
IABSE
AWARDS
2022
&
Gala
Dinner
IABSE Award 2022

Event Schedule

Door Open	**17:00**
Door Open to the Main Hall	**17:30**
People and Paper Awards	**18:00**
Dinner Served	**19:00**
Project and Technology Awards	**19:30**
Open Bar	**22:00**

Note: *Planned schedule may change during the event.*

ABOUT IABSE

The International Association for Bridge and Structural Engineering (IABSE) is a scientific and technical Association comprising members in 100 countries and counting 58 National Groups worldwide. Founded in 1929 it has its seat in Zurich, Switzerland. IABSE's aim is to promote the advancement of structural engineering practice while taking into consideration technical, economic, environment, aesthetic and social aspects.

IABSE deals with all types of structures, composed of various structural materials. To fulfil its mission IABSE organises conferences and publishes the quarterly journal Structural Engineering International (SEI), conference reports, as well as books reflecting the work of its technical groups. It creates technical groups as required by needs and technological progress, offers activities within National Groups of IABSE, supports Young Engineers with a programme and presents annual awards for outstanding achievements in research and practice that advance the profession of structural engineering.

Welcome to IABSE Awards and Gala Dinner!

The IABSE Awards Ceremony and Gala Dinner is a new annual event with its own unique identity established to celebrate advances in our profession. Thank you to all the people and companies who have supported by submitting nominations, and a warm welcome to all the participants who have joined this very first IABSE Awards Ceremony and Gala Dinner held in Zurich.

IABSE's Annual Awards are presented in two overall categories: "People and Papers Awards" and "Projects and Technology Awards".

The People Awards are created to underline the importance of the work done by engineers. These awards are given in recognition of individuals who act as ambassadors for the profession and as role models for future generations of engineers.

Structural Engineering International is the quarterly journal of IABSE and offers a unique mix of articles ranging from practical applications to scientific topics.

The most outstanding papers of each year are selected in two categories: Best Scientific Paper and best Technical Report.

In the assessment of the nominations within Projects and Technology, the jury is evaluating aspects of sustainability, creative innovation, elegant solutions and structural excellence. The projects shortlisted for an Award in 2022 were developed and/or constructed during covid-19 and were one way or another affected by the pandemic. Whereas planners, designers and academics adopted to work in virtual teams from home, construction is carried out by people physically working on the actual construction sites where respecting social distancing was often impractical, where supply of materials and equipment may have been affected by the pandemic and where restrictions prevented specialists from travelling to site to support. Despite all these challenges, the projects have overcome and now the result is benefiting people and communities.

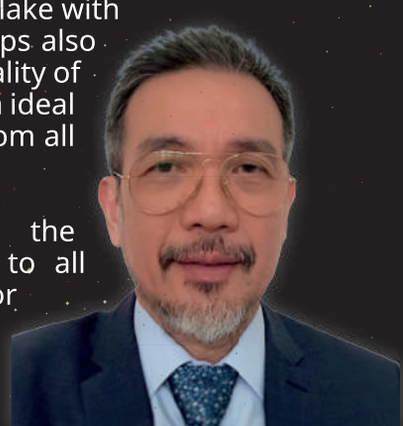
I look forward to celebrating the great engineering achievements of 2022 at the IABSE Awards Ceremony and Gala Dinner!

Tina Vejrum
President of IABSE

On 17 November 2022, the International Association for Bridge and Structural Engineering (IABSE) is holding its Awards Ceremony for the first time in its 93 years history as a stand-alone event with Gala Dinner. On this special occasion, IABSE will recognise companies and engineers within the Bridge and Structural Engineering profession and industry that have made significant advancements today.

Organised by the IABSE Secretariat in Zurich, we are delighted to welcome all participants from around the world to celebrate together in this historic and momentous evening at the Theatre Hall of Volkshaus Zurich to find out the deserving awardees.

Located in northern Switzerland, Zurich is known as one of the global centres for banking and finance. Its picturesque lake with a magnificent view of the alps also offers one of the highest quality of life in the world, making it an ideal venue for visitors coming from all corners of the world.



Congratulations to all the awardees, and thank you to all participants and sponsors for making this event special.

Chep Uytiepo
IABSE Executive Director

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Best PhD Thesis Award
Genshen Fang

The IABSE Best PhD Thesis Award recognizes an outstanding original dissertation in the field of bridge and structural engineering by an individual who earned a doctoral degree within the last three calendar years prior to the year of the award. A candidate included in the shortlist must become an IABSE member to be considered for the award. Maximum one award shall be given annually and may not be awarded every year.

2022 Best PhD Thesis Award goes to Dr. Genshen Fang, currently working at the Department of Bridge Engineering, College of Civil Engineering, Tongji University, China; for his PhD Thesis on “Flutter Fragility Analysis of Long-Span Bridges Based on 3D Typhoon Model Using Geographically Weighted Regression”.

Outstanding Paper Award
Scientific Paper

Round-robin modelling of the load-bearing capacity of slender columns by using classical and advanced non-linear numerical and analytical prediction tools

Abstract: Non-linear finite element analyses have intrinsic model and user factors that influence the results of the analyses. However, non-linear finite element analysis can provide a tool to assess safety using realistic descriptions of material behaviour with actual material properties. A realistic estimation of the existing safety and capacity of slender column elements can be achieved by means of "true" material properties. Nevertheless, it seems that for some structural components, such as slender columns, non-linear finite element analyses can, due to its complexity and its various setting parameters, cause the risk of overestimating the real performance of analysed components or systems. Hence, an invited expert group has carried out an investigation into the experimental testing and the prediction of the bearing capacity of slender columns by performing independent non-linear finite element analyses in order to determine the practical applicability, and its inconsistencies, with respect to the stability failure of slender columns. This work aims the characterization of modelling uncertainties, concerning the prediction of slender columns stability when forecasted by non-linear finite element analysis.

Alfred Strauss, Ana Mandić Ivanković, Vladimir Benko, José Matos, Pierre Marchand, Roman Wan-Wendner, Neryvaldo Galvão, André Orcesi, Jakub Dobrý, Mohammad ElHajj Diab, Krešimir Ninčević, Michael Hauser, Mladen Srbić, and Dominik Skokandić

Outstanding Paper Award
Technical Report

Hålogaland Bridge—A Landmark in Arctic Norway

Hålogaland Bridge in Arctic Norway has been recognized for its elegance and respectful integration within a majestic landscape. The location north of the Arctic Circle means that the bridge must sustain extreme environmental loading, and this has called for a number of innovative design solutions. Using the setting and functional requirements in a creative manner as a basis for the design process, the team of bridge engineers and architects worked actively within these constraints as a unique opportunity to obtain a distinctive and immediately recognizable design, making a difference for local society and raising the profile of a remote area. The combination of a narrow bridge deck and high pylons provided the possibility of designing structurally efficient and elegantly pointed pylons that complement the pointed peaks of the surrounding landscape and especially the neighboring peak, the "Sleeping Queen" which is an important part of local history and storytelling. This paper describes the work methods, process and design criteria adopted by the design team and how aesthetic considerations and functional requirements went hand-in-hand to produce one of the most stunning bridges in the world.

Jamal Assad

Erik Sundet

Early Career Prize
Sotiria Stefanidou

Dr Sotiria Stefanidou is co-Founder and COO of REDI Engineering Solutions PC, a start-up structural engineering company in Greece and Vice president of a spinoff company in Greece, promoting smart technologies for a sustainable and resilient built environment. She is also a Research Associate at the Institute of Engineering Seismology & Earthquake Engineering and the Civil Eng. Dept., Aristotle Univ. of Thessaloniki (AUTh) in the field of Structural Dynamics and Earthquake Engineering, a teaching staff at the International Hellenic University and Affiliate Scientific Staff at AUTh. She received her PhD with Distinction in 2016 in fragility analysis of bridges (AUTh) and holds two MSc degrees in Earthquake Engineeriing (2007) and Natural disasters and climate change (2019). She has an academic record well above the average of her peers, with more than 60 publications in international referred journals, conferences and books and more than 300 citations in Google Scholar. After her PhD, she has consistently received funding for her research, having participated in 15 research projects as Senior Investigator, conducting rigorous research. Having a key role in these projects, she contributed significantly to the dissemination of research results and interim meetings and collaborated with highly reputed researchers.

