement. Wayne Hindshaw cited problems on the Clyde Arch (although not thought to be a bolt problem) and the Forth Bridge and Tudor Roberts reported similar problems had been found in Wales. Richard Fish suggested that Barry Colford had more experience of bolt problems than any other owner and it was agreed that Barry should be asked to provide an update at BOF 46.

ACTION 9: Chairman/Barry Colford

The Chairman recalled earlier problems reported by Network Rail on Macalloy bar failures in transverse prestressing but Rob Dean reported no recent problems.

The Chairman considered that bolt sources, quality control and testing regimes should be reviewed and suggested that there was a need to liaise with building structural engineers. Paul Monaghan offered to seek information on the Leadenhall failures and advise at the next meeting.

ACTION 10: Paul Monaghan

Returning to the original topic of SCOSS/CROSS notifications, the Chairman agreed to issue the appropriate links.

ACTION 11: Chairman

Action 12, Train Borne Geometry Measuring System:

Nick Burgess agreed to issue the report on both the methodology and the results summary which could be uploaded respectively to the public and confidential parts of the BOF website.

ACTION 12: Nick Burgess/Paul Fidler

Actions 14, ADEPT Representation on BOF

Graham Cole agreed to raise the question of ADEPT representation at the ADEPT Bridges Group meeting on 29th January.

ACTION 13: Graham Cole

Action 15, Meeting with UKBB Chair:

The Chairman reported on his meeting with Dana Skelley from the previous day when he had expressed concern over the lack of capacity in, and engagement with, DfT, as exemplified by the unexpected non-attendance of Steve Berry at today's BOF meeting. Dana had agreed to review the situation and raise the issue at UKBB. She had advised, however, that DfT had informed the UKRLG and Boards that a research budget was now available. [*Bids for research were discussed under Item 6 below*]. Dana had also emphasised that any research project had to meet high level strategic objectives of UKRLG.

Action 16, Network Rail BOF Representative:

Rob Dean advised that David Castlo had now been confirmed as the Network Rail representative on BOF.

Action 17, Surveyor Bridge Conference

The Chairman noted that Richard Fish would be presenting the BOF position.

Action 18, Presentation to Parliamentary Infrastructure Groups:

It was noted that the Chairman of this group had recently stood down. The Chairman agreed to contact the Secretariat with a view to seeking an opportunity to give a presentation, after the General Election.

ACTION 14: Chairman

Action 19, Highways Agency Research:

Neil Loudon confirmed that he was responsible for a portfolio of research across various assets and had put an item in the budget for bridge related research. Neil noted that this did not mean that funding was guaranteed but it would enable the HA procurement to be used. Stephen Pottle offered assistance in either the process or as an alternative procurement option.

Action 20, Grand Challenges Document:

Discussed under Action 21 below.

Action 21, Bridge Consultants Forum and/or Bridge Contractors Forum:

Stephen Pottle suggested that a Contractors Forum would be of benefit, giving the opportunity to hear of new construction techniques and also for BOF to raise concerns over quality control and supervision. Rob Dean agreed, offering the view that BOF would have the chance to present a long term vision (as could be set out in a revised Grand Challenges Document) and asking how the contracting industry could contribute to it. Rob also noted that Network Rail had recently held a similar meeting which had identified some headline issues for the next 20 years which might inform the review of the Grand Challenges Document.

The Chairman agreed to consider a format for BOF 47 which could be held over two days in October, including a suggestion that the meeting might benefit from having a facilitator.

ACTION 16: Chairman

Paul Monaghan suggested that it was essential to get the right level of contractor attendance; having sales or business development people would not be beneficial.

The Chairman then considered how best to arrive at a revision of the Grand Challenges document. It was agreed that Paul Fidler would establish a BOF web share point for BOF members to contribute their thoughts.

ACTION 17: Paul Fidler/All

Action 22, Bridge Inspector Competency Accreditation:

Nick Burgess reported that all LUL inspectors were now fully compliant with their own scheme but he agreed to keep in touch with developments of the new scheme and consider possible future realignment.

