

IABSE NEWS

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

No.19

Summer 2004



Wadi Abdoun Bridge, Jordan

(Photo: Dar Consultants (UK) Ltd)

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British Group News

Editorial

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

The production and distribution of this edition of *IABSE News* has taken on several new innovations that I hope will be welcomed by members. Most significantly, this is the first edition to be distributed in digital form by e-mail rather than as a paper copy by post. This offers the dual benefits of savings in reproduction and distribution costs whilst also allowing the inclusion of colour photographs and illustrations. Members will be able to read the newsletter on screen or, if they prefer, print a paper copy from their own PC. Paper copies will continue to be sent to Collective Members and will also be sent to any Individual Member who so wishes upon request.

This issue of *IABSE News* is also the first not to have been produced under the editorship of David Doran. After 18 years David has stepped aside as Editor and he has the sincere thanks of British Group for his work on our behalf during this time. David continues in his role as UK Correspondent for *Structural Engineering International* and retains his involvement with the Executive Committee as a Member of honour of the British Group.

In the following pages you will find news from the British Group, reports on events and conferences, the ever-popular 'Profile' feature and information on forthcoming events. The new means of production and distribution of *IABSE News* offer new opportunities for future issues, including publication more frequently than on the current annual basis. However, the viability of such developments relies upon the response of the readership as much as the editorial contribution, and I would therefore be pleased to receive any opinions and ideas that you might have on the future direction of *IABSE News*.

Andrew Martin
Editor

Events

Forthcoming IABSE British Group events are:

24 June 2004	6.00pm (Tea from 5.30pm)	IStructE/IABSE Joint Evening Technical Meeting Design and Construction of Modern Concrete Bridges Srini Srinivasan (Dar Consultants (UK) Ltd) Winner of the IABSE Milne Medal 2003. Institution of Structural Engineers, 11, Upper Belgrave Street, London.
5-7 July 2004		Henderson Colloquium 2004 Designing for the Consequences of Hazards Magdalene College, Cambridge.
9 December 2004		Annual General Meeting
9 December 2004	6.00pm (Tea from 5.30pm)	Annual Lecture CTRL St Pancras Redevelopment Mike Glover (Arup) followed by Annual Dinner. Institution of Structural Engineers, 11, Upper Belgrave Street, London.



Evening Technical Meeting

Design and Construction of Modern Concrete Bridges

On **Thursday 24 June** at 6.00pm at the Institution of Structural Engineers in London, **Srini Srinivasan** will present a paper entitled 'Design and Construction of Modern Concrete Bridges' to a joint meeting of the IStructE and the IABSE British Group, to which all are welcome.

The lecture will be free of charge, but pre-registration and tickets are required. Those interested should contact the Events Co-ordinator at IStructE (e-mail: conferences@istructe.org.uk). Tea will be served from 5.30pm, with dinner following the lecture (advance reservations required).

Srinivasan is a bridge engineer of remarkable achievement. He is Director of Bridges and Special Structures with Dar Consultants (UK) Ltd and is the first winner of the IABSE British Group Milne Medal (see article in this edition of *IABSE News*). His paper for this Evening Technical Meeting is published in *The Structural Engineer* of 18 May 2004 (Vol. 82, No.10).

The paper presents Srinivasan's philosophy for the design of concrete structures with particular reference to the diverse number of bridges that he has designed and supervised during construction over the past several decades. He believes that every project is unique in that it presents its own guidelines for the design to follow. An holistic approach, that also takes into account the construction methodology, is necessary to produce an adequate response to these specific requirements. Concrete is a mouldable material most suited to express the ideas of form that are true to its function, both economically and efficiently.

The lecture will be presented as a series of case studies of projects designed by the author, including his Milne Medal winning designs for Wadi Leban Bridge (Saudi Arabia) and Wadi Abdoun Bridge (Jordan).

IABSE Annual Lecture 2004

CTRL St Pancras Redevelopment

On **Thursday 9 December** at 6.00pm at Institution of Structural Engineers, 11 Upper Belgrave Street, London, **Mike Glover** will give the IABSE British Group Annual Lecture.



