

BRIDGE OWNERS FORUM

MINUTES OF MEETING BOF 44: WEDNESDAY 29 OCTOBER 2014 AT THE WIMBER ROOM, ST PAUL'S CHURCH, HAMMERSMITH

PRESENT

Campbell Middleton	Chairman & Cambridge University Engineering Department (CUED)
Nick Burgess	London Underground
Graham Cole	ADEPT
Barry Colford	Large Span Bridge Group
Liam Duffy	NRA (Ireland)
Richard Fish	Technical Secretary
Jason Hibbert	Welsh Government
Wayne Hindshaw	Transport Scotland
Rod Howe	Canal and River Trust
Neil Loudon	Highways Agency (HA)
John McRobert	DRD(NI)
Paul Monaghan	LoBEG
Graeme Muir	SCOTS
Stephen Pottle	Transport for London
Paul Thomas	Railway Paths Ltd.
Paul Fidler	CUED

1. Introduction

The Chairman welcomed members to BOF 44 and thanked Stephen Pottle for making the arrangements for this meeting and for programming an excellent day of presentations and the visit to the flyover strengthening works on the previous day. He noted that speakers such as Steve Denton and Paul Jackson were obviously keen to have the opportunity to present to BOF which the Chairman believed recognised BOF's standing in the UK bridge world.

The Chairman confirmed that the agenda for this meeting had deliberately not been fixed as he hoped for an open discussion around a number of topics which he considered were fundamental to the *raison d'être* of the Group:

- Membership
- Priorities
- Relationship with the DfT
- Meeting format/context (ie the preference between Cambridge meetings and those such as at Forth last year and Hammersmith yesterday; and the balance between outside speakers coming to BOF against the opportunity for in-depth discussions.)
- Looking ahead: what and where next for BOF?

The Chairman acknowledged, however, that there were some matters of process that needed to be covered:

2. Apologies

Apologies had been received from the following:

Peter Brown	ADEPT
David Castlo	Network Rail
Huw Davies	SUSTRANS
Richard Frost	Network Rail

The Chairman explained the circumstances behind Peter Brown's absence and noted that he was unlikely to attend future meetings.

3. Previous Minutes – BOF 43: 13th May 2014

The minutes of BOF 43 were accepted and, subject to the following corrections, could be placed on the BOF website:

- **Page 2, Apologies:** Add Barry Colford.
- **Page 6, Item 3, Action 15:** Replace “42” with “41”.
- **Page 7, Item 4, 4th Paragraph:** Replace “Metronet” with “Tubelines”.

ACTION 1: Paul Fidler

4. Actions from BOF 43

References in the text below refer to the numbered actions on the BOF 43 Action Sheet. Boxed reference numbers relate to the BOF 44 Actions:

Action 2, Temporary Bridge AIP Guidance:

Neil Loudon updated the meeting on recent developments: RMD had entered the temporary bridge market and it was important that the Agency's work in this area was fully inclusive. The project, therefore, remained in its information gathering phase but Neil agreed to provide an update at BOF 45.

ACTION 2: Neil Loudon

Action 4, Automating Bridge Inspections:

The Chairman expressed concerns over the lack of a response from DfT over the contract management issues. Neil Loudon pointed out that Paul Hersey was no longer working with Steve Berry and it was agreed that Richard Fish would raise the matter at the next meeting of UKBB.

ACTION 3: Richard Fish

Action 5, Automating Bridge Inspections:

Stephen Pottle will request the final report for discussion at BOF 45.

ACTION 4: Stephen Pottle

Action 6, ADEPT Soils and Materials Group Report:

John McRobert, a member of this group, reported that there had been little discussion on bridge deck surfacing issues at the last meeting other than the fact that the Chairman, Stephen Child, had referred to an article in Transportation Professional magazine. Graham Cole suggested that Stephen should refer back to the author of the report, Ian Walsh, regarding specific bridge surfacing matters and agreed to discuss the matter with him.

ACTION 5: Graham Cole

Action 7, Waterproofing:

Neil Loudon reported that the Atkins study on water management on bridge decks was due for completion in April 2015; whilst it was mostly a desk top study, a number of case studies were to be included and a request would be issued through BOF in due course to ask for examples.

ACTION 6: Neil Loudon

Neil cited an example when surfacing had been planed off but the waterproofing and top of the deck had also been removed. This had not been reported and surfacing had been applied to the damaged deck. The Chairman noted that this was yet another example of the need for improved supervision.

