



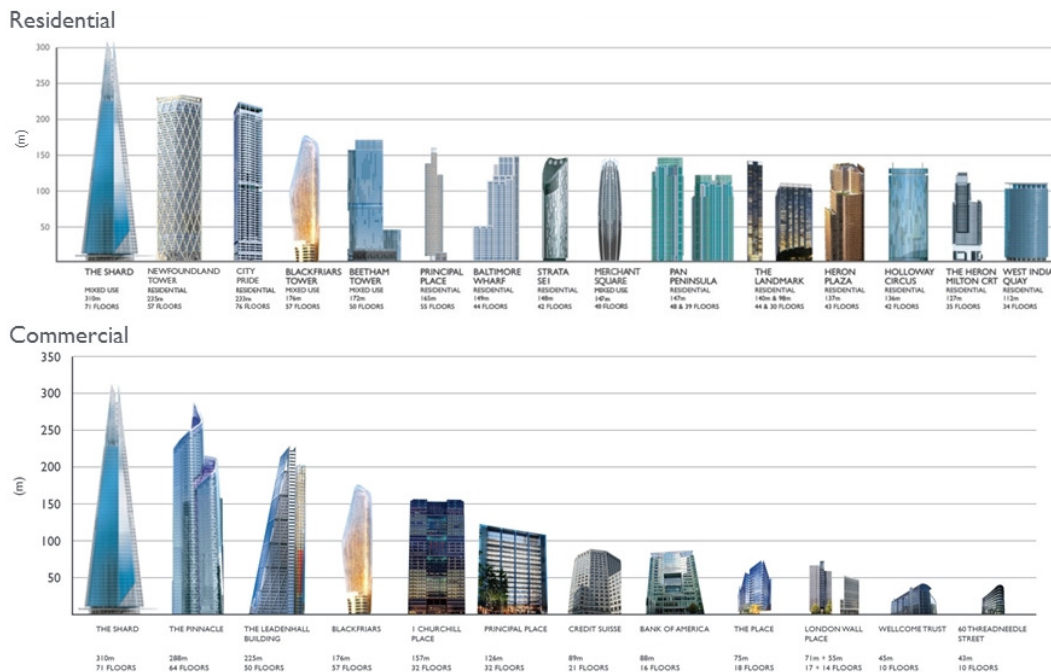
IABSE UK NEWS

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

No. 35

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Standing Tall: Inspiration and Passion in Structural Engineering



The Shard and other tall buildings designed by Kamran Moazami - 2013 Milne Medal Lecture

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IABSE British Group News

Editorial

These are exciting times for the IABSE British Group, as I hope this latest newsletter makes very clear.

However, this will be my last newsletter as editor, as other work commitments are having to take precedence. I owe considerable thanks to Ana Ruiz-Teran, who has helped considerably to complete this issue, and who will take over as newsletter editor from the next edition.

Please give Ana your every support and consider whether there is anything you could contribute. We are not only looking for reports on IABSE events, but also on projects, individuals, or topics which you think may be of interest to our membership.

I'll remain involved in IABSE and look forward to seeing the current levels of interest and enthusiasm expanding over the next few years.

Regards, Brian Duguid, Editor

Events

<u>Date</u>	<u>Time</u>	<u>Event</u>
15 May 2014	5 pm	<u>Annual General Meeting</u> At Arup, 8 Fitzroy Street, London, W1T 4BQ
	6 for 6:30pm	<u>Annual Lecture</u> Peter Ayres – 'Cool Designs: Engineering at the End of the Earth' At RIBA HQ, 66 Portland Place, London, W1B 1AD
22-24 June 2014		<u>IABSE Workshop hybrid2014 – Fribourg, Switzerland</u> Exploring the Potential of Hybrid Structures for Sustainable Construction
9-11 July 2014		<u>Henderson Colloquium</u> Digital Design
16-18 July 2014		<u>Footbridge 2014</u> <i>Footbridges: Past, Present & Future</i> London, co-sponsored by IABSE
3-5 September 2014		<u>IABSE Symposium – Madrid</u> <i>Engineering for Progress, Nature and People</i>
18 September 2014	8 am – 6pm	<u>Future of Design 2014</u> Imperial College London, London, SW7 2AZ
13-15 May 2015		<u>IABSE Conference Nara, Japan</u> Elegance in Structures Abstract submission by 15 May 2014



Disclaimer

The views and opinions expressed in IABSE UK 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.

To all members - Are your contact details up to date?

We want all members get the most from their membership of IABSE and maintaining contact with members is therefore very important both to the IABSE HQ in Zurich and to the British Group in the UK. To ensure that you continue to receive the IABSE Structural Engineering International journal and newsletters from both IABSE HQ in Zurich and the IABSE British Group please ensure that your email contact details are up to date. To check your contact details and to update the information just visit the members area of the www.IABSE.org website. If you hear of any of your colleagues who are members of IABSE but are not receiving the SEI or the newsletters please ask them to update their data on the IABSE website.

New IABSE British Group website: www.iabse.org.uk

The IABSE British Group has a new website! With this tool all our members will be able to access the latest information about all the activities organized by the IABSE British Group. This should become a very useful tool in promoting, celebrating and enjoying membership of IABSE in the UK.