Mike Glover is a Director of Arup with wide experience ranging from the design of very tall building structures to the design and management of industrial facilities both in the UK and overseas for the commercial and industrial sectors. He has been responsible for a wide range of projects, including the signature headquarters building in Hong Kong for the Hong Kong and Shanghai Banking Corporation and for a range of offshore and onshore industrial engineering projects

Most recently, he has been involved in the planning, design and construction of the 109 km-long high-speed Channel Tunnel Rail Link. He is Technical Director and Deputy Project Director for all of these works. It is aspects of the CTRL project, and the redevelopment of St Pancras Station in particular, which will form the basis of his lecture.

Further details of the Annual Lecture will be publicised near the time, but members are encouraged to note the date in their diaries as this lecture promises to be of a high standard, to equal those of past years.



Henderson Colloquium 2001

Achieving Design Quality

Any members wishing to obtain copies of the papers and discussion notes from this Colloquium may do so by emailing a request to Ian Firth's secretary Helen Taylor at hct@flintneill.co.uk. In due course, these papers will be made available through the web site.

Ian Firth

International Links with IABSE

In addition to receiving copies of the IABSE Journal *Structural Engineering International (SEI)* four times a year, members may keep in touch with news from IABSE Headquarters in Zurich via the internet at www.iabse.org. Amongst other information, this website contains details of international IABSE events, links to the web pages of national IABSE Groups and details of IABSE publications available for purchase (with ordering information). Via the 'members only' area of the site, all editions of *SEI* from 1/2002 onwards may be viewed electronically and access to the Membership Directory is also available.

A relatively recent innovation in communications has been the publication of the international *IABSE Newsletter*, which is distributed from Zurich by e-mail to members around the world at the beginning of each month. Members may submit information for inclusion in the *IABSE Newsletter* by e-mail to newsletter@iabse.org.

Andrew Martin

Membership News

A warm welcome is extended to the following new members who have joined the British Group of IABSE since the beginning of 2003:

Brian Bell	(Brian Bell Associates)
Gordon Clark	(Gifford)
Chris Dolling	(Corus)
Brian Duguid	(Mott MacDonald)
Dr Jeffrey Fisher	(Mott MacDonald)
Martin Kirk	(Arup)
Young-Kyeong Lee	(Owen Williams Rail)
Stephen Lockwood	(Doran Consulting)
David Mason	(NGF Europe Ltd)
Sivaji Patro	(Mott MacDonald)
Dr Paul Reynolds	(University of Sheffield)
Nigel Ricketts	(Network Rail)
Ian Ritchie	(Ian Ritchie Architects)
Camelia Schiteanu	(Kellog Brown & Root)
Mel Sime	(Babtie)
Michal Tratkowski	(Scott Wilson)
John Tubman	(Scott Wilson)
Alan Williams	(Kellog Brown & Root)
Kim West	(Faber Maunsell)

At 1 April 2004 there were 147 Collective and Individual Members of the British Group.

Presentation of the first Milne Medal

The inaugural Milne Medal of the IABSE British Group has been awarded to **Srini Srinivasan**, for his designs for the Wadi Leban Bridge, Saudi Arabia and the Wadi Abdoun Bridge, Jordan. Srini Srinivasan is one of the world's leading bridge designers and is Director of Dar Consultants (UK) Ltd.

The Milne Medal is awarded to an individual engineer for excellence in structural design, both in the overall concept and in the attention to detail in their work, and is named in recognition of the late Bob Milne, who served for many years as the Honorary Secretary of the IABSE British Group. In addition to the silver medal, the winner receives a certificate and a financial contribution towards attending an international conference to present a paper on the winning design(s).

Srini Srinivasan received the Milne Medal from Mrs Elta Milne during a short presentation ceremony at the Institution of Structural Engineers in London on 27 November 2003, immediately before the IABSE Annual Lecture. Srini will address a meeting of the Institution of Structural Engineers on 24 June 2004.



Srini Srinivassan, holding the Milne Medal, together with Professor David Nethercot (Chairman, IABSE British Group) and Mrs Elta Milne

Three other entries were highly commended by the judges, each receiving a certificate to record their achievement:

- **Stephen Brown** (Buro Happold) for his designs for Millennium Point, Birmingham, St Catherine's House, London and the QEII Great Court at the British Museum, London.
- **Angus Low** (Arup) for his contributions to the CTRL Medway Viaduct, the Arstaviken Viaduct, Stockholm and the pylons of the Oresund Bridge, Denmark/Sweden.
- **Darren Paine** (Arup) for his work on the City of Manchester Stadium and the Allianz Stadium, Munich. (Since receiving his high commendation Mr Paine has left Arup to found the independent engineering consultancy DP²).