Dr Stefanidou has worked as a Freelancer chartered civil engineer (Greek Institution of Civil Engineers, Greece) since 2006 and has been a member of the Structural Engineering/Consultancy firm Penelis Consulting Engineers SA since 2012. She has worked as a structural engineer on projects in Greece and worldwide for AKTOR SA, TERNA, TERNA Oversees, REDEX, etc. Her experience ranges from structural engineering projects to challenging and specialized high-end designs and projects worldwide, for example, Mexico, USA, and Bahrain. She has collaborated with reputed structural engineers and architects worldwide (e.g. OMETE (GR), Expedition (UK), RPBW Architects) and has led structural engineering teams.

Member of the Year
Joe Tortorella

The IABSE Member of the Year Award 2022 is presented to Joe Tortorella, USA, for his leadership roles within the Association and his significant contributions. Joe Tortorella is a Fellow Member of IABSE and has been an active member of the Association since 1998.

He had an outstanding career at the Silman Corporation with continuous involvement with several professional associations. He was IABSE Vice-President, Chair of the US Group, Chair of WC4: Conservation of Structures and a member of several technical groups. He Chaired the Scientific Committee for IABSE Congress Chicago 2008 and Chaired the Organising Committee of IABSE Symposium New York 2019. Joe was also a member of OPAC: Outstanding Paper Award Committee and Scientific Committee for several IABSE events.

National Group of the Year
New Zealand Group of IABSE

The IABSE National Group of the Year Award 2022 is presented to New Zealand for their remarkable commitment, flexibility and resilience in successfully running the IABSE Congress Christchurch 2020, brought upon by the Covid19 pandemic by converting a face-to-face event into a virtual event.'

Chaired by Prof. Alessandro Palermo, the New Zealand National Group of IABSE was created in 2015. The New Zealand National Group submitted a proposal to have the IABSE Congress in 2020 in Christchurch. At the beginning of 2020, Covid19 Pandemic came, prohibiting international travel and causing the cancellation of all face-to-face events.

Despite the situation's huge financial risk and uncertainties, they decided to postpone and go ahead with the Congress in February 2021. They managed to introduce a conference platform custom-tailored for the IABSE Congress format. This became the first official IABSE Congress Online in the history of the Association. The Congress on „Resilient Technologies for Sustainable Infrastructures" was held from 3-4 February 2021 and was attended by over 300 delegates.

New Zealand Group
IABSE

International Award of Merit
Yozo Fujino

The International Award of Merit in Structural Engineering 2022 is presented to Yozo Fujino, Japan: 'Yozo Fujino has been a professor and a structural engineer for over 40 years, and he has made significant contributions to various aspects of structures, especially bridges. He educated many promising young researchers and engineers and has been internationally active with his work and commitments.'

Dr Yozo FUJINO is currently the President of Josai University. He is also a Professor Emeritus at the University of Tokyo and Yokohama National University. Previously, he was a Distinguished Professor at the Institute of Advanced Sciences at Yokohama National University, Japan (2014-2020) and a Professor of Bridge and Structure, Department of Civil Engineering, The University of Tokyo, for more than 30 years. He was appointed as the Program Director (Policy Advisor) for the Council for Sciences, Technology and Innovation, Cabinet Office, Japanese Government (Dec 2013 to March 2019) and a member of the Engineering Academy of Japan since 2012.

Honorary Membership
Ian Firth

Honorary Membership 2022 is presented to Ian Firth, United Kingdom, ‚in high appreciation of his outstanding and dedicated services to the Association.' Ian Firth is a structural engineering consultant with over 40 years of experience in the design, assessment and structural investigation of a wide variety of bridges and other structures. Ian Firth is a Fellow Member of IABSE and has been an active member of the Association since 1994. He was the Vice-Chair from 2006 – 2012 and has been Chair of the IABSE British Group since 2013. Ian Firth also contributed as Co-Chair of the IABSE Chairs of National Groups and as an active member of the previous IABSE Awards OStrAC. He is now a major contributor to the new IABSE Awards as a member of the new IABSE Awards Committee. Ian Firth was the Chair of the Organising Committee of the IABSE-IASS Symposium London 2011; Co-Chair of the Organising Committee of IABSE Conference Bath 2017; in the Scientific Committee for 11 conferences to date; Keynote Speaker 4 times and has been involved in many other IABSE activities.

Honorary Membership
Mikael W. Braestrup

Honorary Membership 2022 is presented to Mikael W. Braestrup, Denmark, 'in high appreciation of his outstanding and dedicated services to the Association.'

Dr Mikael W. Braestrup has been an active member of IABSE since 1979 when he co-organised the Copenhagen Colloquium on 'Plasticity in Reinforced Concrete' and received the IABSE Early Career Prize in 1984. In 1991 he became a member of Working Commission 3 'Concrete Structures', served as Vice-Chair from 1997-2001, and Chair until 2005. He was on the Organising Committee for the 1996 Congress in Copenhagen and has been a frequent member of Scientific Committees for IABSE conferences. Currently, Dr Braestrup serves on the Bulletin Editorial Board and the Outstanding Paper Awards Committee, and he is the SEI National Correspondent from Denmark and has taken part in the recent IABSE Webinar series too as a Speaker.

Award for Small Projects

Aeroad – Goodwood Festival of Speed 2021

United Kingdom

This temporary structure is of a remarkable unique light shape and is the longest spanning tensegrity cantilever ever constructed. It consists of struts and ties; the complex arrangement however gives a visually lightweight feel. The structural design was challenging and the designers used parametric design tools, which enabled iterative process based on collaboration between engineers, artist and the production team.
Structural analysis consisted of global and local analysis with non-linear behaviour due to structural form and large relative displacements. Each connection was unique.

In collaboration with the welding contractor an exceptional construction sequence with temporary connections was developed to avoid a mechanism failure. All in all a pleasing engineering sculpture.

Award for Small Projects

Chapel of Sound

China

The unique Chapel of Sound is located in a remote rocky valley at the foot of Jinshanling Great Wall, where works can only be executed from April till October. The exterior is formed from concrete mixed with crushed local rock, wonderfully mimicking the surrounding hills in tone and texture. Its final shape was reached by an iteration process of structural design checks deploying algorithms aimed at achieving a uniformly distributed strain energy density. Constructing the façade did not require complex machinery which in this inaccessible place was advantageous.

The concept of the interior of the "the hall" is based on a human ear with final shape being defined by acoustic performance requirements, that was provided by the shape of shell on its own, eliminating the use of additional acoustic elements. The semi-open structure enables natural ventilation and thermal comfort criterion was achieved with shape finding iteration of the structure. To avoid problems in the construction, a full scale model of the most difficult part of the structure was built. Further, the design team provided 3-D models to the contractor for a better overview of the complex geometry of the structure and to aid the construction.

Award for Small Projects

High-performance auxiliary railway bridges for speeds up to 160km/h (HHB) - *Austria*

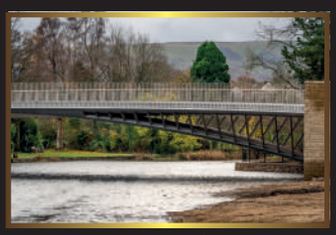
The requirements for temporary construction sequences within railway industry are extraordinarily high. To limit railway possessions, it is common practice to use auxiliary bridges which usually require reduction in operating speed that negatively affect timetables.

To overcome this issue the designers of this auxiliary bridge have creatively developed a slender light weight structure using tuned mass dampers that allow operating speeds up to 160km/hr and that can efficiently cope with dynamic loads.

Award for Small Projects

New Pooley Bridge

United Kingdom




This innovative and visually pleasing composite structure is a slender single span bridge using stainless steel and high strength concrete, and is the first road bridge in the UK to use stainless steel at this scale.

As the riverbanks comprise of low load bearing glacial till, the 7.5 m-long back-spans are designed to transfer the horizontal component of the arch thrust to the deck, thus ensuring that horizontal reactions are not imposed on the glacial till and to enable a traditional transparent arch – deck appearance the back-spans are hidden within reinforced concreted gravity abutments that are clad with local sandstone.

