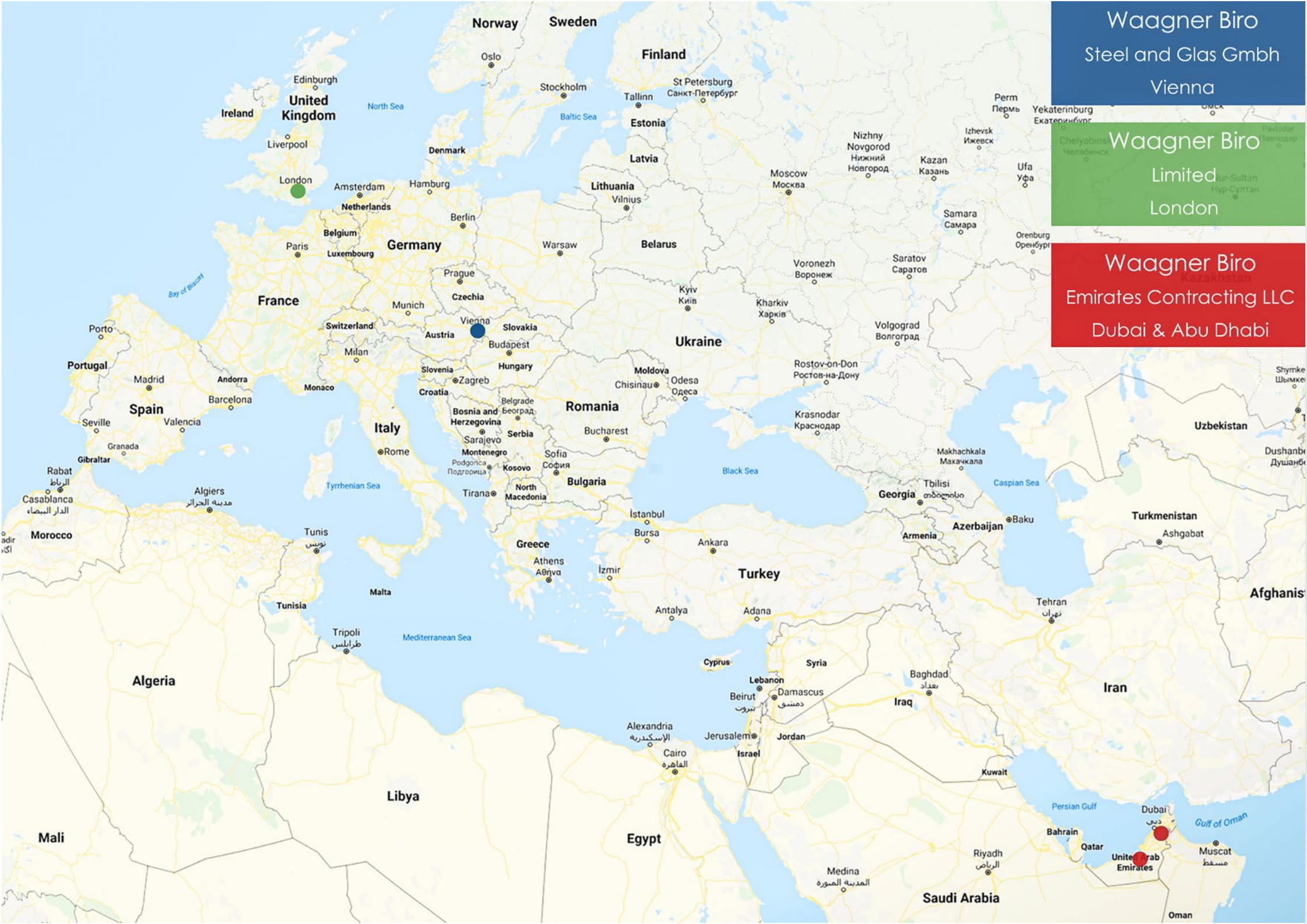
waagner biro

steel and glass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الرياض
Medina
المدينة المنورة
Saudi Arabia
Oman

WHO WE ARE

Waagner Biro steel and glass is the European top enterprise in the field of architectural building envelopes. For over 165 years we have been engineering and helping to make bold and exciting architectural visions become reality. Creating landmarks across the globe is not just what we do, it's who we are.

We are engineers, architects and designers, but above all we are builders; creators of things.

Waagner Biro steel and glass is member of the Zeman Group, the group being globally present in local core markets with subsidiaries and branch offices.

Within this group are two fabrication facilities for steel structures in Poland and Turkey.

Waagner Biro steel and glass uses group-wide standardised processes and modular construction systems combined with bespoke engineering developments to fulfil customer needs. Relevant know-how and skills are anchored inside Waagner Biro steel and glass.

Many of Waagner Biro's steel and glass or façade constructions are instantly recognisable, from the Reichstag dome in Berlin to the roof of the British Museum in London and from the rain-of-light Louvre dome in Abu Dhabi to the Convention Centre in Dublin or the Red Bull Hangar 7 in Salzburg.
These are but a highlight of the projects we have delivered working alongside some of the best architects and engineers in the world.

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Waagner Biro steel and glass is part of the Zeman Group

WHAT DRIVES US

we build our clients' visions by finding simple and effective ways to making them happen ; we are solution oriented.

we build long-lasting relationships with clients, architects and consultants and deliver excellent results.

we build passionately a common future with our people.

we build sustainable values for future generations with a global footprint.

we build a contribution for resilient infrastructure, promote sustainable industrialisation and foster innovation.

OUR CREDO

Waagner Biro steel and glass' collective success is our customers' success!

Always asking what can be done to push the envelope further, push the design limits and most importantly, we enjoy what we do.

© Trevor Palin for WB

IN-HOUSE STEEL MANUFACTURING

Ruda Śląska, Poland

ZEKON sp. z o.o. was established in 2008. ZEKON is a member of the Polish-Austrian professional and experienced steel industry group – ZEMAN. Our modern production plant features technologically advanced equipment and machines; highly-skilled workers and management staff assure the high quality of our services and products. We specialise in the prefabrication of steel structures for industrial halls, warehouses, sports and commercial facilities, as well as for the needs of the power generation and petrochemical industry.
ZEKON sp. z o.o. has a modern, automated production line for straight and tapered SIN corrugated web I-beams, which have recently become popular due to their low weight and attractiveprice in comparison to I-welded profiles, hot-rolled profiles and trusses.

Sakarya, Turkey

Zeman Çelik is achieving all of the production process with benefiting from latest technology in its own factory that have 30.000 m2 total area and 13.500 m2 closed area which is situated on Sakarya Hendek 2.OSB.
Due to renewal technological engine park, automation ratio have been increased, so production quality and the capacity have been increased. The production capacity of the factory is 1.500 tons/ per month

Scheifling, Austria

In 1965 Mr. Hans Zeman and his Partners founded a company to produce structural steel buildings.
More than 55 years in the business and the success that our customers around the world report as a result of their investment is something we are very proud of.

Production facilities in Scheifling were sold 2021, but co-operation is still ongoing.

waagner biro
steel and glass

FROM VISION TO INNOVATION

Waagner Biro steel and glass, your partner for:

- building envelopes in steel and glass
- free-form surfaces and complex geometries
- cable supported structures
- retractable roofs
- Integration of modern steel and glass architecture into historical buildings
- bomb blast and security rated facade
- special solutions for complex aluminium façades
- integrated solutions that include special materials such as textile envelopes
- innovative use of materials like glass as a structural element
- solutions for complex ramps and staircases
- service and maintenance contracts

