

façade engineering

impeccable credentials

Our multidisciplinary approach and global bank of knowledge in façade engineering consistently deliver exceptional solutions that are original, practical and budget-conscious.

100,000+

Globally, Meinhardt has completed over 100,000 projects

US\$15B

The Group consults annually on around US\$15B worth of projects

A to Z

Fully integrated and multidisciplinary capabilities

360°

Start-to-end seamless delivery

1,300+

Over 1,300 façade projects completed, including some of the world's most iconic buildings and developments

20+

Over 20 years of experience in the field of façade engineering

Meinhardt is one of few multidisciplinary consultancies in the world. Since 1955, we have led the way in innovative and highly buildable designs.

In the growing field of façade engineering, we have a formidable track record of over 20 years of specialised experience across more than 1,300 iconic projects.

Our clients can leverage our full suite of integrated capabilities across engineering, infrastructure and project management, and access the best expertise available within the Meinhardt Group. The benefit is a holistic delivery that is totally committed to high quality, cost-effective and sustainable designs and solutions.

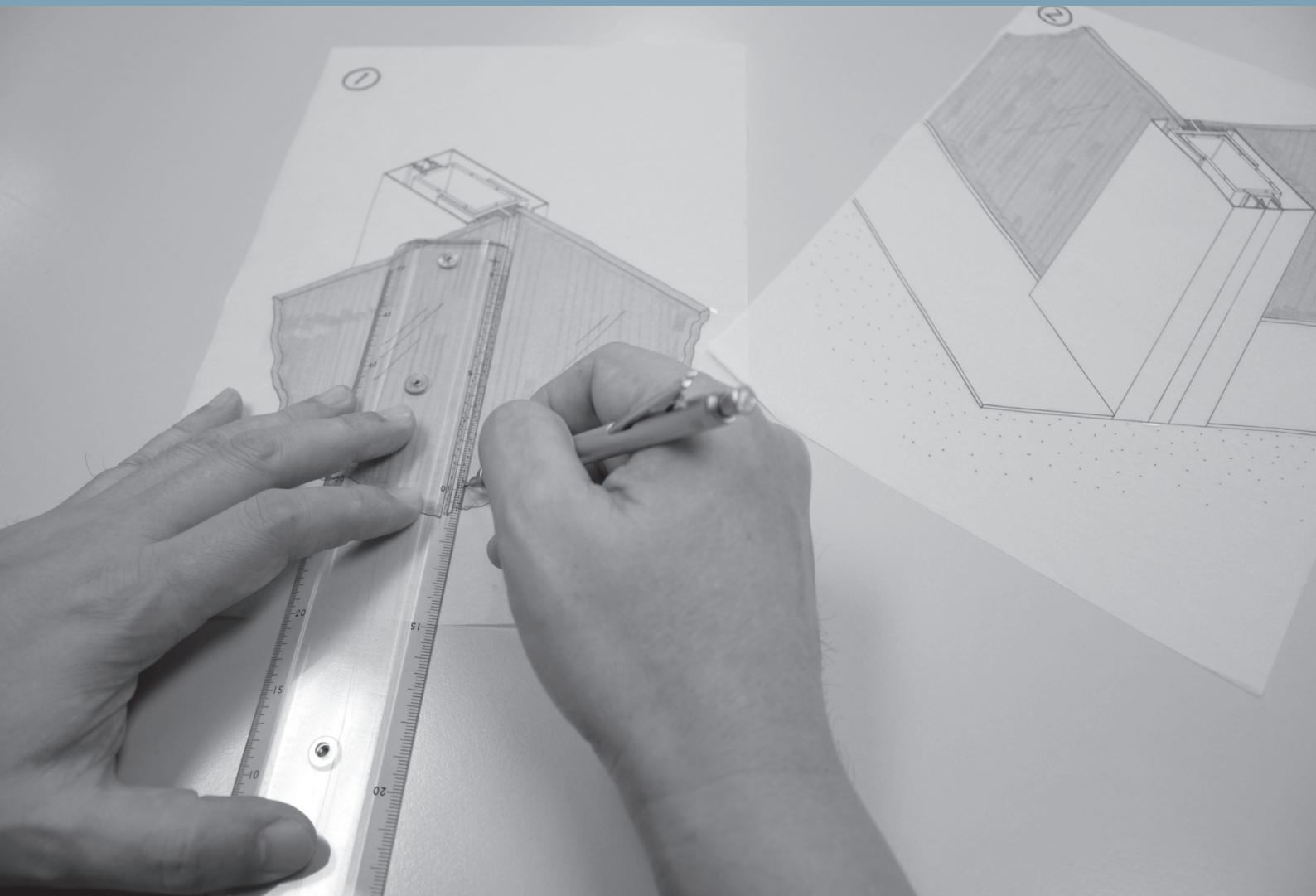
Meinhardt's combination of global resources and strong local presence ensure successful project delivery by our highly-qualified specialists.

Front cover
Suvarnabhumi Airport
Bangkok, Thailand

Opposite page
Rialto Towers
Melbourne, Australia

process and team

Our emphasis on being actively involved early in the development process allows our clients greater scope to customise façade designs and solutions to their particular needs.



All members of our façade engineering team are professionally qualified in an engineering or architectural discipline and fully appreciate the importance of consistent design thinking across all touch points of the project.

A creative and commercially successful building envelope requires expert knowledge and an innovative mind. Meinhardt consistently delivers original design solutions, and is proud to have developed the first unitised curtain wall with flush sash frames which is now a common feature in other buildings, and just one of the many innovations to our credit.

At the same time, we are also about real-world solutions that are practical and on-budget. We understand the intricacies of cross-collaborations and our experience in working with international architects and contractors on large scale and turnkey projects is second to none.



