

# The Institution of Structural Engineers

Founded 1908 and Incorporated by Royal Charter 1934

## Wales Branch Cangen Cymru



Issue 8  
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### CLIFFORD JOHN EVANS REMEMBERED

Clifford John Evans, MA(Cantab) FREng FICE FStructE FCI Arb FIHT FIWEM FASCE FHKIE MconsE and past president of the Institution of Structural Engineers, died on 25 July 2002 at the age of 74. These bleak facts give no idea of the character of this friendly, creative, intelligent and extremely dynamic man who achieved so much during his life.

Clifford was Senior Partner of Wallace Evans and Partners until it was acquired by Welsh Water in 1990 and became Wallace Evans Ltd, which eventually became Hyder Consulting. His father, Wallace Evans, was one of the innovators of prestressed concrete design in Wales and, in 1930, was one of the founder-members of the Wales Branch committee of the Institution, serving as Branch Chairman during the Second World War. Clifford emulated his father in supporting the Institution by becoming Branch Chairman on two occasions and also President of the Institution during 1982-83. He always actively encouraged his staff to participate in Branch activities and many of recent and existing Wales Branch committee members and past chairmen did so with the active encouragement and support of Clifford and his partners.

Clifford Evans was born in Cardiff in 1928 and educated at Cardiff High School where, as well as academic success (he gained a Mathematics Scholarship awarded by Gonville and Caius College) there was equal scope for his sporting prowess. He captained the school rugby and swimming teams, was Wales junior swimming champion and represented Wales in swimming at senior level. At Cambridge he was awarded a half-blue for swimming and water polo in his first year and captained the University team in his last. He also represented his college in rugby and athletics, balancing an enviable sporting record with an Honours degree in the Mechanical Sciences Tripos. Between school and university, Clifford was, for a year, an articulated pupil with the consultancy practice established by his father. After graduation, he joined the firm as a graduate assistant.

A considerable interest in the development of prestressed concrete was a factor in his joining Holland Hannen and Cubitt in 1952 as a site engineer at London Airport with responsibility for construction of the BEA prestressed concrete hangars with 180 feet span post-tensioned main beams and secondary beams of 128 feet span. A year later, he went abroad and obtained a post as design engineer in Jamaica, with Jamaica Concrete Products, designers and manufacturers of prestressed concrete units, and an associated

company of Caribbean Construction Co. Ltd., general contractors. He became Chief Engineer of both companies in 1954 and thereafter served three 2-year contracts with the two firms. During this period he was responsible for the design and construction of many prestressed concrete structures, buildings and maritime works, including a large bauxite storage building which, as one of the largest prestressed concrete structures at that time in the western hemisphere, was described in a paper he presented to the World Conference on prestressed concrete held in San-Francisco in 1957.

In 1960, Clifford assisted in the establishment of a Jamaica office of Wallace Evans & Partners, of which he became partner-in-charge in 1962. He was, at that time, responsible for the design and construction of the National Stadium, Sports Arena and Olympic Pools built for the Central American Games, 1962, and the Commonwealth Games, 1966, at which he was Attaché for the Welsh Team.

Clifford and his family returned to the UK in 1966 and, following the death of his father in 1971, became Senior Partner of the firm, whose activities were extended to many parts of the world. In addition to major work in the UK, he was responsible for projects in Central America, Hong Kong, Malaysia, Indonesia, Burma, Thailand, the Middle East, Egypt, Cyprus, Gibraltar, Bermuda and most of the islands of the West Indies. In 1976 he was engaged by the World Bank as consultant for the scheme to widen and deepen the Suez Canal.

