



IABSE NEWS

Newsletter of the British Group of the
International Association for Bridge and Structural Engineering

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Salginatobel Bridge, Switzerland

Photo: Andrew Martin

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IABSE British Group News

Editorial

Welcome to *IABSE News*, the British Group of IABSE.

In this edition you will find an illustrated report of the British Group 'Study Tour' to Switzerland which took place in early November 2008. Under the leadership of Vice-Chairman Ian Firth, a group of 20 or so 'enthusiasts' (including your Editor) spent two days visiting some of the remarkable bridges of Swiss engineers past and present, including Robert Maillart's Salginatobel Bridge and Christian Menn's Sunniberg Bridge. Several aspects of the tour illustrate the international and diverse nature of both the profession of structural engineering and of IABSE as an organisation.

The tour was very well organised, both by Ian and his team in the UK and in particular by our Swiss hosts, led by Professor Thomas Vogel of ETH, Zurich. All concerned should be given a deserved vote of thanks. There was also a truly international mix amongst the members of the tour party, who included colleagues and friends from the UK and from overseas. A welcome member of the group was a fellow IABSE member from Spain, with no connection to the UK, who joined the tour after reading of it in the monthly IABSE e-mail newsletter. Finally, the party included three architects, all involved in bridge design, whose reactions to the bridges visited gave an added dimension to our otherwise engineering-led appreciation.

The Study Tour has been rightly hailed as a great success. It was certainly enjoyable and a similar tour to another structure-rich destination has been suggested for 2010. Most importantly the tour allowed practising bridge designers to see at first hand some truly great bridges, to 'make pilgrimage' and to gain fresh ideas, perspectives, inspiration and horizons for their own work.

With best wishes,

Andrew Martin
Editor

Events

<u>Date</u>	<u>Time</u>	<u>Event</u>
Thursday 21 May 2009	5.00pm	<u>Annual General Meeting</u> *
	6.00pm	<u>IABSE Annual Lecture 2009</u> * <i>Engineering at the 2012 Olympics</i> John Armitt, Chairman, Olympic Delivery Authority
	8.00pm	<u>Annual Dinner</u> * Pre-booking essential & fee payable.
Mon 6 – Weds 8 July 2009	Residential (fee payable)	<u>Henderson Colloquium</u> <i>Performance Based Approach</i> Magdalene College, Cambridge
18 – 23 September 2011		<u>IABSE Symposium</u> QE2 Conference Centre, London

* From 2009 onwards, the AGM, Annual Lecture and Annual Dinner will take place in May

Unless noted otherwise, all events take place at the Institution of Structural Engineers, 11, Upper Belgrave Street, London. Tea is usually served before evening lectures and meetings from 5.30pm.

The views and opinions expressed in *IABSE News* are those of the respective authors and not those of either the Executive Committee of the IABSE British Group or the Editor. Whereas effort has been made to ensure the accuracy of statements and acknowledgements, we reserve the right to be as wrong as everyone else.



IABSE Annual Lecture – 21 May 2009

John Armitt – ‘Engineering at the 2012 Olympics’

The British Group is delighted to welcome **John Armitt**, Chairman of the Olympic Delivery Authority, to give the 2009 Annual Lecture on 21 May at IStructE HQ.

The delivery of the 2012 Olympics and Paralympic Games in London is dependent on the skills of engineers of all disciplines and John will discuss the contribution of engineers, from the demolition and remediation of the site to the design and construction of Zaha Hadid’s iconic aquatics centre, together with the complex security and communications systems necessary to deliver a 21st century Olympic Games in a sustainable manner.

John is a civil engineer and joined John Laing in 1966 as a graduate engineer. During the next 27 years he worked on major construction projects in the UK and overseas, spending the last 7 as Chairman of Laing’s International and Civil Engineering Divisions. In 1993 he became Chief Executive of Union Railways before going back to construction in 1997 as Chief Executive of Costain, a position he held until 2001 when he joined Railtrack. John was Chief Executive of Network Rail from 2002 until he was appointed Chairman of the Olympic Delivery Authority in September 2007.



John Armitt was awarded the CBE in 1996 for his contribution to the rail industry and is a Fellow of the Royal Academy of Engineering and of the Institution of Civil Engineers.

See ‘Events’ above for further details.