01 Raffles City, Chengdu, China

02 Felda Tower, Kuala Lumpur, Malaysia

03 Zuellig Building, Manila, Philippines

150+

More than 150 façade professionals at our disposal worldwide, one of the key global players in a growing discipline

25 million

Designed over 25 million square metres and 50,000 floors of façade area

500

We work with over 500 clients and architects in successful relationships

30+

One global company with over 30 offices worldwide

one source, all services

From design to construction and post-completion assessment, our team provides an integrated approach to all aspects of façade engineering.

Parkroyal on Pickering

Façade Design and Engineering

Our team combines design, engineering, fabrication and installation expertise to address all aspects of façade design and construction. We provide a full range of services for all types of building envelopes from conventional materials like curtain walls to modern designs using glass as a structure, tensioned fabrics and photovoltaics:

- Concept design
- Detailed design
- Tendering
- System design and engineering
- Design and engineering certification
- Materials and systems testing
- Fabrication and assembly
- Site installation

Façade Remedial and Forensic

We offer façade remedial and forensic services and work closely with building owners, property managers, contractors and insurance companies to deal with performance issues. As an independent third-party assessor, our services include:

- Defect surveys
- Cost studies for repair and replacement
- Remedial works proposals
- Tendering and contract administration
- Due diligence reports
- Expert witness testimony

Building Maintenance Unit Design

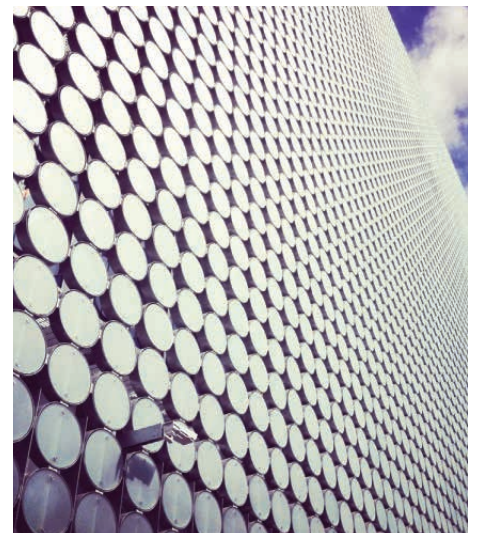
Our façade access solutions go beyond routine cleaning to encompass the long-term strategy for façade maintenance and replacement of façade elements. We assist building owners and architects in the successful design and integration of interior and exterior building maintenance systems, covering:

- BMU system selection
- BMU structural analysis
- BMU supports to buildings
- Façade restraints and track design
- Building services provisions
- Cleaning cycle calculations
- BMU inspections and certification
- BMU system audits

Environmentally Sustainable Design

We evaluate the interaction of the energy systems to construction materials and design methods to achieve exceptional environmental outcomes. Our ESD approach has proven to yield reduced life cycle costs, enhanced building value and profitability, improved health and community benefits as well as positive environmental impact. Our services include:

- Sustainable master planning
- Green building design
- Green retrofitting
- Green rating system certification and project administration
- Total Building Performance (TBP)



RMIT Design Hub, Melbourne, Australia
Photograph courtesy of Andrew Haig

environmentally sustainable design: built in, not bolted on

Growing pressure on limited resources has turned ESD into a key consideration right from the design and conceptual stage.



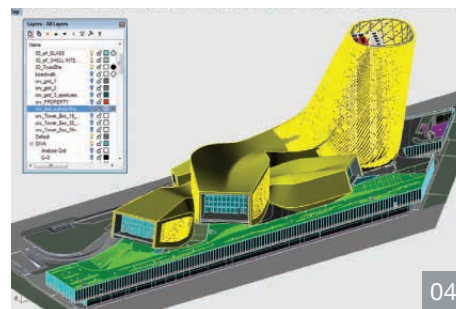
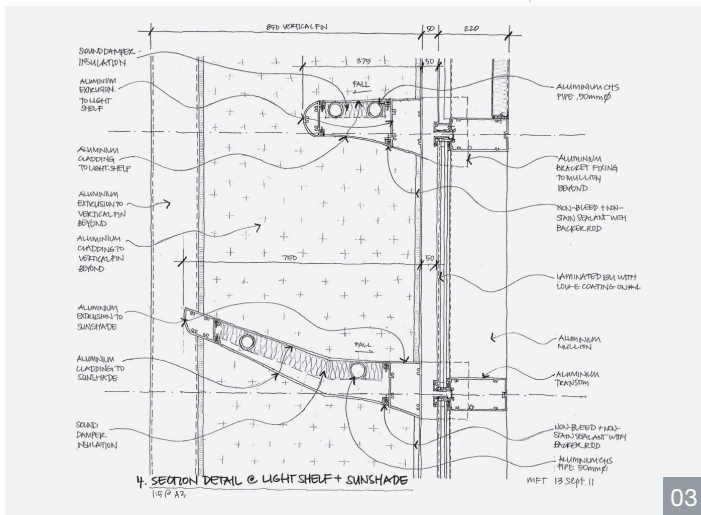
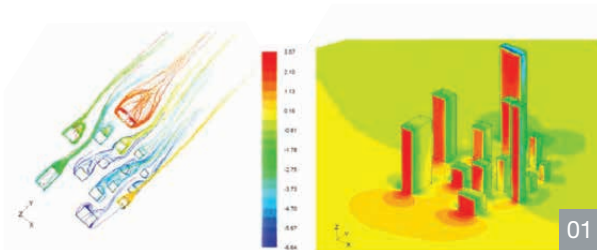
Governments around the world are also encouraging green retrofitting, and see the importance of managing climate change through a sustainable built environment.

