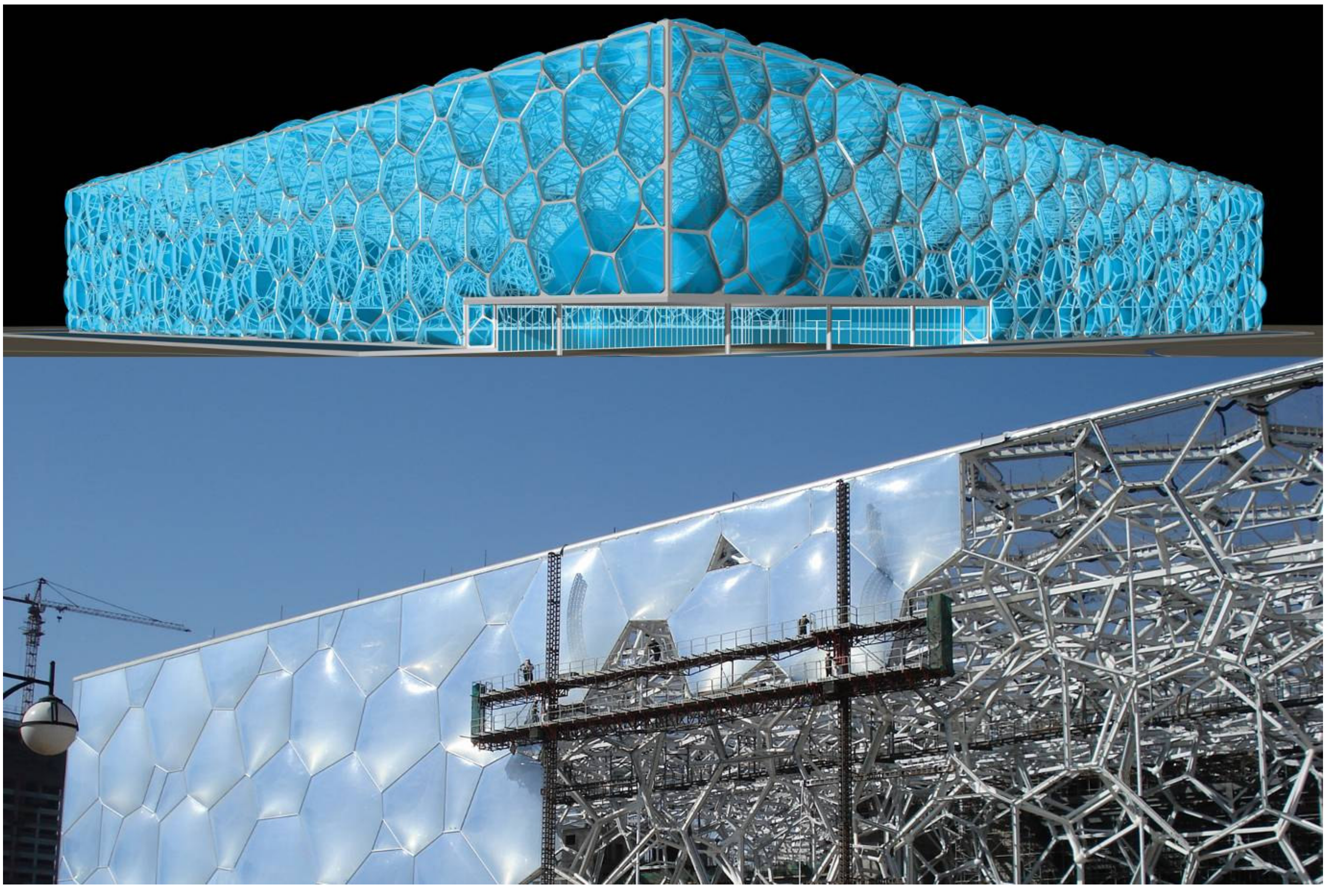
IABSE NEWS

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

No. 24 **January 2007**



National Swimming Centre, Beijing, China – Concept and Reality *Image ©Arup/CSCEC/PTW*

Contents

IABSE British Group News

Editorial

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

The start of a new year offers the opportunity to look ahead and survey the possibilities offered by the next twelve months. This is no less the case for IABSE and it's members than for anyone else as the calendar of events for 2007 shows. The Milne Medal lecture (see page 4 to find out the 2006 winner!) should prove a great attraction as will also the proposed half-day meeting 'Factor 10 engineering for sustainable cities' (the theme of the 2006 Henderson Colloquium) which will present state-of-the-art guidance and examples of how the 'order of magnitude' improvement in sustainability performance, suggested in some quarters as being necessary for our future, can be achieved.