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HISTORY

PALMENHAUS SCHÖNBRUNN
REVITALISATION, VIENNA, AT

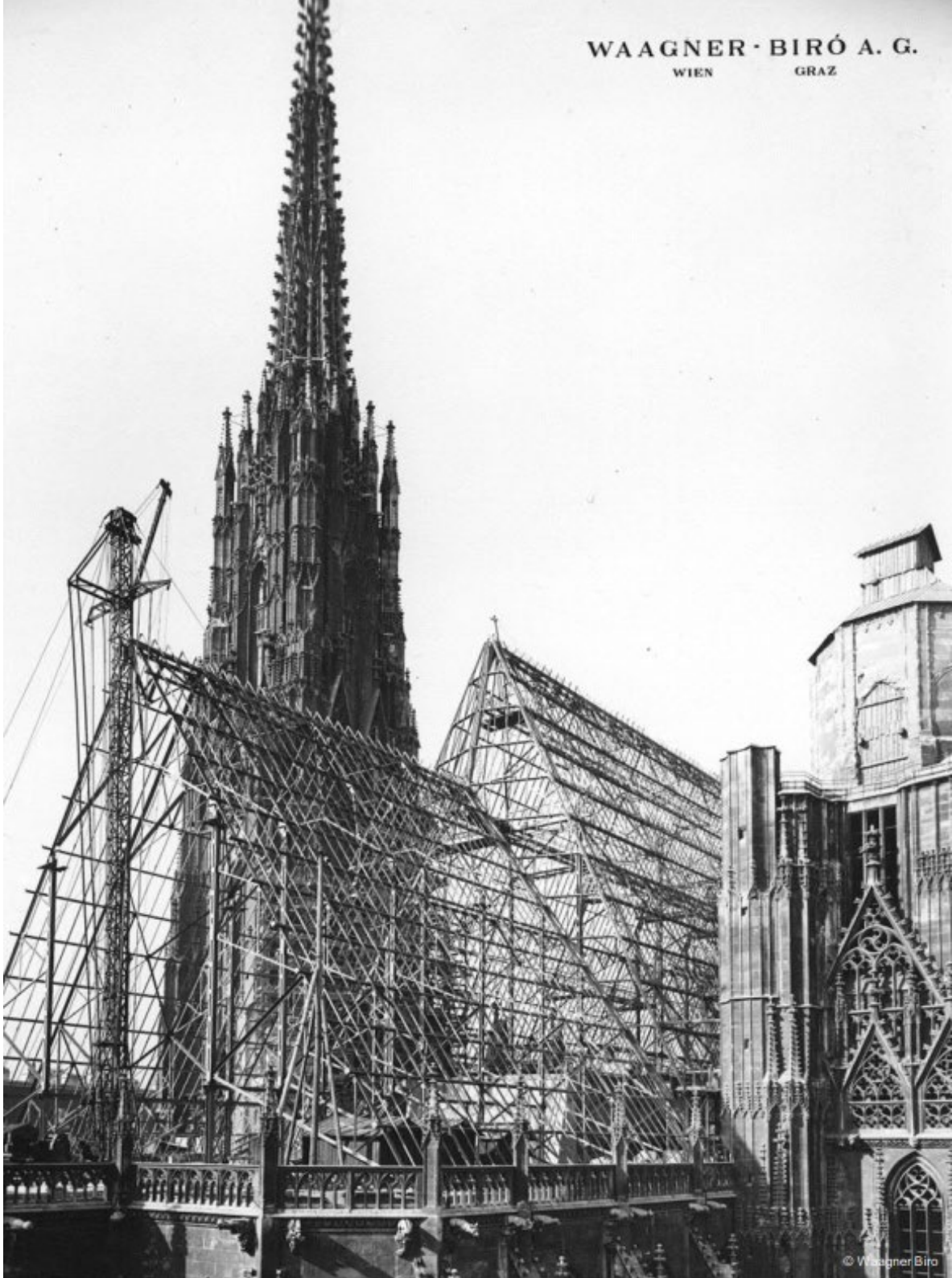
In the 19th century one of the predecessors of Waagner Biro (Ing. Gridl) erected one of his most exciting steel-glass buildings: the Palmenhaus, one of the highlights of Schloss Schönbrunn in Vienna. Damages caused by environmental factors required a renovation of the ancient steel glass building. Waagner Biro was contracted to fulfil this demanding assignment. From 1986 until 1990 the complete steel structure and the scale-like glazing had to be reconstructed. Old riveting techniques and modern technologies were combined to solve the existing problems and to restore the building following the original design and performance targets. The "New Palm House" was opened in 1990.

HISTORY

ST. STEPHENS CATHEDRAL

VIENNA, AT

St. Stephens Cathedral is the most famous landmark in Vienna. The Dome was erected in the 14th and 15th century and was devastated by fire at the end of World War II. During the reconstruction works the old timber roof structure was demolished and replaced by a steel framework that had to carry the new enamelled roof tiles and to stabilize the ancient gothic stone walls. Waagner Biro, one of the leading Austrian steel structure companies, was contracted to complete this works and build the new roof structure between 1950 to 1951.



HISTORY

FERNWÄRME SPITTELAU
VIENNA, AT

Having been originally opposed to the idea, eco-architect and artist Friedensreich Hundertwasser was ultimately convinced, mainly due to the persistence of Helmut Zilk, then Mayor of Vienna, that the centralised garbage-incinerating plant would make Vienna's air cleaner as it used modern emission-purification technology to heat over 60,000 homes which would have otherwise emitted substantially more pollution. Following his involvement, the imagination of the artist, Hundertwasser, coupled with the willingness of both architect and owner to follow this imagination transformed the once contested Spittelau District Heating Station into one of Vienna's most recognisable Landmarks. Its irregularity and surprising combinations of shapes and colours characterise the familiar outer appearance. Waagner Biro Steel and Glass designed and built the exterior façade on the tower, which are the enamelled and trapezoidal sheets which give the tower its distinctive and unmissable look which characterises it to this day.
Client: Fernwärme
Artistic Design: Friedensreich Hundertwasser

United Kingdom and Ireland

University of Sheffield Heartspace

Sheffield, UK

University of Sheffield Heartspace embodies the delivery of real urban transformation – taking a neglected, utilitarian courtyard and converting it into a quadruple height atrium under a striking feature roof. The challenging project unites two of the University of Sheffield's most historic buildings. Preserving and celebrating existing heritage features was central to the design vision. The result is a striking space that solves a fundamental problem of disconnect. A stunning development sympathetically fuses two historically significant buildings, housing new laboratories, offices and social spaces. The precisely engineered 1,400m² undulating atrium roof forms the new combined building as a striking feature in Sheffield's skyline, a city globally renowned for its expertise in engineering. Fittingly, Heartspace is home to the Faculty of Engineering, whose students are now inspired everyday by the display of innovative architectural engineering above them.

Architect: Bond Bryan Client: Interserve plc

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BLAVATNIK SCHOOL OF GOVERNMENT

OXFORD, UK

On the 30th November 2015, the relatively young Blavatnik School of Government started operations in their new main building, designed by the renowned Swiss architects Herzog & de Meuron. The architecture reflects the building's program of providing space for open discussion, exchange and cooperation. The Blavatnik School, founded in 2012, is the only institution in the Oxford University dedicated to government. Waagner Biro realised the entire facade, starting in September 2013 and finishing on time for the opening. The building is enclosed with a thin and crisp double skin. A key feature of this building is the so called "Window to the World", an opening measuring 11.5m in length and 3.0m in height, which has been enclosed using one single double-glazed panel of the same size. A technical and logistical challenge that provides for maximum transparency.

Architect: Herzog & de Meuron Client: Laing O'Rourke

LIBRARY WALK

MANCHESTER, UK

Construction in a historic setting always poses a great challenge. The company‘s portfolio includes numerous examples, and the Library Walk in Manchester complements the list with a particularly interesting reference. The project is part of the comprehensive measures planned for the city‘s town hall complex.

A tear drop shaped enclosure in plan, in the form of a vestibule, ensures that visitors enter the city‘s library via the town hall with dry shoes. The requirement was that the enclosure appeared as immaterial and transparent as possible. In response to this requirement, Waagner Biro built the curved walls with room height glazed units, whilst the cloud-shaped ceiling is manufactured from mirror-polished stainless steel, creating highly interesting and varied visual impressions.

The Library Walk stand out in particular for its realisation of the strategic importance, in this case in of expanding the product portfolio with glass bearing structures.

Architect: Simpson Haugh and Partners Client: Laing O‘Rourke

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GREENWICH MARKETING HUB

LONDON, UK

The Greenwich Peninsula in London‘s Southeast is one of the city‘s biggest development sites where much needed housing for various income levels is being created. Waagner Biro had already built an outstanding building nearby, the Siemens Crystal. The Greenwich Marketing Hub continues the excellent cooperation with Marks Barfield Architects which is based on the successful delivery of the Bayt Abdullah Hospice in Kuwait. Waagner Biro repeatedly collaborates with project partners internationally, which is the best evidence of customer satisfaction.
The scope of the project includes the envelope of the two transparent volumes that are clad with glass and aluminium panels. Both continue beyond the floating roof level, one as a full floor that provides excellent views of the O2 arena and North Greenwich station opposite.

Architect: Marks Barfield Architects Client: Wates Construction

ANNABEL`S

LONDON, UK

This jewel is in London Mayfair in the inner courtyard of 46 Berkeley Square and is an extraordinary piece of architecturally exposed steel construction. The inner courtyard is used as a restaurant area for the luxurious private club "Annabel's".

The roof consists of seven segments, each consisting of two stainless steel arches and three curved glass units. Each roof segment is mounted on its own rails on which it can move freely. Due to a precisely fitting size difference between the individual segments, they can be telescoped into each other. The opening mechanism is controlled via a control panel and can be opened within 4 minutes to allow guests to dine in the open air. However, it not only offers protection in bad weather, but also acts as an acoustic barrier to prevent possible noise pollution during the night. A major challenge was combining the tolerances for curved glass with the tolerances for the steel arches. It had to be ensured that the shapes of both materials matched 100%. This was achieved by reducing the allowable tolerances of the steel arches to half the values of the best class of BS EN ISO 13920.