Building envelopes play one of the most important roles in sustainable built environment. Our sustainable approach has benefited our clients and the local communities through:

- reduced carbon footprint
- energy savings from use of green and renewable energy technologies
- lower operational costs in the long run by managing lifecycle costs from the start
- higher building performance
- improved occupant comfort
- healthier building environment
- responsible sourcing of materials

Within the Meinhardt Group, we have a dedicated team of ESD experts who are focused on delivering sustainable outcomes and are committed to integrating green solutions and technologies during the design and construction phases.

Close project collaboration is maintained between the Façade Engineering, ESD, MEP and Lighting Design teams to create environmentally responsive building envelopes.



01 Computational Fluid Dynamics (CFD) to determine air flow in and around buildings

02 Sun path diagram for shadow analysis

03 Section details of light shelf and sunshade

04 Kaoshiung Port and Cruise Service Center, Taiwan

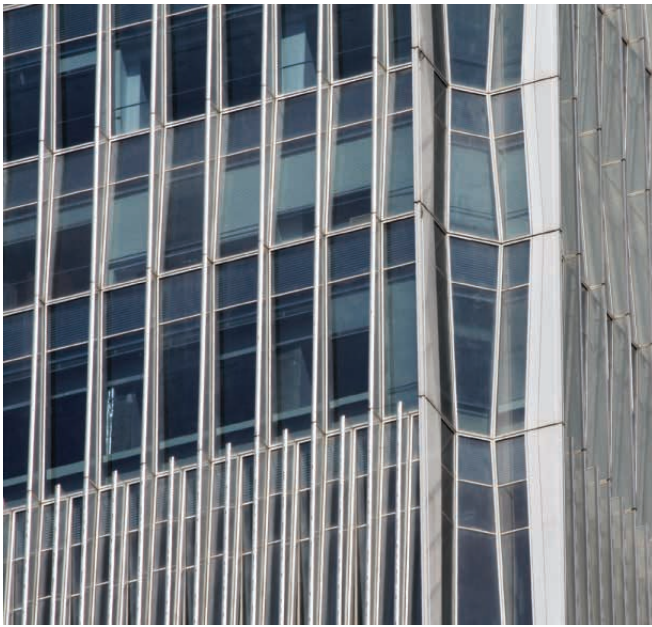
Opposite page 4G11, Kuala Lumpur, Malaysia



key projects

China World Trade Center

Beijing, China



Standing at 330 metres, the China World Trade Center consists of a hotel and office tower and a six-storey retail podium. It is currently the tallest building in Beijing, rising 80 floors above ground.

The tower façade features a thermally-broken, unitised curtain wall system with low emissivity insulated glazed units, shaded by full height external vertical glass fins. Because the tower tapers in as it rises, the curtain wall undulates on alternating floors to create a micro-texture to the overall façade.

The external glass fins cantilever 600 millimetres from the glazed façade, providing shading and housing LED lighting strips along the outer edges for night time illumination.



The retail podium's signature façade is 22 metres high and 100 metres wide, composed of a highly transparent, yet energy efficient retail glass wall, utilising low iron, low emissivity insulated glass units. These are supported only by stainless steel cables running from the ground level to the roof. This structure is the first of its kind in Beijing.

Façade services

- Tall building façade engineering
- Glass wall design and engineering
- Stone cladding design and engineering
- Building maintenance unit design

112,000

square metres total
façade area which
is equivalent
to 16 standard
football fields

285,000

square metres
floor area

83

stories (including
basement)

50+

placed end-to-end
external glass fins
would stretch over 50
kilometres in length



Dubai Mall

Dubai, UAE

The Dubai Mall is a centrepiece of downtown Burj Dubai. The 500-acre mega-development by Emaar Properties is described as the new heart of the city.

Located next to the iconic Burj Khalifa, the tallest tower in the world, the Dubai Mall is one of the largest malls in the world and is about the size of 150 football fields. There are over 1,200 stores, offering a retail mix unmatched by any other mall in the world.

The mall's façade comprises over two kilometres of bespoke curtain walling and precast panel systems. The roof was considered as the fifth elevation due to its proximity to the Burj Khalifa. It required a similar level of detailing to the façade. For this reason, multiple materials and systems are utilised from skylights, standing seam, cladding, tensile fabric to hydraulic retractable roof structures.

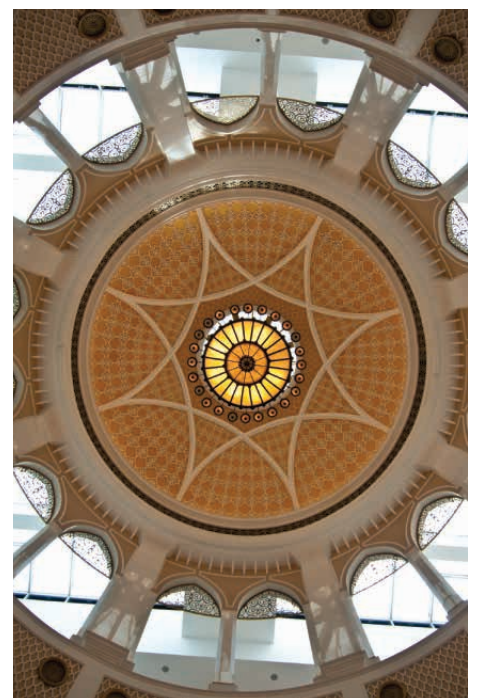
Intelligent, high-performance glazing systems form the backbone of the mall's exterior while patterned and backlit glass panels are chosen for the entrances to support the lighting schemes.

The Dubai Mall has the world's largest acid-etched, precast façade which provides a rustic limestone appearance without the use of a paint-system. Its highly effective and long-lasting properties require minimal maintenance.

Completed in 2008, Meinhardt provided civil, structural, mechanical, electrical, BMU and facade engineering services.