During 2006 it has been a pleasure to welcome over 20 new members to the IABSE British Group and I hope that members both old and new will encourage others to join in 2007. It is, perhaps, fair to say that the British Group programme of events focuses on quality rather than quantity. However, on the international scene IABSE has much to offer to members through attendance and participation in symposia, conferences and technical committees. Please feel free to contact the Chairman, Hon. Secretary or any member of the Executive Committee for initial guidance on how you can make the most of these opportunities.

With best wishes for a prosperous 2007.

Andrew Martin

New Members

A warm welcome is extended to the following who have joined the IABSE British Group in recent months:

David Ashurst	(Arup)	Paul Mullins	(Benaim)
Geoff Campling	(Pell Frishmann)	Nimal Perera	(Robert Bird & Partners)
Gerry Dissanaike	(URS Corporation)	David Pheby	(Pell Frishmann)
Klaus Falbe-Hansen	(Independent)	Chris Plant	(Pell Frischmann)
Ehsan Ghurbal	(TNO Diana Leicester)	Barry Skinner	(Bestech Systems)
Craig Giaccio	(White Young Green)	Paul Sanders	(Flint & Neill)
Ian Liddell	(Ian Liddell Engineering)	Philippe Willareth	(Whitby Bird)
Mahyar Mallak	(Faber Maunsell)	Chun Man Yip	(Halcrow)
Andrea Menardo	(Buro Happold)		

Executive Committee

At the British Group AGM, held on 7 December 2006, **Stuart Withycombe** (Halcrow) and **Jeff Young** (Mott MacDonald) were confirmed as new members of the Executive Committee. Jeff Young replaces **Andrew Beard** (Mott MacDonald) on the Executive Committee and our thanks go to Andrew for his service and contribution.

Events 2007

Date	Time	Event
Thursday 1 March 2007 *[Provisional – tbc]*	6.00pm	Milne Medal Lecture **Tristram Carfrae** (Arup) Winner of the Milne Medal 2006
March 2007 *[Provisional – tbc]*	Half-Day Meeting	Factor 10 Engineering for Sustainable Cities Papers, feedback and discussion from the IABSE Henderson Colloquium 2006
Monday 9 – Wednesday 11 July 2007	Residential	IABSE Henderson Colloquium 2007 **Lessons from Design Competitions** Magdalene College, Cambridge Contact: Ian Firth (Flint & Neill) & Angus Low (Arup)
Thursday 29 November 2007	5.00pm	Annual General Meeting
	6.00pm	IABSE Annual Lecture 2007 *Speaker to be confirmed*
	8.00pm (following Annual Lecture)	Annual Dinner (Fee payable. Prior booking essential.)

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.

IABSE Annual Lecture 2006

'Sustainability: the philosophical basis', by Bob Silman

On 7 December 2006, **Bob Silman** (Bob Silman Associates, New York, USA) delivered the IABSE Annual Lecture to an attentive audience at the IStructE. Bob Silman is well known as a promoter of sustainable engineering and was one of the founding members of IABSE Working Commission 7 on Sustainable Engineering.

Bob Silman delivering his lecture

In his lecture, Bob took the opportunity to look beyond the well-rehearsed definitions of sustainability that we hear and read about and instead looked at some of the philosophical issues underpinning the choice of many engineers and others to adopt sustainable principles in their work and lifestyles. In doing this he made reference to philosophers from ancient Greece to the 20th century and to more recent published works on where mankind's future may lie if our current patterns of consumption and resource depletion continue unchecked.

The lecture prompted a lively discussion and a vote of thanks was proposed by **Peter Head** (Arup). It is hoped to publish a fuller account of Bob Silman's lecture in the next edition of *IABSE News*.

Presentation of the Milne Medal for 2006

The Milne Medal for 2006 has been awarded to **Tristram Carfrae** (Arup). Tristram received the Milne Medal from Professor David Nethercot, chairman of the IABSE British Group, during a short presentation at the Institution of Structural Engineers on 7 December, after which he was the guest of the British Group at the Annual Dinner.