We would like to express our gratitude to Philip Goodall who has set it up and is responsible for its maintenance. Thank you!

Structural Engineering International

The ongoing opportunity exists for all members to have articles published in *SEI*, the international journal of IABSE. It is abstracted and indexed at the Web of Science, Science Citation Index Expanded (SciSearch), and Journal Citation Reports/Science Edition, among others. Rules for publication are available through the IABSE website at www.iabse.org. Brian Duguid is the UK Correspondent for *SEI* and can offer assistance to prospective authors (see Directory). Forthcoming issues are expected to include the following themes:

- May 2014 – IT in Design and Construction (*submissions closed*)
- August 2014 and November 2014 – General reports
- January 2015 – Tension Structures (*abstract submissions closed*)

Journey to Success 2013

Report by Lee Franck, Arup

On Wednesday 3rd of July 2013 the IABSE British Group held an event called Journey to Success. Around 40 young designers came together with leading figures from the construction industry to discuss and debate on how to build a successful career in engineering and architecture. Initiated by Jumana Al-Zubaidi and Lee Franck, two young members of the British Group of IABSE, the idea for the event stems from the realisation that whilst there is an abundance of technical lectures that young people can attend, there is a lack of guidance on how young professionals can develop their careers in the industry. Hearing from people with experience who have developed their career to great success is invaluable.

The evening event took place in one of central London's most traditional pubs, providing a relaxed and informal atmosphere which encouraged much debate. Antony Oliver, editor of the *New Civil Engineer* and chair of the event, created an animated round of discussion between the three panellists and encouraged the audience to ask about everything they ever wanted to know but were afraid ask. He stressed the importance of events such as Journey to Success for young people to celebrate their career and to create an industry which is known for its passion, commitment and expertise, essential in delivering the country's vision for the future.



The panel presented a broad range of expertise from academia, consultancy and construction. It consisted of James Bishop, Associate Partner at Foster + Partners, Sarah Fray, technical director of the Institution of Structural Engineers and David Nethercot, former Head of the Department of Civil and Environmental Engineering at Imperial College and current president of IABSE. Topics discussed included the importance, or not, of having a grand plan, the role of a mentor, specialising vs generalising, life/work balance, the importance of chartership and many more.

I personally took away from the discussion that some key ingredients to success are becoming chartered, a reputation for delivering work without mistakes, building up and maintaining professional relationships and being able to represent the company externally. It is not only about being good at your project work or research, but it is also about the relationships and exchange you have with other professionals and the opportunities which might arise from these connections. Not all opportunities are worth pursuing, but all should be considered carefully before accepting or dismissing them. Being comfortable and to a certain point fatalistic about decisions taken is important too, however if one becomes stuck in a situation, there is no bravery in suffering on. It is not necessary to move to move up; bigger companies often provide the possibility to move within. It is key to build a breadth of knowledge and a wide network that can be built upon later, which can both be achieved by staying with the same company or changing employer. All of the panellists agreed they never changed job for money, but they pursued their personal interest to maximise the satisfaction they enjoy from their daily work. Whilst most engineers would move from a technical side to a more managerial position at one point, some can rise to director level by staying on the technical side. Since key to moving beyond associate level is to facilitate others, it is absolutely important not to lose touch with the hands-on side and not to lose the interest and passion for the detailed work. Both specialist and generalist career paths can lead to success as long as you know your limitations, maximise your personal attributes and be known to be good at what you do.

Feedback collected from participants suggested that the event had been well received and that there was interest for a second edition to take place towards the end of 2013. During the debate, the importance of building up a professional network from early on in one's career was stressed many times and I believe that IABSE can play a key role in facilitating this. Through events such as the Journey to Success or the annual Future of Design Conference IABSE can provide young people with a platform of the most talented and enthusiastic designers worldwide to exchange knowledge and views, create professional links for the future and share the passion for their career.

IABSE Henderson Colloquium – 8th to 10th July 2013 – Applying Lessons from Failures

Report by Jeff Young, Mott MacDonald

Since 1975 the annual two day Henderson Colloquium organised by the British Group of IABSE has provided a forum for the discussion of topics of particular interest to the structural engineering community as well the wider society. The annual colloquium was held this year from 8th to 10th July at Christ's College, Cambridge on the theme of "Applying Lessons from Failure" at which there were 24 participants.

The event was organised by Jonathan Wood who assembled range of engineers, academics, and other disciplines with an interest and track record in the subject. Although UK structural engineers were the largest grouping (designers, contractors and clients being represented) they were complemented by European representatives from the Dutch Safety Board, the Foundation for an Industrial Safety Culture (France), PPV Consulting Italy, plus representatives from the legal profession and process industry to bring a broader perspective to the proceedings. It was particularly pleasing to see one of the ICE President's Apprentices present and to hear her views.