Clifford joined the Institution of Structural Engineers in 1951, while a student at Cambridge; in the next year he was confirmed as a Graduate and, passing the Part 3 examination in 1957, was elected to corporate membership early in 1958. The first of his many contributions to the Institution came in 1966, when he was appointed Representative for Jamaica – an office he continued to hold until 1978. He was awarded the Wales Branch prize 1964-65 for his paper on the National Stadium Jamaica, and joined the Branch Committee in 1968, serving as its Chairman for 1972-73. Elected a member of the Council in 1974 for a 3-year term, Clifford continued as a co-opted Council member while Chairman of the Literature Committee 1977-80. An additional opportunity to serve the Institution came in 1979 when, to his delight having regard to his father's contributions to its affairs, the Committee of the Wales Branch invited him to be their Chairman for a second term during the Branch Golden Jubilee year 1979-80.

Clifford practised as an Arbitrator for many years, until his final illness prevented him from doing so. He was often a sole Arbitrator and also acted as a Member of Tribunal, both in the UK and internationally. He acted on numerous appointments by the President of the Institution of Civil Engineers and President of CI Arb and nomination by parties on engineering and building. He also acted as Conciliator/Mediator and Adjudicator and sometimes as an Expert Witness in numerous disputes in the UK and internationally. His arbitrating skills were not limited to engineering disputes as he acted as arbitrator on the ABTA (travel industry) and the CIH (Chartered Institute of Housing).

Clifford was a dedicated family man. He and his wife Molly had two sons whilst in the West Indies and she was able to follow her career there by teaching botany and zoology to sixth-formers and working as a geologist for the Jamaican Geological Survey Department. Cliff and Molly were keen skiers and avid supporters of the Welsh Rugby XV. He made a point of arranging his Branch Visits during his Presidency to ensure that he and Molly could attend not only home rugby Internationals but in Scotland and elsewhere for away matches. In mature years he replaced the rigours of the rugby field and athletics track with occasional squash and sailing, the sailing covered off-shore racing, including three Fastnet races. In the notorious race of 1979, which was disastrously stormy, he had to abandon the race and run for shelter and solace in Ireland. There were a few worried



brows in the WEP head office until it was established that he and his crew were safe. The professional and personal lives of many of us were enormously benefited by the strong leadership and vision that Clifford brought to his engineering life and the kindness and consideration that our families received from Clifford and Molly. Clifford was prepared to trust and invest in his engineers and was always confident that we could handle any work that he, as principal of our firm, was able to bring in. He therefore built a confident and able team and generated loyalty of a kind that is very rare in the engineering world of today. During the occasional lean times for the company, when the building business cycle made consulting work scarce. Clifford's confidence in his staff was demonstrated by the efforts that he made to retain the services of staff and make sure that they were paid each month. These efforts and sacrifices did not go unnoticed and helped to generate the respect in which he and his partners were held. There are few companies in today's 'corporate business world' that would adopt such a long view and commitment to the survival and future prosperity of their staff. Finally, we shall always be very grateful for the support and encouragement received from Clifford, both in our jobs and in serving in the professional institutions. Thanks to him a number of us now look back on exciting and fulfilling careers where so many of the opportunities and challenges that were laid along the path had resulted from Clifford's entrepreneurial and engineering flare. It is a comfort to know that he greatly enjoyed his work, lived life to the full and enjoyed substantial rewards for the achievements that brought him great recognition and respect from both clients and fellow professionals.

*Maurice Clift*

See our web site at  
[www.istructe.org.uk/branch/wales](http://www.istructe.org.uk/branch/wales)

## MANCHESTER STADIUM

Those of you who were not present missed an excellent presentation, given by Neil Kitchener at Cardiff University, on the evening of 17<sup>th</sup> September 2002. Neil Kitchener took the audience of 35 through the construction of Manchester Stadium for the Commonwealth Games, including provisions for later conversion to Manchester City's Football Stadium by July 2003.

Neil Kitchener graduated from Manchester University in 1969 and immediately joined Laing and has worked for them ever since. Neil has held various positions such as Site Engineer, Agent and Chief Engineer on various high profile projects such as:

- I. Sizewell B.
- II. Second Severn Crossing.
- III. Cardiff Millennium Stadium.
- IV. City of Manchester Stadium.
- V. And currently Terminal 5 at Heathrow.