The designers considered sustainability and whole-life-cost. Stainless steel does not require maintenance painting and can be recycled and it has approximately 25% more structural capacity in comparison to conventional steel. Additionally ground granulated blast furnace slag was used as cement replacement that enhances concrete durability.

It is a good example of sustainable construction.

Award for Small Projects

Melopee

Belgium

The Melopee school is located within the "old-docks" site in Ghent. The building site was not large enough to accommodate all different functions and outdoor playgrounds in a traditional manner, hence the designers creatively placed playgrounds and external areas one upon another supported by portal steel framed structures with composite steel – concrete floors.
On plan the indoor and outdoor spaces have the same area and the structural composition results in a visually slender and transparent structure seemingly floating above the docks. The judges were impressed with the clever use of space.

Award for Small Projects

Swing Bridge to Dinosaur Island

United Kingdom

This tiny swing bridge provides access to the historic site located within Dinosaur Island in Crystal Palace Park in London.

In the recent years the site and dinosaur sculptures have experienced vandalism. After analysing various methods to prevent access by undesired visitors, such as by the use of large gates at the entrance, the designers came up with the idea of a simple hand operated movable bridge

To reduce amount of welding and efficient use of material, the bridge deck, handrail, and support stays forming a "comb-structure" were cut from a single sheet of steel. The comb elements of all parts were bent to obtain the desired geometry and subsequently and were welded to the main spine beam. The geometry of the comb-like handrail was adjusted to follow the sinusoidal alignment on the plan thus strengthening the element.

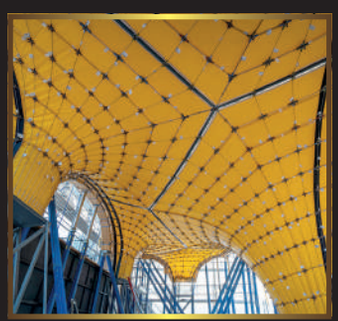
The judges liked the apparent simplicity but creativity of the bridge and considered it as an exquisite example of a small bridge.

Award for Building Structures

HiLo Research & innovation unit for NEST

Switzerland

The project successfully provides an exemplar of modern solutions to achieve low embodied-carbon construction. In doing so, it demonstrates the potential of digital concrete technologies to reduce construction waste and minimise resource consumption. It also shows how the integration of advanced building systems in lightweight structures allows for energy efficient operation and high user comfort.
HiLo is an extraordinary example of innovative research which combines modern processes of analysis and production with creative interpretations of complex shells and rib-stiffened funicular slab structures. The slenderness and elegance of the architectural outcomes are astonishing.



Award for Building Structures

European Spallation Source (ESS)

Sweden

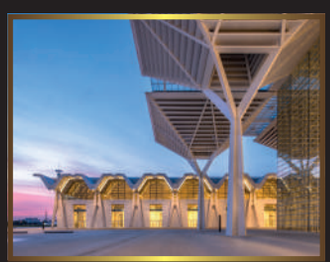
This is a ground-breaking international scientific research facility, whose distinctive building form gathers its diverse uses beneath a vast oval roof. Large column-free halls are placed either side of a spine building, which contributes to the spatial organisation and structural stability of the whole.
Extreme performance demands for snow loading and seismic conditions have been achieved in combination with rigorous building-envelope criteria for energy and airtightness.

Award for Building Structures

National Exhibition Project Phase I

China

An architecturally rich and structurally expressive approach is illustrated in the creation of a vast suite of conference facilities, exhibition halls and ancillary spaces, totalling more than 1.3million m^2 in two phases. The distinctive structural tree columns of the Central Hall complement the linear column and truss arrangement of the 84m-span Exhibition Hall, whose attractive form is inspired by seagulls in flight.



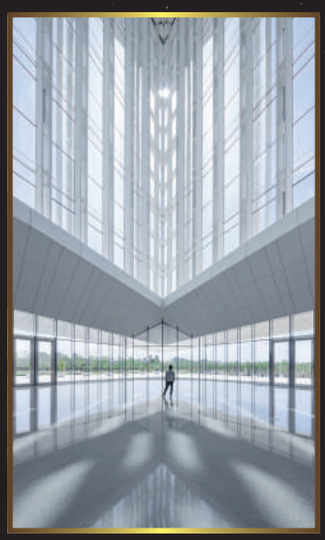
The flow of forces in the different structural forms are well described and could be understood by pay persons. The details of connections and nodes are recognised as important visual references, bringing scale and delight to the super-large building.

Award for Building Structures

Xi'an International Conference Center

China

The bold, square plan of the 50m-tall building encompasses an internal floor area of more than 200,000m^2 to create a state-of-the-art conference centre. Technical demands for seismic performance and the integration of extensive internal environmental services have been well integrated within the massive 207m-span roof truss structures. These allow for the facades to be suspended to provide dramatic column free spaces at ground level and the integrated design of the architecture, structure, and façade achieves a visually lightweight and transparent image of the building.



Award for Building Structures

Shijiazhuang International Convention and Exhibition Center - *China*

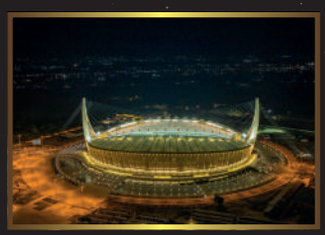
The Exhibition Center comprises a group of buildings whose extreme demands of long-span structures are efficiently fulfilled in a sophisticated and elegant solution, where structural engineering and architecture are harmoniously integrated.
The use of long-span cable trusses of more than 100m spanning in both longitudinal and transverse directions has resulted in a highly efficient design, creating light and airy interiors, whose unity of form is inspired by the vernacular architecture of the region and whose function is elegantly catered for. The outstanding structure is attractive and visually legible, with the breathtaking clear spans providing an appropriately clear example of structural and material efficiency.

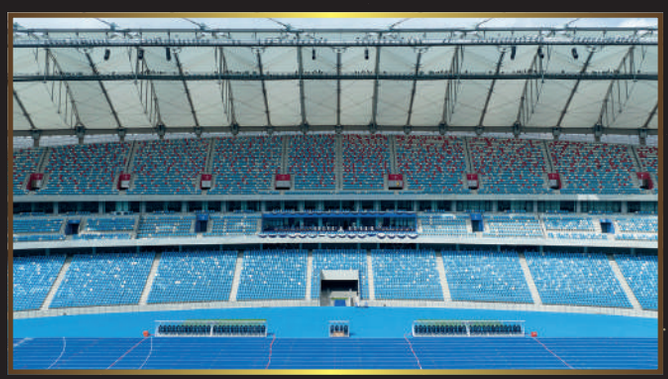
Award for Building Structures

Morodok Techo National Stadium

Cambodia

Providing both a landmark for Phnom Penh and the country's largest sports stadium, the new 60,000 seat facility comprises a dramatic circular plan form with twin 99m-tall concrete masts carrying the cable-supported roofs. Conceived as the key venue for regional and global sporting events, the project combines rich visual language inspired by traditional architecture and cultural iconography with a robust structural system to provide column free enclosure. The dramatic shape of the stadium and the pursuit of lightness and transparency for architectural aesthetics placed significant demands on the structural solution that have been resolved in a highly expressive design.



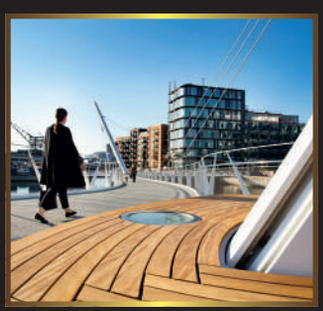


Award for Pedestrian and Cycle Bridges

Shipyard Bridge (Varvsbron)

Sweden

This S-shaped cable stayed bridge in Helsingborg, Sweden, has two dramatically inclined pylons creating a sculptural form that is a new landmark in the harbour area that connects the city centre with new residential and commercial districts. Every element is carefully detailed to enhance public interest and fascination, and the judges acknowledge this effort has resulted in an exciting and well-presented project. The cable stays support the bridge deck on one edge only, passing under the soffit at midspan to tie the mast heads together. The parapet with its V-shaped supports is particularly noteworthy and helps to create an elegant overall appearance.



