Windscape
Meander through TU Delft greatest achievements
Presentation overview

Research - Methodology - Design
Site Research
Tutors: H. Bier, N. Biloria and K. Vollers

Station & City Center

Site

Former House

TU Delft Campus
The current terrain of the TU Delft reflects the way of thinking in the '60. Big solitaire buildings that do not play a role in the public spaces. (FlowMotion)

The use of space changes over time. We must leave the time that every faculty was fixed in their own castle (Executive Board, 2012).
Entrance from parking space and creative companies

(Programme Document TU Delft)

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Functions
Functions
Exhibition
(based on current Delft Exhibition Center)

- Foyer: 20 m²
- Exhibition Light: 40 m² x 8
- Exhibition Heavy: 60 m² x 4
- Exhibition Closed Rooms: 40 m² x 6
- Exhibition Offices
  - Meeting Halls: 100 m² x 4
  - Workshop Spaces: 100 m² x 5

Restaurant

- Kitchen: 40 m²
- Sitting place: (300*4.5)m²

Study Places: 40 m² x 6

Climbing

- Public Space: 1000 m²
- Souvenir Shop: 50 m²
- Bycicle Shed: 300 m²

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Ecology Research
Water
Green
Solar Analysis

Near EWI there is a lot of shadow. But the sun reaches almost the entire site.
Design Brief

- An Exhibition that reflects the ambition of the TU Delft in a non-standard architecture manner (hyperbody).
  - Solving the wind issue at the tram location
  - around 7000 m2
- Connecting the EWI building (restaurant in particular) to the Mekelpark
- Keep the green structure intact and leave space open for future water connections
Wind Research
Used Windprofiles for Combination

- Wind Coming Straight from Drebbelweg (SouthWest)
- Wind Coming Straight from MekelPark (NorthEast)
Used Windprofiles for Combination

Wind Coming Straight from Drebbleweg (SouthWest)

Wind Coming Straight from MekelPark (NorthEast)
Wind is guided over pedestrians-cyclist and tram users
Wind pressure in relation to wind speed
Wind pressure in relation to wind speed and shape
Air Speed in Pipe caused by Underpressure
Wind Research:

The pressure increases enormously when wind blows more rapidly. A small scale element (s-shape, shield, cone) has almost the same ability to create underpressure and overpressure as a big scale element (EWI-block). The cone shape seems preferable because its uniform in profile in almost every wind direction. Natural ventilation can be reached in a closed system. The openings (inlet and outlet) determine the ventilation speed.
Program Methodology

Marvin Valk - Hyperbody
### Programme Features

<table>
<thead>
<tr>
<th>Function Name</th>
<th>Solar Demand</th>
<th>Ventilation Demand</th>
<th>Fixed Position</th>
<th>Noise Production/Sens</th>
<th>Cell Type</th>
<th>Open Air</th>
<th>Cell Type</th>
<th>Appearance</th>
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<tbody>
<tr>
<td><strong>Restaurant</strong></td>
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</tbody>
</table>

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Cell type A (Toilet)
No need for sunlight, but a need for ventilation, also a toilet cannot be used for different activities than toilet, so it has a fixed position. It doesn’t have a lot of noise production and is not sensitive to sound.

Cell type B (Exhibition space)
Sunlight demanded and a need for ventilation. An exhibition space can be used for different uses: when desks are added it can easily become a study space. It does have noise production and is not sensitive to sound.
### Programme Features

<table>
<thead>
<tr>
<th>Function Name</th>
<th>Noise Production/Sens</th>
<th>Cell Type</th>
<th>Push</th>
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<td>A,H</td>
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<td>- Festival Ground</td>
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<td><strong>Farming</strong></td>
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<td>Glass House</td>
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</tr>
</tbody>
</table>

**Cell type A (Toilet):**
Does not want to be close to other toilet.

**Cell type B (expo):**
Wants to be close to toilet.
Programme Features

A
- Toilet
- Service Desk
- Kitchen
- Storage
- Cleaning
- Mechanical Support
- Seating/Table (Study)
- Glass House
- Seating
- Coffee Corner
- Exhibition Space
- Gather Space
- Lounge
- Bar & Stand Space
- Bicycle Shed
- Climbing Wall
- Festival Ground

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Programme Features

Inside
- Toilet
- Service Desk
- Kitchen
- Storage
- Cleaning
- Mechanical Support
- Seating/Table (Study)
- Glass House

Semi (Possibility to open)
- Seating
- Coffee Corner
- Exhibition Space
- Gather Space
- Lounge
- Bar & Stand Space
- Bicycle Shed
- Climbing Wall

Outside (Not indoor)

Internal Relation:
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Internal Condition: Different cell
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Tutors: H. Bier, N. Biloria and K. Vollers
Internal Condition: Same kind of cell
Tutors: H. Bier, N. Biloria and K. Vollers
External Conditions
Tutors: H. Bier, N. Biloria and K. Vollers
External Conditions: Sun
Tutors: H. Bier, N. Biloria and K. Vollers
External Conditions: Wind
Tutors: H. Bier, N. Biloria and K. Vollers