Paul Monaghan asked about the scope of the work; Neil confirmed that arches, steel decks and footbridges were probably not included. He also noted that it might lead to a revision of IAN 96, Guidance on Waterproofing. Graham Cole suggested that updates to the old CSS/TRL guidance documents might also be a suitable outcome.

Action 8, Surfacing:

Wayne Hindshaw noted that the Transport Scotland website contained many helpful documents on this subject as well as that noted at BOF 43. There were case studies including the recent use of Guss Asphalt on Kessock Bridge. Neil Loudon noted the Highways Agency had had problems with the material and agreed to report further at BOF 45.

ACTION 7: Neil Loudon

Action 9, UKBB Business Plan

Richard Fish reported on the meeting of the UKBB on 2nd October 2014, not least that Dana Skelley was to replace Mike Winter as Chair. Dana had not been able to attend that meeting which had been chaired by Liz Kirkham who was both UKBB vice-chairman and the new chairman of the ADEPT Bridges Group. He confirmed that he had made the case that BOF should be actioned as part of the delivery of UKBB business plan objectives.

Action 10 to 13, 16 and 26, Guest speakers at BOF meetings:

The above actions had been for the Chairman to consider invitations to guest speakers at future BOF meetings. As this was one of the target outcomes of today's discussions, the Chairman opted to review the matter after the meeting.

ACTION 8: Chairman

Action 14, 15 and 25, BOF Research Priorities:

As above, this was another topic which the Chairman wished to have discussed at today's meeting and would consider the priorities and delivery mechanisms after the debate.

ACTION 9: Chairman

Action 17, Prevention of Bridge Jumping

The Chairman proposed to defer this action/item until after discussion on future BOF agendas later in the meeting.

Action 18, Hidden Defects in Bridges: CIRIA Research Proposal:

It was noted that CIRIA had now secured funding for the project which was currently out to tender. A Steering Group had been established with membership from principal funders, most of which were represented on BOF. The Chairman asked Steering Group Members to ensure that BOF's role in instigating this research was recognised and that the BOF logo was featured on the final report.

ACTION 10: Project Steering Group Members

Action 20, Highways Agency funded research under new Government Company status:

Neil Loudon wished to include this as part of his update on Highways Agency issues later in the meeting.

Actions 23 and 24, CROSS

Neil Loudon referred the meeting to IAN 106/10 which was the Highways Agency's guidance on structural safety reporting; it was linked to the CROSS website, thereby enabling anonymous reporting. He recommended that everyone should sign up for the SCOSS and CROSS email updates.

ACTION 11: All

The Chairman agreed that BOF should regularly review SCOSS and CROSS issues such as the recently identified problems with Chinese rebar.

Action 27, HA/Network Rail Liaison:

Neil Loudon reported on a recent meeting to discuss general issues of relevance to each party, including advice from Network Rail on how to work with a Regulator which will be the situation when the HA becomes a Government Company. There had been five attendees from each party and other items discussed included the following:

- Technical Assurance/Technical Approval
- Inspections and Examinations – including the use of technology and data management
- Possible research collaboration
- Standards and Specifications
- Sector schemes

A follow up meeting had been proposed for November 2014 to review the benefits of the initial meeting and to discuss other possible agenda items for further meetings.

Neil suggested that a similar session with devolved governmental bodies (Transport Scotland, the Welsh Government and DRD Northern Ireland) would also be productive. Wayne Hindshaw agreed that this would be a good idea and would help to ensure that there was no unnecessary duplication of initiatives.

Action 28, Train Borne Geometry Measurement:

Nick Burgess reported that the preliminary report had been received from LUL's consultant, Euro-consult, and was presently being reviewed. The system utilised a combination of laser and optical technology. Defects such as missing bricks could be identified but others, such as water ingress, would be missed. Accuracy of the geometrical check was said to be within 0.5 to 1.0mm. Nick also mentioned that there might be issues over intellectual property rights with the provider and also pointed out that there was still work to be done to ensure that this type of survey was dovetailed to the routine inspection programmes. Nick passed a hard copy of the draft report around the meeting and agreed to check whether it could be released for upload to the BOF website.