The award of the Milne Medal recognises Tristram's outstanding achievements as a structural engineer and in particular for his work on the City of Manchester Stadium (UK), Khalifa Stadium, Doha (Qatar) and the National Swimming Centre, Beijing (China) (see cover illustration).

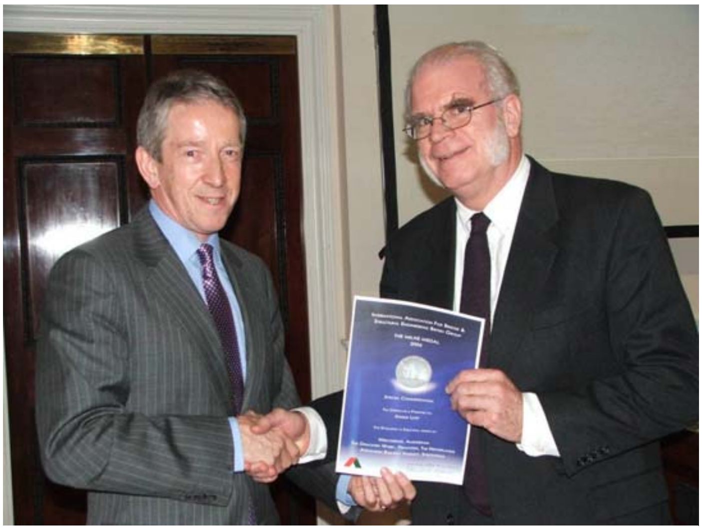
As part of the award Tristram will present a lecture at the Institution of Structural Engineers in London, provisional date 1 March 2007 (tbc) (see *Events*).

Now in its fourth year, the Milne Medal recognises excellence in structural design by an individual and is open to chartered members of British engineering institutions.

The judges reported an exceedingly high standard of entries for this year's award. Amongst these, **Angus Low** (Arup) was given a 'special commendation' in recognition of his work on the Nesciobrug, Amsterdam and The Drachten Wheel, Drachten (both cycle bridges in the Netherlands) and for the Asterviken Railway Viaduct (Sweden).

Entries for next year's Milne Medal will be invited in the spring of 2007.

Tristram Carfrae receiving the Milne Medal from Professor David Nethercot



Angus Low: Special Commendation

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).

IABSE British Group Website

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.

Milne Medal Lecture 2006

'Poised between Gravity and Levity' by David Tasker

David Doran *(IABSE British Group) reports on the lecture presented at a joint IABSE/IStructE evening meeting at IStructE HQ on Thursday 26 October 2006.*

Each year the British Group of IABSE makes a presentation of a medal to chartered members of British Engineering Institutions. The award, the Milne medal, in recognition of Bob Milne a former Assistant Secretary of IStructE and Secretary to the British Group is for an individual designer as opposed to a team. It is intended to identify leaders in the profession and to raise the profile of design engineers in general. Former winners include Srini Srinivasan (Dar Consultants) and Stephen Brown (Buro Happold). David Tasker (Gifford) is the 2005 winner of the medal.

David Tasker
Milne Medal Winner 2005

Judged by any standards David Tasker's career has been remarkable. With Capita Symonds at the time of the award, his submission was the design and construction of a limited budget gateway bridge across Newcastle Road, Stoke-on-Trent, forming the pedestrian entrance to the North Stafford University Hospital.

The bridge deck was 5.6 m above road level, 2.7m wide and overall span of 34m. It was supported at mid span by a pinned arch spanning 26 m between two piled reinforced concrete supports. After consideration of alternatives including concrete, a design using thin (8mm and 10mm) stressed skin steel plates was selected. Potential fabricators for this type of construction were rare so Littlehampton Welding Ltd were chosen as a firm prepared to take risk and perhaps more importantly for their knowledge of boat building techniques. The main structure was fabricated in two units which were transported to site and welded together.

David's written paper (published in *The Structural Engineer* of 3 October 2006) was philosophical in nature. In his presentation he illustrated statuesque images which contrasted the *lightness* of Plato with the *heaviness* of Aristotle. In demonstrating his philosophy of elegance with economy he presented to a full house a dazzling array of slides of his work including a site-laminated timber dome in Colorado; the Manchester Airport tube-like access bridge (now copied elsewhere), hyperbolic parabolic roofs for Centre Parcs using straight timber members, a ski jump in Austria and research structures for outer space. Some structures were of such simplicity that they were erected on site by a workforce of students.

