Civil & Structural Engineering
by BDP
BDP designs and creates inspiring places for people. With international teams of architects, engineers, designers, and urbanists, we work from studios throughout the UK, and in Ireland, the Netherlands, the UAE, India, and China, on projects around the world. Founded in 1961, BDP is now the largest interdisciplinary design-led firm in Europe and has won over 750 awards for design quality from international and national bodies.

Our designers focus on designing buildings and environments for the future to confront the reality of a finite planet. We challenge ourselves to create better environments for everybody using five goals as our starting point for the design process:

- to act as climate shapers to create protective and positive environments for people to enjoy
- to take a creative approach to energy, with natural and technological methods for the use and reuse of energy and resources
- to design in a user-inclusive style, engaging in a learning centred approach with the occupiers of our buildings and places
- to cross-fertilise our knowledge from different cultures, maximising the advantages of being international, interdisciplinary, and multi-sector
- to promote and create liberating buildings, places and communities for people to use and adapt over time.

Creating Places for People.
In challenging times, it is our creativity which provides the answers. Whether it is leaner design, innovative structures, advanced materials, fresh approaches to procurement, better supply chain engagement, safer construction or faster programmes, BDP engineers enjoy the challenge by harnessing our creativity.

We work with contractors to develop cutting-edge modular systems and work hard to incorporate prefabrication in all our designs. This way, we can achieve less waste, better quality and faster build. We are recognised as industry leaders and win awards for our digital technology using Building Information Modelling, applying this expertise throughout projects to deliver better, coordinated information faster.

Recognising the increasing trend towards retrofitting, our specialist teams have developed a bespoke methodology which minimises client risk and optimises the project programme.

And we don’t forget our responsibilities. BDP’s Carbon Calculator helps clients understand the impact of our designs and our work on the 2011 Government Low Carbon Construction report is helping to shape UK legislation.

All along the journey, we hold true to our ethos of designing places for people – yes it really is possible to create wonderful places which minimise our impact on the planet and maximise value for our clients.

Michelle McDowell MBE FREng
Chair of Civil and Structural Engineering, BDP

“Never waste a good crisis”
Craft

To work and shape materials with precision in a manner demonstrating great care and ingenuity.
Working internationally requires sensitivity and an understanding of local materials and construction. BDP was appointed to develop skylight designs across three large retail developments in China. We developed a structural solution that can adapt to the many specific physical and environmental conditions of each project - a kit of parts. The innovative use of a kit of parts, with similarities in fabrication and construction, has created spectacular architectural solutions that respond to each site.

Through parametric modelling the solutions achieved optimise structural performance and utilise mechanical connections to reduce welding on site.
Left: A titanium wrapped timber gridshell ‘egg’ encloses the lecture theatre at Napier University Business School, Edinburgh, UK.

Far right: Concrete as the defining architectural aesthetic – BDP Studio, Manchester, UK.
Advanced digital technology enables creativity, yet ultimately drives efficiency through analytical rigour.

Kiev Women’s and Children’s Hospital, Ukraine. Parametric simulation delivering elegant and efficient forms through digital technologies.
Below left: The structural model is part of a full interdisciplinary building information model of Appleton Academy, developed to allow for fast track project delivery.

Top right: Inspired by nature; roadbridge competition entry for Suzhou, China.

Bottom right: BIM modelling delivering design efficiency for high rise structures - Jumeirah Towers, Dubai.

"AT BENTLEY SYSTEMS, OUR COLLEAGUES HAVE SEEN BDP’S WORK FIRST HAND, AT THE FOREFRONT OF FULLY LEVERAGING BIM TO DELIVER TRULY INTEGRATED PROJECTS, RESULTING IN BETTER PERFORMING FACILITIES."

Greg Bentley, CEO, Bentley Systems.
Above: Delivering integrated building solutions coordinating architecture, building services and structure for Dixons Allerton Academy, Bradford, UK.

Below: Defining the structural concept for Zhenhu Lake Visitors Centre, Jiangsu Province, China.
Design for Manufacture

Fast, efficient, less waste, high quality and on cost - it’s easy to see why Design for Manufacture and Assembly has stimulated industry change.

Left: BDP delivered 2000 residential units, within a 40 week construction programme by designing a precast concrete flat pack component assembly system – University of West of England, Bristol.

Below: The Royal Alexandra Children’s Hospital in Brighton. Prefabricated concrete cladding panels; enabling faster, leaner construction with less waste.
Marlowe Academy Kent. Through early and collaborative engagement with the fabricator we rationalised the roof concept to suit the manufacturing and prefabrication methods. This resulted in a structurally efficient yet dramatic toroidal timber gridshell that spans the academy heartsace.

