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documentation of interdisciplinary design

school of architecture bremen

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history of
interdisciplinary
design

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introduction

The Module "Interdisciplinary Design" was a try to bring architects and engineers back together and it turned out to be a great success. The parties shall no longer work for themselves and problems shall not longer rise because of a lack of communication. We want to point out the benefits of collaboration between the disciplines. We studied some well-known buildings centered in London and nearby to see that teamwork is paying off. This documentation is one step forward to push the work and bring the new information to you.

ARCHITECTURAL
CHARACTERISTICS
shape, widen profile
but slender then
a rectangular block
free space
fully glaced facade

ENGINEERING
CHALLENGES
circular plan
diagonally braced structure
allows column free floor space
triangulated perimeter structure

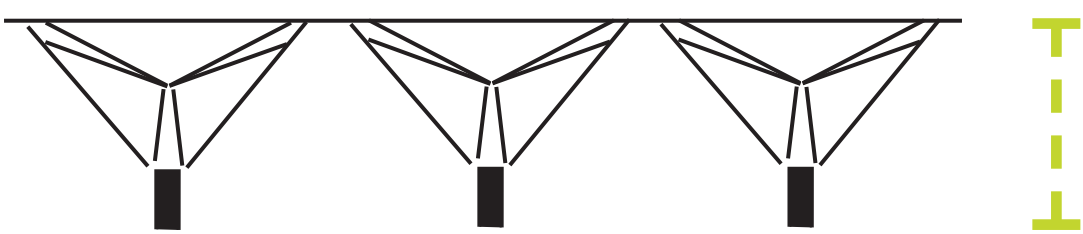
gherkin

The "Gherkin", at the 30St Mary Axe is probably the most exciting part of the London Skyline since 2004.
The unusual shape of the building is with a distinctive design and the fully glazed façade makes it even more spectacular from the outside.
Architect Foster and structural engineer Arup showed once more that great collaboration can lead to an extraordinary result.
The tower's diagonally braced structure allows columnfree floor space and the curtain wall, which opens up the building to daylight and the view in the inside.
The opening panels are not just connected with the construction in a triangle disposal which was a great engineering challenge but are also used as a ventilation system

ENGINEERING
CHALLENGES
vertical seperation in one level
glass panels
triangular structure enable less
„combined" columns

ARCHITECTURAL
CHARACTERISTICS
movementthrough building
shall be straightened forward
roof shall keep the rain away
but let the sun in
open space