David deplored the decline of some craft industries and also paid tribute to his inspirational mentors and colleagues such as Anthony Hunt, Peter Rice and Philip Cooper. He suggested that construction today was too regulated by Health & Safety and other risk-averse legal restraints which were in danger of stifling innovation.

In a short question and answer session David dealt competently with questions from the floor on materials, alternative designs considered for the Hospital Bridge, innovation and education. During the discussion, meeting Chairman, IStructE Vice-President Graham Owens, suggested that consideration by designers of the *carbon tag* in addition to the normal *price tag* of projects heralded a bright and demanding future for engineers.

IABSE Symposium, Budapest, 2006

'Responding to Tomorrow's Challenges in Structural Engineering'

*Report by **Stuart Alexander** (WSP Group).*

IABSE is the International Association for Bridge and Structural Engineering, and every year it brings together leading structural engineers from all over the world to discuss an important topic. The 2006 get-together was held in Budapest from 13-15 September, and the chosen topic was 'Responding to Tomorrow's Challenges in Structural Engineering'. Nearly 200 papers were presented, spread over three days and running in three parallel sessions together with a comprehensive poster display, so this report will not only have to be selective but is limited to general structures, although bridges were also well covered at the event.

Glass

No fewer than 15 papers were on glass, all using laminated glass which is clearly the required material for structural applications. A regular test is dropping a 4 kg steel ball from 3 m height; although broken, the glass must not fall. Iris Maniatis from Germany showed glass with a photovoltaic film in the interleaving layer. Rudolf Hess from Germany showed a cantilever canopy and Kinga Pankhardt from the host country Hungary whole floors and roofs all of laminated glass without separate structural support.

Strengthening Techniques

Pedro Santos from Portugal described work to correlate the strength of the interface between new and old concrete with the surface roughness – obtained as-cast, by wire brushing or by sand blasting. Maria Polak of Canada presented a method of strengthening flat slabs using 'shear bolts' with a flattened head at the top and a nut and washer at the bottom. Six tests with various configurations showed ductile bending failures before punching shear occurred.

New Methods

Hiroshi Shima from Japan described using self-compacting concrete to fill both columns and beams in an earthquake-resisting frame, while Lasse Petersen from Germany had pumped self-compacting concrete to fill steel columns 50 m high in only two lifts. Johann Kollegger from Austria explained his method of forming domes by casting a circular slab on the ground incorporating radial strips of polystyrene dividing it into wedges, then tightening the rim with an unbonded tendon to pull it up to a height equal to diameter/5.5. Arpad Kolozsvary-Kiss from the USA revealed his secret of avoiding local bending moments in very long span triple-tube steel arches – by hanging the roof covering from a single cable which passes over a pulley at each suspension point and is then prestressed.

Innovative Structures

Ding Jiemin from China described the roof of The Beijing University Gym, to be used for table tennis at the 2008 Olympic Games. It spans 80 x 64 m, with a 24 m diameter central dome supported by 32 2.5 m deep trusses each acting with a cable tie. Ulrich Breuninger from Germany showed the competition-winning floor structure used for twin 100 m high office blocks in Frankfurt. Spanning 12 m, the floor consists of steel beams with rectangular openings acting compositely with insitu concrete slabs. These are at bottom flange level over the open office areas but at top flange level over the central corridor. The total depth including floor covering is 530 mm, resulting in two additional floors being accommodated.

IABSE Prize 2006

The IABSE prize for building structures was awarded for the roof of Hamburg bus station. Scimitar-shaped on plan, it is 140 m long by 29 m at its widest point, and floats 11 m in the air supported on a single row of columns only 370 mm in diameter.

The symposium has been reported in a single volume with a short two-page version of each paper, with the full versions on a CD tucked inside the back cover. Many excellent illustrations are included.

Project Feature

Challenges in the Construction of Stonecutters Bridge

*By **Steve Kite** (Associate) and **Naeem Hussain** (Director), Arup, Hong Kong*

The following paper was presented by the authors at the IABSE Symposium 'Responding to Tomorrow's Challenges in Structural Engineering', Budapest, September 13-15, 2006. Naeem Hussain is the Hong Kong Delegate to the Permanent Committee of IABSE.