Wadi Leban Bridge, Saudi Arabia (Photos: Dar Consultants (UK) Ltd)



Conference Report

2nd IABSE-CUES Young Engineers' Conference

Queens' College Cambridge, 13-14 December 2003.

*Report by **James Morton**, 4th Year MEng Student, Department of Engineering, Cambridge University.*

Following the success of the inaugural IABSE-CUES Young Engineers' Conference in 2001, Queens' College Cambridge saw the event repeated in mid-December 2003. Entitled "Maintaining the Structural Gene Pool" the two-day conference provided the opportunity for young civil and structural engineers to meet with some of the leading professionals in the world today.

The speakers represented a range of different aspects of the civil and structural disciplines and spoke on a wide variety of projects. Throughout the conference the presentations underlined not only the engineering issues encountered within the projects but also addressed the challenges and issues arising from the interaction of engineers with architects, customers and public opinion.

Presentations at the conference were received from:

Tom Corsellis	(Shelter Project)
Dennis Crompton	(Archigram)
Peter Curran	(Gifford & Partners Ltd)
Mick Eekhout	(Octatube, Netherlands)
Roger Evans	(Humber Bridge Board)
Jerry Isenberg	(Weidlinger Associates Inc)
Paul Kassabian	(Simpson, Gumpertz & Heger, Boston)
Ian Liddell	(Buro Happold)
Robert Mair	(Cambridge University & Geotechnical Consulting Group)
Alan Mann	(Babtie Group)
Martin Manning	(Arup)
Stephen Morley	(Bianchi Morley)
Himanshu Parikh	(Buro Happold, India)
Bernard Vaudeville	(RFR Paris)
Paul Westbury	(Buro Happold)

The conference was opened by a presentation on the San Francisco-Oakland Bay Bridge by the current President of the Structural Engineers Institute of the American Society of Civil Engineers, Jerry Isenberg. In addition to discussing the engineering work carried out by Weidlinger Associates, of which he is President and CEO, attention was also drawn to the impact and influence of public opinion on the design process.

Bridges featured twice more in the conference as the Bridgmaster of the Humber Bridge and the Project Engineer for Gateshead's Millennium Bridge spoke of their experiences. The presentation by Peter Curran talked about the innovation, manufacture and installation of a new addition to the heritage of bridges across the River Tyne whilst Roger Evans spoke on the long and successful life of the Humber Bridge and the maintenance that had ensured reliable performance over the years.

Engineers from a range of specialised disciplines showcased structures from around the world. Ian Liddell addressed concrete shells "from Candela to Stuttgart 21" whilst Bernard Vaudeville presented a tour of glass roofs across Europe. Stephen Morley spoke on his work in stadia the world over and showed Stadium Australia to be a testament to the excellence of English engineering as well as English rugby.

Structural form and the interaction between engineering and architecture in the achievement of the final form was discussed in both a British and American perspective as Paul Kassabian shared his experiences of life on both sides of the Atlantic. Mick Eekhout's presentation on 'Liquid Design' Architecture tackled the interaction of engineers and architects from the point of view of a man with a foot firmly placed within both



camps. Successful collaboration between the two groups was shown to produce amazing results accessible to neither craft without the other.

Structural form and architecture are easily seen but engineering science is at the heart of civil and structural projects. Alan Mann took the conference on a whistle stop ride through the science behind roller coasters whilst Robert Mair delved deeper below the surface with a presentation on tunnelling and geotechnics. Martin Manning summarised the role of science in engineering quite succinctly in a presentation entitled “...there’s physics and then everything else is stamp collecting”.

The interaction between engineering and architecture was continued by the after dinner speaker, Dennis Crompton. In the presentation of his work with Archigram he explored the power of the imagination and the architectural concepts that had arisen from it. This architecture of fantasy is now beginning to be realised through the application of engineering concepts both old and new.