Award for Pedestrian and Cycle Bridges

Hemei Bridge

China

This is a magnificent monocable suspension bridge in Xiamen, China, with a record span of 216.7m. The lightweight curved deck and the twin slender masts with inclined hangers which support the deck along one side only together create a structure which is legible, logical and well-proportioned in spite of the large span. The delicacy and transparency of the solution, sailing apparently effortlessly over the busy road junction, testifies to the architectural and structural engineering skill and courage of the designers. The use of tuned mass dampers and the boldness of the design convinced the judges that this is a bridge for the future and a celebration of contemporary structural engineering capability.

Award for Pedestrian and Cycle Bridges

Y-Shaped Suspension Bridge

Republic of Korea

Situated in mountainous surroundings in Korea, this spectacular bridge opens accessibility to the public and is most certainly a new destination for hikers and bridge fans alike. The Y-shape refers to the special plan layout with 3 suspended bridge decks meeting in a central node. It is a breath-taking solution both structurally and in appearance, and the judges acknowledge the complexity and the design preparation involving advanced dynamic analyses, loading and vibration tests as well as the necessary use of non-conventional construction methods.

Award for Pedestrian and Cycle Bridges

Haixin Bridge

China

This is a major pedestrian and cycle river bridge in Guangzhou, China, with an impressive span and dramatic appearance. Inspired by regional cultural elements and traditional garden design principles, the curved arch solution appears well adapted to the city and river surroundings. The structural design and construction challenges are obvious to the judges and have been overcome to produce a memorable result. The bridge incorporates many distinctive features including the arch, bridge deck, railings, steps, roofs and garden facilities, which together form an impressive composition.

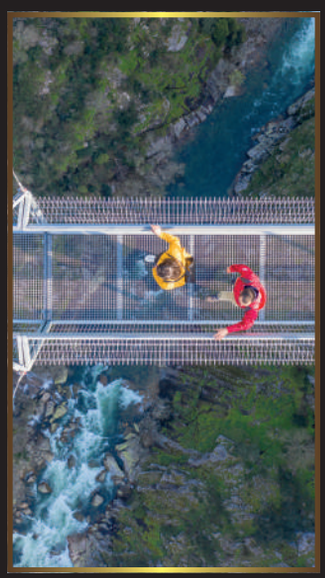
Aerial view of H

Award for Pedestrian and Cycle Bridges

Suspended Footbridge 516 Arouca

Portugal

Having a stunning main span of 516m, this unique suspension bridge in the Arouca UNESCO Global Geopark, Portugal, is truly an engineering accomplishment out of the ordinary. The long, slender and flexible bridge crosses a deep valley and it will most certainly be a dramatic adventure to cross it, as well as a challenge to some users. It is certainly not for the faint-hearted! The judges recognize the challenges in the design for dynamic effects in a slender bridge of this scale, and applaud the brave decisions which have been taken to make remote neighbouring areas accessible to the public by the construction of this bridge.

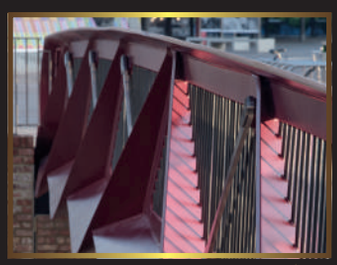


Award for Pedestrian and Cycle Bridges

Esperance Bridge

United Kingdom

This is a sculptural bridge in central London crossing a picturesque canal and connecting shopping, facility and infrastructure areas, and the judges were impressed by the joint collaboration between the client, designers and construction team in order to create this special design and appearance. The bridge takes the classical Warren truss into a new age using tapering and folded steel plates as well as diagonal stainless tension ties. The judges specially liked the expressive form with distinct force flow appearance, which will look inspiring to the public eye.



Award for Road and Rail Bridges

Youshui Bridge of Zhangjiajie-Jishou-Huaihua

China

This large asymmetric arch structure carries two high speed rail lines across a deep gorge in the western mountainous area of Hunan Province. The asymmetric form derived from placing the arch foundations alongside existing roads on the steep valley sides for easy access and minimum environmental impact. Concrete filled steel tubes are used for the 290m span arch structure which supports a slender continuous deck girder.

Considerable care was taken to minimise the local environmental impact during construction, with large, prefabricated sections being installed using an impressive overhead cable crane system, enabling bridge construction to be completed in only 30 months.

Award for Road and Rail Bridges

HusuTong Yangtze River Bridge

China

Carrying four high speed rail lines and a six-lane expressway, this is the first road and rail cable stayed bridge with a span over 1000 metres. The impressive structure crosses the busy Yangtze River in the prosperous delta region to form a critical strategic link between the cities of Nantong and Suzhou.

With a main span of 1092 metres, the double level steel truss girder is supported from diamond shaped concrete towers which rise to a height of 325 metres. The use of high strength steel and concrete, parallel wire stays and large section erection methods resulted a significant savings in materials and equipment to achieve a reduction in carbon emissions.

Award for Road and Rail Bridges

Brigandsbrug Bridge

Belgium

In a beautiful synergy of engineering and architectural design, this elegant shallow arch bridge crosses the Mandel River at Ingelmunster in Belgium. The 286 metre long structure has a main span of 110 metres, and comprises twin steel box girders with a composite concrete deck slab. Over the supports the arch spandrel is effectively a truss with bracing members formed from delicate pre-fabricated star shaped steel elements. The bottom chord of the truss which doubles as the arch rib curves smoothly to create a sinuous, efficient and elegant overall form.

Careful control of the construction sequence and pre-cambering enabled the structure to remain very slender, and the bridge has a lightness and a transparency that sets it apart as a unique and poetic intervention in the flat landscape.

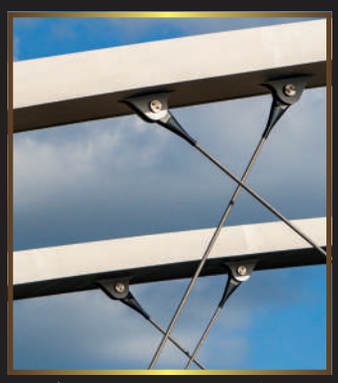
Award for Road and Rail Bridges

Tram Bridge Crossing Highway A8

Germany

This elegant structure carries two new light rail tracks into Stuttgart Airport, and is the first network arch in the world to use carbon fibre hangers. The free-standing slender tapering steel arches have a very low profile and support a post-tensioned concrete slab supporting the rail tracks. The central 80 metre network arch section is supported by two triangulated side spans resulting in a continuous integral structure having an overall length of 147 metres, with an efficient arrangement of vertical supports and tie-downs at the abutments.

This beautifully engineered solution is the result of close collaboration between academic research in new materials and expert practice in lightweight structures to achieve an outstanding design that is at the forefront of emerging technology.