1 Introduction

Stonecutters Bridge will cross the Rambler Channel in Hong Kong at the entrance to Kwai Chung Container Port, one of the busiest in the world. Minimum disruption to the operations of the port was a high priority in the design and construction planning. The new road provides an alternative route to Hong Kong's international airport and better access connections into the new container terminal on Tsing Yi Island. Detailed design by Arup and Cowi took place between 2002 and 2003 [1]. The design is dominated by the effects of extreme loading conditions associated with the site [2]. The construction contract was awarded to the Maeda-Hitachi-Yokogawa-Hsin Chong Joint Venture, and construction began in April 2004 with completion scheduled towards the end of 2008. This paper describes the complex nature of the construction activities to date and how the challenges of erecting this major bridge are being overcome.

Fig. 1 Stonecutters Bridge – a new icon for Hong Kong in 2008

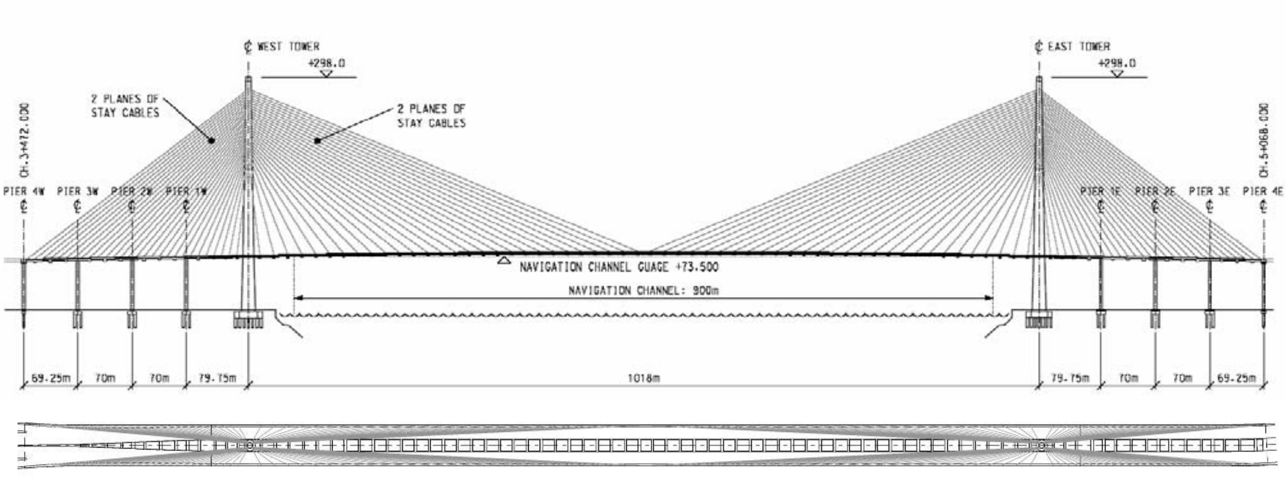


Fig. 2 Elevation and plan

2 The Bridge

The 1596m long cable-stayed bridge has a steel main span of 1018m, with prestressed concrete back spans each side of 79.75m, 70m, 70m and 69.25m. The circular tapered mono-column towers stand on land at the bridge centre line between the two longitudinal boxes of the twin girder deck. The towers are formed of concrete to +175m, are of composite construction with an outer stainless steel skin to +293m and are topped by a lighting feature to +298m. Stay cables are in 2 planes arranged in a modified fan layout and attached to the outside edges of the deck. The deck girders are connected with cross girders spaced at 18m in the main span, coinciding with the stay anchorage spacing, and 20m in the back spans where the stays anchorages are spaced at 10m. The concrete back spans are monolithic with the piers. Three intermediate piers have single rectangular tapered column shafts, while the end piers at the interfaces to the adjoining viaducts are twin column portal structures. Both sides of the bridge are on reclaimed land and foundations are large diameter bored piles to rock. Pile lengths are between 50m and 110m and shaft diameters are between 2.2m and 2.8m.

