

Bridges for the millennium

Chairman
M. Goldschmied

Reporter *J. Hunter*

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On Tuesday 19 September 1999 over 200 people attended the Institution of Civil Engineers (ICE) for the annual ICE/RIBA (Royal Institute of British Architects) lecture entitled 'Bridges for the Millennium'. The speakers were Alex Lifschutz (Lifschutz Davidson), Roger Ridsdill Smith (Ove Arup and Partners) and Gordon Clark (Gifford and Partners). Marco Goldschmied, the President of RIBA, chaired the meeting.

Alex Lifschutz started the meeting by suggesting that the relationship between engineers and architects is analogous to politicians and civil servants. The civil servant does all the work and the politician takes all the credit. He left it to the audience to decide who the politician is and then proceeded to describe the Hungerford Bridge Millennium Project.

The existing Hungerford Bridge originates from Brunel's suspension footbridge built in 1845 between the South Bank and Hungerford Market. This was replaced between 1860 and 1863 by the Charing Cross Railway Bridge and Brunel's brick piers reused. Currently a single pedestrian footway remains on the downstream side of the bridge.

The Cross River Partnership, a public- and private-sector alliance, was set up to promote access across the River Thames and to encourage people to visit the area. The increased number of visitors to the new riverside attractions, for example The London Eye and The Imax Centre, will mean pedestrian links will be vital. One such link is the proposed footbridge.

The Cross River Partnership held a design competition for the project in August 1996 between six short-listed entries. A consortium comprising architects Lifschutz Davidson, engineers WSP Group and quantity surveyors Davis Langdon and Everest won the competition. The winning design was for two symmetrical footbridges suspended a short distance either side of the existing rail bridge. The new footbridges will be suspended from steel pylons on an array of cables with lifts and stairs at either end connecting to ground level. Pedestrians will experience a view of the Palace of Westminster not seen for over 130 years. Two lower level walkways on the south side will link the South Bank to Surrey Pier. The main footbridges will be accessed from these low-level walkways via stairs on either side of the pier.

The objectives of the bridge include

- (a) becoming a focal point on the river
- (b) including a number of activities, such as kiosks, cafés
- (c) connecting key public transport from Charing Cross, Embankment and Waterloo Stations and enhancing the existing route
- (d) providing a heritage benefit in the re-opening of Brunel's Surrey Pier
- (e) providing link bridges from the South Bank direct to Surrey Pier, which will encourage people to get closer to the water and to use the bridge
- (f) provide a landmark to celebrate the millennium.

Alex added that he had learnt a great deal from the project, especially through working with engineers.

The construction contract was awarded in July to a joint venture Costain Norwest Holst, with site work commencing imminently and completion due April 2001.

The second speaker of the evening was Roger Ridsdill Smith. He is the project engineer for the Millennium Bridge across the Thames that links the city at St Paul's Cathedral and the new Tate Gallery at Bankside. Roger has been involved with the project since conception and will see its completion in 2001.

A team of Ove Arup and Partners, Foster and Partners and sculptor Sir Anthony Caro has carried out the design of the scheme. The contract was won following an international design competition in 1996 that attracted 200 entrants.

The idea of a blade across the river was the principal concept of the bridge. The design developed from this maintaining the panoramic view of St Paul's from the south side of the river. As a result the structure had to be below the walkway. The final form of the bridge was described as a shallow suspension bridge, the cables dipping 2.3 m over the 144 m of the central span. The following key technical areas were discussed

- (a) the stiffness of the supports
- (b) the applied wind loading
- (c) the transfer of the loads to the foundations and how to build them in the restricted site boundaries.

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The scheme was based on a simple idea throughout, that together with good teamwork led to a positive result.

The final speaker of the evening was Gordon Clark. This presentation focused on a millennium bridge, not across the Thames but the Tyne. The Gateshead Millennium Bridge will link the newly revived Newcastle Quayside with regenerated areas on the south bank of the Tyne, including a regional music centre, a contemporary arts centre and a leisure complex of cinema, hotels, bars and restaurants.

Gateshead Metropolitan Borough Council held a design competition in the autumn of 1996, inviting six teams of architects and engineers to produce designs. The winning entrant was Gifford and Partners with Chris Wilkinson Architects who produced an opening bridge. Gordon described the opening mechanism as being like an eyelid.

Reference was made to the context in which the bridge was located and the influence of this on the design was discussed and described. Particular reference was made to the existing bridges across the Tyne, the architecture of the existing quaysides, the constraints of headroom and the requirements for ship protection.

Gordon explained why the decision to make the bridge curved was simply to meet the maximum gradient for wheelchair access, the longer curve length between quaysides being required to achieve the 1:20 grade. The development of this curved walkway into a rotating suspension bridge and then a pair of counter-acting arches was described.

Two lanes will be provided on the deck to segregate cyclists from pedestrians. An ingenious deck profile ensures that mounted cyclists do not obscure the view to pedestrians. A lighting architect has designed exciting lighting to light the path for users at night and to illuminate the structure as a whole. Luminaires are provided in the deck, the parapets, the glass canopies over the caissons and along the arch.

The scale of the bridge will be impressive—when closed the parabolic arch is 45 m high. Gordon proposed that the bridge will be immediately recognizable and a symbol of Tyneside.

The project will cost £21 million, half of which is funded by the Millennium Commission.

The bridge is currently under construction and is due for completion in the spring of 2001.

Marco Goldschmied then opened the discussion period. The opening remarks queried the considerations made to protect pedestrians from wind when crossing these relatively long bridges.

- (a) At Hungerford one footbridge is protected from the prevailing wind by the rail bridge. Canopies will be provided on the down-wind side but the exact details were yet to be finalized.
- (b) At Southwark an open aspect was required and no provision for protection was made.
- (c) At Gateshead the parapet is an aluminium 'hedge' and provides some protection.

A large part of the discussion related to the advice that the speakers would give clients on the running of a design competition. Constraints made on entrants should therefore be clearly identified from the outset and those that do not comply fully with the brief should be eliminated quickly. The need for the client to make speedy decisions was also felt to be important.

It was suggested that clients should recognize that design teams put a lot of time and effort into entering competitions and the work is extremely time-consuming, and the number of entrants should therefore be limited. This was the case for the Gateshead Bridge and all entrants were paid some money towards the cost of entering the competition.

Alex commented that the task of building a bridge in the centre of London is very difficult and it was very important that the client held the whole process together by working closely with all the relevant parties.

Roger was asked if they intended monitoring the load in the main cables during the life of the bridge at Southwark. It was confirmed that the abutments have been designed for adjustments to be made in the cables and that the central span can also be adjusted.

The chairman concluded that the speakers delivered lively presentations on three spectacular bridges that are a credit to the profession and set an example for architects and engineers to deliver designs fit for the twenty-first century.