The two days were divided into sessions each with a particular focus during which three/four participants each gave a brief presentation on the topic which was then discussed by the group as whole in an informal and open manner under Chatham House rules. The session topics were:

- Risks from defects and deterioration in aging infrastructure
- Deficiencies and risk in historic and current design and construction practice
- Obstacles to obtaining and disseminating information from failures



- Applying case studies in research, training and teaching
- Improving standards and guidance for design and appraisal
- Improving the construction process to achieve safe quality construction



Participants at the IABSE Henderson Colloquium 2013

From presentations made and the subsequent discussions it became clear that whilst structural engineering design has achieved a high degree of reliability in structural capacity in the as-designed state it was evident that the risks of (a) long term structural deterioration and (b) collapse during construction remained of concern around the world.

Understanding material performance and implementing this knowledge in the design of structures was a key theme that emerged and codes were seen as often lagging behind current experience.

Hindrances to industry learning lessons were discussed at length, including legal constraints, loss of corporate memory and retirement of individuals. Although there were examples where information on failures had been made available expeditiously generally hindrances to learning were of concern.

The fragmentation of the design, construction and maintenance operations as a result of current procurement practices and the loss of the 'controlling mind' was a concern to all. By contrast there were several projects quoted which had adopted an holistic approach with significant success.

Finally, the culture of organisations was recognised as being key, with appropriate competencies at strategic, operational and project level being essential.

It is intended that a report of the colloquium be made available through the IABSE British Group website in the near future.

IABSE Symposium, Kolkata 2013

Report by Ian Liddell

(this is intended to be about the culture shock that is Kolkata rather than the symposium itself.)

My attendance at the Symposium was a part of a trip I was making with my wife to Myanmar where I was going to help the Yangon Heritage Trust by holding a workshop on the re-use of the grand colonial buildings in the city. Because of this we were travelling by Thai Airways via Bangkok that involved a 30 hour stopover at Bangkok.

The Thai flight to Kolkata departed at 11.45 pm and arrived at 01.00. We were met by a taxi from the ITC Sonar Hotel where the symposium was to be held and got there at about 2 in the morning. In the dark we were aware of un-made-up roads with an elevated motorway being constructed above it. We turned off in to a yard



and got out to be greeted by security, X-ray checking machines and a very foul smell. We groped our way through the dark hotel to a room that had not been used for some time and had a damp and musty feel about it. In the morning we discovered that it was a very luxurious hotel set in a beautifully tended garden with large rectangular lily ponds. The wind had changed and the smell, which apparently came from a nearby rubbish dump had gone. The hotel had a marvellous buffet type restaurant where dishes from various parts of India and elsewhere could be sampled.



Victoria Memorial

Because of flight limitations on our preferred route, and because I wanted to look at how they were refurbishing the famed colonial buildings, we had three days to spend looking around the city which had been the centre of the British administration in India up to the move to new Delhi in 1911. On our first day, Sunday, we went to look at the Victoria Memorial, a very grand marble pile in the centre of a park, built between 1906 and 1921. The monsoon had not completely finished and it was very hot and humid. The inside of the building contained a number of pictures dating from the colonial days.

Following this we had arranged to meet GM Kapur who is the chairman of the West Bengal Chapter of INTACH, The Indian National Trust for Art and Cultural Heritage. We arranged to meet in the Calcutta Club, which apparently was just across the road from the park, an easy walk. The road was an approach road to the new Second Hooghly Bridge and was a four-lane highway with extra lanes for local traffic so crossing it was a big challenge. The club was another small oasis from the noise dust and chaos of the city and unchanged from the days of the Raj. We took tea and got some pointers of where to go in the city. GM then drove us around the Chowringhee area to point out some of the features there.



Two views of the building enveloped by a Bengal fig



The next day, Monday, we hired a car from the hotel and went to the famed Howrah bridge, opened in 1943. We crossed over it to Howrah station. After that we crossed back and continued north along Strand Road. This went past more derelict grand buildings and under some steel work that had been erected some while before as part of a planned overpass to Vivekananda road, seemingly long abandoned. That part of the street was being used as a wholesale market with people carrying bags of rice etc from truck to truck. The market continued nearly all the way to Sovabazar Street but thinning out. Over the distance of 1.5km we saw one new building and a few that had been built 20 or 30 years before. There was absolutely no signs of any maintenance taking place. One very grand building in its own grounds was being completely enveloped and destroyed by the ubiquitous Bengal fig, (*Ficus Benghalensis* or Banyan) which produces aerial roots that will reach the ground and then become new trunks.

On our way back we went to look at the Marble Palace, now an art gallery with extensive grounds. Unfortunately the museums are closed on Mondays and a fierce Indian Gentleman with traditional moustache blocked our entry. The Palace was another oasis of green and calm, next door there is another grand



colonnaded building that has become a total ruin with all the plaster fallen off the brickwork and most of the roofs gone. The front garden had become a car park with shiny new cars.



Colonnaded building and car park



Second Hooghly Bridge

Back through the centre of town and out to the second Hooghly Bridge. This is a cable-stayed bridge 823m long, with a 457m central span that was finished in 1992. It was designed by Schlaich Bergerman & Partners and reviewed by Freeman Fox & partners. At the symposium Mike Schlaich presented a paper on a recent survey of the current condition of the bridge. (paper SS2-5) This had revealed that there had been minimal maintenance and that more detailed inspection of a number of components should be made. With all the museums etc closed we looked at the Princep memorial that had been recently restored by Intach. This was adjacent to the riverbank reached by crossing over a local railway. The river bank was well paved and the footpath I think, runs all the way to the Howrah bridge.