2.1 Structural Behaviour

The steel main span is a flexible girder formed by a twin box section which carries the longitudinal compression induced by the inclined stay cables. This compressive force increases towards the towers, with the highest concentration of load being in the outer edges of the deck around the tower, due to the combined dead load and transverse wind load effects. The cross girders span 53m between stays, and also provide the virendeel action in plan to resist transverse wind.

The concrete spans act as stiff anchor spans. Due to the layout with the cables on the outer edge of the twin box girders, the load path for the stay forces is a combination of bending and torsion of the longitudinal structure, and bending of the cross girders. The balance between longitudinal box torsion and cross girder bending is dependent on the methods of construction, as initial stressing of the cables could apply large torsions to the boxes. This is overcome by applying temporary prestress at the top of the cross girders prior to building them in to the pier cross heads, which in effect mimics the action of the stay cables. When the stays are stressed the temporary bowstring prestress is released. The combined effect is a much reduced torsion in the boxes.

3 Foundations

3.1 Piles

The ground is reclaimed fill overlying alluvial deposits on top of bedrock, typically between 50 and 90m below ground level. However, two major faults running through the site lead some local areas with very deep bedrock, and widely varying levels of bedrock in close proximity. Due to the nature of the reclamation sand, the strength and stiffness of the ground varies. Cast-in-place end-bearing bored piles of between 2.2 and 2.8m diameter were constructed using 45 MPa concrete. Piles lengths are up to 110 metres, with the bellouts formed at the base up to 4.5m diameter to limit the stresses imposed on the rock.

The piles were constructed to tight positional and verticality tolerances using full depth temporary steel casings installed using an oscillator. For the longest piles some of the casings were sacrificial. A grab was used to excavate the sand, followed by Rotary Core Drilling to form bellouts in rock. The bellouts were not cased, so there was potential for instability and void loss. This problem was overcome by grouting the zones where necessary, and then coring though the grout, leaving an annulus of stable material.

3.2 Pile caps

Constructing the pile caps in the permeable sand next to the sea required careful design of the sheet pile cofferdams and dewatering systems. The back span caps, typically 19m by 11m by 4m thick, were cast as a single pour. To control differential temperatures insulation was provided to retard heat dissipation. Each tower cofferdam was a 38m by 50m by 10m deep excavation and had three layers of steel struts which were incorporated into the caps. Concrete pours typically 1m thick were used to form the 8m thick caps, with additional reinforcement provided at each layer to control thermal cracking.

4 Concrete Back Spans

4.1 Pier Shafts

The intermediate pier shafts are between 60 and 65m tall, with hollow box sections tapering from 12.5m to 10m wide, having a constant thickness of 4m. Walls are either 600mm or 1m thick. They were constructed with 60MPa concrete using a hydraulic climbing form system from VSL. Four pockets were cast into the outer face at each pour to provide the support points for the climbform. With typical pour heights of 4m, a cycle time for construction of each lift of 6 days was achieved, with concrete finishing works undertaken from trailing platforms hanging below the main working platforms. The end portal shafts have a similar form and were constructed by similar techniques.

4.2 Pier Cross Heads

At each intermediate pier, the monolithic cross head is formed by in-situ cantilever construction. The integration of the deep section (9m at the root) with the curved soffit of the longitudinal deck made for a complicated geometry, so the pours are split into manageable sizes. A temporary works truss cantilevering from the pier shaft provides the support in the temporary condition before the concrete has gained the required strength.

4.3 Concrete Deck

4.3.1 Construction Sequence

In each span the three cross girders are cast first as independent units. After the first stage of transverse prestressing is applied, the two longitudinal bays between these cross girders are constructed. After the remaining transverse prestressing, the final deck pours will stitch the span concrete to the pier cross heads. Once a continuous deck is formed, the longitudinal prestress is applied, with stressing taking place at the ends of the deck where there is adequate access. This sequence allows independent components of the deck to be constructed and adjusted to the correct geometry prior to forming an increasingly complex non-determinate structure.