The Manchester Stadium site was originally a derelict site previously used for industrial works. The project had to deal with site waste, gas works, mine workings, contaminated ground, main sewer runs, derelict housing and the Manchester Canal dividing the site in half. Manchester City originally included this site in their 1990 bid for the Olympic Games, which was later resurrected for the Commonwealth Games. The stadium was developed for athletics to hold 38,000 spectators, later being converted to a football stadium holding 48,000. Due to the client requirement of football supporters being in close proximity to the pitch, than that at the athletics stadium, the football pitch had to be later constructed 5m below that of the running track. Considerations for this had to be included in the original design and construction works.

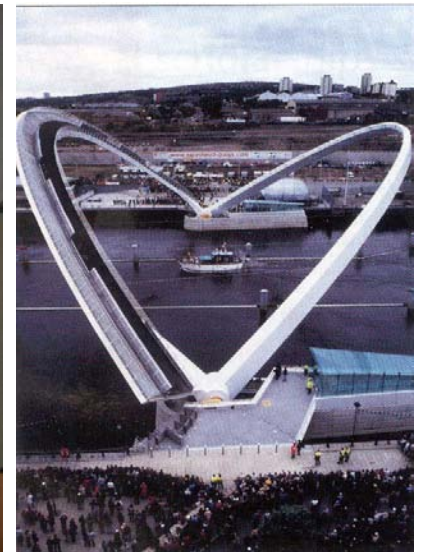
The main frame was constructed of reinforced concrete supporting precast concrete terracing. The roof rafters were structural steelwork, prefabricated prior to transporting to site for the final fabrication and erection. The main masts were treated in a similar fashion with the three sections being finally fabricated on site. The temporary stand, which consisted of one quarter of the stadium, was erected at one end in preparation for demolition, when the football stadium building phase commenced.

The site will be subject to further development to support Manchester City Stadium, including a hotel and other facilities.

David Brett

To the immediate right Neil Kitchener during his talk on the Manchester Stadium.

To the far right an open Gateshead Millennium Bridge



## WHEN WE OPEN OUR 'EYE,' THE WORLD LOOKS ON

On Tuesday 8<sup>th</sup> October 2002, Peter Curran, an Associate with Gifford and Partners, gave a first class and interesting presentation at the Cardiff University, Trevithick Building on the Gateshead Millennium Bridge.

The bridge was designed by Gifford and Partners in collaboration with Wilkinson Eyre Architects and has been likened to a 'blinking eye'. The bridge spans the River Tyne connecting Gateshead with Newcastle. The design requirements were that it not only had to be functional but also a catalyst for the Gateshead area regeneration.

Peter took the 49 audience up the banks of the River Tyne and through the history and various constructions of existing bridges before going into the design, construction and erection of the Millennium Bridge.

The initial specification required that the bridge should: -

- a) be 4.5m above the high-water spring tides in the closed position.
- b) be constructed with nothing being built on the Gateshead of Newcastle quay sides.
- c) have a maximum slope of 1:20 to allow for disabled access.

To achieve these requirements, particularly the clearances, the concept of a rotating bridge was created.

Gifford and Wilkinson Eyre submitted their entry for a competition to design the Millennium Bridge in September 1996 and were notified in February 1997 that they had successfully won the competition. They helped the Authority apply for lottery money and

seek various permissions to build the bridge. Once this funding was secured they were able to commence the design in earnest, with the contract for construction was awarded in May 1999.

The bridge was founded on two islands in the River Tyne, so preventing any construction works on both quay sides. The riverbed was initially dredged, then piled, before forming cofferdams from sheet piles and constructing the islands. These would finally house the hydraulic ram system operating on paddles, the electrical room and control room for opening and closing the bridge. The bridge was constructed from two arches, one to provide a walkway and cycle track, while the other provided support to the bridge deck and was spanned between by cable stays. The cycle track was formed 300mm below the walkway to maintain a slender appearance, whilst the two were separated by a stainless steel partition which provided pull down seating and lighting to the deck. The shape and cross section of the bridge varied to take account of out of plane bending. A model of the bridge was subjected to static and dynamic consideration by wind tunnel tests and the design was scrutinised for lateral movement.