Action 23, Tagging Technology:

Neil Loudon advised that this work was not yet complete but agreed to provide an update at BOF 46.

ACTION 18: Neil Loudon

Action 24, Highways Agency:

Neil Loudon reported that the new company would be known as Highways England and was still on target to be established on 1st April 2015 as long as there remained enough parliamentary time for the Infrastructure Bill to be passed. The new company would be responsible for a £15bn budget over a five year period. There would be two regulators: Transport Focus, dealing with customer issues and the Office of the Rail Regulator which would be re-badged and would deal with Technical issues. Rob Dean confirmed that Network Rail had been helping to prepare for the new regulatory role.

As part of the preparation for the new company, the Agency had been on a “Transformation Journey”; seven work streams had been established and Neil was part of the “Capable Assets” stream. There will be five year “Asset Periods” which would overlap. Neil anticipated that relationships with devolved administrations and other major owners would be enhanced, especially with respect to standards. He also confirmed that the company would continue to offer support to DfT with respect to political matters. Finally, Neil confirmed that Highways England would retain responsibility for the Historic Rail Estate (formerly BRPB).

Action 26, Technical Approval Guidance on Phased Works:

Neil Loudon agreed to provide an update on this issue at BOF 46.

ACTION 19: Neil Loudon

Action 27, Safety Fences:

Wayne Hindshaw reported on two research projects in progress: testing at impact angles greater than 20°, such as on tight bends, and alternative materials and systems that were on the market. Wayne agreed to make the project briefs available.

ACTION 20: Wayne Hindshaw

Wayne also noted that the Scottish Road Research Board were inviting bids for research projects and agreed to send the appropriate forms to the Chairman.

ACTION 21: Wayne Hindshaw

Action 28, Dealing with Parapet Impact Damage

Forms had been issued with the BOF 45 agenda.

Action 29, Buried Joints

Liam Duffy gave more details of his Buried Joint issues that he had mentioned at BOF 44: four joints had failed on a single bridge, all within the maintenance period. The Joint sub-contractor had measured the vertical displacement at the joints which was >1.3mm, the maximum value given in BD33. Liam noted that the depth of the joint was <90mm and that the joint had been fully specified by the designer asked if other had experienced similar failures.

Stephen Pottle reported a Tfl joint failure even before the maintenance period had started but it was thought that this was due to thin surfacing and discussions were ongoing.

Graeme Muir suggested that it was better to specify joints as a contractor designed item rather than the designer specification. He noted that most joint failures, in his experience, were attributable to poor workmanship. Wayne Hindshaw observed that joint life seemed to be generally longer for new build rather than maintenance. He also commented that this was another issue which would benefit from full time supervision and good record keeping. Paul Monaghan noted cases where even a specialist joint sub-contractor had admitted that they had installed the wrong type of joint. He pointed out that the choice of joint and method of installation had to be based on a wide range of factors and occasionally not all were considered.

Action 30, De-icing Materials:

As Barry Colford had been unable to attend this meeting, he would be asked to give an update at BOF 46.

ACTION 22: Barry Colford

Action 31, CSS Wales Representation:

The Chairman advised that he had been advised that Neil Garton-Jones was unable to support BOF as CSS Wales representative. Tudor Roberts agreed to contact Jacqueline Mynott of Caerphilly Council who chairs CSS Wales and ask for a BOF nomination.

ACTION 23: Tudor Roberts

All unrecorded actions from BOF 44 had either been completed or were discussed as part of the BOF 45 agenda.

4. Membership Update & Subscriptions for 2015-16

The Chairman reported that he was reviewing invoices for 2015/16 and tabled a list of organisations and amounts that had been used for 2014/15. He referred to issues with some organisations which should be noted:

- **DfT:** The Chairman understood that DfT were now reluctant to pay the invoice although the original conditions of agreeing the BOF Constitution and formalising the relationship with UKBB had been met in full. This was also a problem in that the principle had been established that national government organisations would cover respective local governments and if DfT were refusing to pay, this meant that ADEPT had no other means of payment.

- **Network Rail:** Rob Dean acknowledged that Network Rail had yet to pay their 2014/15 invoice and agreed to chase.