ACTION 12: Nick Burgess

The Chairman noted that similar research was also underway at CUED but also suggested that a BOF discussion/review of all LIDAR or similar techniques might worthwhile at a future meeting.

ACTION 13: Chairman

Neil Loudon noted that the Highways Agency was also pursuing a similar system to map road cross sections but it seemed that areas at the foot of embankments and bridge soffits could not be detected. Following general discussion, it was noted that such techniques were only likely to provide a benchmark for future comparisons and would not necessarily be of immediate benefit.

All unrecorded actions from BOF 43 had either been completed or were discussed as part of the BOF 44 agenda.

5. Membership Update

The Chairman noted the recent changes in Chairmanship of both UKBB and ADEPT Bridges Group. Graham Cole agreed to discuss ADEPT representation on BOF with Liz Kirkham.

ACTION 14: Graham Cole

The Chairman also agreed to arrange a meeting with Dana Skelley ahead of the next UKBB meeting.

ACTION 15: Chairman

The Chairman noted that this BOF meeting had no representation from Network Rail but believed that David Castlo would be returning to BOF as NR member. He agreed to investigate.

ACTION 16: Chairman

6. BOF Terms of Reference

The Chairman projected the current BOF Terms of Reference on a screen:

1. *Promote co-operation, collaboration and partnership amongst bridge owners*
2. *Identify technical and research needs/priorities to promote good practice in the management of the bridge infrastructure*
3. *Disseminate information*
4. *Recommend research priorities avoiding duplication*
5. *Provide technical advice/support to the UK Bridges Board and bridge engineers on issues affecting the bridge infrastructure*

During subsequent discussion, it was agreed that No. 1 should be extended by adding “*and the wider bridge engineering community.*”, that No. 4 should read

“Recommend and facilitate research priorities” and that No. 5 should be extended by *“and the implementation and delivery of the Forum outcomes.”*

The question of dissemination of BOF activities was also discussed: it was agreed that this was already down to individual members within their respective wider organisations but it was suggested that a BOF newsletter might be worth consideration. Stephen Pottle thought that regular presentations at the annual Surveyor Bridge Conference would benefit all parties. The Chairman agreed to contact the organisers to request this.

ACTION 17: Chairman

The Chairman expressed concern that BOF had not been as productive as it had been in the early years in terms of delivering successful outcomes. He noted that there was reluctance in DfT to embrace research but it was generally felt that this was more a reflection of reduced research funding. Stephen Pottle agreed that bridge related research was nowhere near the top of DfT’s priorities and also noted that many organisations were now running their own research programmes rather than rely on central budgets. Neil Loudon agreed but commented that the Highways Agency was reviewing the delivery of its research programme and might be amenable to accept contributions to research projects from other organisations.

Richard Fish suggested that now was the time to seek support at a political level and to locate a politician who might be a bridges “champion”. Paul Monaghan pointed out that there were a number of parliamentary groups which focussed on infrastructure and that they were often in need of speakers for their meetings. The Chairman agreed to make enquiries.

ACTION 18: Chairman

John McRobert reflected that any successful bid for funding now had to be badged as “asset management”. Graham Cole agreed and suggested that the other badge needed was “efficiency”. He noted that the DfT HEMP had received funding (about £1.8m) although none of that had been allocated to bridges. Wayne Hindshaw pointed out that the three planks of any government were policy, finance and delivery and it was the last of these which was now becoming more remote as arms length companies and agencies were now commonplace. Wayne also pointed out that as far as the devolved governments were concerned, DfT initiatives in isolation were no longer relevant and that his organisation worked closely with the Scottish Road Research Board. This comment sparked the suggestion from the Chairman that BOF might consider bypassing DfT and seek to promote research through other bodies, such as Transport Scotland. It was generally agreed that any of Transport Scotland, Welsh Government, London Underground, Network Rail or the Highways Agency might be used as an accountable body for a research project.

Neil Loudon suggested that engagement with other parties might be appropriate; he mentioned that CSIC (Cambridge Smart Infrastructure Centre) were looking for ideas to which they might offer support. Wayne Hindshaw felt that it was important to work closely with suppliers on occasions. Neil agreed, citing the Highways Agency's investigations into paint systems as one example and surfacing as another when the Agency worked closely with Trade Associations.

Neil also offered to lift the profile of bridge related research within the Highways Agency by adding an item on the list of research on "Capable Assets" and by adding an item to the agenda on the Agency's "Project Innovate" workshop planned for November 2014.

