Design of an art center in The Hague on the location of American Embassy
Focusing on spatial composition and influence of building envelope on daylight aspects in an art center
Opbouw period (Marcel Breuer 1956 – 1959)

Problem definition
Opbouw (past & current situation)
Opbouw (past & current situation)
American embassy (current situation)
Approach to design

• Questionnaire
• Evaluation model
• Perception studies
1) Do you know where the American Embassy is Situated?

- Yes: 75%
- No: 25%
The building is not very exciting, it needs to be attractive.

It does not suit the place, it’s ugly.

The fences have ruined the corner.
Comparision (current & new situation)
Fuzzy neural tree for human-like assessment of soft objectives

Fuzzy logic operations at neurons

Decision variables

Evaluation model
Fuzzy neural tree (group-work 1)

1. No Intervention
2. Renovation Art centre
3. New Art Centre

Evaluation model

Exhibitions
- Art Related
- Not Art Related
- Locals

Attractions
- Tourists
- Interaction
- New Job
- Better Job

Functions
- Horeca
- Existing Stores

Transport network
- Public Transport
- Pedestrian
- Cycling
- Cars
- Boats

Urban context
- Urban Squares
- Green Areas

History
- History
- Style Context

Recreational
- Exciting Events
- People

Banks / Money Related Business
- Job
- Tourism Effect
- Social
- Traffic

Social
- Economic
- Accessibility
- Public Areas
- Architecture

Coherence of Space

Sustainability

Safety

Prosperity

High Liveliness

Good Neighbourhood

End node
Node
Analysis
Fuzzy neural tree (group-work 1)

Evaluation model

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Social
- Economic

Accessibility

Public Areas
- Architectures

Coherence of Space
- Sustainability
- Safety
- Prosperity
- Good Neighbourhood

High Liveliness
0.74
0.80
0.91

Prosperity
0.59
0.70
0.84

Safety
0.86
0.86
0.86

Sustainability
0.70
0.77
0.85

Coherence of Space
0.78
0.70
0.81
Public transport

Potential number of people per grid
Local public transport roots

Evaluation model

Average number of trams passing by site per day

426 = Average number of trams passing by site per day
Pedestrian analysis

- Pedestrian analysis brings information on the accessibility of the site and number of people.
  - Possibility of building a public building in the area
  - Number of visitors
  - Entrance orientation
  - Function’s situation
  - Perception Analysis
Pedestrian analysis

- Site connects to all main routes of the neighbourhood
- 24,444 people / day
- Node 1 is the most crowded
- Perception Analysis will take place at Node 1, 2, 7
- Entrance should be located towards Node 1
- Public related functions should be located also more towards Node 1
Computational approach

• Re-connecting to the Urban Fabric
• Providing a Public Space (fluid spatial organisation)
• Lightness (not touching the ground)

• Bringing transparency back to the site!
Evaluation model

Fuzzy neural tree in grasshopper
Fuzzy neural tree

1. Existing Building
2. New Design

- Urban Nodes
- Green Areas
- Visual Connections
- Lightness
- Accessibility of Parts
- Functional Separations
- Accessibility (entering the building area)
- Visibility of the Entrances

Movement Connection among Public Areas

Urban Performance

Visual Aspects

Coherence of Space

Flexibility

Building Performance

Inviting
Fuzzy neural tree

Evaluation model

1. Existing Building
2. New Design

- Urban Nodes
  - Movement Connection among Public Areas
  - Urban Performance
- Green Areas
- Visual Connections
- Lightness
- Accessibility of Parts
- Functional Separations
- Accessibility (entering the building area)
- Visibility of the Entrances

- Visual Aspects
- Flexibility
- Inviting
- Building Performance

Coherence of Space
Reconnecting to the urban fabric
Reconnecting to the urban fabric
Reconnecting to the urban fabric
Reconnecting to the urban fabric

Concept
Reconnecting to the urban fabric

Communicating in all directions

Merging with Public Space

Passing by & through
Reconnecting to the urban fabric
Reconnecting to the urban fabric
Reconnecting to the urban fabric
Sunlight aspects
Fuzzy neural tree

1. Existing Building
2. New Design

- Urban Nodes
  - Movement Connection among Public Areas

- Green Areas
  - Urban Performance

- Visual Connections
  - Visual Aspects

- Lightness
  - Coherence of Space

- Accessibility of Parts
  - Flexibility

- Functional Separations
  - Building Performance

- Accessibility (entering the building area)
  - Inviting

- Visibility of the Entrances
This sensitivity is expressed in the value of the slope and is sometimes called the "rate of change" because it measures the rate of change in y as a result of a change in x.

On our knowledge model, we can address which nodes we may improve to get the higher increase in the overall neighbourhood goodness.
Sensitivity analysis

Evaluation model

Urban Nodes
Green Areas
Visual Connections
Lightness
Accessibility of Parts
Functional Separation
Accessibility (entering the building)
Visibility
Sensitivity analysis

Evaluation model

- Urban Nodes: 0.55 / 0.75
- Green Areas: 0.50 / 0.58
- Visual Connections: 0.48 / 0.79
- Lightness: 0.50 / 0.58
- Accessibility of Parts: 0.64 / 0.81
- Functional Separation: 0.61 / 0.79
- Accessibility: 0.50 / 0.76
- Visibility: 0.49 / 0.74
perception analysis
Joint perception analysis
Complexity in spatial organization

Perception studies
Complexity in spatial organization

Perception studies

- Exhibition Space
  - Spaciousness
  - High Functionality
  - Good Proportion
  - Less Perception

- Transition Space
  - Spaciousness
  - High Functionality
  - Good Proportion
  - Visual Connection (context)

- Public Space
  - Spaciousness
  - High Functionality
  - Good Proportion
  - Less Perception

- Good Spatial Composition
3D cross-section (B-B’)

Interior organization

Administration
Orientation Gallery
General Public (lobby, shop, café, …)
Service Areas (mech. room, storage, WC, …)
Multi-purpose & Collection
Exhibition Space
3D longitudinal-section (B-B’)

Interior organization

- Collection
- Exhibition Spaces
- Vertical Circulation
Circulation

Interior organization
Circulation

Interior organization
Circulation

Interior organization
Longitudinal section (A-A’)

Collection
Vertical Circulations
Exhibition Spaces
Receiving & Shipping
Ground floor (public space)

Interior organization

- Entrance
- Shop
- Locker
- Cafe
- Lobby
- Deck
First floor (exhibition space)

Orientation Gallery

Exhibition Space
Second floor (administration floor)

Interior organization
Structural system overview
Structural system overview
Structural system overview
Structural system overview
Structural system overview
3D views
Partial details

1. Bed of gravel, bituminous roof sealing layer, polystyrene insulation, vapour barrier, rein. conc. composite slab with steel decking sheet, still I beam, louver suspended soffit

2. Steel sheet covering, thermal insulation, vapour barrier, trapezoidal section sheet steel, SHS column, gypsum plasterboard

3. Polythene separation layer, composite wood board, dust palliative coating, , rein. conc. composite slab with steel decking sheet, still I beam, thermal insulation, Steel sheet covering

Floor & Diagrid structure connection detail
3D views

Materialization
3D views
3D views
Joint perception analysis
Joint perception analysis
Joint perception analysis
Evaluation

- Fuzzy neural tree
- Perception analysis
Thank You
time for questions...