85,700m²



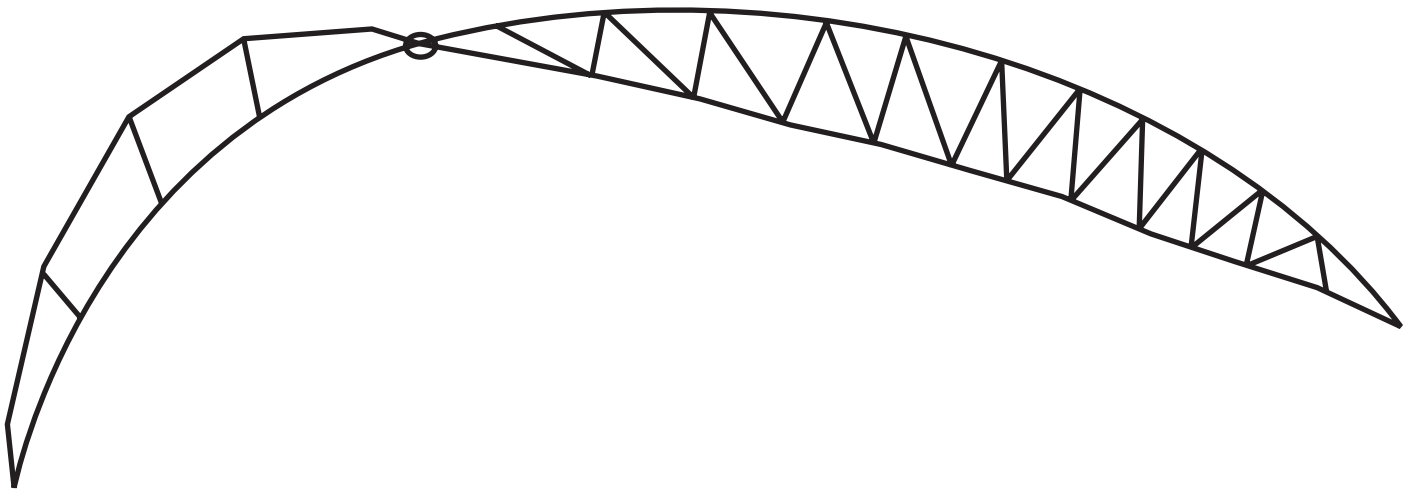
stansted airport

Stansted Airport was completed in 1991.
The responsible architect was Foster and the structural engineer was Arup.
The team tried to keep the design simple, which means a traditional way of travelling should be created. From the car - through the terminal - into the plane.
For the traveler the movement through the terminal should be very straight forward and direct.
The solution was one floor, as empty as possible.
Arup designed column trees which combine several columns with a big diameter in the bottom and then separate into limbs at the top. So in total the loads get brought- down by fewer columns in total.
These trees support a roof canopy that is freed simply to keep out the rain and let in light. All the heavy environmental services usually found at roof level to an undercroft that runs beneath the concourse.
The undercroft also contains baggage handling and was able to accommodate a mainline railway station.

ARCHITECTURAL
CHARACTERISTICS
long sinous plan
bright inside natural light

ENGINEERING
CHALLENGES
cladding arch system is flexible
variably sized sheets of glass
that can flex and expand