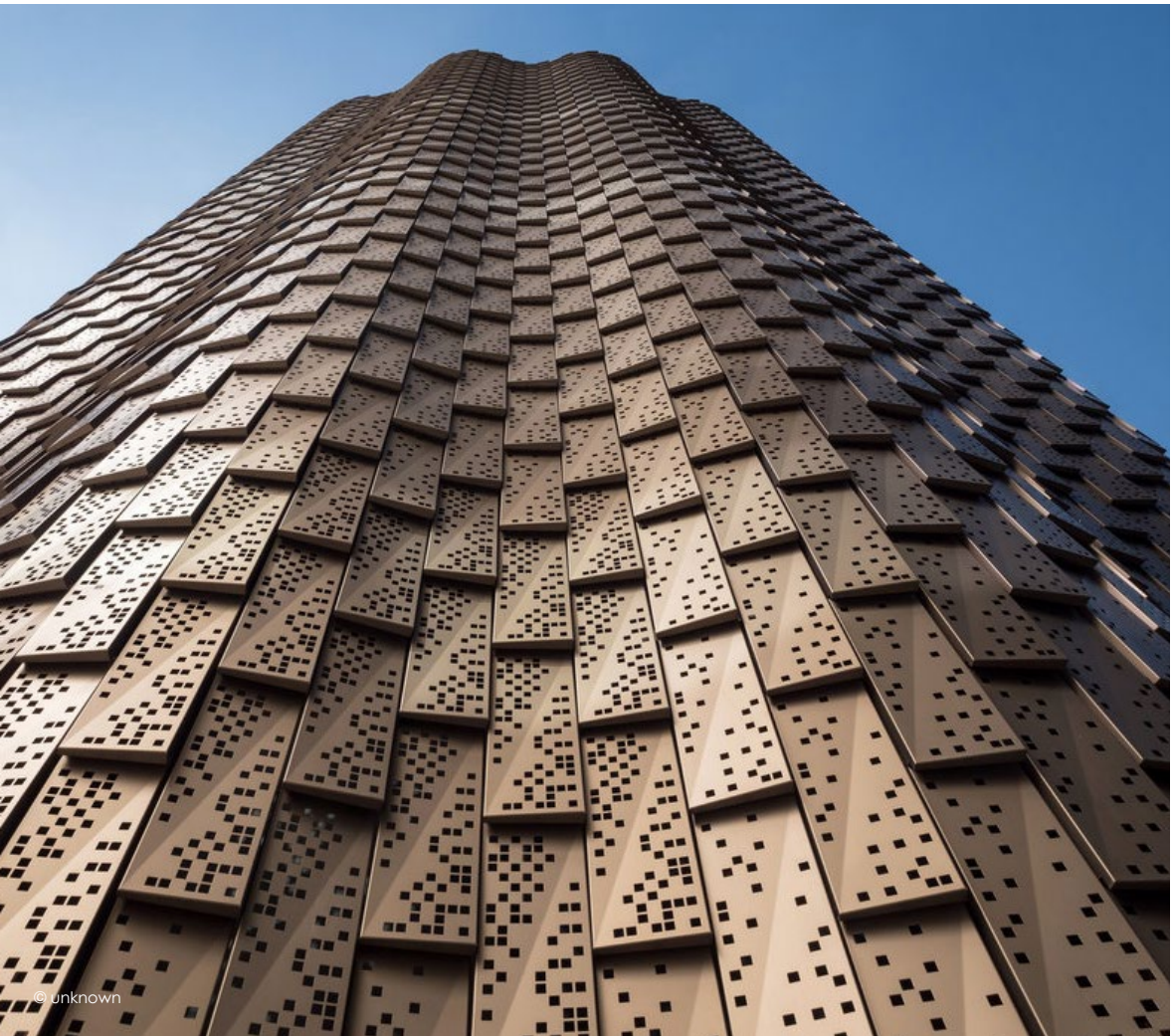
Client: Caprice Holdings Ltd Architect: Palmer Lunn Architects

3 BROADGATE PAVILION

LONDON, UK

The Pavillion, 3 Broadgate, in London by Orms for sits in the heart of British Land's wider Broadgate development with its cool, striking veil facade of curved glass and laser cut anodised aluminium tiles by Waagner Biro. As the heart of the Broadgate development and the city of London more widely, the pavillion serves as a connecting hub and focal point for the 150,000 people who pass through every week. Interestingly, the veil references the site's past use as tenter grounds; with tiles appearing to be hung, referencing the medieval cloth making process.

Client: British Land Architect: Orms



COOP HEADQUARTERS

MANCHESTER, UK

After nearly two years of construction the new Cooperative Group headquarters, the most energy friendly office building in the United Kingdom, was ready to be occupied. Its innovative architecture is impressive.
In terms of urban and construction planning, it was arranged based on the angle of incidence. The building resembles a beehive and has room for more than 3,000 employees.
Future adaptations can easily be accommodated. This sustainable prototype building which is at the same time visually appealing is part of an urban revitalisation project, where the company has opted to remain at its almost 150-year-old traditional location in Manchester.
The scope of works undertaken by Waagner Biro comprises the double skin facade of the 15 storey building, and the steel and glass diagrid roof of the naturally lit atrium, both of which are important for the environment and energy management of the building.

Architect: 3D Reid

Client: BAM Construction UK

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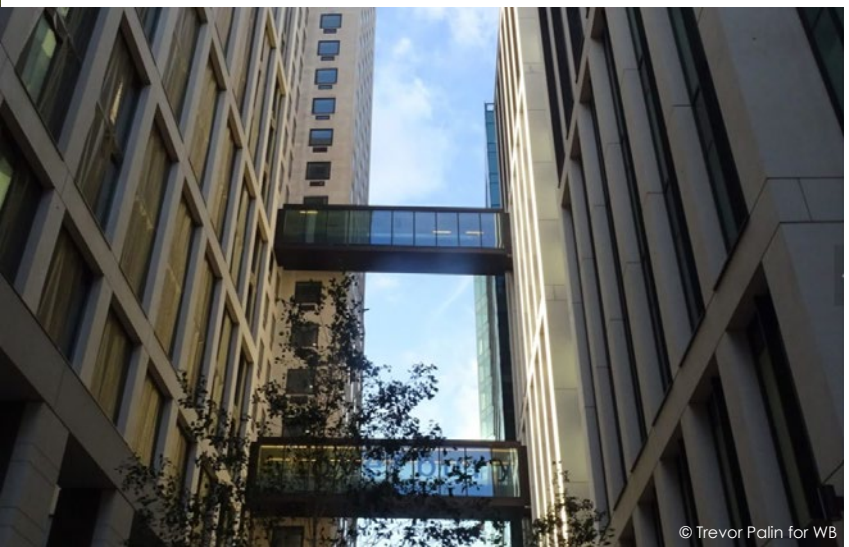
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SOUTHBANK PLACE

LONDON, UK

Southbank Place is a large urban development project, led by the Canary Wharf Group in the Southbank area of London, adjacent to Waterloo station surrounding the site of the historical Shell corporate headquarters. The overall scheme involves multiple residential and commercial buildings in addition to landscaping and public realm improvements. Waagner Biro's scope of works on this project was to design and build an articulated steel and glass canopy over part of the public forming a main entry into Southbank Place, in addition to two Link Bridges, connecting the existing, historic Shell Tower to a new building. The canopy has LED lighting and aluminium articulated feature fins integrated into the structure, in addition to electric wiring throughout. It also has a fully concealed gutter and downpipe system integrated within the bespoke steel structure. The canopy structure and glazing is designed for walk on loads, to allow for maintenance and cleaning safely and efficiently. The 18m long link bridges were both manufactured, glazed and clad off-site, including electrical, M&E and lighting before being delivered to site using oversized special transport and lifted into place and installed on site using a 500t crane over a single weekend. The bridges were designed to accommodate gravitational loads in addition to sway and rotation from differential movement of both buildings (which can move independently from each other).

Client: Canary Wharf Contractors

Architect: Kohn Pederson Fox (Canopy), Squire and Partners (Link Bridges

The Crystal

LONDON, UK

After a construction period of one-and-a-half years, "The Crystal" has been completed as an architectural highlight in the English capital, one of the greenest buildings in the world. The conference centre was developed by the renowned British architects Wilkinson Eyre, with whom Waagner Biro already cooperated successfully on the Kings Waterfront project.
The building contains offices, an auditorium, and an exhibition dedicated to sustainable urban development and the urban infrastructure of the future. The centre for sustainable urban development is run by Siemens. The articulated and futuristic facade covers a surface area of 2,000m2.

Architect: Wilkinson Eyre Architects Client: ISG

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Westfield Shopping Centre – White City
LONDON, UK

The Westfield Shopping Centre is a 200,000m² retail and leisure centre in west London. The Shopping Centre is spread over six levels, comprising three levels of car parking (two underground), two levels of retail and a leisure complex at roof level. The main focal point of the centre is the "Wintergarden", an insulated space with a 7,650m2 "free-form diagrid roof ". The roof structure is formed from steel members and node elements and incorporates a mix of insulated glass units and opaque cladding modules. Waagner Biro was appointed to complete the design, engineering and construction of the Wintergarden roof. This included the engineering and finalising of the free-form geometry. For the construction of this project, Waagner Biro was awarded the SOLID Bautech Prize 2008.

Architect: Benoy / Buchan Group International

Client: Westfield Shopping Towns Ltd

QUEEN ELIZABETH II, GREAT COURT

BRITISH MUSEUM LONDON, UK

When it opened in 1850, the British Museum was already a symbol of the greatness of the British Empire. Eight architects have over the past 150 years tried their hand on this hallowed building. However, the most spectacular transformation was undertaken by Foster + Partners, with the support of Waagner Biro, in 2000; a vaulted roof to cover the museum's courtyard, which was not accessible to the public in the past.

Over 3,300 triangular glass panels form one of the largest covered courtyards in Europe, which can be admired by the museum's over 6 million visitors a year.

The conversion almost doubled the public space of the museum. The glazed roof covers 5,900 m² and consists of 4,878 individual members, 1,566 individual nodes and 3,312 insulating glass panels, with a total weight of about 800 tons. The newly constructed 65-metre-high southern portico, which serves as a foyer, is also part of the courtyard.