ACTION 19: Neil Loudon

John McRobert suggested closer links with Universities as they had experience in attracting funding. The Chairman agreed that this might be an option but felt that research contractors from this route were more likely to be Consultants.

Concluding this part of the meeting, the Chairman stated that BOF should continue to try to achieve the optimum mechanism for commissioning and delivering research outcomes. He accepted, however, that the days of BOF being engaged by DfT following UKRLG invitation had probably passed and that other bodies, as noted above, would be better placed to assist. Stephen Pottle suggested that as many options as possible should be kept open for as long as possible rather than attempt to push all projects through the same route.

7. Research and the Grand Challenges Paper

The Chairman referred to the BOF "Grand Challenges" document which had been prepared by the previous Technical Secretary, Dr John Menzies, in 2007 which he projected onto the screen.

Suggesting that it was probably time to review and update this paper, the Chairman reflected on the changes of emphases over the last 7 years where the following points were now high priority and yet could not have been previously predicted:

- Digital Technology
- Asset Management
- New Materials
- Accelerated Construction Methods

The Chairman's personal observation was that the paper was not pitched at a sufficiently high level and that it was too detailed. He then invited comments and discussion:

Stephen Pottle suggested that a document was needed which clearly showed the links with Government agendas. The Chairman agreed, suggesting that Peter Hansford's Government Construction Strategy was a good place to start but also to review other strategic documents. Stephen Pottle noted that this approach was that followed by TfL when all work had to be shown to be part of the Mayor's Transport Strategy.

Wayne Hindshaw suggested that links to performance indicators which were high priority for network managers were important, such as reduced congestion and journey time reliability. He also suggested raising the profile of increased risk to the travelling public in the context of reduced maintenance standards. Neil Loudon agreed, pointing out that bridge maintenance funding was losing out to resurfacing programmes which were being advanced without consideration of any bridge maintenance needs on that route.

The discussion then moved to the balance between the need for high level strategies and the lower level detailed research areas. Stephen Pottle suggested that BOF should cover both, advocating a bottom up/top down approach: the former being driven by bridge owners and the latter by government(s).

The Chairman invited suggestions on higher level issues: John McRobert thought that deterioration modelling was essential in order to convince politicians to fund maintenance activities. Neil Loudon believed that rather than focus on bridges alone, a holistic approach to asset management on the network was crucial and bridges should be part of the wider assets which included drainage, geotechnics and street lighting as well as carriageways. Paul Monaghan noted that there was always a problem in identifying asset values and their projected residual life. Wayne Hindshaw reflected on the Network Rail position where many bridges were beyond their original design life and were now treated on a "fit for purpose" basis.

Liam Duffy felt that different bridge owners would have different priorities: whilst digital engineering and carbon reduction were interesting they were by no means essential when there were many day to day challenges to be faced such as improved assessment methods. This view was widely supported by the meeting. The Chairman agreed that there was still a need to improve assessment methods to save on unnecessary strengthening or replacement and Graham Cole reported on an Essex CC initiative to use University research to pass arches which had previously failed, resulting in substantial savings. Wayne Hindshaw suggested that load testing ahead of demolition would enable verification of assessment codes. There were a large number of redundant bridges in Scotland which were scheduled for demolition and could be made available for testing.

Barry Colford returned to the subject of painting: the Forth Rail Bridge had been painted at a cost of £120m with paint which had been promised to last 25 years. But what was critical was the standard of surface preparation; his own Forth Road

Bridge had its towers painted at a unit cost of £500/m² but within that the cost of the paint was only £11/m², indicating the huge cost of temporary works in terms of access and enclosure. The Chairman, in passing, reported on research on using fibre optic laser technology to apply a stainless steel coating to structural steel which would eliminate the need for painting. Neil Loudon thought that research examples such as this were too much in the blue sky thinking territory for today's needs and should not be mixed with current needs and initiatives to deal with them.

Jason Hibbert suggested that Whole Life Costing (WLC) was an issue which should be included in any review of the BOF aims and objectives. He felt that this was especially difficult when politicians were locked into four or five year election cycles. Stephen Pottle noted that WLC was now being used to make decisions on interventions within TfL as this was part of their Asset Management policy which had been agreed at a political level. Liam Duffy reported that NRA used the same approach, noting that the Leenane collapse had helped to focus the minds of his politicians.