60,000m²



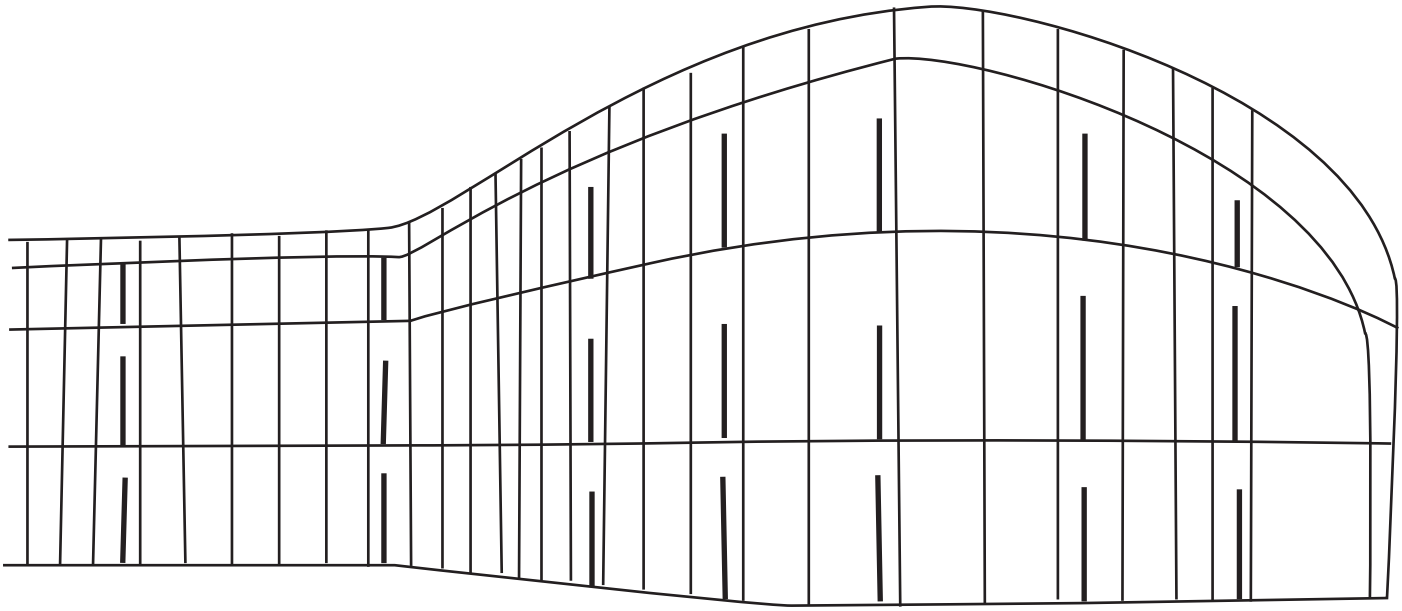
waterloo

The International Terminal Waterloo is a multi-faceted transport interchange that was designed by Grimshaw Architects.
After competition in 1994 Eurostar-trains used to run from London all the way through Belgium and France.
Since 2007 the international trains divert to the St Pancras International so the Waterloo International got closed.
Nevertheless it is a remarkable building and worth it to have a look closer. Grimshaw's brief for the project was to build a streamlined terminal, and because of the international service, it had all the requirements of an airport, so passengers could pass quickly and efficiently.
The roof responds to the dictates of the site, specifically to the west where it must rise more steeply in order to accommodate the height of the trains.
The building design of the western side is clad in glass. Underground, a two-story viaduct supports the platforms and incorporates two floors of passenger facilities:
Departures and Arrivals, a basement car park and the brick vaults underneath the mainline station.

ARCHITECTURAL
CHARACTERISTICS
form is adapted to the streets free
space - no walls
conspicious curtain glass wall
sundbathed rooms
roofgarden and pool

ENGINEERING
CHALLENGES
reinforced steel ceilings
small columns
extra joints
light and open framework
construction on the rooftop

21,255m²



willis faber headquarter

The Willis Headquarter was completed 1971. The company wanted to move from London to Ipswich, so the employees needed to be convinced to follow. The young and ambitious architect Norman Foster had strong ideas of a special office, where all the needs of the employees will be satisfied. The given space made Foster chose a curved form of a building in which Anthony Hunt formed reinforced concrete ceilings. Foster wanted an open workspace for better atmosphere and communication so they decided to use columns instead of walls.

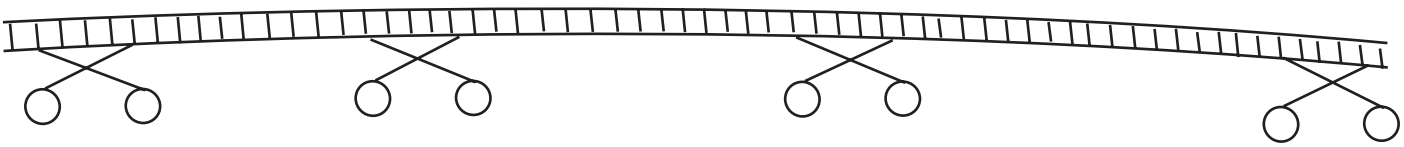
The facade was going to be a conspicuous curtain wall of glass in combination with a light and open framework construction on the rooftop.

As special features the employees also got a roof garden and a pool in the ground floor.

ENGINEERING
CHALLENGES
hydraullic lifting of middle part
decking on the main spine
four pairs of polystyrene filled
pontoons
pines between pontoons

ARCHITECTURAL
CHARACTERISTICS
possibilty of opening for boats
hidden structure
natural form finding
(waterinsect)

94 m



west india quay bridge

The West India Quay Bridge was opened in 1996. The London Dockland as a Client didn't save costs and asked the architectural company future system and the engineer Anthony Hunt the to evolve something special. At first view the bridge seems to be normal way to combine two riversides. But if one look closer the architectural characteristics and the engineering challenges become obvious. Future System took a water insect as a role model for the structure so the bridge is beared by polystyrene filled pontoons and pines between them. The bridge also needed to have the possibility to open to let boats through so in the middle part a hydraulic lifting system was installed.

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history of
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design

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