Façade services

- Precast and glass reinforced concrete
- Stone cladding design and engineering
- Curtain wall, skylight and shopfront design and engineering
- Building maintenance unit design



2

Over two kilometres of curtain wall, precast and glass reinforced concrete panels in total

65

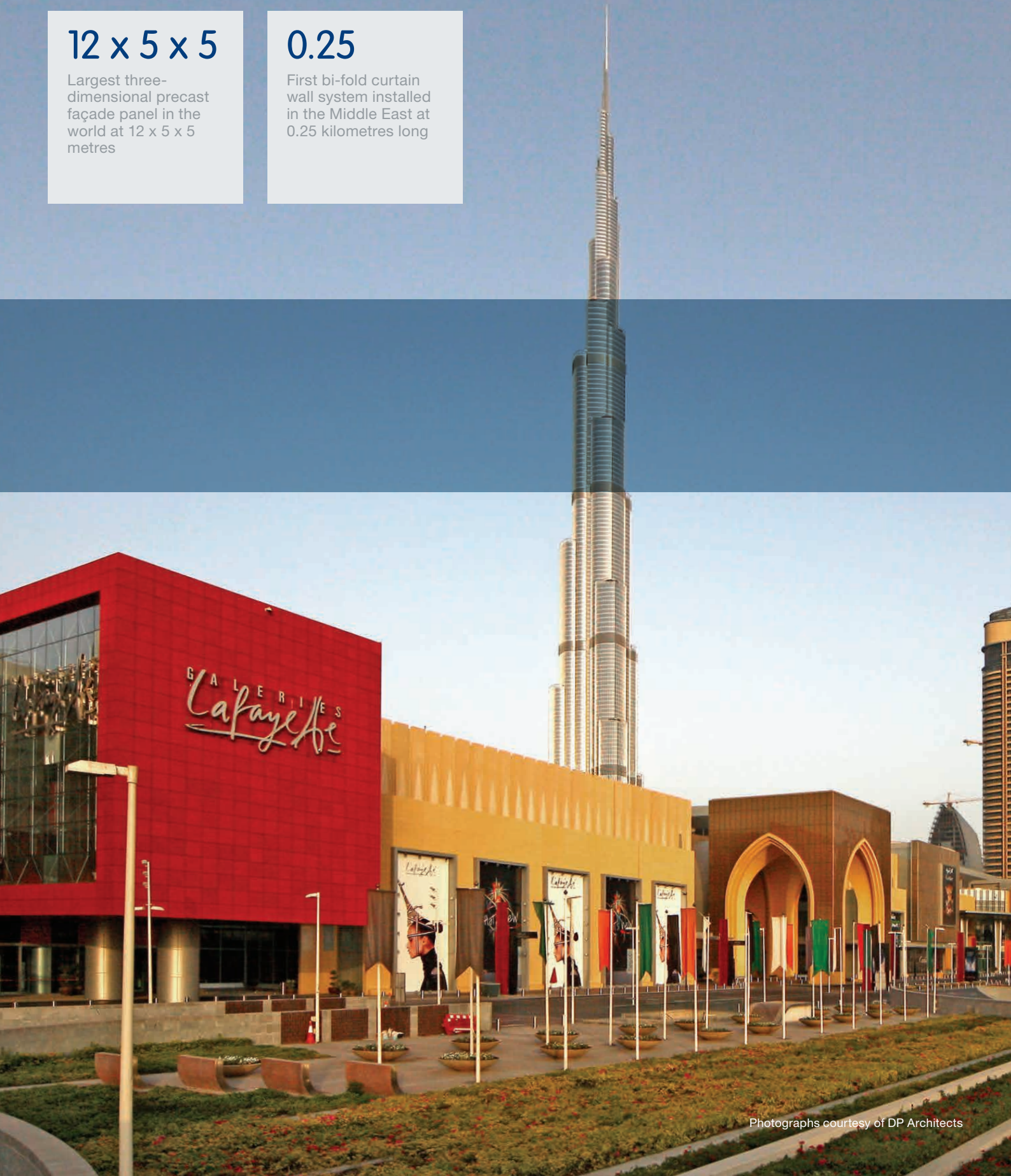
Over 65 different skylights and roof structures

12 x 5 x 5

Largest three-dimensional precast façade panel in the world at 12 x 5 x 5 metres

0.25

First bi-fold curtain wall system installed in the Middle East at 0.25 kilometres long