Architect: Foster + Partners Client: MACE

TOWER PLACE
LONDON, UK

A gently curved and floating roof together with glass walls envelop the area between two buildings situated near the Tower of London and Tower Bridge. The 60 m wide north wall is especially innovative and the most transparent one built so far. It includes 4 m long horizontal glass needles to support the wall which is the first use of glass tubes on a large-scale project worldwide.

Architect: Foster + Partners Client: MACE

WELLCOME TRUST KITCHEN GARDEN

CAMBRIDGE, UK

The Wellcome Trust is a worldwide operating charitable organisation dedicated to the improvement of health. The Hinxton Estate in Cambridge, dating back to 1506, is one of its many locations. Hinxton Hall is a conference facility for Wellcome Trust where guests from all over the world convene to exchange information. Architects Abell Nepp of London were commissioned to cover the historic kitchen garden around the Crick Auditorium to create a covered meeting zone for the auditorium. From October 2013 until April 2015 Waagner Biro delivered this demanding steel and glass roof to the fullest satisfaction. Once again, a project with historic context was added to the portfolio.

Architect: Abell Nepp

Client: R G Carter Construction

GREATER LONDON ASSEMBLY
LONDON, UK

Foster + Partners designed the new building for the Greater London Authority, located next to the Tower Bridge. It houses the assembly chamber for the 25 elected members of the London Assembly and the office of the Mayor and 500 staff of the Greater London Authority. A half-kilometre-long, gently rising public ramp coils through all ten stories to the top of the building. At the level of the assembly chamber is a viewing gallery giving the public dramatic views over the river to the Tower of London. One of the ramp's most prominent characteristics is its lack of symmetry relative to the primary building's axis.

Architect: Foster + Partners Client: MACE

© Waagner Biro

30 ST MARY AXE

LONDON, UK

30 St Mary Axe commonly known as "the Gherkin" is a commercial office tower in London's financial district, the City of London.

The architectural masterpiece was designed by Foster + Partners who sought Waagner Biro's technical expertise to create the building's complex dome.

It was completed in December 2003 and opened in April 2004.

Comprised of 41 storeys, it is 180 metres (591 ft) tall, the curved form complements the ever-growing group of high-rise buildings in the neighbourhood and has since become a symbol of the City.

Architect: Foster + Partners

Client: Skanska

THE SAGE MUSIC CENTRE
GATESHEAD, UK

The building's dramatic, shell-like form encloses three main performance spaces. The project took ten years of planning and has received worldwide attention. Foster + Partners were appointed after an international competition. The centre was designed after extensive consultation with users, audiences, artists and musicians.

Architect: Foster + Partners

Client: Laing O'Rourke

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THE CONVENTION CENTRE, SPENCER DOCK
DUBLIN, IE

The Convention Centre is located on the North bank of the River Liffey in the heart of Dublin's docklands, Spencer Dock, which has undergone large regeneration and development in the recent past and continues to be developed. Waagner Biro designed and build the cylindrical shaped steel-glass structure and the canopy forming the main entrance area.

Architect: Kevin Roche, John Dinkeloo & Ass. LLC Client: CMP

CONTINENTAL EUROPE

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Cavatina Hall

Bielsko-Biala , PL

The real estate company Cavatina Holding S.A., Krakow, is building a six-storey multifunctional building that includes high-quality offices, modern meeting rooms and cafes with terraces. But the main attraction of the building will be a concert hall with the highest acoustic standard for 650 listeners. Even a recording studio will be integrated into the music hall.

The semicircular shape of the concert hall inside is reflected outside in the compact, sound-absorbing concrete structure, which is clad by a complex steel construction with an unusual spiral glass shell.

In September 2020, the companies Zeman HDF and Waagner Biro steel & glass got the award for the steel structure with the glazed building envelope. The challenges lay not only in the geometry, but also in the extremely tight schedule for completion.

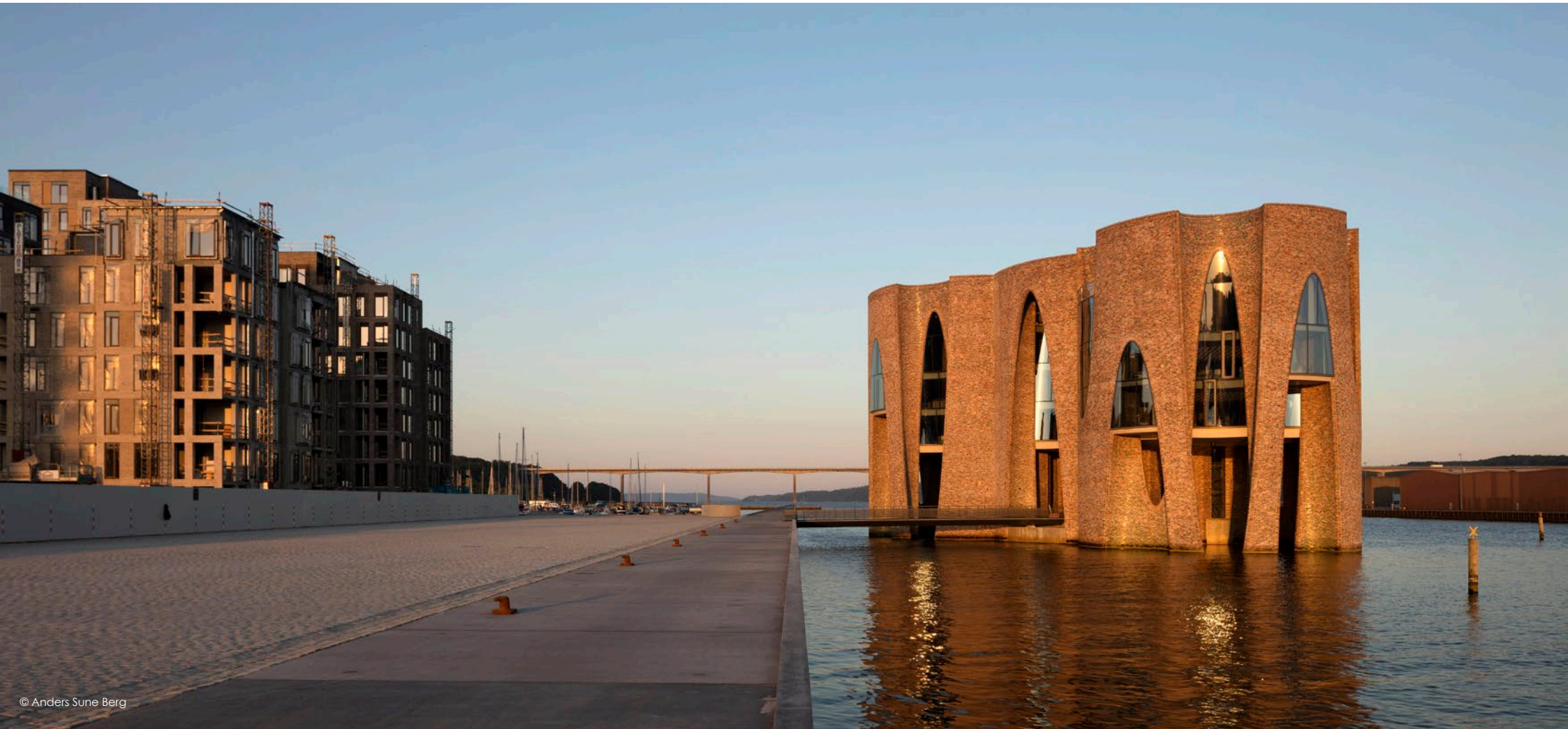
The total glazed area is 1,800 m², which is supported on 1,800 steel elements, which are connected by 870 different steel nodes. The total number of individual panes of glass is 887.

In September 2021, the concert hall should be able to receive its first guests, the audience and the artists, which looks very good given the current status of the assembly progress by Zeman and Waagner Biro.

FJORDENHUS
VEJLE, DK

Fjordenhus, or house on the fjord, in Vejle. Designed by the Danish-Icelandic Studio Olafur Eliasson as a castle-like office headquarters for Kirk Kapital, which is the holding and investment company for the three brothers who are direct descendants of the founder of Lego. It also features a publicly accessible ground floor. The architecturally striking building rises sharply yet smoothly from the water out of the Vejle harbour and beyond the footbridge has an area of over 4,800m². The shape is a creation made up of four 28-meter-high intersecting cylinders with negative ellipsoidal spaces carved out of them at various angles, all of which are formed out of just under a million bricks. The parabolic cut-outs create arched, multi-floor windows. This interplay of open and closed surfaces, torsions and arches, inside and out, makes the brick body an organic, almost filigree structure. The steel and glass facades and pivot doors designed and built by Waagner Biro Steel and Glass follow the complex geometry created by these intersections and were manufactured using millimetre-tight templates before being welded together on the construction site. Most of the facades and doors are not vertical but tilted by up to 13°. These unusual angles led to special bespoke solutions being necessary, especially for the doors in order to enable their functionality. In keeping with the architectural design concept, special attention was paid to the design of the connection details to the masonry in order to achieve a discreet appearance and for the glazed façade to seamlessly integrate with the surrounding facades externally. Internally, with the use of extremely slender posts and bars, the structure of the façade was minimised in order to allow for maximised views of the harbour, without dominating these views.