The arches were formed of nine sections, which were fabricated by Watsons Steel, in Bolton and were tapered and curved in several directions. These sections were assembled and the arch, deck and stays constructed along with a temporary lifting frame and tie to allow the whole structure to be transported six miles upstream to its final location.

The initial transporting arrangements were cancelled on 6<sup>th</sup> November 2000 due to weather conditions as there was a deep depression out to the west. However, a window in the weather was found and the bridge began its trip and installation on 19<sup>th</sup> and 20<sup>th</sup> November 2000.

Once in position the finishes were attached along with the mechanics and electrics for operating the bridge. The Gateshead Millennium Bridge opened for the first time on 28<sup>th</sup> June 2001 and takes up to 4 minutes at wind speeds of 14m/s. The deck and arch have been provided with architectural lighting to provide different lighting effects for different days of the week. On its first day of opening it was crossed by about 30,000 people. The Royal Opening was held on 7<sup>th</sup> May 2002.

Gateshead have adopted the slogan "when we open our 'eye' the world looks on."

David Brett

## MEMBERSHIP APPLICATION FORMS A REMINDER OF SPONSOR'S RESPONSIBILITIES

The Branch Committee has recently considered, and subsequently interviewed, the latest Applicants for the Associate and Corporate membership examinations. From the information provided on some of the forms, and also similar observations by committee members over previous years, the Branch believes that it should remind Sponsors of their "ethical responsibilities". It is our opinion that these primarily include, but are not limited to;

1. The applicant **must** at least be reasonably well known to you.
2. You should have **personal** knowledge and experience of either, or preferably both;
  - a. Their "professional" work experience.
  - b. Activities they undertake "socially" as part of their continuing professional development.
3. Be **able to substantiate** the Applicants training and/or experience record.

It is evident that some sponsors, who have signed forms, may not necessarily be in a position to endorse all, if any, of the above. The committee accepts that some candidates, particularly those working for smaller practices, can find it difficult to find appropriate sponsors. However, should a Fellow or Member of the Institution be approached to act as a sponsor, this responsibility **must**

## STUDENT'S EVENING

The students, from Cardiff University and the University of Glamorgan, who attended the talk at the at the Trevithick Building on 15 October 2001, assured the Wales Branch Committee that they had come for the presentation and not the wine, beer and buffet. They were not disappointed as the joint presentation given by Julian Lipscombe, of Bennetts Associates, and John Charrington, of Jacob Gibb was on "Architectural Engineering - A Collaborative Approach". The 40 strong audience were treated to the combined approach of Architectural and Engineering design for the new Control Room for the Thames Link Project which was on the

Waterloo Line and sited over old Victorian arches. The purpose of the control room was to increase the usage of the line from eight trains per hour to twenty four trains per hour. The structure was 4 m off the ground, to provide good visibility of the railway. The arches were used for pedestrian access and to house the plant and services to run the control room.

*David Brett*



not be undertaken lightly. In addition to the above, the sponsor;

1. Should not endorse an application unless or until they are fully satisfied that the applicant is ready to become an Associate or Corporate Member of the Institution.
2. Note that it is both awkward and embarrassing for those who later have to interview candidates where they appear to be lacking, sometimes significantly, in sufficient and/or appropriate "professional" experience.

In short, when members have insufficient knowledge of an applicant, such

that they cannot confidently endorse their application, they must learn to "Just say no." Whilst this may seem harsh, a little explanation as to why you are unable to support them should suffice.

Remember, at the end of the day, we are a Professional Institution with a world class reputation to uphold. The examinations are therefore not easy, and in our opinion probably impossible, for those with insufficient or inadequate experience. As such, sponsors have a duty to ensure that applicants are adequately practised in many aspects of structural engineering such that the applicant is both ready and able to pass, hopefully, their examination.