Vwind = 12 m/s
External Conditions: Site Restriction
Tutors: H. Bier, N. Biloria and K. Vollers
External Conditions: Simulation
Tutors: H. Bier, N. Biloria and K. Vollers
Corresponding Videos:
1. Growth of Route (1:00min)
2. Generated Route Exhib
2. DifferenceSlopeHeight

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Corresponding Videos:
1. Growth of Route (1:00min)  
2. Generated Route Exhib  
2. DifferenceSlopeHeight

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Slope Setting 1 (max rise 20 degrees)

Corresponding Videos:
1. Growth of Route (1:00min)
2. Generated Route Exhibit
2. Difference Slope Height

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FloorGrowth

Corresponding Video: 3.Growth

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FloorGrowth
FloorGrowth

Height of layers is determined by growth. (A study cell can't be placed closer than 2.5 m from another).
Simulation Outcome
Simulation Outcome

Multiple Ways to go from A - B
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Design
Marvin Valk - Hyperbody
Reference

Dalain National Congress center (China)
Coop Himmelblau

Quality
- Sculptural (eye-catcher)
- Continuous (wind)
Reference
Dalain National Congress center (China)

Quality
- Sculptural (eye-catcher)
- Continuous (wind)

Build Up
- Horizontal Power Lines
- Segmentation and Vertical Powerlines
From Sculptural shape, function and routing to building
From Sculptural shape, function and routing to building

Concrete Pillars ( “position of vertical powerlines” )
Functions of segment

- Open Energy Zone
- Exhibition
- Study
- Entrance Hall
Open Energy Zone
Exhibition
Study
Entrance Hall

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### Skin Typologies

<table>
<thead>
<tr>
<th>Name</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gill</td>
<td>Very Sloped Surface</td>
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<tr>
<td>Schub</td>
<td>Sloped Surface</td>
</tr>
<tr>
<td>Mapped</td>
<td>Top Floor Building</td>
</tr>
<tr>
<td>Cutted</td>
<td>Entrance and restaurant</td>
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<tr>
<td>Air Inlet</td>
<td>Spreaded</td>
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</table>

![Diagram of building with labels for skin typologies](image)
Segment in Site

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Entrance
Floor plan 0 (z= 1500 +P)
Heavy Exhibition
Floor plan 1 (z=5100 +P)
Floor plan 3 (z=11000 +P)
Floor plan 5 (z= 23000 +P)
Floor plan 6 (z= 26000+P)
Organisational Diagram

Building specification

- total area: 9000 m²
- landscape area: 1400 m²
Landscape Diagram

Building specification
total area: 9000 m²
landscape area: 1400 m²
Organisation
Floor Plan ~0 (+1500mm)

Key
0. Tram Stop
1. Service Desk
2. Heavy Exposition
3. Exposition Workspaces
4. Bicycle Parking (-2.5 m)

A. Roof entrance
B. Building entrance

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Organisation
Floor Plan ~1

Key
0. EWI Restaurant
1. Lecture Halls EWI
2. EWI Roof terrace
3. Workspaces Students
4. Exhibition

A. Roof entrance
B. Building entrance

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Organisation

Floor Plan ~2

Key

0. EWI Restaurant
1. Lecture Halls EWI
2. EWI Roof terrace
3. Workspaces Students
4. Exhibition
5. Meeting space
6. Terrace

A. Roof entrance
B. Building entrance

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Organisation
Floor Plan ~3

Key
0. EWI Restaurant
1. Lecture Halls EWI
2. EWI Roof terrace
3. Workspaces Students
4. Exhibition
5. Meeting space
6. Terrace

A. Roof entrance
B. Building entrance

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Organisation
Floor Plan ~4

Key

0. EWI Restaurant
1. Lecture Halls EWI
2. EWI Roof terrace
3. Workspaces Students
4. Exhibition
5. Meeting space
6. Terrace
7. Restaurant
8. Open terrace

A. Roof entrance
B. Building entrance

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Organisation

Floor Plan ~5

Key

0. EWI Restaurant
1. Lecture Halls EWI
2. EWI Roof terrace
3. Workspaces Students
4. Exhibition
5. Meeting space
6. Terrace
7. Restaurant
8. Open terrace

A. Roof entrance
B. Building entrance
Organisation
Floor Plan ~Top

Key

0. EWI Restaurant
1. Lecture Halls EWI
2. EWI Roof terrace
3. Workspaces Students
4. Exhibition
5. Meeting space
6. Terrace
7. Restaurant
8. Open terrace
9. Wind energy zone

A. Roof entrance
B. Building entrance
Construction
Marvin Valk - Hyperbody
Column / Steel Frame

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P4 Marvin Valk Hyperbody  91/97
Build up Steel Frame

1
2
3
4
5

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Inbetween floor

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Prefabricated Steel frames
Thank you for your attention