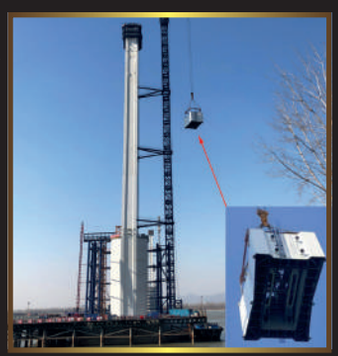


Award for Road and Rail Bridges

Nanjing Jiangxinzhou Yangtze River Bridge

China

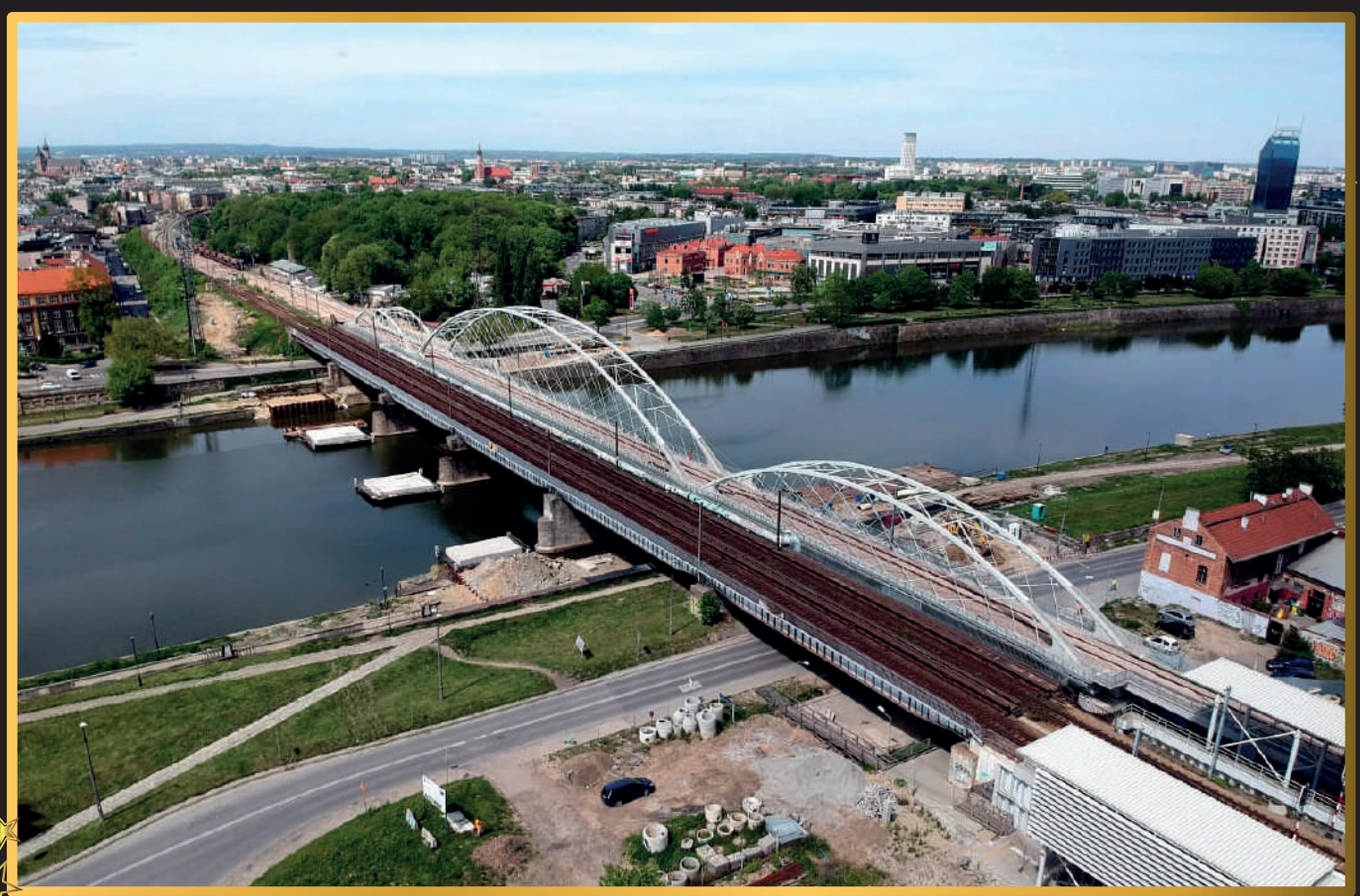
The design of a three-tower cable stayed bridge demands special treatment to deal with the effects of unbalanced live loading on adjacent spans. This large bridge with two 600 metre main spans addresses this issue with inverted v-shaped pylons providing the necessary stiffness at the central support. The bridge girder is a steel trapezoidal box, unusually topped by a coarse aggregate reactive powder concrete deck slab acting compositely with the steel top flange plate. This innovative combination results in a much lighter weight solution than a conventional steel-concrete composite girder. A large-scale factory production line was created for prefabricating the deck sections, resulting in an efficient and high quality rapid construction process.



Award for Road and Rail Bridges

Works on the railway line no. 30 Kraków Główny Towarowy - *Poland*

This family of network arch railway bridges over the Vistula River in Krakow represents a significant step in bridge design and construction. The use of cold-formed steel sections for the arches is unusual for a bridge of this scale, and the engineers have broken new ground in developing the design for this demanding application. The base of the steel arches is filled with concrete to form a composite section merging with the prestressed concrete deck slab in an innovative and efficient way, using composite dowel connectors not normally seen in such applications. High strength steel bars are used for the hangers with a specially developed composite anchorage detail at the deck connection.



Award for Infrastructure

Pingtang Bridge

China

This structure is a triple-tower cable-stayed bridge in Guizhou, China, with a steel-concrete composite girder and tall pylons designed to emphasize its visual impact. The twin 550m long main spans and the tall piers, which include the world's tallest concrete pylon 332m high, create a dramatic intervention in the landscape. The project adopted an innovative construction method involving swivelling the bridge deck segments to enable them to pass along the cantilevering deck, and the result is a major new tourist attraction in this mountainous region.

Award for Infrastructure

The Pihe Main Canal Aqueduct

China

This impressive structure is a water viaduct or boat overpass carrying vessels over a wide canal which is part of the Yangtze-to-Huai water diversion project. The aqueduct also supplies water for downstream irrigation, industrial development, and drinking water for millions of people. The structure is a haunched truss girder, with the world's longest span of 110 metres in a navigable aqueduct, supporting the water trough which has corrugated stainless-steel webs. The judges were impressed by the design which ensures satisfactory seismic performance, mitigating the fluid–solid coupling effects and managing the deformations induced by large temperature differences.

Award for Infrastructure

Zweite Hinterrheinbrücke Reichenau

Switzerland

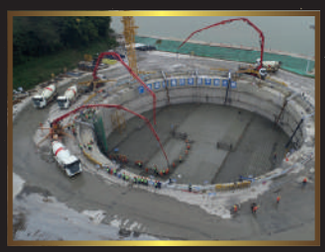
This elegant and slender steel railway bridge stands immediately alongside an historic steel truss bridge rail crossing of the Hinterrhein river at Reichenau, Switzerland. It has an elegant modern design with a U-shaped trough girder, formed by trapezoidal steel boxes standing on slender Y-shaped steel piers. The judges were impressed with the delicacy and suitability of the slender and contemporary design which responds well to the extraordinary site with multiple boundary conditions and challenges and with a long historical significance for Swiss bridge engineering.

Award for Infrastructure

The Pingnan Third Bridge

China

This bridge is a half-through concrete-filled steel tubular (CFST) arch bridge with the world's largest span of 560 m, being a symbol of the consistent efforts made by Chinese bridge engineers in relation to CFST arch bridges. It has several technological innovations related to abutment foundation construction, construction of the arches using large towers and temporary cable-stayed buckle system with careful tower displacement control. The judges were impressed by the way the engineers responded to the sheer scale of the challenge.