ACTION 26: Rob Dean

- **Transport for Greater Manchester:** The Chairman noted that TfGM were no longer members of BOF following Mungo Stacey’s departure but reported that they had agreed to pay a year’s subscription.
- **Highways England:** Neil Loudon suggested that HE’s contribution should be £1500 per annum, reflecting the fact that the Historic Railway Estate was also covered by HE.
- **TfL/LUL:** Stephen Pottle and Nick Burgess agreed to discuss their contribution(s) as they were both part of the same organization.

ACTION 27: Stephen Pottle/Nick Burgess

- **Transport Scotland:** Wayne Hindshaw suggested Transport Scotland’s contribution could be set at £1200 per annum.
- **Railway Paths Ltd.:** Paul Thomas asked for Railway Paths to be invoiced, not Sustrans.

The Chairman suggested that invoices should be sent as soon as possible and this was generally agreed.

ACTION 28: Chairman

5. DfT Priorities & Research Programme Overview

The Chairman explained that this item had been listed on the agenda in the expectation that Steve Berry would be in attendance as he had wanted BOF to be informed of the DfT research selection process.

6. BOF Bridge Research proposals for UKRLG/Bridges Board

In Steve’s absence, the meeting concentrated on the immediate request for projects to be submitted to UKBB on 3rd February. Graham Cole emphasised the importance of complying with the UKRLG/UKBB process as it gave the only opportunity to establish some bridge related research. He explained the method set out by Justin Ward at CIHT which included very little time to assemble ideas and followed by a review of proposals from all Boards by a UKRLG “Task and Finish” group before UKRLG made final recommendations. He noted that some of the questions on the forms were quite challenging as a fit with higher level UKRLG policies and strategies had to be demonstrated. The Chairman accepted that there was little point in complaining about timescales and process and agreed to a review of the list of priorities which had been drawn up at BOFs 41 and 42.

After discussion, the following projects were agreed:

1. A Strategic Guidance Document on the introduction of BIM for existing bridge operation and management. (What do we need to know and what data do we need to measure and/or collect?)
2. A Best Practice Guide to installation and management of safety critical fixings.
3. Methods of assurance of deterioration models and deterioration rates for bridge assets.

Discussion was also extended to determine possible approximate funding contributions from BOF members which is summarised in the table below:

Project	Possible contribution in £k									
	HA	TS	WG	NR	ADEPT	C&RT	RP	NRA	LoBEG	LUL
1	10	5				1				
2	10	5	?	?	?		2	10	?	?
3	10	5								

Notes:

WG: Supportive of proposals but funding to be investigated

NR: Funding to be investigated

ADEPT: Funding will be investigated but it is understood that research bids can now be made within ADEPT

NRA: Supportive of 2 but not yet engaged in 1 or 3

LoBEG: Funding to be investigated

LUL: Funding to be investigated

The Chairman asked all BOF members to consider and maximise their funding pledges.

ACTION 29: Chairman

Ball park estimates were agreed for the three projects as £100k, £75k and £100k respectively. Neil Loudon suggested that DfT would be leading the procurement on behalf of UKRLG but noted that they could invoice other parties in order to collect contributions from others.

In the event that any or all of the projects were successful in securing funding, discussion on possible steering group chairs and members lead to the following conclusion:

Project	Possible Chair	Possible steering group members					
1	TfL	HA	TS	NR	ADEPT	WG*	
2	HA	HA	TS	NR	ADEPT	WG*	
3	NR	HA	TS	NR	ADEPT	WG*	LoBEG*

*To be confirmed

Finally, Richard Fish agreed to complete the forms for consideration by UKBB on 3rd February.

ACTION 30: Richard Fish

7. Dynamic Monitoring of Bridges with Cameras

The Chairman introduced Paul Waterfall of iMETRUM who gave a presentation on the use of this technology. Paul agreed that the presentation could be uploaded to the BOF website.

ACTION 31: Paul Fidler

The Chairman invited questions or comments. Paul Monaghan asked whether the system could monitor movement in structural dampers and whether it could be applied to digital CCTV images. Paul Waterfall confirmed both with the proviso for the latter that the CCTV quality had to be sufficiently high.