New Members

A warm welcome to IABSE and to the British Group is extended to the following new members:

Tim Abbott	Jeanette Abela	Keith Brownlie
Gainpaolo Bucci	Charles Leprince	

IStructE Gold Medal awarded to Professor David Nethercot

Congratulations to **Professor David Nethercot**, Chairman of the British Group, on the award of the Gold Medal of the Institution of Structural Engineers in recognition of his distinguished career in structural engineering. David gave his gold medal address ‘They all want to be Brunel’ on 23 April at Imperial College in London, where he is Head of the Department of Civil and Environmental Engineering.

New Honorary Secretary for IABSE British Group

*On 1 January, Graham Tilly stepped down as Honorary Secretary of the British Group. **Professor David Nethercot** writes:*

The sudden death in 2002 of Bob Milne, for many years the Honorary Secretary to the British Group, provided us with a considerable problem. How to find someone who might be persuaded to take on this role?

Discussions within the Executive Committee didn’t immediately provide any pointers to a solution, so I was delighted and more than a little relieved when Graham Tilly said that he would be prepared to look after this until a more permanent arrangement could be established. This “temporary situation” continued for some 5 years with Graham taking on all the tasks previously looked after by Bob as if he had been understudying the



role for years. Organising meetings, preparing Minutes, prompting the Chairman and, of course, personally setting up the Milne Medal all flowed easily and we came to rely on Graham.

It couldn't last forever and Graham has now decided that it's time to devote more time to other pursuits. We are extremely grateful that he gave so freely of his time and energy to the British Group, that he discharged all his duties so capably and that he has effected a smooth handover to Andrew Martin. We will all miss seeing Graham at our meetings and we all wish him well going into the future.

British Group Finances

Honorary Treasurer Tony Oakhill writes:

Each year the British Group endeavours to ensure that its activities are self-financing, for example, the Henderson Colloquium, the Young Engineers' Conference, and the Annual Dinner. However, it is also recognised that some items of expenditure (Milne Medal, Young Researchers' Conference, administrative costs) require to be financed from members' subscriptions.

British Group members will appreciate that the level of additional fees collected from subscriptions is extremely important and needs to be preserved. We are fortunate that IABSE HQ allows us to collect subscriptions in sterling with the membership fee transferred to Zurich at the appropriate currency exchange rate. This has always proved to be of considerable benefit to us in maintaining our required Group funding arrangements.

But, during 2008, as a result of the worsening global economic downturn, we have seen a dramatic change, with the sterling / Swiss franc exchange rate dropping by some 25%. This has left our potential finances in an exposed situation. At its last meeting the Executive Committee agreed to adopt the proposal to increase the subscription rates for 2009 as follows:

Membership Grade	New Subscription Rate
Under 35 years	£65.00
35 – 65 years	£165.00
Over 65 years	£90.00
Collective (Business)	£500.00
Collective (Academic)	£380.00
Fellows – double membership rate	

The Committee recognises that any significant subscription rise might cause some difficulties, and this fact has been taken very much into account in determining the new rates, consistent with ensuring that membership levels will be maintained. The Committee will of course continue to keep a constant watch on the financial situation over the coming months to ensure that no opportunity is lost in preserving a reasonable level of funding for the British Group.

Apart from the existing technical publications, newsletters and other international items of interest which are available from HQ, or from the British Group, the committee is anxious to continue its support for those events each year in which members can take an active participation. Further information can be found in this Newsletter and from the British Group website, linked on the IStructE webpage (including a link from the IABSE HQ website).

The British Group is certainly recognised by IABSE as making a significant contribution each year to the continued success of our International Association. It should be in everyone's interest to support and nurture this contribution.

Structural Engineering International

The ongoing opportunity exists for all members to have articles published in *SEI*, the international journal of IABSE. Rules for publication are available through the IABSE website at www.iabse.org. David Doran is the UK Correspondent for *SEI* and can offer assistance to prospective authors (see Directory).



Report

Young Researchers' Conference 2009

By **Oliver Stross** (*Flint & Neill*):

The 12th annual Young Researchers' Conference was held on Wednesday 18 March at the Institution of Structural Engineers in London. The conference opened with Graham Owens, President of the IStructE, stressing the importance of research within the construction industry. He emphasised the critical role research will play in the next few years if engineers are to help society to progress to a more sustainable future. Twenty-four researchers from fifteen different universities presented their work at the conference.

In the oral presentations, the judges were unable to decide upon a clear winner and so first prize was shared between Jessica Whittle (University of Oxford) for her research into the 'Optimisation of viscous fluid dampener configuration for seismic structural design' and Andrew Thomson (University of Bath) for his work into 'The structural performance of non-metallic timber connections'. Third prize was awarded to Gareth Whittleston (Salford University) for his work on the 'Development of a new structural glass floor system'.