Award for Infrastructure

The Gerald Desmond Bridge Replacement Project - *United States*

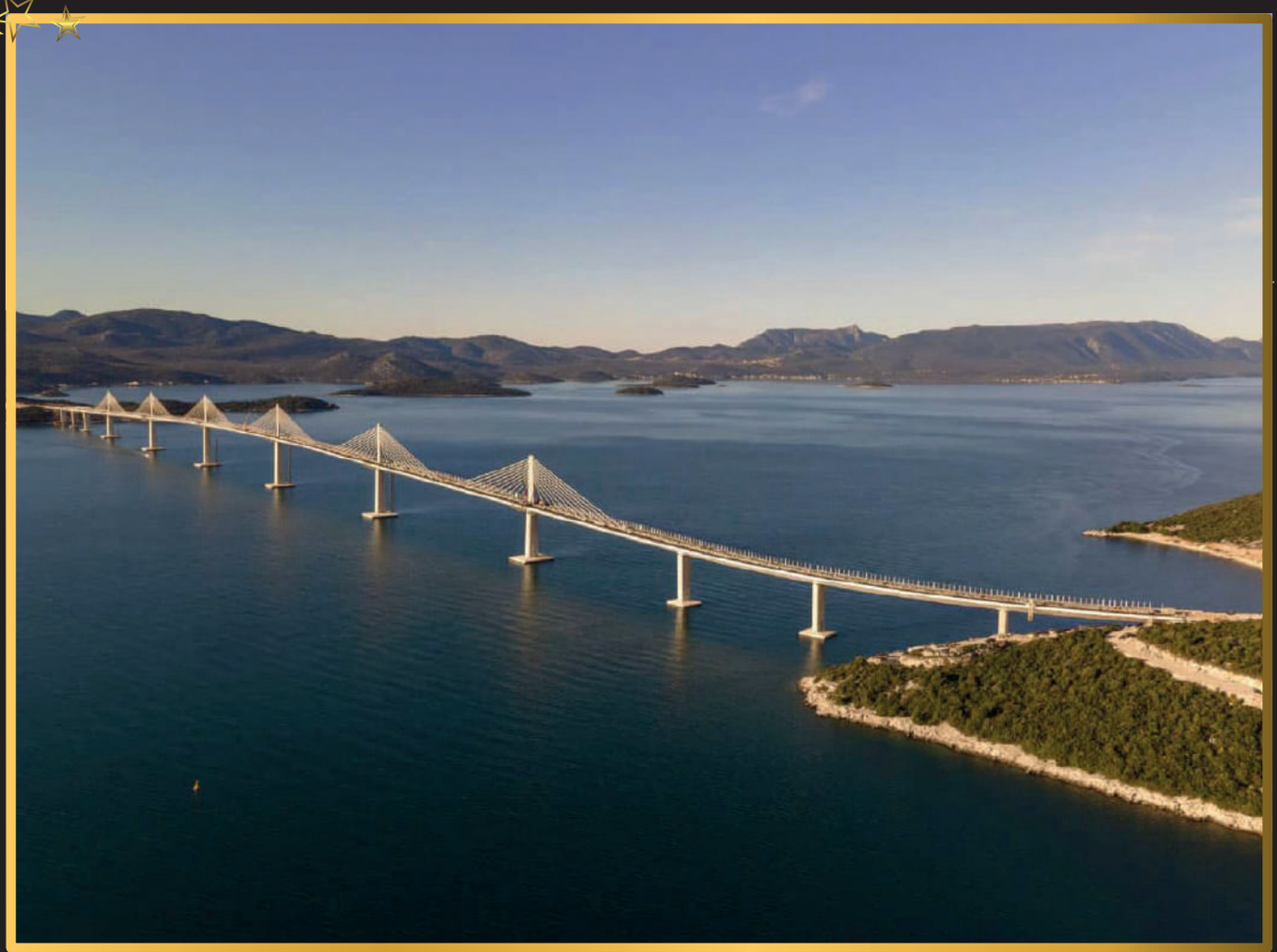
This project replaced a 1960's steel arch bridge with a new signature cable stayed bridge in a vital traffic connection in Long Beach, USA. The 305m main span is supported from twin mono-pylons standing on the bridge centreline with the stays supporting the steel box edge girders and steel-composite ladder deck arrangement and innovative seismic alleviation system. An innovative movable scaffold system was used for the approach structures, and the tall pylons adopt an elegant octagon-to-diamond cross section for an attractive and slender appearance.

Award for Infrastructure

Peljesac Bridge

Croatia

This multiple span sea crossing established the connection between the northern Croatia and Dubrovnik - Neretva province, allowing, after many years, a national road connection by avoiding border crossing with Bosnia and Herzegovina. The steel box girder structure has 5 extradosed cable-stayed main spans with 6 pylons, with a total overall length of 2440m. The judges noted the particular innovations related to the steel-concrete composite cofferdams, the design of the segments of the superstructure, structural health monitoring during construction and other features.

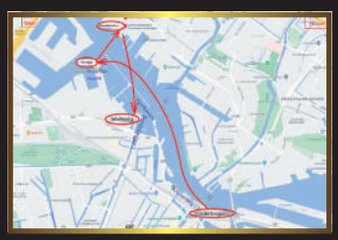


Award for Rehabilitation

The Gevle Bridge

The Netherlands

This project involved the relocation of an historical lifting steel bridge dating from 1930, in central Amsterdam. In moving the bridge to its new location, the engineers were able to preserve as much as possible of the original components and materials. After a detailed inspection and assessment, the engineers were able to devise a scheme to preserve a unique piece of Amsterdam's history in such a way that is original function as a bridge was restored and it could become again part of the city's critical road infrastructure.

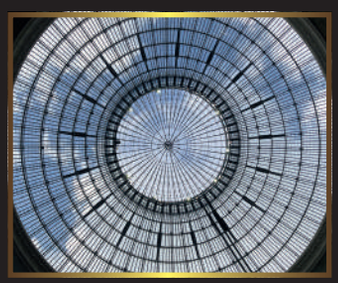


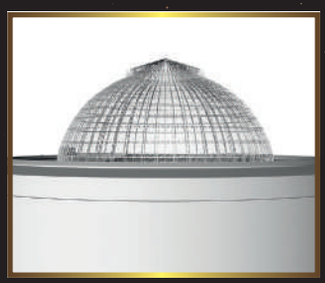
Award for Rehabilitation

Bourse de Commerce Rehabilitation

France

This project considers the rehabilitation of an historical monument including a glass dome 40m high, built in 1812, in central Paris. The judges were impressed by the care and rigour adopted in the advanced technical procedures of inspecting and modelling which made it possible both to preserve the remarkable architectural aspect of the existing structure and to guarantee its stability with the new loads of the envelope. Slow and painstaking work was required to ensure that the refurbished structure both respected the original and also gave confidence of a long and safe future life for this beautiful structure.



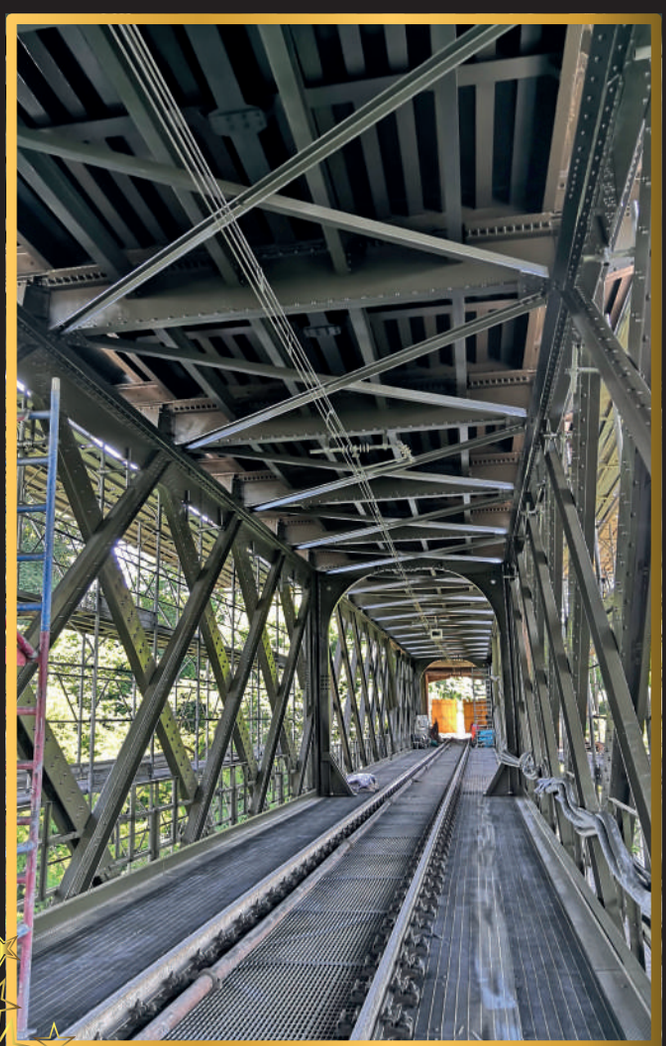


Award for Rehabilitation

San Michele Bridge

Italy

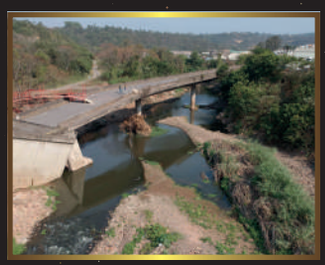
The San Michele Bridge, in North Italy, is a lattice steel arch structure with a span of 150 metres, built between 1887 and 1889. The double level deck carries road traffic on top and railway traffic below and was closed to traffic in 2018 after being found to be in poor condition. Careful investigations, inspections, tests and structural assessments led to refurbishment works which enabled the bridge to be reopened to traffic in 2020. The judges were impressed by the care and rigour adopted by the engineers in refurbishing and preserving this historic structure.