The following day we abandoned the idea of driving around the city and determined to walk around the centre at BBD Bagh, formerly Dalhousie Square so we could look at the buildings in more detail. We started at St John's church designed by Lieutenant James Agg of the Bengal Engineers and built in 1784 to 1787. There were subsequent additions and alterations. (see "The Splendours of The Raj" by Philip Davies). The interior has been little changed over the last 100 years and contains curious furniture and fittings of that time. There are also some interesting pictures including a "Last Supper" by Zoffany, definitely worth a visit. From there we battled round the main square and some of the streets around it. There are grand colonnaded buildings some still used as banks and government offices like the office of non delivered mail but many of them like the magnificent Chartered Bank building were unused and suffering from blocked or leaking drains which rapidly leads to plant growth and degradation. There are some new buildings like the Reserve Bank of India with 1960's style concrete brise-soleil on the east side.

The main building on the North side of Dalhousie Square (now BBD Bagh), is the 200m long Writers Building that houses a large number of the government departments. The current Italianate façade was built over the original plain façade in 1880 to reflect the Victorian view of its imperial power.

The side streets off the main square were taken over by pavement stalls and dwellings. In one street a man was having a thorough wash by a stand-pipe next to the gutter. Further along there were piles of rubble under an elegant cast iron portico. Our route led to Strand Road with Metcalfe Hall built 1840 – 1844 on the corner. This was described by Davies as a fine Greek revival building. It had an ageing notice on the railings that it was a protected building but it did not look to be in use. Further along Strand road is the New Secretariat Building a 1950s or 60s construction that would not look out of place in East Berlin. This is followed by the new State Bank of India Building, a very recent building with an unusual facade design. We turned the corner past the High Court with a roundabout in front totally jammed up with taxis and then the Town Hall Designed in Palladian style by Col. John Garstin, Chief Engineer for Bengal. Two years after its opening in 1813 a spring appeared in the ballroom and cracks developed in the walls and the portico collapsed. Apparently it was built on semi-fluid quicksand. The Chief Engineer was required to repair it at his own expense.

Having reviewed our attempts to see some of the Kolkata buildings I am forced to conclude that we missed a lot more than we managed to find. Unlike other cities that are set up for tourists there are virtually no bars or cafés where one could go and sit for a few moments in the cool with some refreshment to plan one's next



move. By car or on foot it was tough going in the humid heat and the traffic. One can take bus or taxi tours but then you miss much of the flavour of the city and end up at a few selected tourist sites.



St John's church



Reserve Bank of India



Writers Building



Science City Conference Hall

Back to the ITC Hotel for the opening of the Symposium. The event was held in the main theatre of the Science City across the road from the Hotel. The programme was to run as follows 18.00 – 19.30 Inaugural programme; 19.30- 20.30 cultural programme; 20.30- 22.30 dinner. It started late and the programme slipped. The formal bit was very wordy and the cultural programme was amazing featuring an orchestra and choir performing some specially composed pieces and a percussion group with a remarkable range of instruments. When we finally made it to the buffet dinner there was plenty of delicious food.

The next day, Wednesday, the symposium started for real. The papers are all published in the usual way with synopses in a substantial volume with the full papers in an accompanying DVD. Of special interest was a special plenary session on poverty alleviation. One of the presenters Jan Wium from Stellenbosch University described some projects from there that were linked in to education and training schemes with positive results. Another interesting session of was for the young engineers. This was chaired/led by Ian Firth with a presentation by Lee Frank on the YE activities that are now being organised by the British Group in London. Similar activities are happening in Germany Netherlands and Switzerland, very encouraging.

Unfortunately because of flight schedules we had to leave early on the Friday to get to Yangon in Myanmar where I was meeting with some people in the Yangon Heritage Trust you are trying to set up a Conservation area in the old commercial centre of the city and save the old buildings and the feel of the area. As in Kolkata the need for building maintenance has yet to be grasped and the grand old buildings built between 1880 and 1930 are deteriorating badly. The underlying problems are probably similar in both places; uncertain ownership and very low fixed rents. Flat rentals as low as 100 Kyats/month have been reported, 966 Kyats = \$1. According to Mike Slingsby, who works for Habitat, the urban poverty in Yangon is worse than Kolkata so there is much to do.



IABSE Future of Design 2013 – Organiser's Report

Report by Philip Goodall, WSP

The British Group of IABSE hosted *Future of Design 2013* at University College London on 12th September. Organised by Jeanette M Abela (Flint & Neill Ltd.), Fernando Madrazo (Imperial College London), Tom Osborne (Knight Architects) and Philip Goodall (WSP) this was the fifth running of the conference, which aims to encourage and inspire young engineers and other professionals early in their careers and help them establish a network of contacts among their peers. The event attracted 140 young professionals and students for the day conference, with 85 staying for the evening dinner. 70% of the delegates were attending their first IABSE event.