“I BELIEVE WE HAVE SUCCEEDED IN CREATING A BUILDING WHICH PUPILS AND STAFF - INDEED THE WHOLE COMMUNITY - WILL ENJOY USING AND BE PROUD OF. THE FLEXIBLE SPACE ACCOMMODATING ENTIRE SCHOOL ASSEMBLIES WILL ENCOURAGE A STRONG SENSE OF IDENTITY AND SHARED PURPOSE.”

Roger De Haan, Chair Of Governors (Marlowe Academy).
The multi award winning and BREEAM ‘Excellent’ headquarters building for Roche – BDP’s engineers worked with the architects to drive a very strong rationale of the building structure, leading to a highly efficient structural form and savings in the construction cost and programme.
Victoria Square, Belfast, UK. Creative yet economic design solutions, ensuring the commercial viability of city centre regeneration.

Temporary works sheet piling creates a permanent solution to the basement car park.

Fully glazed geodesic dome creates a landmark feature to the Belfast skyline.
Sustainability is the sum of many parts from climate change, minimised impact on resources and designing for future flexibility – all need to be considered by the engineer in creating places for people.

“As a practical and tangible statement, the Manchester HQ of BDP is powerful.”

Tony Juniper, environmental campaigner and former Chief Executive Of Friends Of The Earth.
THE INTEGRATED APPROACH OF THIS PROJECT SHOWS HOW STRUCTURAL ENGINEERING, BUILDING SERVICES AND ARCHITECTURE CAN WORK SO WELL TOGETHER.

ACE Engineering Excellence Judges.

Engineers can use their creativity and innovation to respond with sustainable solutions to some of the biggest challenges facing our world.

BDP’s commitment to a sustainable built environment is demonstrated in the design of the BDP Manchester studio at Piccadilly Basin.

A derelict brown field canalside site became home to Manchester’s first BREEAM ‘Excellent’ naturally ventilated office building, which features an entirely exposed concrete frame which thermally regulates the workspace, negating the requirement for air conditioning – thereby considerably reducing energy demands.
The synergy of architect, environmental engineer and structural engineer, working in close collaboration, and with common goals, enables ‘simple’ solutions to complex problems.

Integrated Thinking
Bridge Academy, London, UK - a unique structural design incorporating a wishbone hoop to hang the inner edge of the main building to create a column free space at ground level. This hoop also provides the primary framework to the inclined ETFE façade.
Adaptive re-use

Specialist engineering skills and technologies, exploiting the potential of existing building stock.

Left and below: Royal Albert Hall, London, UK – redeveloping a world class performance space through the creation of much needed back of house facilities and servicing access – this was the first complete refit for the Royal Albert Hall since it was originally built in 1871.

Above: Sensitivey executed structural repair works undertaken to the historically significant Murray Brothers’ Grade II* listed mill building complex in Ancoats, Manchester, UK, dating from 1798.

"OBJECTIVES HAVE BEEN ACHIEVED WHILST STILL HOSTING OVER 300 PERFORMANCES A YEAR... A COMPLEX AND IMPRESSIVE PROJECT."

Chief Executive, Royal Albert Hall
No 1 First St, Manchester, UK.

New extended facades, together with two additional floors of accommodation were added to the original five storey precast concrete framed structure, providing a much needed face lift, and increasing net lettable floor areas from 10,000m² to 16,700m².

**ESSENTIALLY SUSTAINABLE DEVELOPMENTS:**
MEETING CONTEMPORARY DEMANDS AND STANDARDS WHILST DELIVERING MEASURABLE DEVELOPMENT VALUE.
Communication

The essential tool to express our ideas.

Inspired innovation through creative application: a BDP paper folding class encourages engineers to experiment in expressing their ideas.
Above: BDP engineers refining their sketching skills through structured training.

Right: Rather than being a sobering influence on architecture, BDP engineers communicate innovative concepts of structure and form through creative technique.

"BDP ENGINEERS INTEGRATE CONVERSATIONAL SKETCHING INTO THEIR PRACTISE - THIS ENABLES A SUBLIME AND FREQUENT EXCHANGE OF IDEAS AT ALL STAGES OF THEIR DESIGN. THIS CLEARLY MATTERS TO THEM."

Trevor Flynn, Director of Drawing At Work and lecturer at Central St Martin’s College and the Architectural Association.
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