Engineering is a world discipline and Himanshu Parikh displayed the versatility and quality of traditional craftsmanship of India in the form of palatial hotels to rival anything from the more developed world. In stark contrast to that he also spoke of the technical and social issues being addressed in the redevelopment of slum areas. The work of Tom Corsellis with Shelter Project displayed similarly basic concepts making huge differences in the lives of refugees the world over. The provision of emergency shelter in areas of disaster relief demonstrated that the value contributed to society by engineers has many different forms.

The conference closed with a presentation by Paul Westbury on design and the client, which lead into an interactive discussion session. Many of the audience and all the speakers contributed to the session that included topics such as the relationships between engineers, architects and clients, the provision of value and the image of the engineer in society.

The conference provided an opportunity for undergraduates and new graduates alike to mix and speak with some of those at the forefront of the profession. In addition to the formal discussion session the speakers spoke freely with the young engineers throughout mealtimes and breaks in the conference proceedings, again promoting the intimate friendly atmosphere that had characterised the first conference. The format found favour with both speakers and delegates and the success of the weekend provides strong support for a repeat of such an event in the future.

For more information please visit <http://www-g.eng.cam.ac.uk/IABSE/>

[Editor’s Note. Thanks are due to Ian Liddell (IABSE British Group), Dr Campbell Middleton (Cambridge University) and to the members of the Organising Committee, drawn from engineering students at Cambridge, for organising this successful event which was co-sponsored by the IABSE British Group and Cambridge University Engineering Society.]

Conference Report

Young Researchers’ Conference

*Institution of Structural Engineers, London. 17 March 2004.
Report by **Professor Jonathan G.M. Wood.***

There is a new generation of enthusiastic young engineers, not as many of them as we might like, but the quality of the best is impressive. Each year in March, young structural engineers working on their PhDs gather at the Institution of Structural Engineers to present their work in progress and compare and exchange views, and there are prizes.

IABSE (British Group) with the IStructE, ICE and EPSRC sponsor this event now, in its 6th year, with support from Flint & Neill, Arup and Buro Happold. The presentations and posters are judged by senior engineers



from the supporting organisations, who included Dr Duncan Lillistone whose presentation won at the first Young Researchers' conference.

In an inspiring introduction to the event, Norman Haste of Cross London Rail Links, described how in his varied career, ranging from the Humber Bridge to Heathrow Terminal Five, he had built on knowledge derived from research.

From 56 research abstracts submitted by young researchers, 9 were selected for oral presentation and discussion at the meeting on 17 March. A further 15 were presented as posters, with the authors there to discuss them during breaks in the proceedings. These presentations came from a total of 18 university departments. The consistent high quality and wide range of the presented work led to lively debate amongst the judges before a consensus was established. However, the winners emerged from those projects combining advanced analysis with testing to establish the performance of structures and materials as their behaviour becomes non-linear and the real failure modes develop. All presentations showed that communication skills are being well developed.

The spread of research presented largely flowed from the EPSRC awards of grants to universities. These are subject to review by academics and by those with a research background now in industry. EPSRC are currently short of reviewers from among engineering practitioners and would be very grateful for volunteers to take part in occasional peer review of research proposals and/or associated activities (further details from Dr Andrew Davies at andrew.davies@epsrc.ac.uk. See also The Structural Engineer V.81, No.19, pp.14-16). A number of the research programmes were also supported by consultants and/or industry giving a practical input and facilitating the rapid transfer of research results into construction practice.

The range of abstracts reflected many of the current preoccupations of designers. Robustness and the development of collapse mechanisms and the overall instability of structures are rightly principle areas of research. A number of papers related to the 9/11 scenario and some looked at the influence of fire on the interaction between members as distortion and catenary action shift the flow of forces and alter the stability of elements within a structure.

However, it was joints which produced some of the most interesting presentations and the main prizewinners. Jonathan Shanks (University of Bath) made an outstanding presentation on the testing of craftsmen made pegged mortise and tenon joints in green oak construction, which won the £350 First Prize for an oral presentation. The test data is being used to develop and calibrate analytical methods for this historically well-proven and sustainable form of construction for conservation work and for design.