The day consisted of three parts – keynote speakers, discussion panels and the young designer presentations. The 13 keynote speakers represented a broad cross-section of the industry, with structural engineers, architects, contractors and academics all being represented. Naming just three, Mike Schlaich (Technischen Universität Berlin/SBP), Roger Ridsdill Smith (Foster + Partners), and Clive Loosemore (Costain), they covered topics such as *Hommage – Principles – Sculpture and Research*, *Integrated Design* and *Design and Construct Projects* respectively.

Young designers were also invited to submit one-page papers outlining recent work they'd been involved in, with 8 being selected to present on the day. Prizes were awarded, with 2nd and 1st places being awarded tickets to the German Group's Young Engineer's Colloquium 2013 in Dusseldorf and the 37th IABSE Symposium in Madrid next year. With 6 from industry and 2 students, the top 3 presentations were:

- 3rd, Daisuke Saito (Mott MacDonald), Double deck prestressed composite truss bridge design
- 2nd, Salome Galjaard (Arup, Amsterdam), Tensegrity structures with integrated street lighting
- 1st, Thomas Prospert (Arup), The embassy for refugees.

The three prize-winning one page papers are included in this issue of IABSE UK News.

Alongside the presentations two discussion panels also took place. Covering the topics of Education and Low Carbon Design, each featured a number of prominent figures from industry and gave a chance for delegates to hear views from of the panellists whilst allowing the audience a chance to interact in the debates. These were chaired by Antony Oliver from NCE magazine and Peter Hansford, the Government's Chief Construction Adviser.

Following on from the daytime activities was a drink reception and evening meal. This gave a great opportunity for the attendees to socialise with each other, the keynote speakers and discussion panelists that took part in the day.

Thanks to all those that helped make the event a great success and good luck to those organizing Future of Design 2014!

IABSE Future of Design 2013 – Attendee's Report

Report by Sufian Haddo, Tony Gee & Partners

"When you understand all the issues, you can be the conductor of the orchestra" – Mike Glover (Arup) – Keynote speaker at the Future of Design 2013 event.

When I heard about the IABSE Future of Design 2013 conference, I decided to attend and give myself a break from work to network with like-minded young professional engineers, architects and academics. The conference was a whole day event, divided into two sessions and followed by an evening meal.

The morning session started off at 9.00am with the speaker Sadie Morgan (dRMM) and her talk about Design with timber, encouraging designers and engineers to work with timber.

"Most engineers design in concrete and steel, it's all too easy to forget timber - perhaps it's time we remembered" she said. Her talk was a great start to the day, drawing the attention of both engineers and architects to inspiring projects where innovation, passion and determination have played a central part. This



was then followed by 8 equally inspiring speakers covering topics as diverse as the design and delivery of Halley VI Antarctic Station, and more local projects such as the Shard.

The second session began with young designers and architects presenting their innovative work, with prizes given at the end of the day. This was followed by discussion panels debating two important topics: Education, and Low Carbon Structures. I attended the Education debate which addressed the question “*Are universities delivering what industry is looking for?*” Many viewpoints were expressed with the general consensus reached being that engineering needs to be introduced at an earlier stage in Education – certainly in my view, students need to be made aware at a younger age (GCSE or A-Level) of what engineering entails, and what is needed to fill the role. Events such as this should inspire young engineering graduates to outreach into the community and encourage the next generation’s engineers.

The day was concluded with a further 4 inspirational talks, with Mike Schlaich (Schlaich Bergermann und Partner) paying homage to the great engineers of the past, and the original principles of their projects which can be taken forward and applied in a new context. Mike Glover (Arup) rounded up the day with his talk about the cutting edge projects he was involved in, for example the Channel Tunnel Rail Link (CTRL) and the Forth Replacement Crossing project.

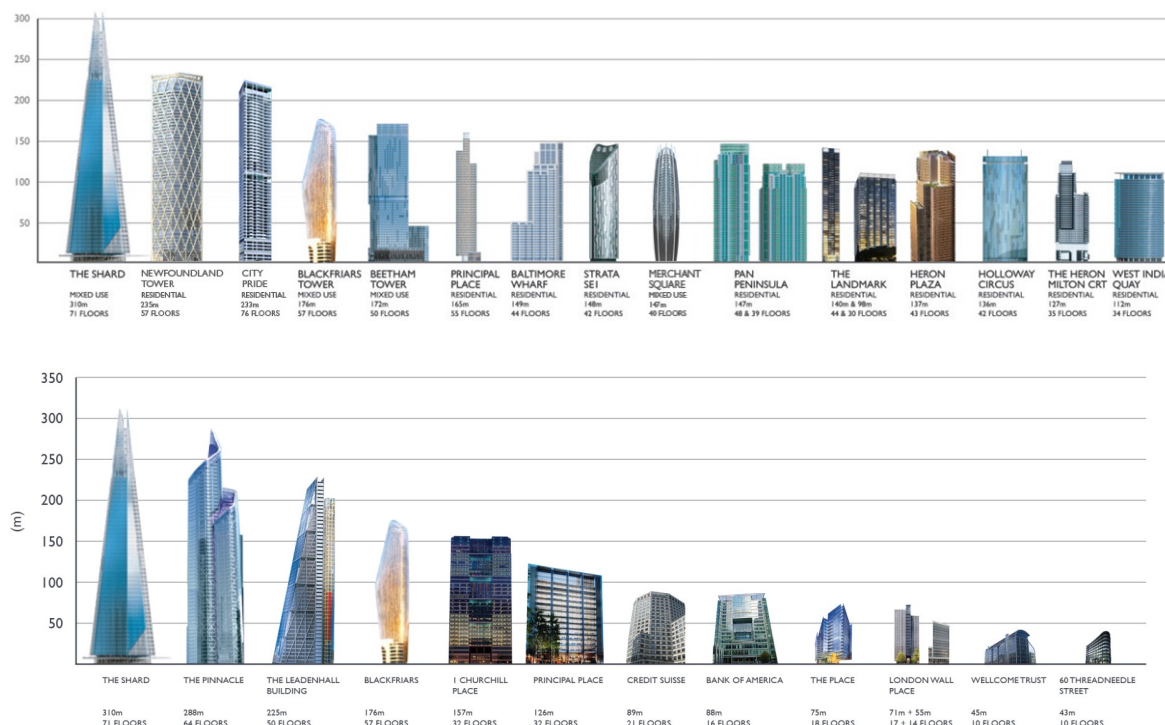
Overall the conference proved to be a great event for networking as well as an opportunity to hear the various speakers: the lunch break provided a welcome opportunity to socialise with the speakers and delegates. This allowed young engineers and architects alike to mingle with top end professionals in the industry.