Pearl River Tower

Guangzhou, China

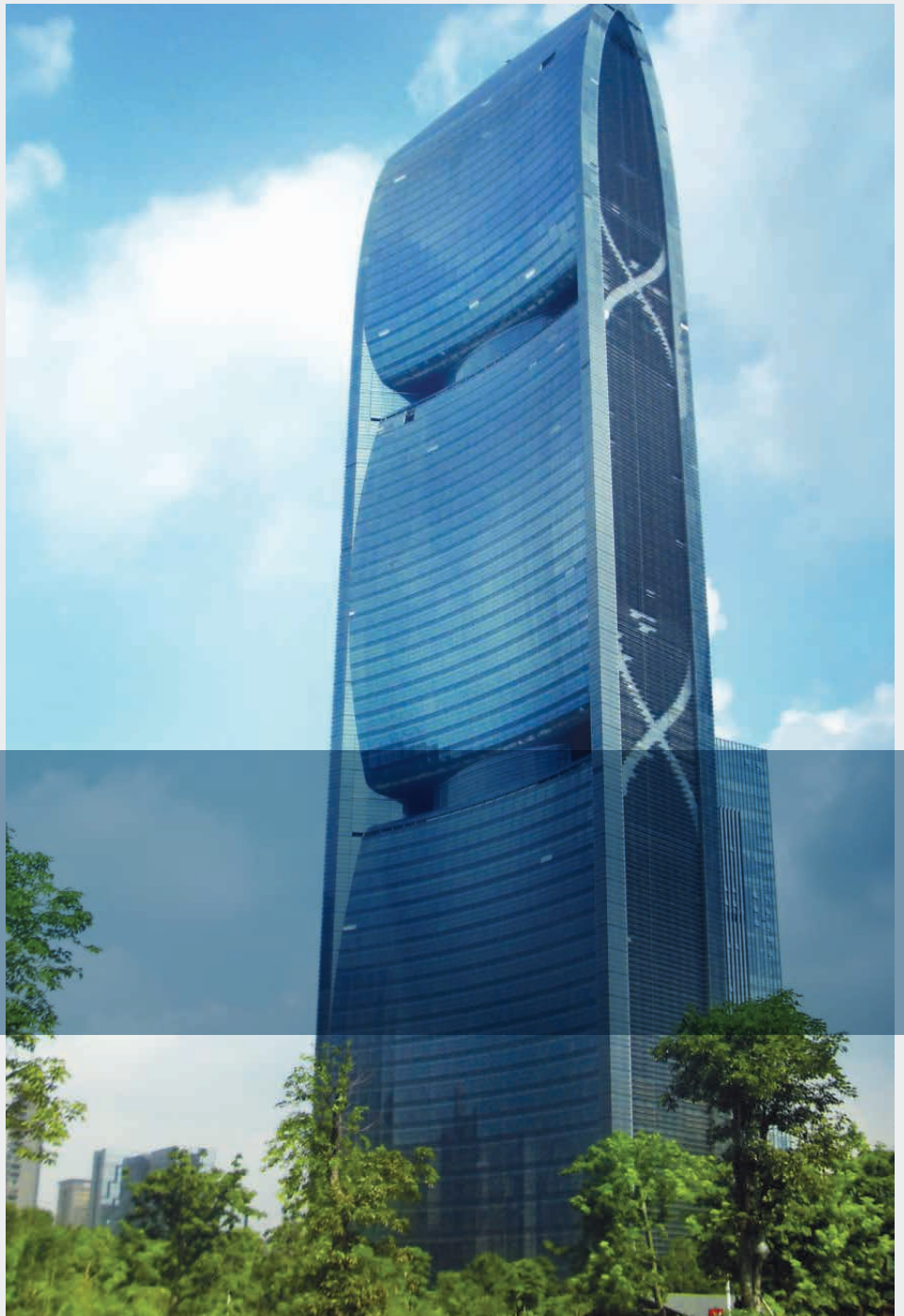
Designed by Gordon Gill in collaboration with Adrian Smith while both were at Skidmore, Owings & Merrill, Pearl River Tower is one of the most energy efficient super skyscrapers ever built.

The 309-metre tall, 2.2 million-square foot Pearl River Tower boasts of a high performance façade that generates energy for the tower via building-integrated photovoltaics and a subtly sculpted form that drives wind into turbines at accelerated speeds. Its aerodynamic form funnels the wind at high velocity through to four turbine inlets on the façade located on the 25/26th and 49/50th floors.

These rapid winds will in turn power the integral wind turbines to generate energy for the building's heating, ventilation and air conditioning systems. A stick façade system is devised around the wind turbine generator tunnel.

This super skyscraper contains several other exteriors, including a double-skin curtain wall that is embedded with solar panels to convert the sun's energy into electricity, and photoelectric sunshades to maximise the natural daylighting.

Photographs courtesy of
Adrian Smith + Gordon Gill Architecture



Façade services

- Curtain wall design and engineering
- Glass wall design and engineering



World Trade Centre II

Jakarta, Indonesia

World Trade Centre II is one of the most iconic office buildings in the central business district of Jakarta.

With a total floor area of approximately 60,000 square metres, this prestigious Grade A office tower is 30 storeys high and reaches a height of 160 metres, including a 25-metre tall architectural crown.

There is also an existing five-storey basement which was constructed circa 1997 and this has been integrated to the new construction.

One of the few developments in Jakarta designed to comply with the Green Mark criteria of Singapore, the building's main façade system consists of a unitised curtain wall with high performance, low-E coated insulated glass. Light weight and translucent glass panels are integrated within the curtain wall, offering varying degrees of light transmission and visual privacy for the occupants.

A high-end and quality building was successfully delivered to the client within budget and a scheduled timeframe.

Façade services

- Curtain wall design and engineering
- Glass wall design and engineering

Ocean Heights

Dubai, UAE



Ocean Heights is currently among the top five tallest residential buildings in the world.

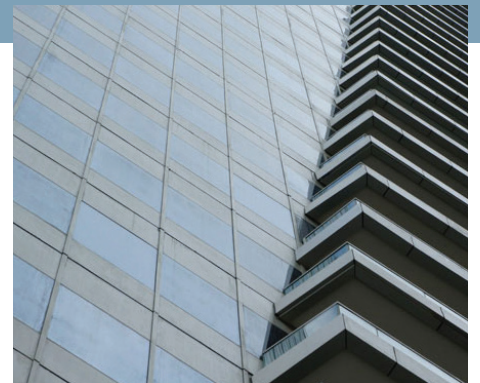
The 83-storey, 310-metre towering masterpiece is strategically located at the entrance of Dubai Marina, overlooking magnificent vistas on all sides. It houses 608 luxury apartments.

Ocean Heights is considered a 'super slender' building with an aspect ratio of 9.2 : 1.

The design was achieved by twisting the floor plate at every level to create the curved elevation.

As it rises, the tower's floor plates reduce in size, allowing the rotation to become even more pronounced.

Meinhardt designed what the industry would term as "true-warped" type unitised curtain wall system through cold-bending of glazed panels, to achieve the distinctive silhouette. Engineering the façade system involved a much more rigorous set of design strategies compared to conventional unitised curtain wall systems.