Award for Rehabilitation

Emergency Rehabilitation of Umhlatuzana River Bridge - *South Africa*

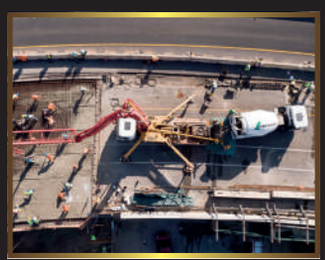
This bridge near Durban in South Africa was constructed in 1979 with a five-span, post-tensioned concrete box girder and was partially destroyed in severe flooding in 2019. A delicate, multistage demolition with variable stabilization was used to remove and replace only the damaged spans, limiting material use and damage to the local ecosystem. Custom-designed cable fittings were used to carefully reintegrate the continuous prestress system through the new spans, and the entire work was carried out rapidly to minimise delay and disruption to the critical transportation link.



Award for Rehabilitation

Expansion of the King Cetshwayo Highway-Westwood Interchange - *South Africa*

This project achieved the preservation and extension of an existing underpass structure, converting one of its abutments into a pier and adding a second span. The engineers incorporated various technical and aesthetic innovations, including a top-down construction method, a minimalist sprayed-concrete abutment wall solution and a deliberate contrast between the new and old bridge spans. The judges noted that the project piloted a new South African specification for radical community participation and economic empowerment as part of its notable sustainability priorities.



Award for Rehabilitation

New Pier for the Bridge-Aqueduct PSA 101

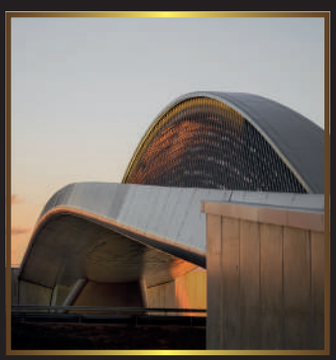
Spain

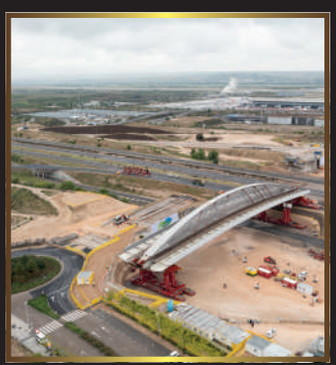
The realignment of a major road in Northern Spain required the reconfiguration of an existing aqueduct dating from the 1970's. The engineer's solution that made it possible was to introduce a dramatic and challenging new pier with an eccentricity of 7.50m to support the post-tensioned concrete box girder structure. The complex load transfer procedure involved a challenging technical solution with a very high eccentricity, while keeping highway traffic open throughout and without any effect on the water pipes inside the deck.

Award for Innovation in Construction

"La Concordia" outstanding new arch bridge in Valdebebas - *Spain*

This unique bridge is a shallow bowstring arch, with the lattice web formed by a structural mesh diagrid from which the deck hangs. The structural configuration allows for the desired 162mspan while meeting strict clearances from the highway below and aeronautical clearance above, without transferring horizontal loads to the foundations. The project incorporates 3-D printed transverse clamps for research and development, in addition to the typical steel prototypes, to tie the lattice webs together. The project employed an innovative construction approach, in which the transported elements went through different support schemes through a series of load transfers, so that the structure always remained supported on two transverse axes while being moved into place.





Award for Innovation in Construction

Gare Maritime Inner Volumes

Belgium

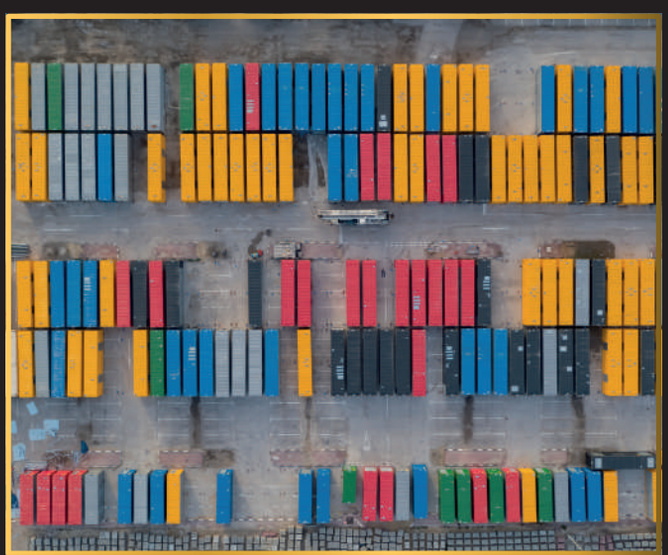
The insertion of twelve new multi-story timber framed pavilions into the historic Gare Maritime structure has breathed new life into the former railway station. The designers were tasked with creating new volumes that were compatible with the existing structure while creating a unique sense of space. The judges appreciated the selection of cross-laminated timber and glulam framing for the pavilions; this provided a demountable, easy-to-assemble structure within the site constraints of an existing building. The timber elements were optimized at the cantilevered edges, utilizing concealed ribs at the top of the CLT panel to express a shallow profile. All of the joints were detailed to be visible, mimicking the craftmanship of historic timber buildings, while using concealed steel elements to strengthen the joinery. The project was one of the largest heavy timber construction projects in Europe at the time of construction; the judges feel that it is a wonderful example of adaptive reuse with sustainable materials for new construction elements.

Award for Innovation in Construction

Stadium 974

Qatar

The judges were excited with this unprecedented scale of modular construction at a venue as complex as a FIFA World Cup Stadium. Stadium 974 creates a temporary venue that is fully fabricated off site, transported and installed on site, and can then be easily demounted after the event to be completely re- installed in another location or repurposed into many small stadia at different locations. Every structural element of the stadium is designed to fit within a standard shipping container; all joints are designed using single pins with no plastic deformation allowed, to ensure full de-mountability. Each individual structural element has a scannable QR-code to simplify construction as well as future removal, storage, and reinstallation. The judges appreciated the holistic design approach across all trades to achieve this unique and visionary structure; a simple concept scaled up many times. The modular concept on a large- scale has the potential to improve the environmental and community impacts of temporary events in the future and is an exciting innovation for stadium engineering.

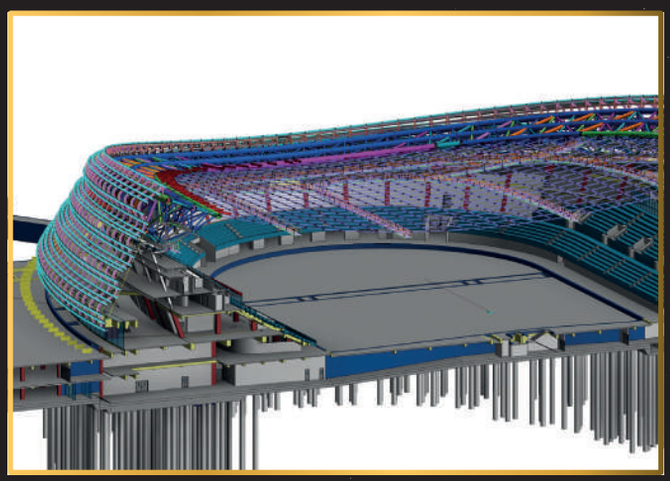


Award for Innovation in Construction

National Speed Skating Oval

China

This impressive and complex building structure adopts a cable net roof supported on compression-ring trusses and a perimeter curtainwall on stay cables. The curved curtain wall system was inspired by the Temple of Heaven. To avoid huge lateral forces from the tension in the cable nets, the compression ring truss was allowed to slide freely horizontally during the tensioning of the cables and was fixed after the tensioning was complete. Complex analysis methods were necessary to account for the horizontal deformation of the truss during tensioning in order to achieve the desired roof geometry within the target form and forces, in a consistent manner. The roof cable net also supports the roof panels; the cable nets were preloaded using hanging water tanks as counterweights; water was removed as the cladding as added on to achieve optimal load transfer - the judges appreciated this simple yet effective measure. Innovative analysis and technology were necessary to design and build this complex building structure with excellent results.



Award for Innovation in Construction

Striatus

Italy

This arched unreinforced masonry footbridge combines traditional techniques of master builders following form and forces, supplemented by computational design and robotics. The profile of the bridge was optimized so that all elements take advantage of concrete's natural strength in compression. The concrete blocks that make up the arches were built without any reinforcement, dowels, or mortar in between joints. Not having grout between the joints of the concrete blocks of the bridge meant that fabrication and precision during the 3-D printing and fabrication was critical. The analysis combined traditional methods of limit state and thrust line analysis with finite element modeling to verify stability as well as all stresses. The judges appreciated the sustainable nature of the construction which allows for future removal, reuse, or repurposing, as well as optimal use of material.