The Branch would like to thank you in anticipation of your support and co-operation.

*Andy Hallum*

## THE DAY THE NATIONAL PRESIDENT CAME TO WALES



Bob McKittrick the new President of the Institution of Structural Engineers made the annual pilgrimage of the National Presidents to Cardiff on Tuesday 29 October 2002 to inaugurate the incoming Wales Branch Chairman Dr Paul Howson of Cardiff University.

The day started with Paul Howson arranging an interesting tour and talk of Cardiff Bay and Barrage carried out by Roger Thorney, Operational Manager of the barrage. The tour party was taken, in addition to the normal viewing points sites, to various areas of interest not normally visited by the public. This was followed by a picturesque view of

the bay and barrage by water bus from the barrage to Mermaid Quay.

After a brisk walk Bob McKittrick had the opportunity to take a further tour of the construction of the Wales Millennium Centre. This talk and tour was provided by Mark Williamson of Sir Robert McAlpine, arranged by Lorraine Bradley of Ove Arup.

In the evening Bob McKittrick took the audience through a synopsis of his Presidential Address, whilst Dr Keith Eaton, Chief Executive and Secretary of the Institution of Structural Engineers, informed the Wales Branch of the current state of affairs of the Institution. Bob McKittrick then presented the Wales

Branch Jubilee Prize to Clare Pearse, Michael Pearson, Paul Davies and Choe Seong Chin, followed by the Wales Branch Prize to Behzad Rafezy and Dr Paul Howson. Dr Paul Howson was installed as the Wales Branch Chairman for 2002/2003 and gave his inaugural talk on Cardiff Bay : Back to the Future. Dr Howson took those present through the history of the initial expansion of Cardiff due to iron export from Merthyr Tydfil, followed by the major expansion due to coal from the South Wales Valleys, through the decline of the bay due to the decline of exporting coal, finally ending up at the regeneration of Cardiff Bay at present day.

The evening was concluded with a buffet and the opportunity for the President, Chief Executive, new Branch Chairman and Wales Branch Committee meeting and having informal discussions with the Wales Branch Membership.

*David Brett*

## APPEALS

The Wales Branch Committee would like to ask the Wales membership to come forward with suggestions of topics for talks and meetings that they have a preference to hear, see or provide.

The Wales Branch Membership are asked to provide feedback to the Wales Branch Committee on any Institutional matters that they feel they wish to bring to the Branch Committee's attention.

In addition the Branch Committee would like to ask the membership for any nominees who would be prepared to represent the Associate Membership on the Wales Branch Committee.

In response to any of the above please contact Chris Usher (Hon Secretary)  
CD Gray & Associates  
Cardiff Business Park  
Malvern Drive  
Llanishen  
CARDIFF CF14 5DR  
Tel; 029-2076-4333 Fax: 029-2076-2175  
E-mail: design@cdgray.demon.co.uk

## CONGRATULATIONS

The Wales Branch Committee would like to congratulate the following Wales Branch Members for successfully passing the Institution 2002 Part 3 Examination:

Lorraine Butler  
Simon Roger Cope  
Victor Mark Richards

Associate Membership Examination:  
Simon John Mason

## FOOD FOR THOUGHT

### Why Are Technical People, Paid Less Than Managers?

Engineers will never make as much money as executives. This can be easily proved mathematically :-

Postulate 1: Knowledge is Power  
Postulate 2: Time is Money

As every Engineer knows :-

Power = Work/Time

We know since Knowledge = Power

And Time = Money

This results in Knowledge = Work / Money

Solving this equation for Money, we get :-

Money = Work / Knowledge

Thus, as Knowledge tends towards zero, Money tends towards infinity regardless of the amount of work done. In other words, the less you know, the more money you make.

## THE 2002/2003 CALENDAR

Meetings are at Cardiff University  
Trevithick Buildings Newport Road Cardiff 5.30 for 6.15pm, unless noted otherwise.