The Chairman returned to his view that BOF should identify “game changing” initiatives, projects which might transform current practice. He cited examples such as HGV telemetry and its consequential benefits to network management and the gains to be made from accelerated construction. Stephen Pottle proposed research into new materials that might lead to shallow construction depths, particularly useful where there was restricted headroom such as required by rail electrification. Wayne Hindshaw agreed, suggesting that durable composite bridges were part of the future. Paul Monaghan suggested that reduced standards for local bridges would save money by not having to meet unnecessarily high specifications. Stephen Pottle believed that 90% of the DMRB was relevant to local authority bridges but much less than this for other assets.

The Chairman agreed that he would reflect on this discussion when formulating a future direction for BOF and would work with Richard Fish to review and refresh the grand challenges paper.

ACTION 20: Chairman

8. Format of BOF meetings

The Chairman asked for views on whether BOF meetings should generally include invited external speakers. After a brief discussion, the consensus of the meeting was that such presentations were a valuable addition and updated BOF members on current initiatives and best practice. Stephen Pottle warned that ensuring the quality of speakers should be paramount, citing the Ramboll/PB presentations from the previous day as exemplars. In contrast, there was a danger that less well informed consultants could “lead” bridge owners, especially those that lacked an intelligent client capability.

Neil Loudon proposed that the previously planned presentations on paint and protective systems would still be relevant and repeated the Highways Agency's offer of Geoff Boden as a speaker. Barry Colford suggested that paint specialist, David Deacon, might also be present to enhance debate and discussion. The Chairman thought that extending painting presentations to cover innovation and automation would also be helpful. Wayne Hindshaw suggested that learning from other sectors such as aero and auto engineering would be beneficial.

The Chairman noted the discussion on consultants' influence on bridge owners and undertook to consider a possible Bridge Consultants Forum or even a Bridge Contractors Forum.

ACTION 21: Chairman

9. Bridge Inspector Competency Accreditation

Stephen Pottle gave a brief résumé of the DfT tendering process to date but reported that he had been approached by LANTRA (one of the originally interested bodies) who ran similar accreditation schemes in the highways sector. Good progress was being made and it was hoped that the scheme could start early in 2015, still self financing as had originally been intended.

Responding to a question from the Chairman, all present agreed that they would be encouraging their staff and agents to adopt the scheme with the exception (as had previously been noted) of LUL where specific requirements were already in place. Nick Burgess agreed to monitor the situation in the short term and would report to the next meeting about possible amalgamation with the national position.

ACTION 22: Nick Burgess

Neil Loudon reported that the Highways Agency was considering reviews of BD 63 and the Bridge Inspection Manual, with a possible IAN in the near future. He also reported that the universities providing approved training, UWE and Sheffield Hallam, were interested in being members of the accreditation steering group. Stephen Pottle noted that the Code of Practice update would also need to reflect the new arrangements.

The Chairman was very pleased with the positive outcome which he believed reflected well on BOF's tenacity and drive. He congratulated all involved.

10. Updates from BOF Organisations

The Chairman invited updates on research initiatives or other matters from BOF members:

10a. Highways Agency

Neil Loudon gave the following summary:

- HA were interested in developing or utilising tagging technology such that individual components in a bridge construction could be tracked and monitored. Atkins were working on this and Neil agreed to provide an update at future BOF meetings.

ACTION 23: Neil Loudon

- The State of Bridge Infrastructure project was progressing and internal workshops were taking place.
- National Structures Programme initiatives were underway for fatigue prone steel structures and the inspection and management of safety critical fixings.
- A number of problems had been identified during reviews of inspection reports which might lead to a revision of how inspection services were delivered. Discussion followed in which it was noted that this point closely aligned with the bridge inspector competency training and accreditation. It was suggested that the problems may not rest only with inspectors but also the supervising engineers. Paul Monaghan pointed out that some 30% of London Boroughs had no specific or experienced bridge engineer.
- The Agency was also concerned with quality of construction and in particular the process of inspection, reporting and management. He cited John Carpenter's three Ps and added a fourth: People, Product, Process and *Procurement*. Stephen Pottle also reported incidents of work being signed off when not fully checked and even instances of the supervisor signing a record when he had not even been to site.
- Neil reported a recent increase in thefts of aluminium parapets and also noted that BPL had ceased trading and there might be resultant problems in obtaining replacement components.
- Lastly, Neil reported that the legislation for the new Government Company was going through parliament but there was a chance that it might not be passed before next May's election. He agreed to report on progress and transition arrangements at BOF 45.