The event left me inspired, encouraged and above all impassioned by the difference engineers and architects make by overcoming the diverse challenges faced by our modern society.

IABSE Milne Medal Lecture – November 2013 – Kamran Moazami – Standing Tall: Inspiration and Passion in Structural Engineering

Report by Stuart Alexander, WSP

On 17 November, the 2013 IABSE Milne medal was presented to Kamran Moazami of WSP. Kamran’s forte is in the design of tall buildings, and although he showed many examples of his contribution in this field, his talk was fundamentally about solving problems and adding value.



The Shard and other tall buildings designed by Kamran Moazami



His problems started early. On arrival in New York from Iran he needed 18 months' intensive study before being accepted by Columbia University. On being awarded his degree the Revolution prevented him returning home. So he signed up with consultant Leroy Callender. This folded after the infamous collapse of the hotel walkway in Kansas City, but he was able to join Irving Cantor and Israel Seinuk, later joined by Ahmad Rahimian, all who were to be hugely influential. He quickly took to computers, beginning with STAAD on 5¼ inch floppy disks. An early involvement was in World Trade Center 7 which made history when it burned for many hours after the initial collapses on 11 September 2001 before itself collapsing.

In 1989, he came to London for Cantor Seinuk, forging a long-lasting relationship with Canary Wharf pioneers Olympia & York. There he adopted post-tensioned floors to create very thin – and highly economical – floors. Back in New York, as buildings became taller he wrestled with axial shortening and the need to pre-set floor levels to allow for it. Another complexity was coping with railway vibrations, solved by isolation bearings.

Returning to London, Kamran won the commission for West India Quay by inserting two extra floors within the planning envelope using post-tensioning. Then came the events of 11 September 2001. Barclays Bank needed reassuring that their new headquarters building in Canary Wharf would be robust against terrorist attack. Kamran developed a non-linear analysis to show that key columns could be removed without causing collapse. Not many years later, at a well-advanced stage of construction of another building in Canary Wharf which had been restarted with a new design on an already-constructed basement, a column was found to have dropped by 100 mm. It transpired that it had been founded over an opening in the basement wall below. Kamran ascribed the restricted settlement with no overall failure to the same non-linear behaviour, and initiated a scheme whereby the column was jacked back into position without needing reconstruction.

Another problem arose when a client's review engineer refused to accept the design of embedded plates pre-positioned to connect steel floor beams to concrete core walls. Kamran's answer was to set up a successful insitu load test.

Kamran went on to show many more value-adding solutions including: using walking columns to transfer vertical loads sideways; isolating vibration from the three integral wind generators in Strata tower; founding a building on a footprint only half its floor area; and using staggered outrigger walls to permit access around the floors during construction.

He shared with us his disappointment that after £100m has been spent on foundations the 1 kilometre high tower in Dubai has not yet proceeded. This in spite of his very economical design which includes minimising the wind force by creating gaps between four separate bridge-linked segments.

A vigorous discussion followed, and Kamran had clearly got his message across when he was asked '*You have clearly shown that good engineering can produce a better end product; how can we persuade clients to pay for this?*'

Editorial note: The 2013 Milne Medal lecture is available online through the [IStructE Webinar site](#)

Journey to Success 2014

Report by Alessandra Villa, Arup

On Wednesday 12th of February 2014 the second event called Journey to Success, organised by the IABSE British Group, was held at the George on the Strand in London.

The idea for this event was born in 2013, when it was realised that there was a lack of career driven lectures in the construction industry, despite the high number of technical lectures.

Journey to Success is an informal event, aimed at young designers in the construction industry and students, about how to make a successful career in Engineering and Architecture.

The aim of the event is to give the opportunity to the audience to hear leading figures reflecting back on their career and sharing their own personal story in an informal environment which allows young designers to ask those questions they never had the opportunity or were afraid to ask before.

More than 50 people, from students to young engineers and architects, to senior and experienced professionals, attended the event, considerably increasing the number of attendees compared to last year.



