MSC4 Science Business Center
P5

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PART 1: TUDelft Campus and Technopolis area MasterPlan

PART 2: Science Business Center

---- Concept and develop
---- Plans and layers and structures
---- Unfolding of the building
---- Ventilation strategy
---- Sections and Details
Central Pavilion Park
Masterplan Design
Pavilion Park between the old Research institute and the new Science Business Center

Put the New Science Business Center in the End of the Axes

Mekel Park

Research Institute

Science Business Center
MASTERPLAN and Architecture

Green Sport Buffer Area with Activity Spots

Green Bank with Meeting Points

Continue the Mekelpark and extend into Pavilion Park Area
Breathing Pavilion
Science Business Center Design
bubbles diffuse into the building and form courtyard and patio, to introduce the green and lead people into the building.
the programs arranged and shaped by several “function bubbles.” Entrance hall as a heart in the middle, other functions stand around it. The curved walls with different materials and colors guide the visitors to different directions creating a unique experience throughout the sequence of space. The glass envelope close the building and as well making subtle spaces and connections in between each “function bubbles.”
the inbetween space, a result of independent shapes, function like a dynamic buffer, sometimes emphasize the closeness, sometimes strengthen the distance.
I designed this center a low, spread building with a courtyard and main patio, each bubble itself has a "core" as well. Sometimes is a facility box like kitchen, sometimes is a patio open to the sky, which also make the facade of the building close and abstract without a lot of normal windows. The main and sub facility core connect both the vertical and horizontal space and mechanical ducts, like a good organ, adjust the health of the building.
underground parking floor plan
main structure system:
- concrete column
- concrete floor slab
- reinforced concrete shear wall

underground floor layer
ground floor plan

sapce for facility and verticle connection of HVAC ducts
main structure system:

- steel columns
- primary beams
- sub beams for metal flooring
- sub beams to carry the glass walls
- diagonal bridging to prevent the lateral movement

ground floor layer
close view of the structure

in case of here, apply lattice beam to support the angle where without a column beneath
looking from the park towards the courtyard

close view into ground floor
main stair and patio in the entrance hall

close view into ground floor
main entrance and terrace of restaurant

close view into ground floor
main entrance
reading room
mazzanine floor plan

first floor plan

space for facility and vertical connection of HVAC ducts
main structure system:
sub beams to carry the glass walls
steel columns
primary beams
sub beams for metal flooring
diagonal bridging to prevent lateral movement
lattice beams & bridging beams & lateral brace for big span
ground floor layer
close view of the structure

bridging beams and lateral brace

steel lattice beams formed with a combination of different sections
Architecture

First floor program layout

- museum
- patio
- foyer
- S auditorium
- M auditorium
- L auditorium
- conference & office
- bar
- terrace

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looking towards the courtyard from main stair

close view into first floor
looking towards the courtyard from foyer

close view into first floor
main patio and foyer

close view into first floor
a glance of the space: two void open to sky and rooms with different colors

close view into first floor
Architecture

exhibition space

workshop space

exhibition space

close view into first floor
learning and conference space

close view into first floor
terrace space

close view into first floor
perspective view looking towards courtyard from pavilion park

bubbles with similar character and function share the same materials and colors which is easy to recognize and brings subtle difference of space to people, while the glass envelope and three floor slab perfectly make the building a organic whole.
the glass and the metal reflect the surroundings and at the same time the light and landscape diffuse into the building
Basic strategy for HVAC

- Exhaust air
- Fresh air
- Return air is conveyed from the ducts back to the central plant for processing and recirculation
- Dampers regulate the draft in air duct, in and out
- Packaged HVAC system unit incorporating a fan, filters, compressor, condenser and evaporator coils for cooling and heating, monitors climate and allows control of ventilation and temperature.
- Small terminal units mounted below a window or in openings cut into the exterior wall of each served space
- High-velocity ducts to supply primary air to each space and further heated or cooled by local thermostats, the thermostats control water flow over the coils to regulate the air
Natural and Mechanical Ventilation

trees in courtyard improve the air quality and act as a windbreak

extract drawn by stack effect through patio

air passes through floor or ceiling hollow core

winter sun can enter the glass facade and warm internal space

supply air duct and outlet in the ceiling

radiant cooling heating from floor ceiling slabs
Sky Light: While winter the window of the sky light will be close to keep the wind and cold air out and brings sunlight into the interior to keep space warm;

While summer the window will be open to introduce the fresh air and wind as natural ventilation, but not get too much direct light.
Detail 1:
Foundation and Ground floor
Detail 2: Exterior glass wall of Courtyard

- 5 mm clear anodized aluminum
- t.o. metal facia
to beams
- b.o. girders
to ceiling
- 10mm+10mm low iron laminated glass
- stainless steel mesh
- steel grating
- sound insulation
- concrete slab
- radiant heating
- concrete slab
- roofing membrane insulation
- vapor barrier
- metal decking
- radiant heating
- gyp.blad
- HEB 300x400 beam
- 150mm steel column
  with fire protect coat

Detail 2
Detail 3:
Roof and Ceiling
Detail 4:
Interior and Exterior

- Steel connect element
- Radiant heating
- Steel channel section
  - Beam 480mm deep
  - Steel I beam 360mm deep
- Shining stainless steel mesh on grating
- Fix element rectangle hollow steel
- Wood handrail
- Steel platebar 8mm+8mm tempered glass
- 5mm clear anodized aluminum
Detail 5: Roof (inside and outside)

- Roofing membrane
- Sponge tubing and joint filler
- Insulation laid to fall slope 1.5%
- Sunshine absorbed by the mass of loadbearing layer
- Rainwater prevented by waterproofing and water run-off layer
- Roof flashing
- 5mm clear anodized aluminum
- Shining stainless steel mesh on grating
- Connection of the aluminium & shining steel mesh
Detail 6:
Beams and Bridging in L Auditorium

lattice beam made from combinations of various steel sections

diagonal bridging to prevent lateral movement of joist chords

detail 6
Architecture

Detail 7:
Sky light window

detail 7
slope 1.5%

outside

inside

box window for natural ventilation

sealant joint

colored steel frame
Detail 8:
Metal mesh envelope of Museum

- 5mm clear anodized aluminum
- 200mm reinforced concrete and 80mm insulation layer
- 2mm corrugated reflection metal (tin plate)
- Concealed framing structure
The End

Thank you for your attention!

Welcome comments and questions