The poster presentation category was won by Andrew Jackson (Cambridge University) for his work into 'Predicting the plastic collapse load of reinforced concrete slabs'. Second and third prize were awarded to Vitomir Racic (Sheffield University) and Edward Hirst (University of Bath).

The subject of human-structure interaction was considered by a number of researchers presenting at the conference. Christopher Jones' (Sheffield University) poster presentation focused on verifying existing methods of modelling stadium structures susceptible to vibrations. In these models the structure is represented by a simplified or reduced degree of freedom (DOF) model. One DOF is used to model the structure, with additional DOFs used to model the active and passive crowds. The passive portion of the crowd adds to the damping properties of the structure. Jones plans to improve such models by comparing their results to data recorded at a large number of real stadia in the UK.

Vitomir Racic's thesis proposed a novel method for investigating the effects of human-structure interaction. Predicting the interaction between pedestrians and flexible structures, such as footbridges, and entertainment venues is very complex. The dynamic forces generated by people walking, dancing, jumping, swaying etc are random events which do not only vary in time but also space. However, once vibrations start, there is also the possibility of users synchronising their motion to the frequency of the structure producing resonance. Until recently, most studies into the forces produced by humans walking have directly measured foot loads using instrumented treadmills. However the use of treadmills is unsatisfactory due to their inability to recreate a natural walk. More importantly they do not model the motion of the structure itself.

Instead, Racic suggests the use of visual motion tracking data (similar to that used in the animation industry) combined with body mass distributions. Through assigning a mass distribution to each of the tracker points representing each body part, Racic is able to indirectly measure the loads produced whilst people move. The advantage of this approach is that it can be used as participants move across real structures. By producing a large database of the forces produced by different people as they move along different types of structures, Racic hopes to produce a new probability based stochastic model for the dynamic loading caused by groups of pedestrians.

IABSE on the Internet

The website of the British Group can be accessed at www.iabse-uk.org, where proceedings of Henderson Colloquia and back editions of *IABSE News* are available in downloadable form. We are grateful to the Institution of Structural Engineers for their continued generosity in hosting the website.

The international website of IABSE at www.iabse.org contains comprehensive information on IABSE organisation, activities and publications.



Henderson Colloquium 2007 – Update

Bridge Design Competitions

Angus Low writes:

The subject for the Henderson Colloquium in 2007 was "Lessons from design competitions" and the invitation made it clear that it was focussed principally on bridge design competitions. It was a timely topic and our deliberations in July 2007 continue to feed into other initiatives today.

The event was an excellent with the right mix of engineers, architects, clients and a contractor – all with considerable experience of bridge design competitions. Four were from overseas. The subject was topical because there had been a number of high profile competitions that had “gone wrong”. In spite of, or because of, having at least one such project represented from two sides, there was a strong consensus.

While Henderson 2007 was being planned, IABSE at an international level set up Working Group 3 on "Guidelines for design competitions for bridges" under the chairmanship of Naeem Hussain of Arup Hong Kong, who chairs the Hong Kong Group of IABSE. Naeem joined Henderson 2007, and two others from the colloquium are also on the international working group.

At about the same time talks were initiated between ICE, IStructE and RIBA. The RIBA has a Competitions Office in Leeds dedicated to running architectural competitions. In the past a small proportion of these competitions have been for bridge designs and there had been concerns that the roles in these competitions, both of competitors and judges, had been overlooked in their procedures. The talks have moved slowly but they have achieved some significant provisional agreements:

- there will always be an engineer with suitable bridge experience on the jury,
- the engineer shall be involved at an early enough stage to influence the brief,
- design teams shall include an engineer,
- design teams can be lead by an engineer.

The next step is for ICE and IStructE to set up a procedure for nominating suitably experienced engineers to act as scrutinisers and jurors for the RIBA. They have nominated Barry Mawson, a bridge engineer (retired) based in Cardiff, to take this forward. Barry is hopeful that he will have reported back with his proposals within a few months.

Meanwhile, as Chair of Henderson 2007, I have been charged with producing "Guidelines for promoters of bridge design competitions". At the colloquium there was an intent to produce a comprehensive document with proposals and checklists for various options. The range of options grew and I saw a need for a much simpler document, which has recently been circulated in draft. It concentrates on discussing some key issues and it includes a list of the many ways in which competitions have gone wrong. A promoter who has this document will be able to avoid the problems of the past.