Chair of the event was Antony Oliver, ex editor of the NCE and now editor of Infrastructure Intelligence; the panel included 4 professionals: Ian Firth, Chief Operative Officer at Flint & Neill; Hayley Gryc, Associate at Arup; Sebastian Macmillan, Building Environment Course Director at the University of Cambridge and Caroline Tong, Associate Director at CH2M Hill.

The evening was a real success, thanks to the invaluable stories and tips from the panellists, the energy and vibe produced by the chair and the active participation of all attending people.

Antony, chair of the event, successfully engaged the audience through questions and promoting a constructive discussion. He kept the interest high, challenging the speakers and promoting the audience in sharing personal experience and opinion.

The first speaker was Ian Firth who has worked for Flint & Neill since his graduation. His career took off when he came back after getting a masters qualification, but it really changed when he had the courage to go to his boss and proposed to enter a conceptual design competition, an area in which Flint & Neill were not specialised before that moment.

"I had the courage to go to the boss and say: I really want to do something..."

His experience also brought up the discussion about small versus big firms. He said "I really love the buzz of a small company". In a small company one can have more responsibilities and have a bigger role in a project, while the advantages of a big firm are easier access to big and exciting projects, better mentoring systems and more networking opportunities.

The most frequently used word during the evening was most likely the word "passion". What really impressed me about Ian is his passion about design. To the question about if he ever had to choose between being a designer or commercial manager, he answered with a clear "I am always excited about design. You have to know how business works but keep a hand on the design".



Journey to Success 2014 panel members. From left to right: Ian Firth, Sebastian Macmillan, Hayley Gryc, Caroline Tong, and Antony Oliver

All the panellists agreed that they never based their decisions on money but always on their passion.

Hayley Gryc, as well as Ian, has always worked for the same company, Arup, starting when she was still studying through annual summer placements.

She started in the building group, working on big projects with well-known architects. It was her dream before she joined, but after a trip to India six years ago she thought that more should be done to help those in need, and she realised that she wanted to work more in developing countries.

She worked, in parallel to her daily job, on humanitarian projects, developing a partnership with Habitat for Humanity. When she went through the process of becoming an Associate, she decided she wanted to focus her efforts on those projects where she felt she could add most value. This is when she moved to Arup's International Development Group. "I just want to give the people the best I can do". What became apparent in Hayley's talk was the importance of building up a good technical base and become chartered; to follow your passions and, more importantly, to let people know what you are interested in, so that, when the opportunity arises, they come to you first.

IABSE Future of Design 2013 – First Prize



The Embassy for Refugees

Thomas PROSPERT
Graduate Engineer
Arup
London, UK
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A Luxembourg native, Thomas has studied Structural Engineering at ETH Zurich and Imperial College. Before starting his MSc in 2010, he interned with Bouygues in Zurich and high-rise specialist Thornton Tomasetti in New York. Since 2012, Thomas works at Arup in London in the commercial buildings group.

Keywords: *timber structures, OSB, parametric design, freeform, buildability*

1. Introduction

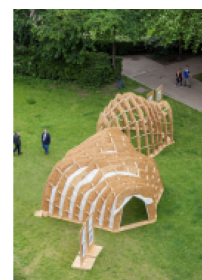
Commissioned for Celebrating Sanctuary London 2013, the Embassy for Refugees blurs the boundaries between architecture, art practice and engineering, as a cross-disciplinary endeavour that explores concepts of sanctuary and representation. Nestled within Bernie Spain Gardens next to the Oxo Tower in London, the temporary organic timber structure formed a poetic expression of refuge whilst providing a platform for debates on humanitarian issues. This unusual and highly bespoke structure was brought to life through the rich collaborative efforts of architect Natasha Reid, engineers Arup and fabricators Grassroot Garden.

2. Content



In a pro bono effort, a small team of young engineers at Arup collaborated with the artiste to design and explore the form of the unusual and highly surprising structure. Using plywood-like material to build such a structure is unusual and standard building codes were inadequate to design such complex, curved beams. Due to the low self-weight and sensitivity to wind action, an advanced numerical approach was taken to analyse the behaviour of this deceptively complex structure.

Striving to overcome the challenges of delivering the artiste's vision, the Pavilion was designed with a focus on buildability to achieve a 10 hour construction time. Using 3D modelling and powerful parametric design tools, a simple solution was developed that was easy to construct, deconstruct (& reconstruct) as required by the fast-paced programme. The structural ribs of the pavilion were cut from standard sized OSB sheets in a sophisticated CNC-machined process. Each element was clearly marked and identifiable by an engraved code, which determined the member's position, both in the structure and the construction sequence.



3. Conclusions

The Embassy for Refugee project showcased, albeit in a concise format, how important collaboration between architects and structural designers is when it comes to developing unusual structures. The proactive approach of the engineers to understand the artiste's intent and transpose it into a safe and economical design ensured the success of this project and is of paramount importance for the future of good design.

References

Articles in the press: bdonline.co.uk, londonarchitecturediary.com

IABSE Future of Design 2013 – Second Prize



Tensegrity Structures with Integrated Street Lighting

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As a product and interaction designer Salomé's role is to work with many different specialists and disciplines in Arup. These multidisciplinary projects demand a clear and quick exchange of knowledge and ideas, and a tight integration of products and solutions.