ACTION 24: Neil Loudon

10b. LUL

Nick Burgess reported nothing specific other than the ongoing push for innovation.

10c. Canal and River Trust

Rod Howe expressed concern over the move towards using Eurocodes for assessments. Neil Loudon reported that the timing was such that they were unlikely to be implemented until after 2020. He noted that this development was in the hands of the TC250 Horizontal Committee, chaired by Steve Denton.

10d. Welsh Government

Jason Hibbert referred to concerns on bridge suicides as raised at previous BOF meetings. There was some confusion over the UKBB document (Personal Safety

at Bridges) for which John McRobert was still awaiting permission to promulgate. Jason pointed out that it was freely available on the UKBB website: it was agreed that a link should be provided on the BOF website or a pdf file made available.

ACTION 25: Paul Fidler

10e LoBEG

Paul Monaghan reported a growth in the number of love-locks being attached to bridges, now approaching about 100 per month across London. Barry Colford described a special love-lock panel he had incorporated on the Forth Road Bridge for that purpose.

10f TfL

Stephen Pottle raised a number of issues:

- He asked about progress on the revision to BD 78 on tunnels. Neil Loudon confirmed that a review was underway.
- With regard to temporary works, TfL were insisting that all components should be fully compliant with the Construction Product Regulations if they were taking permanent loads, if only for a short period of time.
- Citing the Hammersmith flyover strengthening works as an example, Stephen asked for guidance on how interim sign offs for Technical Approval should be managed. Such works were not covered by BD 2 and he was keen to be consistent with good practice elsewhere. Neil Loudon agreed to investigate.

ACTION 26: Neil Loudon

10g SCOTS

Graeme Muir expressed concern that there was a general perception that manufacturers were reluctant to provide durable products as this gave them no long term financial benefit. He urged bridge owners to complain more strongly when there were premature failures.

10h Transport Scotland

Wayne Hindshaw made the following points:

- The Scottish Road Research Board was reviewing the effectiveness of safety barriers at sites where horizontal alignment meant that there could be high angles of impact. At present, Departures from Standard (DfS) were needed and/or specific impact tests at a cost of up to £100,000 per test. The SSRB were also investigating alternative barrier systems and Wayne agreed to provide updates at future meetings. Liam Duffy reported that NRA used a DfS process for safety fences as long as there was a clearly reduce risk. He also referred to timber safety fences that had been used in rural locations.

ACTION 27: Wayne Hindshaw

- Transport Scotland was trialling an AIP/DfS form for use when parapets had been damaged. The form allowed for interim, short term or long term

measures. Improved parapet repair methods were also under investigation. Wayne agreed to issue a copy of the form for uploading onto the BOF website.

ACTION 28: Wayne Hindshaw/Paul Fidler

10i NRA

Liam Duffy referred to concerns over buried joint longevity and a particular case where surfacing was failing. Although it was noted that the surfacing depth was <90mm, the joint supplier had argued that the designer had specified the wrong joint, alleging that the design standard restricted vertical movement to <1.3mm. Liam agreed to provide an update at BOF 45.

ACTION 29: Liam Duffy

10j Large Span Bridge Group

Barry Colford reported on an unlikely alternative to de-icing glycol being trialled on the Great Belt Bridge – saline solution. He agreed to update at future meetings.

ACTION 30: Barry Colford

10k ADEPT

Graham Cole asked when the Cathodic Protection BA/BD was to be updated. Neil Loudon noted that the 1800 and 1900 series (steel protection) of the DMRB were now published and that the 1700 series (concrete) would be out soon.

11. Any Other Business

Richard Fish noted that CSS Wales no longer seemed to be represented on BOF.

ACTION 31: Chairman

12. Proposed Dates for Future BOF Meetings

The Chairman proposed to send out a doodle poll for the BOF 45 meeting which would be held in January 2015.

ACTION 32: Chairman

13. Closing/Summing Up

The Chairman thanked all members for their attendance and contributions to the meeting and thanked Stephen Pottle for making all the arrangements for the two days.

Richard Fish
Technical Secretary
28 November 2014