The statistical prediction of extreme loadings on bridge decks from analysis of real vehicle streams won the Second Prize for an oral presentation for Colin Caprani (University College Dublin). As tunnelling under urban areas is increasing, the analysis by John Pickhaver (University of Oxford) of the response of brick buildings to ground deformations from tunnelling will be of particular value and it gained a share of Third oral prize. Dynamic effects were the theme in another group of papers including measuring and analysing the behaviour of grandstands with different types of crowds (goals give the largest peaks), liquid column dampers and the honking vibrations as stored material flow interacts with silo walls, which brought share of Third oral prize to Jesus Chavez-Sagarnaga (Edinburgh University). Studies on unusual structures included wind loads on fabric roofs and optimisation and stability of cable domes,

The best poster presentation prize of £300 went to José Castro (Imperial College) for his analytical studies of the interaction of concrete and steel in composite steel frame joints. This work forms part of an European project and is being calibrated using data from the testing of a two-storey frame subjected to extreme and earthquake loadings in Italy.

Human prosthetic hip to pelvis joints are being analysed by Andrew Phillips (Edinburgh University), who was joint Second Prize winner in the poster awards. This is an interesting development of structural FE modelling incorporating the very different non linear properties of bone, plastic, cement, bone graft, cancellous bone and cortical bone and is already aiding surgeons in identifying the structural reasons for the failure of some surgery. The analysis and testing by John Lau (University of Birmingham) of the strength and ductility of

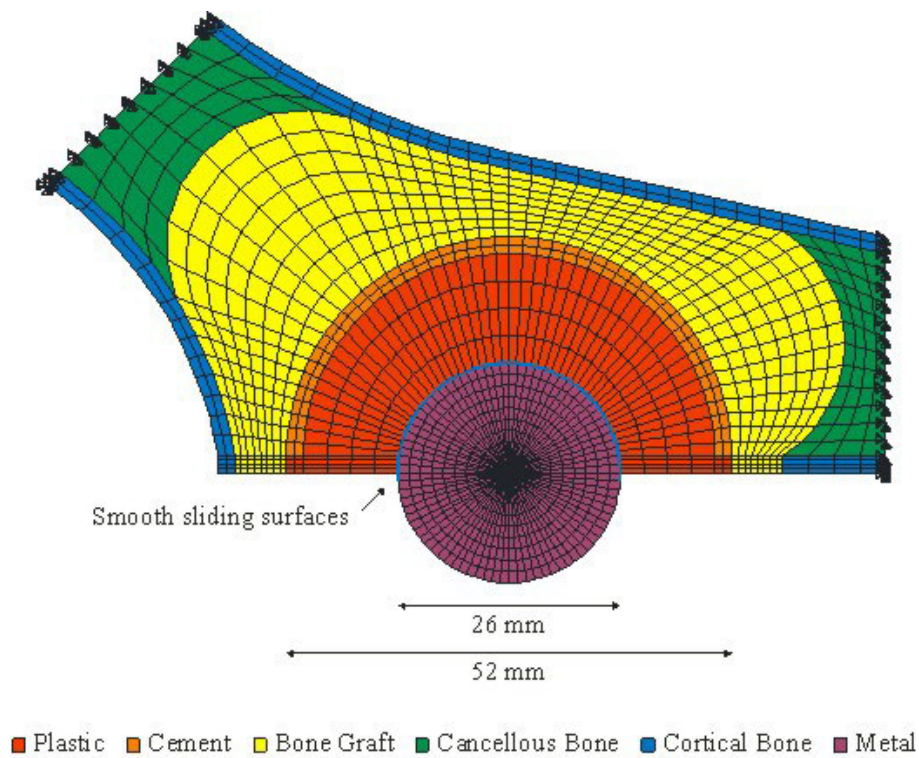


reinforcement with inadequate lap lengths was also equal Second Prize in the poster section. The outcome of this will be of substantial value to those assessing concrete structures of the 1950s and '60s, which often fail by the book but in reality are found to have sufficient strength reserves.