### Tuesday 14th January 2003

Rhuddlan Castle - Structural Repairs 1997 to 2003  
Mr. William Day, High-Point Rendel

### Tuesday 21st January 6.00 pm Westminster Hotel, Chester

Concrete or Steel Framed Building - A Debate  
For further details contact David Grove (Hon Sec)  
Tel 01244 311 855, Fax 01244 314 560.

### Tuesday 11th February

Vertically restrained clay brickwork cladding  
Dr Pav Bingel, Leeds Metropolitan University

### Thursday 20th February 6.00 pm

Ellesmere Port Boat Museum, Ellesmere  
Ground Radar and other non-obtrusive techniques  
For further details contact David Grove (Hon Sec)  
Tel 01244 311 855, Fax 01244 314 560.

### Wednesday 26th February 5.30pm for 6.15pm Pembrokeshire College, Haverfordwest

To be confirmed

### Wednesday 12th March 4.30pm Seminar Cardiff University Trevithick Building

Construction over shallow mine workings  
For further details contact Chris Usher (Hon Sec)  
Tel 029 2076 4333, cu@cdgray.demon.co.uk

### Tuesday 18th March 6.00 pm Theatre Clwyd, Mold

Structural Glass  
For further details contact David Grove (Hon Sec)  
Tel 01244 311 855, Fax 01244 314 560.

### Wednesday 19th March

Wind Farm Developments  
Mr. Robert Waddington, PMMS Ltd

### Wednesday 9th April

Direct Application of Cone Penetration Test Data for Automated Design of Piles  
R Delpak, JR Omer and RB Robinson, University of Glamorgan

### Friday 11th April

Social Evening  
For further details contact Chris Usher (Hon Sec)  
Tel 029 2076 4333,  
cu@cdgray.demon.co.uk

### Tuesday 15th April

Reflections  
Mr. Anthony Hunt

### Tuesday 15th April 6.00 pm Westminster Hotel, Chester

The Use of Sprayed Concrete  
For further details contact David Grove (Hon Sec)  
Tel 01244 311 855, Fax 01244 314 560.

### Tuesday 6th May 6.00pm for 6.30pm Cophthorne Hotel, Culverhouse Cross, Cardiff AGM

Followed by The Wales Millennium Centre

### Tuesday 20th May 6.00 pm Chester Zoo, Upton, Chester

Seismic Design for Building Structures  
For further details contact David Grove (Hon Sec)  
Tel 01244 311 855, Fax 01244 314 560.

### Wednesday 4th June 4.30pm Seminar

Structural Dynamics  
For further details contact Chris Usher (Hon Sec)  
Tel 029 2076 4333, cu@cdgray.demon.co.uk

### Tuesday 10th June

Heathrow Terminal 5  
Mark Richards, Ove Arup & Partners

## Newsletter Contributions

Mae newydd llythyr Cangen cymru yn croesdru cyfraniadau yn y Gymraeg a'r Saesneg wrth unrhyw un o'n haelodau. Gwerthfawrogi cyfraniadau un ymwneud ag unrhyw agwedd o weithgareddau'r sefydliad hwn.

Gellir dewis pynciau megis sylwadau ar gyfarfodydd gyda'r nos, pynciau ar gyfer cyfarfodydd y dyfodol, sylwadau ar weithgareddau'r Pwyllgor, paratoadau ar gyfer archoliad Rhan 3, neu unrhyw sylwadau ar faterion y dydd ym myd peiranyddiaeth.

Am fwy o fanylion cysylltwch â David Brett ar 01656 869210.

The Wales Branch Newsletter welcomes contributions in Welsh or English from any of our members. Contributions relating to any aspect of the Institution's activities are welcomed.

Subjects may include comments on evening meetings, subjects for future meetings, the activities of the Committee, preparation for the part 3 exam or comments on topical engineering issues

If members wish to correspond on any items in the newsletter or submit contributions, please contact David Brett on 01656 869210