Client: Kirk Kapital Architect: Studio Olafur Eliasson



PANUM TOWER
COPENHAGEN, DK

The Panum Tower, in Copenhagen, Denmark by C.F. Møller Architects - the world class research and teaching facility for the Københavns Universitet - University of Copenhagen's Faculty of Health and Medical Sciences. Clad in a striking unitized curtain wall facade with integrated GFRC and copper shading fins which create a beautiful and contrasting dialogue with its surroundings and sky backdrop. The 15-storey façade completed by Waagner Biro in 2016 is an aluminium unitised façade with storey-high glass and panel fields. Horizontal elements made of GFRC (glass-fibre reinforced concrete) as well as vertically arranged shading elements clad in copper are installed over these façade elements. Integrated into the shading elements are movable panels expanded with copper mesh which can be moved to cover the glass panes. The building will break new ground in the field of energy consumption for Denmark's most energy-efficient laboratories as an unprecedented level of "waste energy" from the ventilation system will be fed back into the building's total energy balance. The building was completed by Waagner Biro in September 2016 and officially opened by Queen Margrethe II of Denmark on January 18, 2017. Because of its striking architecture and the innovative use of copper as facade cladding the Panum Tower has already been announced as award winning project for several times. So has the project been announced as winner of the "European Copper in Architecture Award 2017". C.F. Møller Architects has been announced as award winner for the Panum Tower in the category "Higher Education & Research" at the World Architecture Festival 2017.

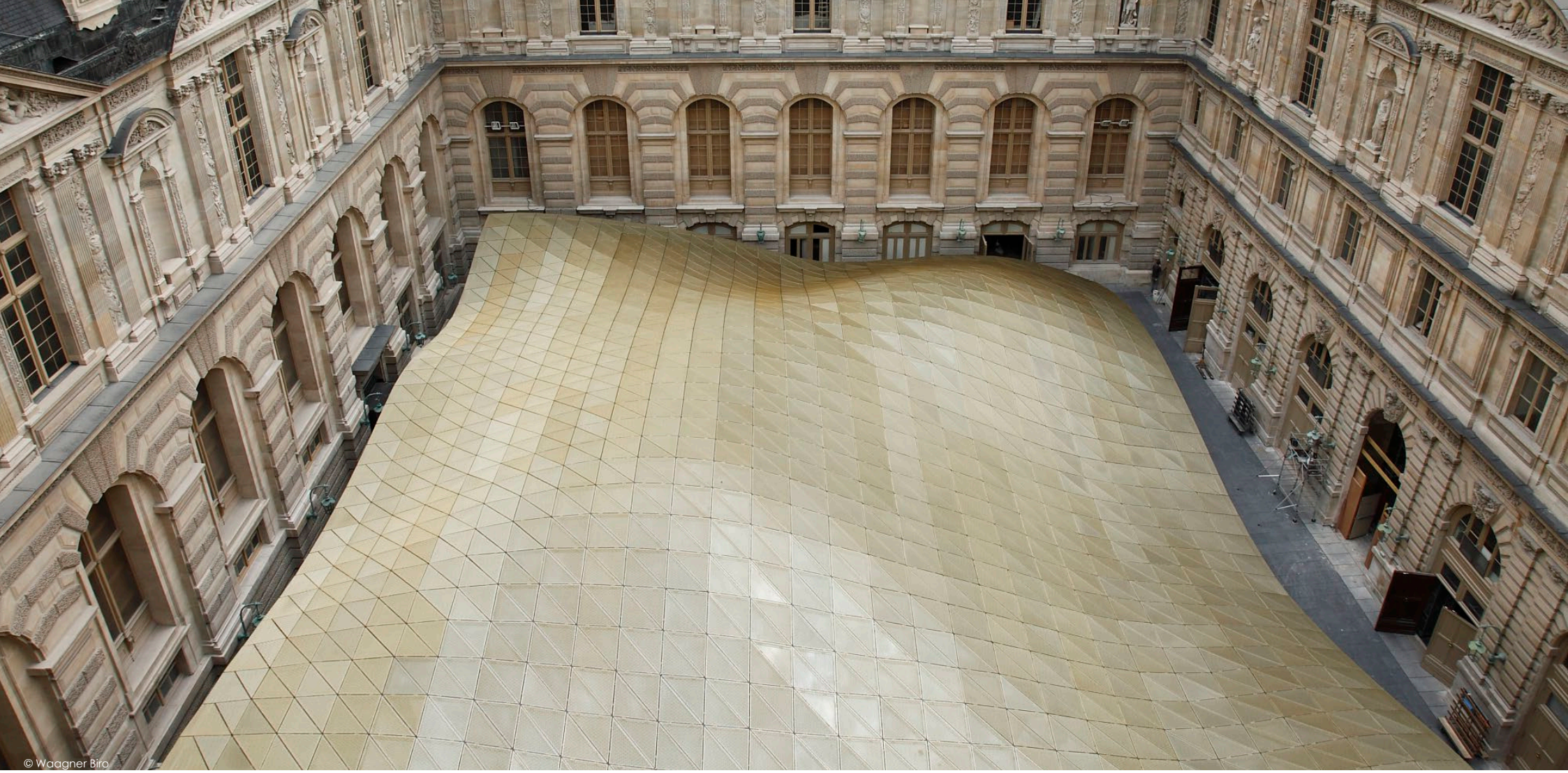
Client: Bygningsstyrelsen Architect: C.F. Møller Architects

MARIINSKY THEATRE
ST. PETERSBURG, RU

The name Mariinsky Theatre is worldwide known for masterful opera and ballet productions. On the order of Empress Catherine the Great, it was opened in 1783 as the Bolshoi Theatre. Despite destruction during the war and modernisation the building kept its original splendour. The design of the Canadian architects Diamond Schmitt was elected as the winning entry of an international architectural competition for an extension of the theatre. With its stone façade the new building perfectly fits into the historical block development. However, the simplicity of the building does not lead to less imposing spaces. Particularly the multi-storey foyer impresses with its extravagant size. Waagner Biro realized a large number of its circulation elements that enable the guests to reach their seats or simply to enjoy the view. In addition to the single, straight and dog-legged stairs Waagner Biro realized one suspended oval staircase connecting several floors, one glass stair with about 35-metre length as well as a footbridge for VIP-guests.

Architect: Diamond & Schmidt Architects

Client: Metrostroy Building Company



COUR VISCONTI, Musée du Louvre

PARIS, F

In the heart of Paris, is the 'flying carpet' by French architect Rudy Ricciotti and Italian design icon Mario Bellini. Surrounded by the neoclassical Parisian courtyard facades, it houses the museums Department of Islamic Art, along with over 18,000 works of art, many of which are so delicate they require shading from direct sunlight. The roof is an undulating, free form design nothing short of magnifique – an architectural masterpiece which is a gentle, sympathetic integration of contemporary architecture in a historic location. Designed and built by Waagner Biro Steel and Glass, the roof is comprised of 8,000 tubular steel sections supporting tessellated glazed triangles sandwiched between golden shading aluminium panels, covering over 1,700m² and creating a soft floating veil which compliments the historic facades perfectly without overpowering them or detracting from their historical and natural beauty.

Client: Musée du Louvre Architect: Mario Bellini, Rudy Ricciotti

DANISH RADIO BYEN

COPENHAGEN, DK

The Danish Radio Byen (DR Town) Koncerthuset or Concert Hall in Copenhagen, designed by Pritzker Prize winning architect Jean Nouvel, houses the Danish Broadcasting Corporation, DR. The concert complex consists of four halls with the main auditorium seating 1,800 people. It is the home of the Danish National Symphony Orchestra and includes three recording studios with variable acoustics. The Queen of Denmark inaugurated the venue on January 17, 2009. Waagner Biro Steel and Glass designed and built the 4,000m² cable net façade and a 500m² glass roof. The glass facade impresses concert goers with of its high transparency and minimal structure which allow for unobstructed views over the canal. The insulated glazed units are fixed in place by bespoke cast steel nodes which are located at the diagonal crossing points of the steel cables. The steel cables (22mm diameter) are fixed to a primary steel structure and are highly pre-tensioned in order to minimize the deflections within the entire structure.