4.3.2 Falsework System

The contractor elected to use precast columns on bored pile foundations to provide the required temporary support system which carries the weight of the concrete decks until the stay cables are installed. Two columns per cross girder up to 60m tall are spaced at 35.8m to suit the web locations. This system provides a relatively stiff support, which minimises the deflections that occur as the deck segments are cast, and also minimises uncertainty of those deflections. This reduces the adjustments required to correct the levels. The 50MPa concrete columns are hollow sections, 2.5m square, with wall thicknesses up to 250mm. Vertical prestressing bars are coupled together and stressed down onto the segments at each of three 20m high modules. Steel truss members brace the columns together in both the longitudinal and transverse directions, and plan bracing also is introduced at the top of each module to form structures rigid enough to carry the heavy deck even in the full typhoon condition. Level adjustment is provided at the top of each temporary column, with four 500T jacks, used to move elements of the deck up or down as necessary, to ensure the correct alignment of the independent cross girders, prior to connecting them to each other and then to the pier cross heads.

4.3.3 Cross girders

The 4m wide concrete cross girders each contain 10 internal prestressing tendons in the permanent works which pass from stay cable to stay cable through the bottom slab. To accommodate the anchorages at the edges of the deck and to avoid a clash with the stay cable anchorage, the tendons fan out. Therefore, in this region, an 8m wide section is cast as part of the cross girder construction. Temporary support during casting is provided by stiff steel trusses which span the 35.8m between the falsework columns, and wing trusses for the areas outboard of the columns. The area on top of the trusses is decked out, with scaffolding on top of this forming the curved shape of the soffit. A two stage pour – firstly the bottom slab and webs, then the top slab – will minimise the additional stresses locked into the girders due to the weight of the second pour being partially carried by the first stage. The contractor has modified the envisaged arrangement of temporary transverse prestress slightly to give better clearance for access along the top of the deck. The pairs of horizontal cables, providing a force of 5MN, are located 4.5m above the top slab. Additional transverse prestress tendons are provided in the region above the falsework columns to counteract the hogging moment.

4.3.4 Longitudinal Girders

Steel falsework trusses are hung from the constructed cross girders and cross heads to support casting the longitudinal box girders in each bay. Similar decking as used for the cross girders is placed on these trusses to form the working platform, and then scaffolding is provided to form curved soffit shape. Due to the larger pours and more complex shapes, a three staged pour is used – bottom slab first, then webs, lastly the top slab – with careful evaluation of the locked-in stresses this causes to ensure that they can be accommodated by the design. Longitudinal prestressing is a combination of internal and external tendons of varying lengths, running from the end of the bridge into the girder, or from near the steel-concrete deck interface. In this way, the areas where stressing must take place are limited, and handling operations for the 2¼T jack for the 6-37 tendons can be limited. Small temporary holes are left in the top slab to allow easier access for stressing the tendons which cross the steel-concrete interface rather than transporting the jack along the inside of the deck.

5 Towers

5.1 Lower Towers

The shape of the tower section at the base is a circle of diameter 18m, split in two and elongated by 6m long straight sides. The straights reduce in length and the radius of the curved parts reduces as the tower tapers with increased height, to become circular at deck level, with a diameter of 14m. This circle then continues to reduce to just under 11m diameter at +175m. The wall thickness is a constant 2m up to deck level, and then tapered to 1.4m at +175m. The complex shape is formed using a climbing formwork system provided by subcontractor Cantilever. 10 individual panels carry the plywood shutters. Strips are cut off the edges to reduce the perimeter length for each pour. The high quality plywood had to be durable enough for the repeated pours, but also flexible enough to be bent into the ever decreasing radius shape. The climbing operation to raise the form in preparation for the next pour is controlled by 10 pairs of screw jacks, supported on the top of the previous construction joint. Steering the form to maintain the correct alignment was a delicate operation with coordination of all jacks required to keep the form level and stop any twisting. A cycle time of 7 days was achieved for the typically 4m high pours, with concrete finishing works done from trailing platforms hanging below the main working platforms.

5.2 Upper Towers

Upper tower skin segments are fabricated in 2 halves from 20mm thick duplex stainless steel plate in China. These are fitted around the central core steel anchor boxes in a trial assembly operation of three segments at once to ensure the correct geometry. Lifting operations on site will erect the stack of steelwork on top of the lower tower, reproducing the same geometry. Concrete will then be placed inside the skin to form the composite wall.

6 Steel Deck

6.1 Area around Towers

A heavy lift scheme is planned to erect the deck around the towers. An 88m length of deck formed from 6 sections of each of the longitudinal boxes will be welded at ground level and strand jacked into place. The jacking operation will use a large bracket arrangement on the tower to carry most of the load, with additional load being carried on the tip of the concrete deck.