We are now looking for ways to publicise the document, and we will probably join forces with ICE, IStructE and RIBA for this. Their initiative is specifically related to competitions run by RIBA. Our initiative is wider in that it covers competitions from all sources and it also suggests alternatives, including Design & Build tenders, that have some of the characteristics of competitions but can be much simpler.



Silvertown Footbridge Competition, won by Patel Taylor with Arup, 2007.

Photo: Patel Taylor



Report

British Group Study Tour to Switzerland

Ian Firth, leader of the Study Tour, writes:

It was with eager anticipation that a group of us arrived in Zurich on 6th November ready to embark upon a pretty full two-day programme of bridge spotting in the Alps. We were here to see some bridges by Robert Maillart, Christian Menn and Jürg Conzett, and the perfect weather made the visit all the more memorable.



Tour group and hosts at Salgiantobel Bridge

Photo: Brian Duguid

It is easy to see why Maillart's bridges occupy a special place in the hearts of many bridge designers, and for me this was something of a dream come true. I have always wanted to see Salgiantobel in the flesh, as it were, and the visit confirmed what I long suspected – that no photograph can do it justice. The setting is stunning and the bridge simply magnificent. To have even conceived of building a bridge in that place was an achievement in itself, but the way in which it was built is awe-inspiring. The bridge is celebrated locally, even to the extent of having some of Maillart's engineering drawings framed and on the wall in a nearby cafe!

All in all, we visited five Maillart bridges, as well as Menn's beautiful Sunniberg Bridge and two pedestrian bridges by Conzett who accompanied us on the second day. For many, Conzett's little stressed ribbon Pont de Suransuns was a high point of the tour, not least because of the privilege of having the designer himself lead us on a hike through the mountains to find it!

These bridges stand among some of the most stunningly beautiful natural scenery in Europe, and are testimony to the genius and creative spirit of those who designed them. Thanks to the excellent guidance from our local hosts, we learnt a lot about the techniques and methods used in Maillart's day, and reflected on where modern methods have perhaps not progressed as far as we might like to believe.

This was the first time the IABSE British Group has arranged such a tour and it was gratifying that it attracted such keen interest. We all enjoyed ourselves enormously, and it was with much enthusiasm that the discussion turned to where we might go next time.

Watch this space for news of the next visit, probably in 2010.



Bridges by Robert Maillart

(1) *Rossgaben* (1932).

(2) *Schwandbach* (1933).

(3) *Bohlbach* (1933).

(4) *Traubach* (1932).

Photos 1, 3 & 4: Andrew Martin

Photo 2: Brain Duguid

1	2
3	4

Ana Ruiz-Teran, Principal Lecturer in Structural Engineering at the University of East London, gives some personal reflections on the tour.

“It was a fascinating experience that left unforgettable memories deep within those that took part in this intense two-day trip. The excursions were full of incredible moments: gazing at the conceptual structural beauty in some of the deck-stiffened arch bridges designed by Robert Maillart; the overwhelming feeling of looking at the Salginatobel bridge and its surroundings; touching with our own hands, with great care and admiration, the extremely short, but accurate, calculations in Maillart’s own handwriting, from eighty years ago, where his talent allowed the simplicity of the analyses by using a funicular approach; crossing the elegant and slender Suransuns and Traversina footbridges, sneakily jumping on them, hoping to excite a resonant response, in front of a smiling Jürg Conzett; trekking across fields in order to be completely amazed by the elegance of form and proportions achieved by Christian Menn in designing the piers of the Sunniberg bridge; enjoying the magnificent and peaceful landscape of the Swiss Alps, and also the pleasant dinners in Zurich, in the company of a charming group of structural engineers and architects on pilgrimage, fascinated by so much beauty of both structural form and concept, that was born from the masters’ minds.”



1	2
	3
	4
6	5



Swiss Masters

- (1) *Sunniberg Bridge (1998) by Christian Menn.*
- (2) *Punt de Suransuns (1999) by Conzett, Bronzini, Gartmann AG.*
- (3) *Jürg Conzett at the Punt de Suansuns*
- (4) *Traversina Footbridge (2005) by Conzett, Bronzini, Gartmann AG.*
- (5) *A concrete 'Virendeel' bridge.*
- (6) *A covered timber bridge discovered. 'en route'.*

Photos 1, 5 & 6: Andrew Martin

Photos 2, 3 & 4: Brian Duguid





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