Keywords: *Tensegrity, Lightweight structure, Floating compression, Pre-stress, Integration, Interactive lighting.*

1. Introduction

The Grote Marktstraat in The Hague is being completely refurbished and the municipality requested a special lighting solution for the street. Arup proposed to develop tensegrity structures with integrated fixtures, providing both functional and aesthetic lighting that respond in a dynamic way to the presence of people on the street.

2. Content

Arup designed the lighting elements as a tensegrity structure. Tensegrity, or floating compression, is a network of cables that creates a geometry under a certain tension which ensures to position struts in such a way that they do not touch one another. The struts press outwards against nodal points in the tension network. In this way it seems as if the struts are floating. The total plan contains two different tensegrity designs. Both structures are based on the connection of 'tripod' modules: a set of three compression struts within a network of nine cables. The large tensegrity 'chandeliers' are structures where these modules are linked in a horizontal plane. The smaller vertical lighting elements are tensegrity structures where the modules are connected by putting them together in the vertical direction, like building a tower.

Lighting fixtures, providing either white or coloured light, are integrated in the structure. The white light provides static, functional lighting, but the coloured light responds dynamically to the amount of people in the street and their position. This results in an ever changing image, both in colour as in light intensity.

The position and orientation of the tensegrity are crucial elements in ensuring that the lighting is directed to the right places and meets the lighting level requirements of the municipality.

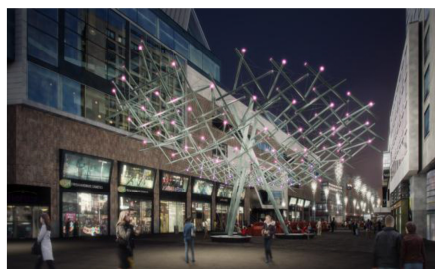


Fig. 1: One of the large tensegrity 'chandeliers'

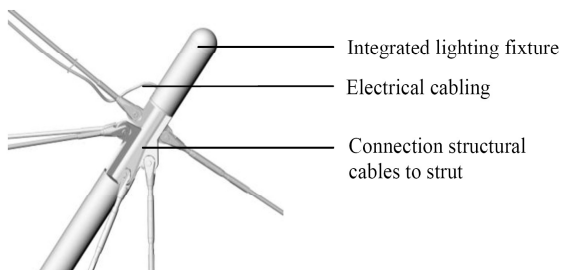


Fig. 2: Integration of the lighting in the tensegrity.

Conclusions

The perceived value of the solution sits in the complete integration of all the different elements. Close cooperation of several Arup teams resulted in a balanced structure with all the electronic hardware being integrated and adapted to the shape. Here, the structure becomes art.

IABSE Future of Design 2013 – Third Prize



Double Deck Prestressed Composite Truss Bridge Design

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Bridge Design Experience in Japan
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Keywords: Composite Truss, Post-tensioning, Double-deck bridge, Feasibility Study.

1. Introduction

Mott MacDonald was commissioned by the Ministry of Transport, Quebec to investigate the feasibility for incorporating a light rail transit (LRT) on the 3.4km long new Champlain Bridge in Montreal, Canada. A double deck prestressed composite truss bridge design option was developed in the project, which is presented in the current paper.

2. Composite Truss Bridge

Prestressed composite truss bridges are of novel bridge construction. They consist of steel diagonal truss members, and top and bottom concrete slabs, and prestressing cables as shown in Fig 1.

The integration of the steel into the concrete means that the total weight of the bridge can be reduced typically 10-20% without compromising the stiffness of the structure. In addition to a reduction in the self-weight, this bridge system has the following advantages over the conventional prestressed concrete box girder bridge:

- No reinforcement cages and formwork are required for the web (ease of construction)
- An open/transparent appearance of the structure (aesthetic quality, reduction in wind loading)

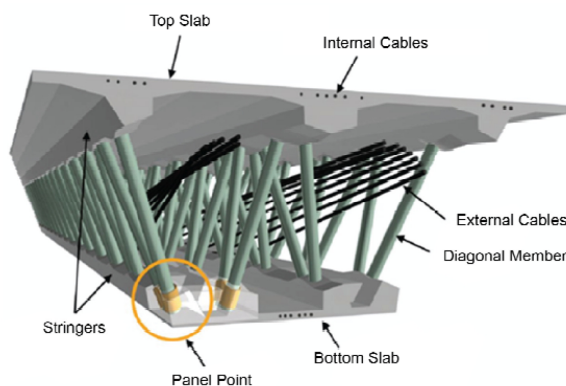


Fig. 1: Prestressed Composite Truss System



Fig. 2: Design Option Developed for the Project

Fig 2 shows the design option developed for the new Champlain Bridge project. As can be seen the LRT is positioned on the lower deck in order to protect it from the severe winter weather in Montreal and to avoid various operational and highway issues.

3. Conclusions

The outline of the pressed concrete truss bridge system and the recent design work with this system have been reported. Further investigation on the truss joint system will be required at a preliminary design stage for this composite truss option to be realised.



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