Façade services

- Glass wall design and engineering
- Stone cladding design and engineering



Meydan Racecourse

Dubai, UAE

The Meydan Racecourse is an iconic development in Dubai spanning 67 million square feet. It comprises 1,750-metre all-weather Tapeta surface track and a 2,400-metre turf course.

The grandstand can accommodate 60,000 spectators and incorporates the world's first five-star trackside hotel with 285 rooms, two race tracks, restaurants, a racing museum and 72 corporate suites for entertaining throughout the year.

Twelve-metre glass fins are used to support the monolithic glass façade. This gives the effect of a minimally supported façade with extremely high transparency.

The VIP lounge is located on the roof of the main terrace and is designed as a free form structure. It is constructed from custom steel profiles with glass cassette units fixed to the steel frame.



Façade service

- Glass wall design and engineering



The Capital

Mumbai, India

Based on the idea of 'Cybertecture', The Capital merges evolutionary concepts with sustainable designs and advanced building systems.

The exterior of this high-tech office building comprises a protruding glass Cybertecture Egg.

The structure of the Cybertecture Egg uses a diagrid exo-skeleton which creates a rigid structural system, allowing for large column-free floor plates and high space flexibility. As the Egg does not have a flat surface, an exterior cleaning system is essential. The monorail is installed on the 13th floor, underneath the slab, and moves around the entire egg diagrid façade and window wall system.

In all, the façade consists of 22,600 square metres of unitized curtain wall, 3,750 square metres of egg diagrid semi-unitized system, 1,000 square metres of louvres system, stick curtain wall system and swing doors.

Photovoltaic cells are integrated within the glass façade to provide an alternative electricity source. The building's glazing has variable fritting and tones based on the sun orientation as well as variable shading and tinting.

Photographs courtesy of James Law Cybertecture



Façade services

- Glass wall design and engineering
- Building maintenance unit design





Modelled after a lotus, Vietnam's national flower, this 68-storey, 260-metre tall office tower has a six-storey retail podium.

As part of the tower's lotus flower image, one side of the tower protrudes out as the helipad.

Constructed from more than 250 tons of structural steel and requiring 4,000 ultra-strong bolts to hold it together, the helipad is cantilevered 22 metres out from the main structure.

The unconventional building shape is such that the perimeter tapers inward at the lower 20 floors.

The building's curvature means no two floors are the same.

Each of the 6,000 sleek glass panels is individually cut to unique specifications because each floor is different from the next.

Bitexco Financial Tower

Ho Chi Minh City, Vietnam

BITEXCO
FINANCIAL
TOWER

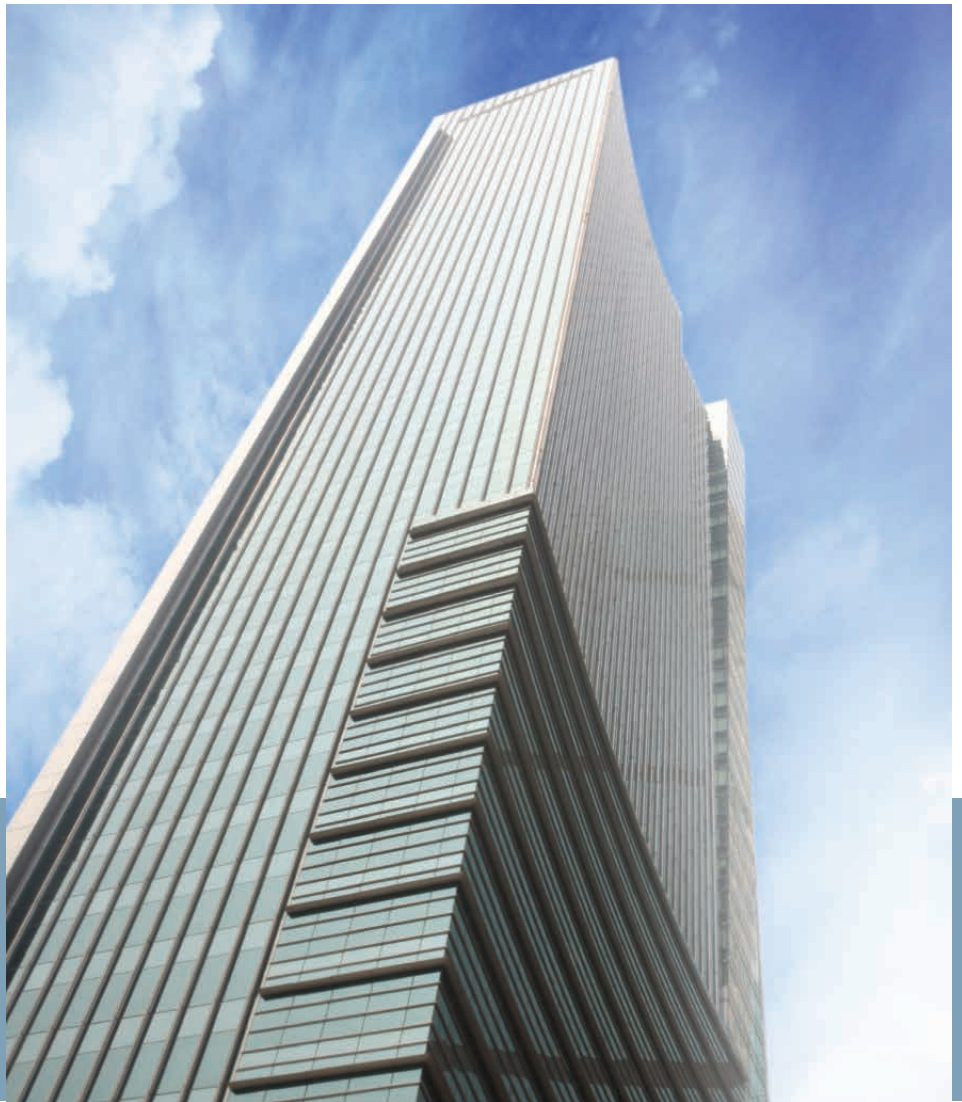


Façade services

- Tall building façade engineering
- Curtain wall design and engineering
- Building maintenance unit design

Plaza 66

Shanghai, China



Located in one of Shanghai's most well-known shopping districts, this project is a 66-storey office building (Tower 1) designed with a sloped metal roof feature. There are altogether 78,000 square metres of Grade A office space and five levels of luxury shopping at the podium fronting Nanjing Xi Lu.