Client: DR BYEN Architect: Ateliers Jean Nouvel

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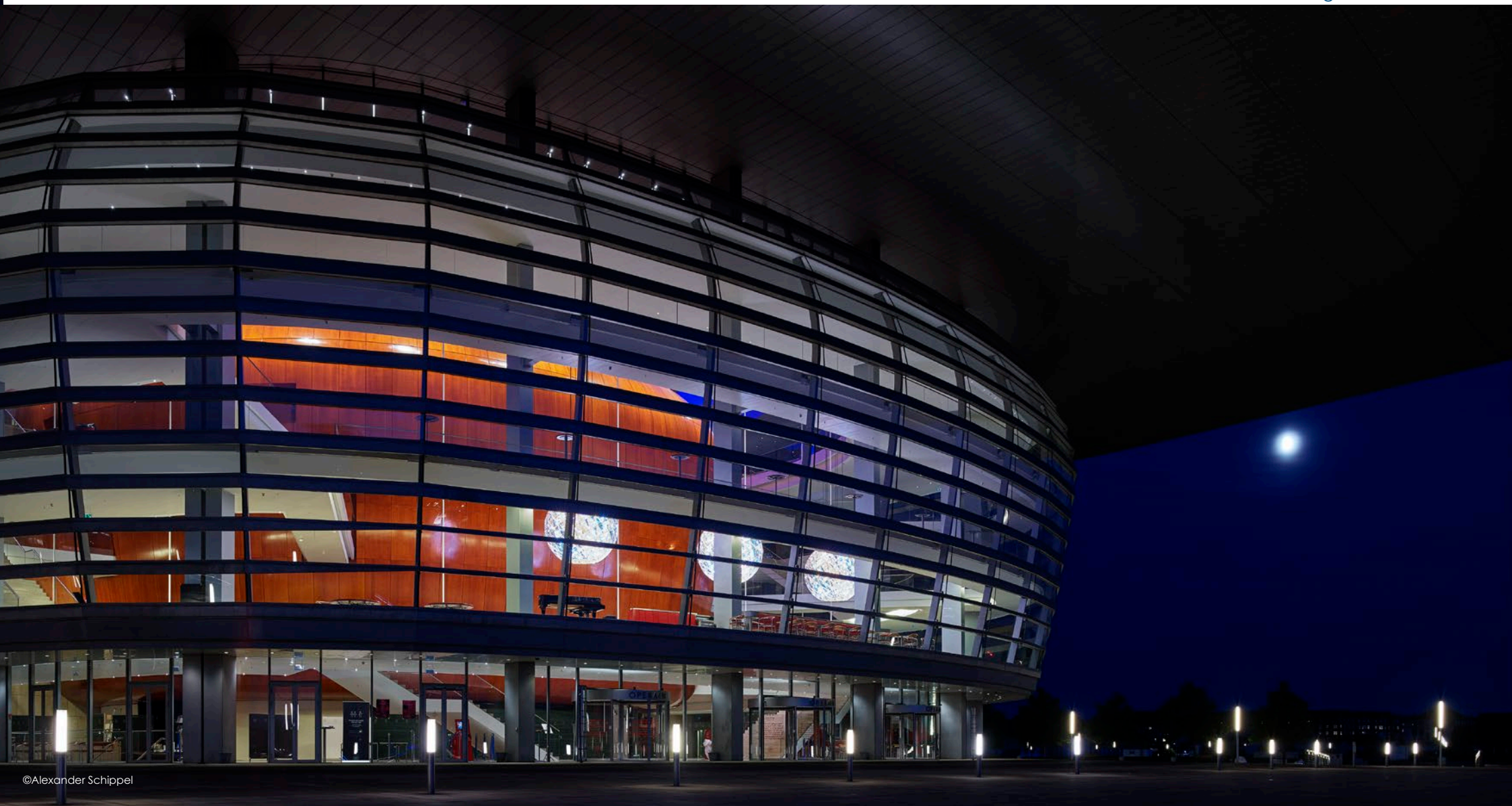
ROYAL DANISH OPERA

COPENHAGEN, DK

The Royal Danish Opera in Copenhagen, designed by Henning Larsen Architects, was a gift by Danish shipping magnate Mærsk McKinney Møller to the state of Denmark. Situated on Dock Island in Copenhagen Harbour, on axis with Amalienborg, the Royal Residence, the Opera structure sits as a counterpart to Frederik's Church, forming the termination points of the east-west axis from the harbour and across Amalienborg Square. Various 17-meter-wide canals run on either side of the building accentuating the placement of the Opera House on the island. The front of the house is visually integrated in the harbour space, whereas the back of the building, designed as a lower building block, relates to the buildings in the area and to the new apartment blocks subsequently built on the north and south side of the Opera building. Waagner Biro Steel and Glass was designed and constructed the architecturally impressive, minimalistic steel and glass façade which welcomes the over 1,700 visitors and passers-by.

Architect: Henning Larsen Architects



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SONY CENTER ROOF

BERLIN, D

The central element of the Sony Center is the 4.000 m² roof, covering the marketplace. It spans 102 m at the main axis and 77 m at the minor axis. The elliptical space in plan is an all-weather gathering place, the social centre of the building complex.

The slightly swaying roof construction made of steel, glass and translucent fabric produces interesting lighting effects. The unique form of the roof required the highest technical niveau in installation. The displacement of the centre axis and the swinging form of the perimeter ring bestow upon the roof construction a sense of dynamism. In the centre and at the connections to adjacent buildings the roof is open.

Client:
Sony/TishmanSpeyer/
Kajima
Architect: Murphy Jahn

REICHSTAG

BERLIN, D

The dome on the Reichstag in Berlin is one of Waagner Biro's most prestigious projects. It is an architectural landmark, designed by Foster and Partners, and also a technical masterpiece. The brief was to create a symbol of democracy and freedom in this historically significant structure; an idea which runs through the entire building. The steel and glass structure allows viewers to look directly into the chamber of the German Bundestag. The passage of natural light highlights the transparency of government and its openness to its citizens. The light is directed by 30 rows of mirrors. Each row has 12 mirrors directed into the chamber 10 metres below. A movable, computer-controlled shading element made of aluminum panels, deflects direct sunlight. The dome itself consists of 24 major steel ribs, which are supported on a lower ring beam and tapered to an upper ring beam. The horizontal bracing is secured using 17 steel rings. They are an essential part of design: they also bear the scale-like 3,000m2 of glazing, constructed from 24 panes of glass per row, and the observation deck. This observation deck is accessible over two interlocked, co-rotating spiral ramps made from spatially shaped steel plates.

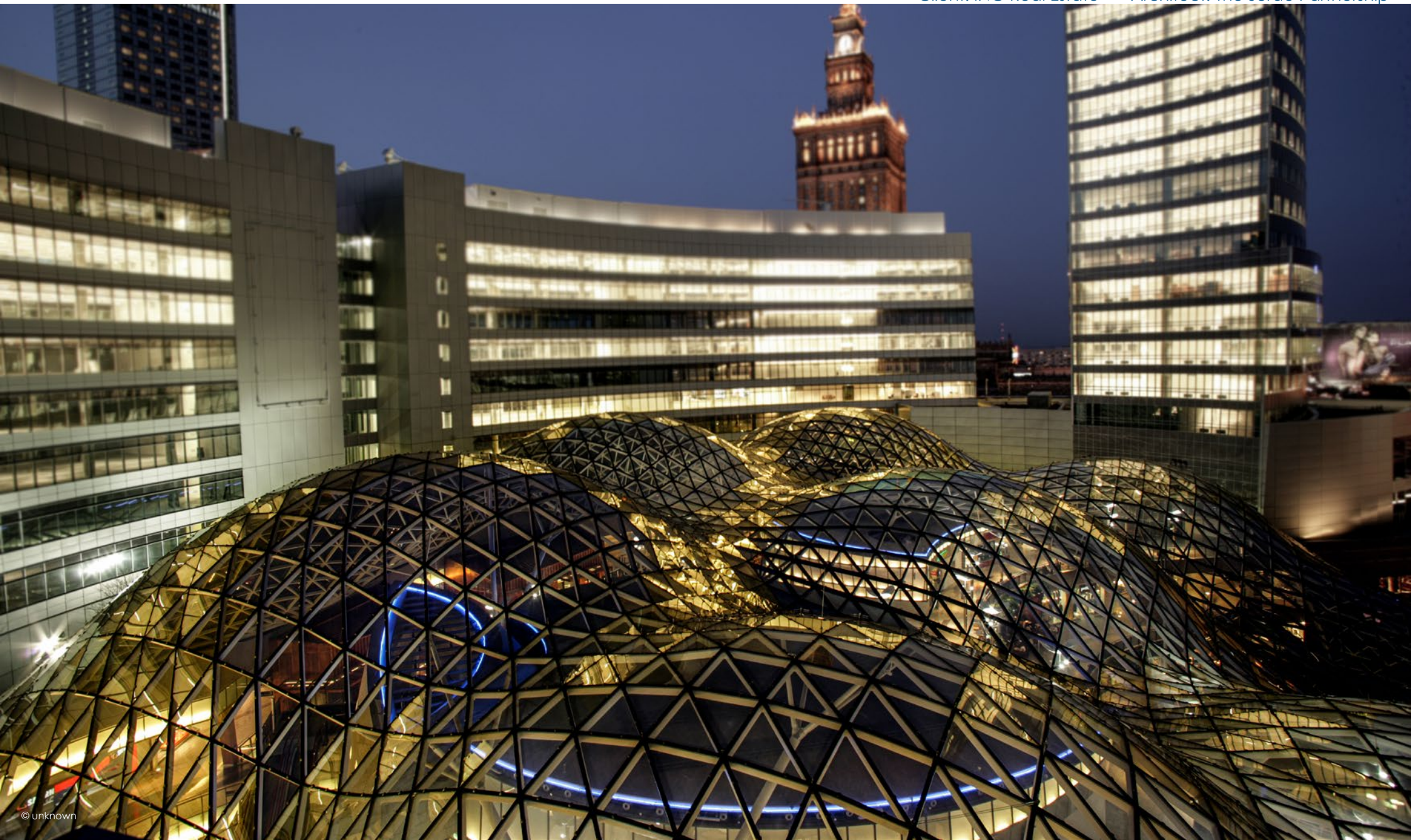
Client: Bundesbaugesellschaft Berlin mbH

Architect: Foster & partners

ZLOTE TARASY
WARSAW, PL

Like a cloth draped over seven spheres – that's the image that the impressive steel and glass architecture conjures up in viewers of the multifunctional building in the heart of Warsaw. At approximately 10,000 m², the geometrically complex grid shell is a huge free-form surface. Triangular glass panels give the greatest possible flexibility to form the curvature. For the design of the steel nodes, Waagner-Biro developed the technology already used to construct the roof of the Great Court at the British Museum. Using this innovative technology created an architectural landmark whose elegance is unique throughout the country. It deservedly won the European Steel Design Award 2007.