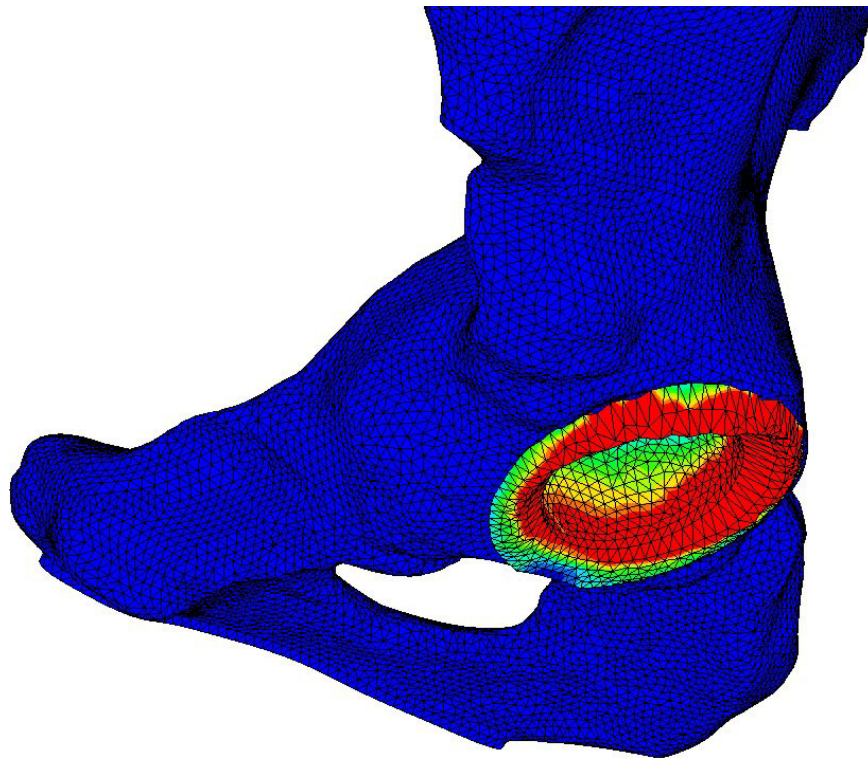
It was a most enjoyable day with a hubbub of discussions during the breaks, which has helped strengthen the network between young engineers tackling their PhDs. For more information and the abstracts you can go to the IStructE web site www.istructe.org.uk and then via 'Technical' and 'Research' to 'Young Researchers Conference'.



Professor David Nethercot, President of IStructE and Chairman of IABSE British Group, presenting the First Prize to Jonathan Shanks (University of Bath).



Structured mesh of the acetabular construct and femoral head developed for an acetabular cup with an inside diameter of 26 mm and an outside diameter of 52 mm



Advanced 3-d FE analysis of plastic deformation in an artificial hip joint by Andrew Phillips(University of Edinburgh).



Profile

ALAN PICKETT

*Divisional Director, Safety & Information Division, Highways Agency
Member, IABSE British Group Executive Committee*



I guess I became a bridge and civil engineer like many others; I was good at mathematics and physics at school but wanted some sort of practical application. Inspiration was also on my doorstep, as the Severn Bridge was being constructed only a ‘Sunday bike ride’ away from my home town of Cardiff. At Chepstow it was easy to overlook the fabrication yards and watch box sections being assembled, ready to be floated out to join the ever-lengthening bridge deck. So it was that I took a civil engineering degree at Southampton University. In fact, it was the expanding motorway programme that really caught my imagination. I had travelled extensively in Britain and seen new stretches of motorway opening up road travel in England. I wanted to be part of that and so joined the Bridges Section of the South Eastern Road Construction Unit in 1969.

Somewhere in those early years of training names like James Drake and Colonel Lovell (‘Mr Motorway’), of Lancashire and the West Riding respectively, must have made a big impression as they remain with me now. It was I recall a pioneering time. The rate and volume of bridge design needed for the motorway programme, new codes and new techniques (and state of the art programmable Olivetti computers with less functions than today’s wrist watches!) kept us on our toes but allowed us to experiment and innovate quite freely. Using the same outline design again for economy was rarely if ever considered. Unfortunately, we didn’t consider either that these bridges would one day have to be maintained, or indeed that some of the roads they carried would need drainage. I can think of a few examples of drainage pipes ‘tacked on’ to bridges as an essential afterthought. Unfortunate also were the collapses during construction of the Milford Haven and Yarra (West Gate) bridges. I still have the report of the Royal Commission into the latter today. They served as a warning and led to the Technical Approval procedures we use today.