Architecturally, the building's curved volume spirals from the base in an ascending fashion to the top. Its main façade system is characterised by a unitised curtain wall and aluminium cladding.

The east side of Tower 1 is fitted with flat-glass cladding and a minimal amount of aluminium to play up the contrast against the more sculptural walls at the secondary tower. One of the key challenges in the project was the integration of glass cleaning system (BMU) with its curved roof structures.



Façade services

- Curtain wall design and engineering
- Glass wall design and engineering
- Building maintenance unit design



Costing over S\$6.5 billion, the Resorts World Sentosa is an integrated resort taking pride of place on a 49-hectare site at on the northern shore of Singapore's Sentosa island.

This integrated resort brings together a collection of six hotels, a casino, the world's largest Oceanarium and the region's first Universal Studios theme park.

Meinhardt deployed its expertise for the façade and roof designs for the entire project.

The works cover stone cladding, window walls, high performance sliding doors, aluminum roofing with built-in green features, glass walls and shopfronts, roof slate tiles, glass skylights, and over 25,000 square metres of ETFE and PTFE canopies. The cooling system integrated within these canopies contributes to energy savings of 2.9 million kWh per year.

Resorts World Sentosa

Singapore

The team was also involved in the engineering of the themed façades at the Universal Studios. Set on an enormous scale, a wide variety of materials from precast concrete to NALC panels, metal cladding, GFRC (Glass Fiber Reinforced Concrete) and GFRP (Glass Fiber Reinforced Plastic) were utilised.

For its exemplary sustainable designs, the Resorts World Sentosa won the Building Construction Authority's Green Mark District Gold Plus Award in 2009.



Façade services

- Stone cladding design and engineering
- Glass wall design and engineering
- Green roof design and engineering
- Building maintenance unit design
- Fabric and ETFE canopy design
- Themed façades for Universal Studios



Suvarnabhumi Airport

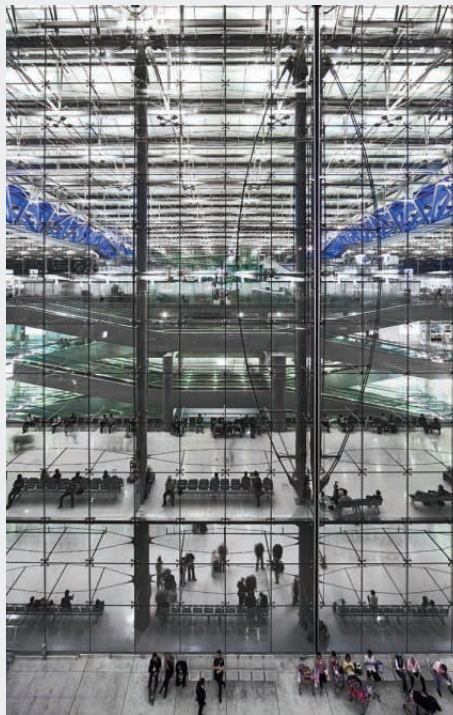
Bangkok, Thailand

The Suvarnabhumi Airport in Bangkok is the world's 4th largest single-building airport terminal at 563,000 square metres, and handles more than 45 million passengers a year.

The main terminal roof is designed with structural elements and bays placed in a cantilevered wavelike form. This canopy comprises eight super-truss girders with a central span of 126 metres and two cantilevering ends of 42 metres long. The entire roof is supported by 16 frame-type steel columns.

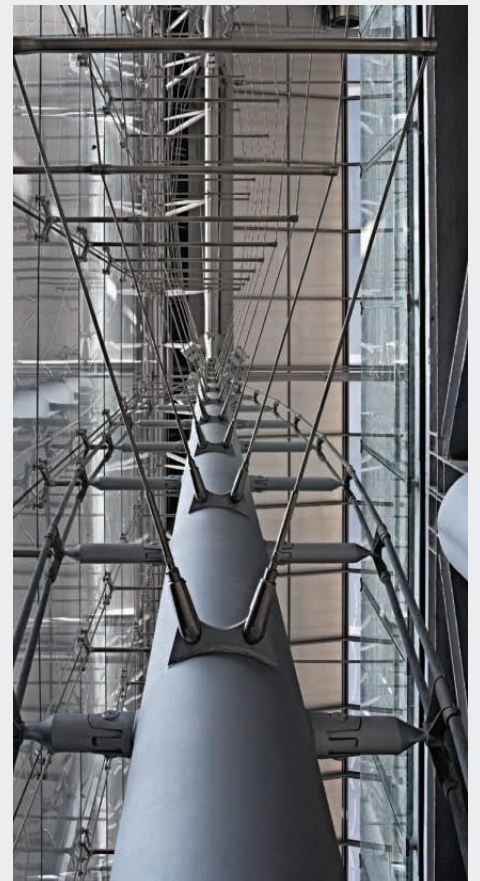
Its glass wall utilises a cable truss system. Internally, the concourse enclosure consists of five-pin arch truss girders with an alternating system of glazed façades and a translucent fabric membrane set-up, which is spanned to bridge the 27-metre spacing between the glass façades.