Client: ING Real Estate Architect: The Jerde Partnership



RED BULL HANGAR 7

SALZBURG, A

Red Bull Hangar-7 in Salzburg, Austria is a multifunctional building that has become a modern symbol of the city. Architecturally, it is an incredible juxtaposition of historic aircraft in a futuristic steel and glass structure, complete with a suspended three-sixty fine dining restaurant. Part of the attraction of Hangar-7 is its impressive architecture. From the outside, it has the appearance of a wing - designed to echo the aerodynamic shapes of the wings and aircraft inside. From the inside, however, it looks like a celestial vault opened above the historic aircraft which it houses. The structure consists of curved steel pipes which describe an oblique ellipsoid and are supported on a central structure. This central structure is a circular 50-tonne steel cage beneath the ceiling of the building which joins the façade's individual joists. This steel and glass structure designed and built by Waagner Biro Steel and Glass is over 100m long, 67m wide and reaches a height of 15m. It is constructed from 7,000m² of glass panels weighing about 380 tons and its steel structure weighs over 1,200 tons.

Client: Red Bull Architect: Volkmar Burgstaller

BLOB

EINDHOVEN, NL

The “Blob” in Eindhoven - the name says it all: The futuristic building is an impressive example of a geometric design whose shape defies any attempt at categorization – it’s just a blob. Where does the roof end and the walls begin? Boundaries are blurred. To construct this unusual building, Waagner-Biro’s engineers called on their long experience in 3D design. The structure consists of triangular, welded steel profiles into which glass and metal panels are set. Each glass panel is unique. In total, the panels cover 2,940m2. The Blob is part of a larger project to revitalize Eindhoven city centre. What looks like a new structure is actually a renovated office building.

Client: Heijmans Architect: Studio Fuksas

MYZEIL, PALAIS QUARTIER
FRANKFURT, D

The Palais Quartier development in the City of Frankfurt combines restored historical buildings and modern complexes into a huge area for shopping, entertainment and leisure facilities as well as offices and hotels. Waagner Biro designed and built the roof and facade structure of the main building which contains a shopping mall and a concert hall. The complex geometry diagrid roof is created with a triangular steel lattice and infill panels made of glass and metal panels. The rhombus structured façade part of the building includes a trumpet formed building part which creates a seamless transition from the façade to the roof. The facade is conceived as a river that has different depths reaching into the core of the earth. The structure is inspired by the historical context of the sites' surroundings. The fluid shape comes from the connection of the Zeil, the shopping boulevard in the heart of Frankfurt, and the Thurn and Taxis palace. The two facades on opposite ends of the building are designed to evoke the two distinct senses of the city. The modern city on the facade running along the Zeil expresses leisure, entertainment and relaxation whilst the historic-facing facade maintains a more measured, formal appearance.

Client: MAB Architect: Studio Fuksas

Middle East

© TDIC

LOUVRE AD

ABU DHABI, UAE

On Saadiyat Island, situated off the coast in the immediate proximity of the centre of Abu Dhabi, a number of renowned cultural institutions and high-quality tourist facilities will be built in the coming years, representing one of the world's greatest concentrations of top-class artifacts. As well as the Louvre, there will also be a branch of the Guggenheim Museum. The exhibition will devote particular attention to the cultural bridge between the Orient and Occident.

The open dome construction, at a diameter of around 180 meters, is roughly the size of five football pitches and is made from steel profiles. The upper and lower sides are covered with ornamental patterns made from aluminium profiles, which generate a special light quality called "rain of light". The French architect Jean Nouvel was inspired by rays of light like those that penetrate the lanes covered in raffia mats in an oriental bazaar. The dome is bearing on the buildings beneath at only four points and appears to be floating on air. Some of the museum pavilions stand in sea water, creating a graceful interplay of directly and indirectly falling light.

Architect: Jean Nouvel

KACCH-BAYT ABDULLAH

KUWAIT

The Bayt Abdullah children's hospice in Kuwait was built under the patronage of His Highness Sheikh Sabah Al Ahmad Al Sabah, Emir of Kuwait. This children's hospice is one of a kind in the world. It is a new shelter for families with children suffering from incurable illnesses. In this project, Waagner Biro built a walkway made from steel, glass and aluminium panels. The images make it clear that this steel structure is something special. The 200 m walkway channels through the hospital grounds between the buildings and leads over the roofs to a platform with a view. Pedestrians are supported by a balustrade with colourful perforated brass panels and boards that tell stories from a popular Arabic children's book.

Architect: Marks Barfield Architects Client: KACCH

SUN TOWER

ABU DHABI, UAE

The Formula One Circuit of the Yas Island development comprises various buildings: hotels, grandstands, a yacht marina and the sun tower with the royal lounges. It is located right at the start/finish line providing the most impressive views of the circuit.

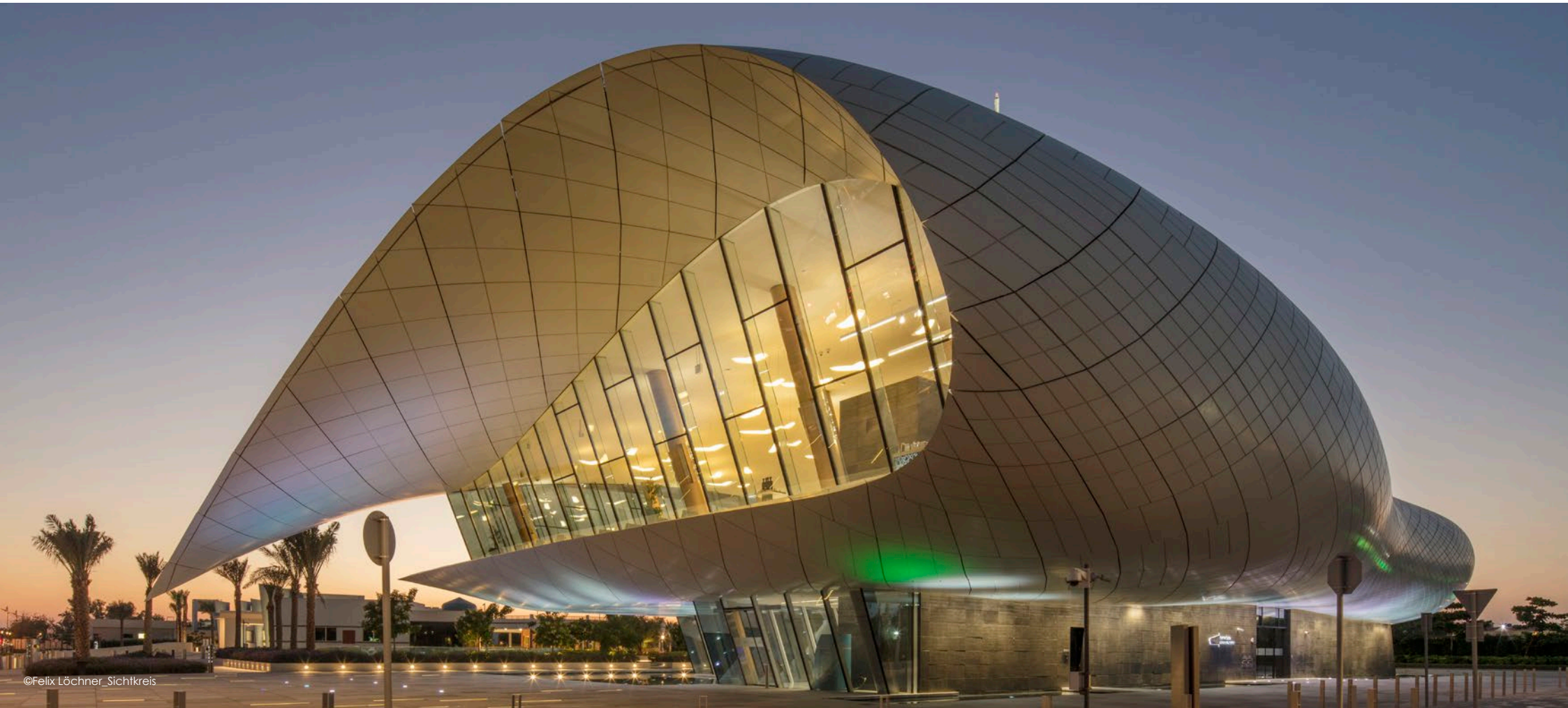
Architect: Tilke Client: Cebarco / WCT

ETIHAD MUSEUM
Dubai UAE

Etihad means Union in Arabic. The museum was built to celebrate the 45th anniversary of the 1971 unification agreement which brought together the United Arab Emirates with a fascinating parabolic curved facade, designed to resemble and represent the parchment upon which the unification agreement was signed. The Etihad Museum is a unique museum complex. Waagner Biro constructed the impressive visitors' pavilion. The bright, curved roof designed by architects Moriyama & Teshima, modeled as a white parchment scroll. The load-bearing structure of the approximately 2,000 m² two-storey pavilion is composed of a 950 tonne primary and secondary steel structure and is supported on the ground floor by the underlying reinforced concrete structure. The total of 21 supports, inclined at 21 degrees from the vertical, bear the curved roof structure and the upper storey of the pavilion. Owing to the extremely short period of less than 10 months allowed by the schedule for the planning, fabrication and construction of the entire pavilion, it proved necessary to optimise the cladding for the steel structure for faster fabrication and assembly. Thanks to the holistic approach adopted by Waagner-Biro, it was possible to realise this globally unique inclined glass-fin façade within an extremely short fabrication and construction period. A project under such "fast-track" circumstances requires considerable experience and a high degree of expertise – which Waagner-Biro was able to impressively demonstrate in the successful realisation of the visitors' pavilion for the Etihad Museum. The Etihad Museum was awarded the prestigious "Best New Museum – Middle East" at the Leading Culture Destinations Awards 2017.