Rob Dean described a similar system that Network Rail were developing which utilised hand held devices aimed at fixed targets.

Tudor Roberts asked if the system could detect movements in retaining walls which were presently being monitored under a BD79 regime. Paul was doubtful but agreed to discuss with the Welsh Government.

The Chairman thanked Paul for his attendance and presentation.

8. Sensing Displacement Mechanisms in Masonry Arch Bridges

The Chairman introduced Matt DeJong of CUED who gave a presentation on the use of Laser Scanning technology, including pioneering work in surveying King's College Chapel. Matt agreed that the presentation could be uploaded to the BOF website.

ACTION 32: Paul Fidler

The Chairman invited questions and comments. Paul Thomas asked about the repeatability of such surveys such that they might be used at successive Principal Inspections. Matt suggested that this might be possible as the system develops, especially if suitable post-processing can also be designed.

Paul Monaghan cited a zero live load rated jack arch bridge which he felt might benefit from such survey work and offered it as a possible test case for research.

Rod Howe related a similar experience utilising technology to monitor tunnel movements after visual inspections had identified possible problems.

The Chairman thanked Matt for his presentation and emphasised the potential that the system had in enhancing our understanding of bridge behaviour. He also introduced Niamh Gibbons who had attended for this item and was working at CUED on smart bridges with built-in sensors.

9. BOF Sponsored Research Projects - Update

9a. Bridge Inspector Competence

Neil Loudon reported on recent developments: he and Stephen Pottle had recently met with both DfT and Jennifer Walpole of LANTRA and another meeting had been arranged with the latter. The proposal was to consider the accreditation as a national Sector Scheme and organisational committees were being established to report to UKBB and BOF. Neil acknowledged that utilising a Sector Scheme was creating some problems for the NRA in Ireland but Liam Duffy was working on a suitable solution. Neil confirmed that LANTRA had visited training providers (UWE, Sheffield Hallam and UC Dublin Universities) with a view to accreditation but had also advised that they would certify experienced inspectors who had no need of training. It was hoped that accreditation could start in the early summer although certification may be phased in. Neil confirmed that the HA (HE) would require their inspectors to be certified and that the scheme would feature in the revision to the Code of Practice.

Liam Duffy concurred with Neil's summary but added that there was also a need to identify suitable assessors. He reported that the demand had been assessed by Atkins as in the thousands of inspectors.

The Chairman thanked Neil and Liam for their updates and also paid tribute to the work of Stephen Pottle in reaching this position. He also asked if all BOF members would support the scheme. This was confirmed by all with the possible proviso that political support might have to wait until it was endorsed by the Code of Practice. Neil agreed to provide another progress report at BOF 46.

ACTION 33: Neil Loudon

9b. Hidden Components CIRIA Project

Rod Howe repeated comments from earlier in the meeting and agreed to update at future meetings. Action 7 refers.

9c. CIRIA Scour Report

Rod Howe confirmed that the report was due to be published in February 2015 and would report further at BOF 46.

ACTION 34: Rod Howe

10. New Bridges and Major Projects Update

10a. Highways Agency:

- **HS2:** Neil Loudon reported on ongoing negotiations with HS2 on new major structures and noted that HS2 were working with BSI on embedded retaining walls. The Chairman suggested that a future BOF meeting might benefit from a presentation from HS2 and undertook to ask Andrew MacNaughton to nominate a speaker.

ACTION 35: Chairman

- Neil referred to the three options being considered for the **Lower Thames Crossing**. He also noted ongoing work on the **Silvertown Thames Crossing** and the **Mersey Gateway**. He also referred to the fact that David Climie was speaking at the Surveyor Bridge Conference on the **Queensferry Crossing**.

10b. Welsh Government:

- Tudor Roberts reported on the early stages of ECI for the £1bn **M4 Newport Bypass** as well as **Newtown and Caernarvon Bypasses**.

10c. Transport Scotland:

- Wayne Hindshaw noted the preparation work on the **Aberdeen Peripheral Road** and **A9 Perth to Inverness Improvements**.