Together with customers and partners, we shape a future where people and societies grow and flourish. We do that by co-creating sustainable and aesthetic solutions that improve the quality of life for people today and many generations ahead. Our starting point is gaining a deep understanding of our customers, their aspirations, and priorities. This is what sets us apart and how we deliver long-term value.

Our core service is consultancy: From planning and design to construction and operation, we cover the whole engineering process in close collaboration with our customers and contribute with state-of-the-art technologies and design solutions.

To support the green transition, we have strengthened our focus on renewable energy, including offshore wind and new energy systems. Sustainability is also a key factor when working with large and often complex infrastructure with our customers, finding the optimal solutions together. Every bridge, tunnel, and marine structure is unique, and how we solve the task will impact many people for generations to come.

The COWI-designed 1915 Çanakkale Bridge in Turkey carries a new highway connecting Europe and Asia. It is the world's largest span suspension bridge with a 2023m long main span and 770m long side spans and two identical steel towers. The tower foundations are concrete caissons placed on improved soil.

The 1915 Çanakkale Bridge stands out because of its high-end steel structures and innovative engineering design and has been chosen for the European Steel Bridge Award 2022.

At SeismicPS, our vision is saving lives and protecting infrastructure against earthquakes by enabling a safer and sustainable built environment. Our team of engineers is dedicated to research and engineering consultancy in the field of earthquake and structural engineering. We are specialized in R&D, as well as design and implementation of seismic protection technologies for structures, including bridges, buildings, industrial structures, power plants, etc. Our main objective is to provide structures with the capacity to withstand severe earthquakes, saving lives, avoiding seismic damage, and allowing immediate occupancy.

We have a solid 15-year experience providing consultancy and design support to owners, designers, and contractors for projects all around the world. Our team consists of highly qualified engineers with world-class knowledge and global experience in the research, design and application of innovating seismic design principles and strategies, including seismic isolation and energy dissipation, to ensure safer and sustainable structures. Our headquarters are located in New York City, in the US, and we have international subsidiaries in Mexico City, Mexico and Bogota, Colombia.

BUILDING TRUST

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing, and protecting in the building sector and motor vehicle industry. Sika has subsidiaries in 100+ countries around the world and manufactures in 300+ factories.

Sika is the leading worldwide partner for all needs with regards to the new construction, maintenance and refurbishment of bridges:
Concrete technology

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- Structural bonding
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TEUFELBERGER-REDAELLI provides its clients with unique expertise for high-performance steel wire ropes and world-leading technical support.
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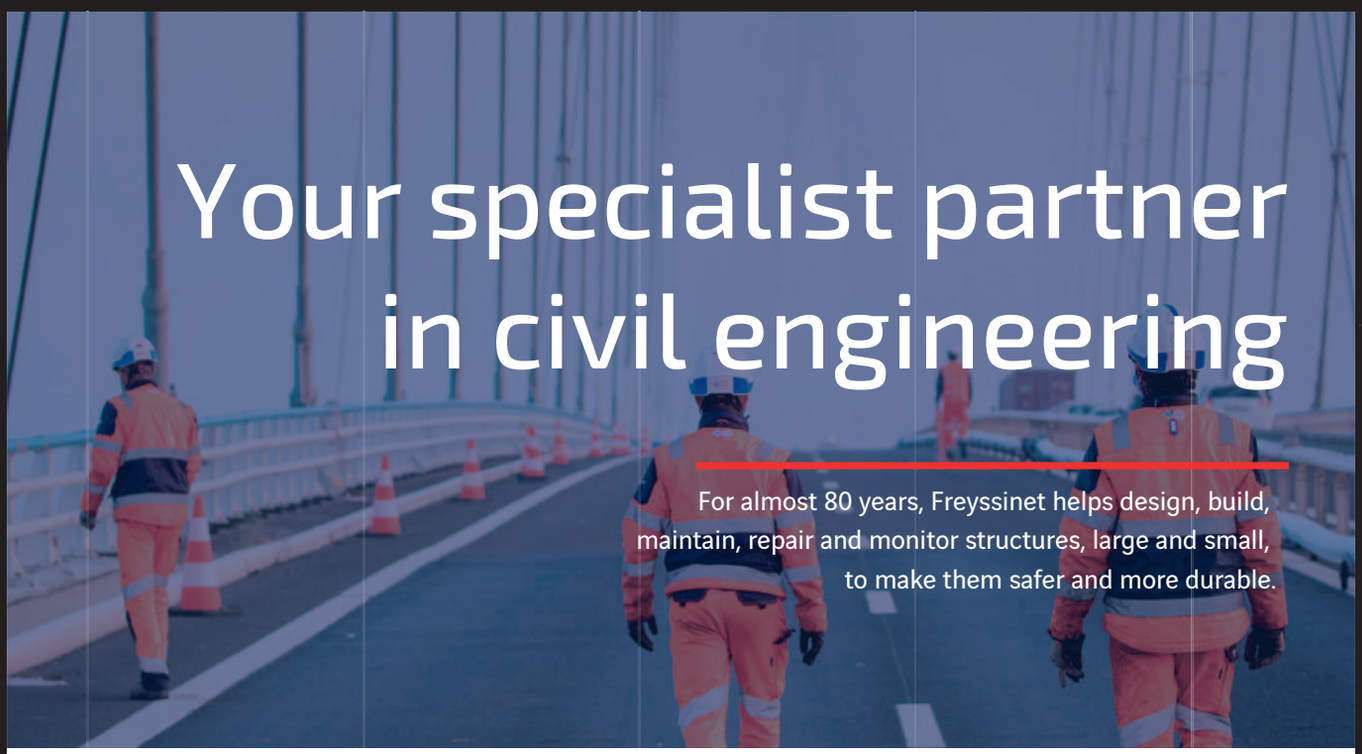
TEUFELBERGER-REDAELLI cable systems are applied on long-span bridges like the Storebælt Bridge. Recent achievements are the Tana Bru, the Dalsfjord Suspension Bridge, Tillf bridge, and Strömsund Bridge, and solutions for pedestrian/cycle bridges including the Dubai Canal Footbridges, Scioto River Footbridge in Ohio, and the Sky Bridge 721- Dolni Morava, the world's longest suspension bridge.
The cable-supported tensile structure applications include the London Eye and the Las Vegas High Roller Observation Wheel as well as cable nets for large facades e.g. The Shed Cultural Center in NY, the Diversity Garden in Canada. Major Soccer and Olympic stadia such as the Miami Dolphins Hard Rock Stadium, the Motera Cricket stadium, and the Cairo, Valencia and Budapest stadia.



Freyssinet helps design, build, maintain, repair and monitor structures, large and small, to make them safer and more durable. Through a network of 60 subsidiaries located on five continents, our local teams are close to their clients and projects, and firmly rooted in their local economic environment. We are working with clients, designers, contractors and local authorities, applying the same approach: use our experience, expertise and technologies to create or adapt the most economically, technically and environmentally appropriate solution for the project.

From engineering to product manufacturing to the implementation of technical solutions on site, we support each project from A to Z with the same principles of excellence, innovation, performance and sustainability. Our strength lies in our ability to mobilise both highly specialised teams to replace expansion joints at short notice and experienced engineers to prepare and manage bridge construction projects providing the full service, excluding foundations.

We are involved in all types of buildings and structures, from the most familiar to the most unique: stay-cable bridges, viaducts, footbridges, buildings, nuclear reactors, water infrastructure, ports, etc.
With both building capabilities *(cable systems, prestressing, bearings, expansion joints, seismic protection, deck construction methods, heavy lifting, geotechnical engineering, etc.)* and *structural repair capabilities (hydro demolition, abrasive blasting, hydrophobic impregnation, coatings, corrosion protection, dry shotcrete, additional prestressing, composite reinforcement, seismic retrofitting, maintenance of structural fittings, etc.)*, Freyssinet brings together a range of expertise that is unrivalled in civil engineering to support our customers throughout the life cycle of their infrastructure.

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