Client: Al Shafar General Contracting

Archtiect: Monyama & Teshima



ENTRANCE PAVILIONS, BURJ KHALIFA

DUBAI, UAE

To be involved on the tallest building in the world is something special.
An architectural monument like the Burj Khalifa Dubai attracts worldwide attention especially because of its height.
But before visitors enter the elevator to reach the upper floors, they pass through one of the three entrance pavilions constructed by Waagner Biro and enjoy a first impression of the special nature of the building.
In simple terms: the design impresses with sophisticated technology that meets the highest standards of quality.
In technical terms: the massive roof structure is supported by ten columns inside the building with a height of 20m in the hotel and residential area, and 25m in the office area.

Architect: Skidmore, Owings and Merrill (SOM)

Client: Al Abber Group

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YAS ISLAND MARINA HOTEL

ABU DHABI, UAE

Situated right on the new Formula 1 circuit in Abu Dhabi, the Yas Marina Hotel offers the racing drivers an impressive sight. The gridshell, a free-form surface of steel and glass which spans the hotel and parts of the track, has a unique appearance. The design, a vision from architects Asymptote, was inspired by terms like speed, motion, elegance and spectacle. This inspiration was developed by Waagner Biro to create a steel and glass structure which radiates ease and elegance. The free-form surface settles over the multistorey hotel like a reptilian skin. It rests on only a few V-shaped supports, even though it consists of 2,800 tons of steel and 5,100 glass panels. To produce this delicate appearance, each of the 10,700 individual rods had to be as thin as possible, a task that only a few suppliers in the world are capable of.

Architect: Asymptote Client: Al Futtain Carillion

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DUBAI FESTIVAL CITY

DUBAI, UAE

Intended to become the focal point for the people of Dubai and global tourists, Festival City was designed with people in mind, providing them with a unique destination. A creek side "city within a city" and true master-planned waterfront community comprising a unique mix of entertainment, dining, shopping, sport and leisure facilities, automotive dealerships, hotels, a marina, residential and office components.

Architect: The Jerde Partnership

Client: Al Futtain Carillion

© Hyatt Hotels

© Hyatt Hotels

CAPITAL GATE

ABU DHABI, UAE

Capital Gate is regarded as an architectural landmark, a milestone of engineering for the Middle East. It was not only the largest ever single order in the history of Waagner Biro steel and glass at that time, the tower is also in the Guinness Book of World Records. Because of its skewed structure, it apparently mocks gravity and is recognized as the most leaning tower in the world (14 degrees more than the leaning Tower of Pisa). Capital Gate rises to a height of 160m. Its steel and glass façade covers 23,000m2 over 34 floors. The triangular construction of the main structure was formed by bringing into position 700 elements. These elements are predominantly triangular with diamond-shaped profiles and were pre-fabricated on site. The complex geometry involved means the dimensions of each of the 12,000 triangular panes of insulating glass is unique.

Architect: RMJM Client: Al Habtoor

E-TREES for Sustainable Pavilion, EXPO 2020

Dubai, UAE

Placed around the „Sustainability Pavilion“ of the Expo 2020 in Dubai the E-Trees were designed to provide power from photovoltaic panels placed on the „branches“. The crown of the trees including the PV panels are following the position of the sun, gaining always the optimum of the sun’s energy input. Waagner Biro designed and delivered the tree trunks for 18 no. of trees and the hubs. 3D modelling of the hub, the transition piece between the trunk and the gear box was a very challenging task.

Client: EXPO 2020 Architect: Grimshaw

© unknown

SOWWAH

ABU DHABI, UAE

Standing together on a common base, four high-rise buildings form a new open space oriented towards the stock exchange. A shopping centre is located in the base, the central highlight of which is the Galleria, set directly at the water's edge with its spectacular view. The complexity of the atrium enclosure consists not only in the curved geometry, but also in its diversity; the glass climate shell that encompasses the space hangs from supporting steel structures, which at the same time act as shading elements. The third, highest level of the roof storey also has a triangulated "brise soleil", which reduces the sun rays and simultaneously accentuates the surface. The curved glass façade at water level is also suspended, hanging from a horizontal beam and a series of vertical cables.

Architect: Benoy / RFR Client: Oger Abu Dhabi

SEEROO FI AL ARDH

Doha, Qatar

The Seero Fi Al Ardh Carousel consists of a pavilion building housing a carousel and incorporating Artwork of the late Artist Mr. Maqbool Al Hussain along with supporting facilities. The artwork highlights the progress of humanity on land, in air and sea. In a joint venture with Waagner Biro Stage System, WBSG developed the rotating steelwork of the carousel which is equipped with vintage cars and crystal glass horses, manufactured by Murano Glass in Venice, Italy. The carousel's kinematic mechanism is housed in the basement structure sitting under the pavilion building.
The carousels cars and crystal glass horses only surface when the carousel is in motion. If not in use, cars and horses are automatically lifted into the basement in order to store and protect these unique and precious pieces of art. The five Murano Crystal Glass Horses, coloured in blue, red, green, amber, and white, were transported and assembled under WBSG guidance and supervision.

Client: Qatar Foundation

Artist: Maqbool Al Hussain

© Qatar Foundation

© Waagner Biro

EURASIA

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BAKU AIRPORT TOLLGATE

BAKU, AZB

The stunning elliptical arch entrance greets visitors to Baku airport both by road and by air. Just over 72 meters wide and 28 meters deep, it is a feature arch greeting air traffic and bidding farewell to those departing. To enhance the geometrical shape, the structure is secured by only two concrete fundaments. The smooth architecture of the arch is accentuated by a clear interface at the support points of the concrete pedestal on which it sits to ensure a smooth transition from arch to ground level. The arch is comprised of a steel structure supporting a cable net assembly which in turn supports the array of suspended gold coloured perforated panels.

To work towards an efficient construction period, the pipes and steel plates which make up the main structural ring, or carrier frame were prefabricated off-site using specialist, custom-made moulds and delivered to the construction site in the correct dimensions. The cable assembly was enabled by pre-loading the ring carrier beam to replicate the expected 180mm deflection at the middle of the span, followed by suspending 800 panels of golden expanded metal in a grid of 1.40 meters using 53 longitudinal and 19 transverse cables with single point fixings. The Azeri star as the national symbol of Azerbaijan is prominently depicted at the centre of the span. This was embedded in the suspended panels by using a darker shade of gold. Waagner Biro Steel and Glass drew on their wealth of understanding of the fabrication processes and innovation required to deliver these deceivingly complex steel components. As a result, the project was completed on schedule at the end of 2010. Only one year on from initial planning. The tollgate functions as a connective feature for the airport and the city of Baku. Due to its visibility from air traffic, the tollgate required a distinctive character for a wider audience both at day and night. The night character of the tollgate is enhanced by an atmospheric light concept.

BAKU AIRPORT NEW TERMINAL
BAKU, AZB

A notable number of our customers and project partners – including architects and engineers – are repeat customers. This is the best indicator for their satisfaction with our company's performance. We often follow the in the footsteps of our project partners, such as Arup, when entering the Azeri market with a mutual project. After the award-winning Baku Tollgate, the successful partnership continued with a variety of features related to the Baku Airport complex, mainly the new International Terminal. The airport is subject to an ongoing development plan, in order to accommodate an expected 3 million passengers a year in addition to the prosperous cargo business in this increasingly popular hub airport. The new terminal's architectural shape is based on a tripod with a clear base geometry. During the early design development process Waagner Biro Steel and Glass assisted with our expertise to influence and plan the construction and design methodology, ensuring the result was an economic solution which maintained the architectural design concept. Waagner Biro Steel and Glass's scope included not only the full envelope - facade, roof and passenger bridges - but also the structural steel, with its impressive roof grid and tree columns. At the time, this was the largest single contract for the company in its long history.

Client: AZAL

VVIP TERMINAL BAKU AIRPORT

BAKU, AZB

As a result of the long-standing relationship between Waagner Biro and the Baku Airport, Waagner Biro were commissioned to design and build the VVIP Terminal as a special feature of the airport, designed to complement the aesthetics of the International Terminal building, also designed and built by Waagner Biro. Through our quality-oriented approach, Waagner Biro retained the trust of this valued client and delivered another world-class building for the Baku Airport.

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AVIATION CANOPY

BAKU, AZB

As a result of the long-standing relationship between Waagner Biro and the Baku Airport, Waagner Biro were commissioned to design and build the Aviation Canopy as a special feature of the airport, designed to complement the aesthetics of the International Terminal building, also designed and built by Waagner Biro. Through our quality-oriented approach, Waagner Biro retained the trust of this valued client and delivered another world-class canopy for the Baku Airport.

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