From this early background, my career moved away from bridges to first of all more general road planning in the Ministry of Transport Headquarters, and then to management and maintenance in Yorkshire and Humberside, followed by major project delivery in the South West. It was during my time in Leeds that the first signs that some of our new bridges weren’t going to last 120 years became manifest. I can still recall when it was confirmed that the ‘map’ cracking we were seeing in concrete structures was ASR, and indeed the first confirmed example found north of the River Trent. Other problems were also emerging, for example inspecting and painting the Ouse Bridge (no access but vision), concrete spalling on piers (not enough cover), concealed honeycombing (poor workmanship) and so on. Road pavements were not performing much better and so began a more systematic approach to monitoring and managing maintenance programmes. Looking back I am sure I made an intelligent contribution and added value, but there was also a large amount of learning involved.



I relate all this because, although involved in some notable bridge and tunnel works, it wasn't until 1994 that I became really involved again in mainstream bridge engineering. Having held a senior management role in our Nottingham Office, and spending a number of years on engineering policy and European standards issues, when the opportunity arose to become Head of Bridges Engineering in the now Highways Agency, I took it.

From a manager's viewpoint, the Agency's key task was maintaining and strengthening its stock of 10,000 bridges. Yet we had a rather antiquated inventory of them, with no benchmark or target condition for bridges to be maintained to, with no overall picture of the collective state of these bridges, and we didn't know overall whether our maintenance and strengthening activity was improving or even keeping pace with bridge deterioration. Coupled with that, within the Agency at least, the value and contribution bridge engineers made was not fully recognised, largely because they failed to address their weaknesses and market their strengths. One of my goals was to change the face and perception of the Bridges Division.

Terry Rochester, Chief Highway Engineer at that time, also asked me to represent the Agency within IABSE, an organisation that I had not heard of before. Not at all clear at what was involved I attended the IABSE Symposium that the British Group hosted in Birmingham, as a guest of Working Commission 4. All I can recollect was a presentation on the construction of egg-shaped sewage digesters but despite this rather confused introduction, I soon realised IABSE was a gateway and access to a large number of very senior, experienced and eminent engineers both in the UK and internationally. IABSE's aims of promoting and advancing the practice of structural engineering mirrored ours as a client and standard setter. It was clear that here was a forum to support.

For a newcomer it takes a while to understand how IABSE works, but as a member of the Executive Committee of the British Group, and by attending the annual meetings and symposia, its committee system and functioning became clear. To be honest not all the Working Commissions are very productive but nevertheless provide some of the glue that keeps the organisation together. If you are interested in a particular subject they do provide an introduction to like-minded worldwide communities. For me, the shop window on developments worldwide that IABSE provides, and the opportunity to see first hand engineering achievements in other countries and meet the people that make things happen, is one of the major benefits of supporting IABSE. It is often very reassuring, and indeed very cost-effective research, to look and see what somebody else is doing faced with similar problems. You can also develop new ideas. For example at Innsbruck I met promoters of carbon fibre strengthening techniques, which later led to trials on one of our own bridges in Cornwall, paving the way for it becoming an accepted practice for bridge pier strengthening in the UK. Symposia were also a chance to chat with UK colleagues, and for people like Peter Head to bend my ear towards building one of his space-frame plastic bridges (something I regret that I was never able to convince the Agency to do). An added bonus of international IABSE events, particularly during the annual meetings, is that they allow delegates to experience aspects of another country's culture that as a tourist you wouldn't always be privileged to see.

At home, I have to mention the uniquely British, Henderson Colloquia held at Cambridge. These are really rewarding and any effort put into organising or supporting these events is easily surpassed by the benefits from the opportunity to meet and debate issues with an eminent cross-section of UK engineering expertise and experience, all in a convivial and conducive environment.

Looking back, accepting the Head of Bridges Engineering post was one of my career pinnacles during which IABSE played an important part. It also gave me the opportunity to be active in our engineering institutions, judge the Structural Steel Design Awards and serve as a Board member of CARES. In all, it enabled me to put something back into the industry that had provided me with so many opportunities including making numerous life long friends. In 2002 I felt I needed a new challenge and direction and in one of the many Highways Agency reorganisations I took on the responsibilities for corporate safety management, road safety management and driver information, a far cry from bridges. Happily, the Agency supports and allows me to maintain my interest in bridges, and continue to serve IABSE.



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