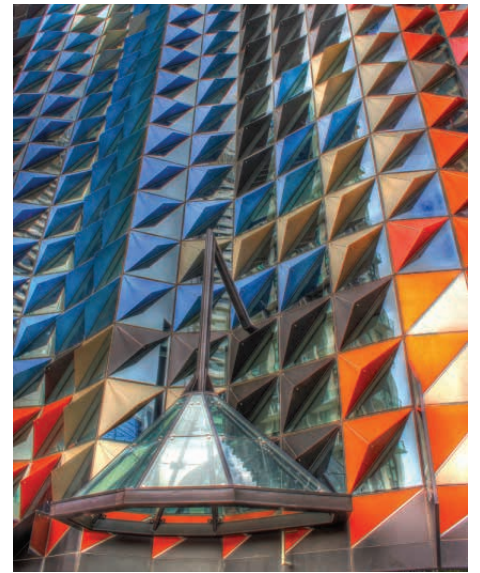
The low-E coated glass façade system and the three layer-translucent membrane helps to mediate between the tropical climate and interior, reduce the noise transmission, and optimise the daylight into building.



Façade service

- Independent design checking





RMIT Swanston Academic Building

Melbourne, Australia

At over A\$200 million, the Swanston Academic Building is the largest construction project ever undertaken by the Royal Melbourne Institute of Technology (RMIT).

The 35,000-square metre, 11-storey building contains highly advanced, sustainable teaching and learning facilities.

It has a visually stunning building envelope with no straight walls around the perimeter.

The high-performance façade includes external angular shaped sunshades, internal blinds and double-glazed units.

Key features include balconies from the two-storey cantilevered student social space overhanging Swanston Street to a further nine, double-height student portals for informal study and collaboration.

Façade service

- Curtain wall and cladding design and engineering



Meinhardt Façade worldwide

Australia

Melbourne

Meinhardt Australia Pty Ltd
Level 11 501 Swanston St
Melbourne VIC 3000
Australia
info.au@mfacade.com
T: +613 8676 1200
F: +613 8676 1201

Brisbane

Level 2
135 Wickham Terrace Spring Hill
Australia
info.au@mfacade.com
T: +61 7 3018 5000
F: +61 7 3018 5099

China

Hong Kong

Meinhardt Façade Technology (HK)
Limited
4/F Wah Ming Centre
421 Queen's Road West,
Hong Kong
info.hk@mfacade.com
T: +852 28580738
F: +852 28581326

Beijing

Meinhardt Facade Technology
(Shanghai) Ltd.
23/F HuaTeng Plaza No 302 Jia,
Jinsong Zon3, Chaoyang District
Beijing 100021, China
info.bj@mfacade.com
T: +86 10 8599 9144
F: +86 10 8599 9446

Shanghai

6/F Block 3A
Tianhua Information
Technology Park
No.299, Longcao Rd., Xuhui District
Shanghai 200235, China
info.sh@mfacade.com
T: +86 21 6466 8375
F: +86 21 5465 4093

Shenzhen

Room 204,Block B, Union Square,
5022 Binhe Road
Shenzhen, China
info.sz@mfacade.com
T: +0755 8297 8489
F: +0755 8297 8456

India

Chennai

Meinhardt Facade Technology
(India) Pvt Ltd No.22, Anna Salai
Standard House, First Floor Little
Mount, Saidapet
Chennai 600 015, India
info.in@mfacade.com
T: +91 44 22351333
F: +91 44 22351332

Indonesia

Jakarta

PT. Meinhardt Indonesia
Grha Tirtadi, 3rd Floor
Jalan Raden Saleh No. 20
Jakarta 10430, Indonesia
info.id@mfacade.com
T: +62-21 392 9911
F: +62 21 392 5995

Malaysia

Kuala Lumpur

Meinhardt Façade Technology (S)
Pte. Ltd.
Suite 17.02, Level 17, AMODA
22 Jalan Imbi, 55100
Kuala Lumpur, Malaysia
info.my@mfacade.com
T: +603 2710 9488
F: +603 2711 2990

Middle East

Dubai

Gold & Diamond Park, Building 4
Unit 130 Sheikh Zayed Rd,
Dubai, U.A.E
info.db@mfacade.com
T: +9714 380 9422
F: +9714 4323 7592

Philippines

Manila

Meinhardt Philippines Inc. (MFT HK)
25th Floor Chatham House
116 Valero cor. V.A. Rufino Streets
Salcedo Village, Makati City 1227
Philippines
info.ph@mfacade.com
T: +632 887 1391 loc. 251 & 252
F: +632 887 1172

Singapore

Singapore

Meinhardt Façade Technology
(S) Pte. Ltd
168 Jalan Bukit Merah
#05-01 Surbana One
Singapore 150168
info.sg@mfacade.com
T: +65 6238 9730
F: +65 6736 1542

Thailand

Bangkok

Meinhardt (Thailand) Ltd.
6th Floors, Thanapoom Tower
1550 New Petchburi Road,
Makkasan Ratchtevee,
Bangkok 10400, Thailand
info.th@mfacade.com
T: +66 2207 0568
F: +66 2207 0574

United Kingdom

London

Meinhardt (UK) Ltd.
New Penderel House
283-288 High Holborn, London
WC1V 7HP, United Kingdom
info.uk@mfacade.com
T: +44 20 7831 7969
F: +44 20 7404 7872

Group Capabilities

Infrastructure & Environment

Structures

MEP

Project Management

Planning & Urban Development

Façade Engineering

Environmentally
Sustainable Design

Specialist and
Architectural Lighting

Fire Performance Engineering

Integrated Design Management

Mission Critical Facility Design