The Chairman asked if procurement lessons were being learnt. Neil Loudon noted that the HA have been using their collaborative framework and reported that there was some exchange of information at a high level but many organisations were still using independent procurement processes. He confirmed that he was pushing his procurement teams to include an enhanced level of site supervision. Tudor Roberts advised that the Welsh Government tended to influence Value for Money *after* the appointment of the contractor.

11. Other Bridge Research Update

11a. TfL: There was no update as Stephen Pottle had had to leave the meeting by this time.

11b. Network Rail: Rob Dean reported as follows and agreed to issue a summary for uploading to the BOF website:

ACTION 36: Rob Dean/Paul Fidler

- ULS performance of masonry arches at Sheffield University
- Flood Debris effects on arch bridges at Exeter University
- Optical sensors in new works, focusing on interfaces between structural forms and/or materials
- Reclassification of arch bridges based on their original designs/designers

- Trespass and suicide prevention with respect to parapet heights. Other expressed an interest in this topic and Rob agreed to issue the output once available.

ACTION 37: Rob Dean

11c. Highways Agency: Neil Loudon commented on the following:

- A technical workshop has been arranged to consider issues associated with trespass etc.
- A standards overhaul was proposed on steel and concrete protection to make them compliant with Eurocodes
- HA were updating specifications for concrete repair and cathodic protection.
- Further trials were underway on the use of the drone for inspections and would include requirements for operational guidance and safety issues. Nick Burgess commented that LUL were also considering the use of a drone for inspections.
- HA were also reviewing the quality of some 700 inspection reports from different areas and agents. Inspection reports were self regulating at the moment but audits seem to concentrate on people and process but not the product: reports themselves. Early indications show that the results are mixed and there are concerns that price is driving down quality. Wayne Hindshaw explained that Transport Scotland review every inspection report produced by their agents as well as having a Performance Audit Group which carry out independent audits on a sample of reports. Rob Dean noted that Network Rail carry out independent verification of a small number of the 29,000 inspections undertaken each year. Nick Burgess reported that LUL have a number of reviewing engineers all of whom are Chartered.

11d. LUL: Nick Burgess had no major research topics to report.

11e. Railway Paths Ltd.: Paul Thomas reported that he was looking for methods of inspecting major viaducts remotely, possibly with a drone. Large viaduct inspections were often carried out using binoculars, with hands-on or hammer testing unrealistic. The Chairman suggested that the photographic approach as earlier outlined by Matt DeJong could be used and Neil Loudon suggested remote infra-red technology with more detailed inspection targeted at suspicious areas.

11e CUED: Responding to a question, the Chairman gave a brief overview of the Centre for Smart Infrastructure but offered a full presentation at a future BOF. Wayne Hindshaw noted that the Queensferry Crossing is being built with a high specification SHMS. The Chairman suggested that the propose session on this topic might also extend to the question of what data should be collected and how to use it.

ACTION 38: Chairman

12. Any Other Business: Future Agenda Items

- a) The Chairman asked if anyone had had recent experience of realkalisation. It was generally agreed that this method of treating carbonation was no longer in common practice.
- b) The Chairman advised that he wished to review the BOF constitution for future discussion.

ACTION 39: Chairman

- c) Paul Monaghan asked for a future agenda item on fire protection issues.
- d) Paul also asked for an item on standards, particularly for developer designed structures.
- e) Neil Loudon gave a reminder of the earlier commitment to an item on steel protective systems, suggesting that Geoff Bowden and Malcolm Astle should be invited to present.

The Chairman agreed to consider all of the above.

ACTION 40: Chairman

13. Proposed Dates for Future BOF Meetings

- a) BOF 46 was agreed to be held on 19th May.
- b) The Chairman would revise the proposed date for BOF 47 due to a clash with a UKBB meeting. He would also consider BOF 47 as a possible date for the proposed meeting with Contractors.

ACTION 41: Chairman

14. Closing/Summing Up

The Chairman thanked all members for their attendance and contributions to the meeting.

Richard Fish
Technical Secretary
18 February 2015