6.2 Main Span

18m long segments will be lifted from dynamic positioning barges as the main span deck cantilevers out over the Rambler Channel. A 200m square work zone, and an 8 hour window for lifting operations will ensure minimum disruption to shipping. Local jacking to match the face geometry of the new segment supported on lifting strands to the existing geometry of the cantilever, supported at its outer edges by the stay cables, will be required to allow the welding to take place.

7 Stay Cables

Nippon Steel are supplying prefabricated parallel wire cables, which will arrive on site from China on large diameter drums. They will be lifted up, unreeled along the deck and the sockets installed into the structure. Stressing will take place at deck level, with the jacking equipment transported along on an underslung gantry.

Temporary measures to control cable vibrations will be used until installation of the hydraulic dampers to achieve the required level of 4% damping.

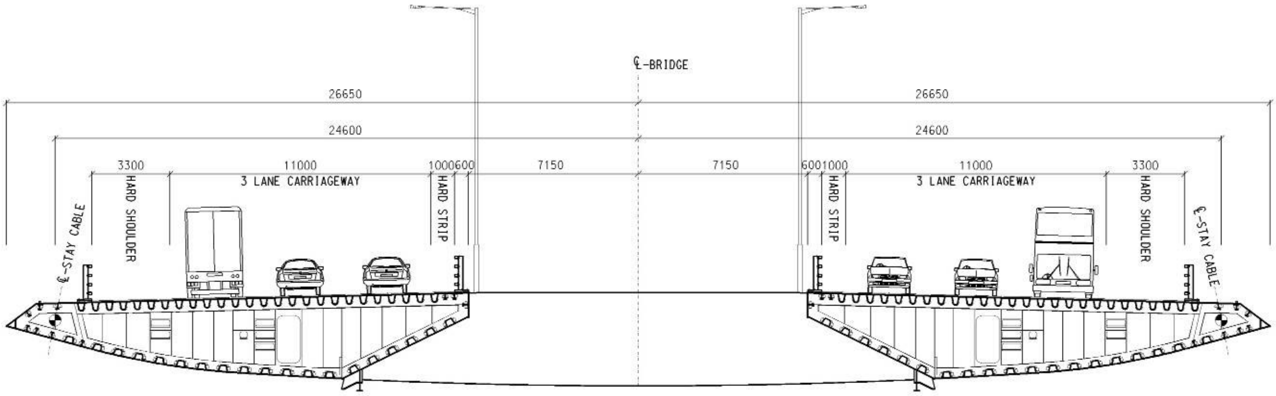


Fig. 3 Steel deck

8 Conclusion

The project has been on site since April 2004, and construction is well underway. All foundation works are complete, and the concrete back spans are in progress, with the East side pier shafts already completed, and deck work commencing. The lower tower on the East side is progressing well, with the self-climbing form rising as the tower grows. Fabrication works for stainless steel skin sections and steel anchor boxes of the upper tower, and the steel deck is progressing in China. Planning for erection of the upper towers, and steel deck and cable stressing is ongoing. There is still a long way to go and no doubt many more challenges to be overcome before completion of the bridge, scheduled for the end of 2008.

9 Acknowledgement

This paper has been published with the permission of the Highways Department, the Government of the Hong Kong Special Administrative Region.

10 References

[1] FALBE-HANSEN, K., HAUGE, L. & KITE, S., "Stonecutters Bridge – Detailed Design", *IABSE Symposium Shanghai 2004,* IABSE Report, Vol. 88, 2004.

[2] KITE, S., FALBE-HANSEN, K., VEJRUM, T., HUSSAIN, N. & PAPPIN, J., "Stonecutters Bridge – Design for Extreme Events", *IABSE Symposium Lisbon 2005,* IABSE Report Vol. 90, 2005.

[Editor's Note. I am particularly grateful to Naeem Hussain and Steve Kite for their agreement to reproduce this paper in IABSE News. *Stonecutters Bridge is a project on a scale that is sometimes difficult to grasp and on completion will be a testament to the achievements of the many skilled engineers involved in its conception, detail design and in construction. Whilst the text of the paper is presented here in full, editorial pressures have meant that it has been necessary to omit most of the accompanying drawings and photographs. These may be found in the proceedings of the IABSE Budapest Symposium, to which interested readers are directed..]*

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