Digital Manufacturing Design Centre

Neighbourhood and Industry in Harmony

PILSEN | CHICAGO | ILLINOIS | USA
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ABOUT PILSEN
Pilsen: Located at southwest of Chicago’s city centre, the Loop
Pilsen: Long tradition of Immigrants and Industrial heritage through the history
Pilsen: Now a Mexican enclave
Current situation:
Neighbourhood and Industry
Current situation:
Heavy industries in corridor: bland, dirty,
Unglamorous image for the area’s development
Heavy Industry inside the Industrial Corridor led to pollutions and bad health of the neighbourhood. Which led to numerous protest
Current Situation: Scale Mismatch/Difference between neighbourhood: scale of person and Industrial zones, scale of ultra-large industrial complexes
Current situation:
Harsh border between neighbourhood and industry
Isolating and separating industry and neighbourhood
Current situation:
Harsh border between neighbourhood and industry
Current situation:
Vacancy and Decay after old industry and manufacturing activities left
Current situation:
Vacancy and under-management -> lack of public green spaces and quality public spaces
Conclusion: There are frictions between neighbourhood and industry in physical and psychological way. Physical: Scale differences, Harsh Border and Vacancy. Psychological: Bland, Dirty, Pollutions, Unhealthy environments...
Duality of Industry in Pilsen:

Bland, Dirty, Unglamorous for the image of the area
Duality of Industry in Pilsen:

Identity of Place: Industrial heritage and tradition of Industry continuing through the history:

- Pilsen has long tradition of manufacturing and industry...

- Culture in Pilsen is inherently tied up with its industrial past..

- Manufacturing and industry makes what Pilsen is now....
The permanent feature of Pilsen is defined by the co-existence of its community and industry. It made and breaks Pilsen in its history. For Pilsen to thrive as a neighborhood it must keep this urban symbiosis.
Towards the Future, facing the new challenges....
URBAN STRATEGY
The New Challange, ask for new Urban Questions....

How to create understandings between both parties: neighbourhoods and Industry?

In which ways could the industry and neighbourhood contribute to each other in Pilsen in the future?
Concept Image: The Pilsen Mediating Realm
1. Current Situation

Industry is splitting the neighbourhoods. The alienating landscape is the industrial corridor.
2. Aim

The goal is to isolate the neighbourhoods and industry, by separating them and also ‘connects’ them with a mediating zone, a soft border instead of a harsh one.
3. Identifying existing main connections

The current main roads become the basis for the structure of the mediating realm.
4. Extruding connecting axes into a surface

Once the main connections have been identified, at sufficiently accessible intervals, they are extruded out to form the basis of the mediating zone’s surface.

Boundary is defined by private residence on neighbourhood side and functioning industrial plots.
5. Designating potential mediating zone for Pilsen

The Pilsen side of the mediating zone can be divided into roughly three main parts.

1. There is a horizontal belt running along the former division between industry and neighborhood.
2. There’s are the new connections running through the industrial corridor,
3. The zone also permeates into the residential area.
6. Populating zone with projects

The mediating zone is activated through a series of projects and interventions, these can range from small temporary pop-ups to large scale renovations or developments.

The Mediating Zone should contain both Industry and Neighbourhood related functions.
Neighbourhood functions to mediating zone

Industry functions to mediating zone
Thematic areas within Pilsen

Distribution of the general thematic across the area. The design proposes to take this as a starting point and elaborate on it.
Projects on mediating zone as a means to bring Pilsen together

Main focus lies on industry-initiated projects, but also neighbourhoods initiated projects.
Conceptual Layout and Program of final mediating zone in Pilsen
Master Plan: The Pilsen Mediating Realm
ARCHITECTURE
What to Design?
- Following New Industry Perspective and Ambitions
- Follow and continuous development of Pilsen
- The Proposal should contributes to both neighbourhoods and Industry; bring them together!
New Industry Perspective and Ambitions
Governmental support and ambitions for new advanced, clean and high tech industries

In 2011 President Obama announced the formation of the “Advanced Manufacturing Partnership (AMP), a national effort bringing together industry, universities, and the federal government to invest in the emerging technologies that will create high quality manufacturing jobs and enhance our global competitiveness.
Federal funded organisations and institutes.
Seeking for new (young) talents and new workforce

JOIN THE REVOLUTION IN AMERICAN MANUFACTURING.

WE ARE DMDII
The Digital Manufacturing and Design Innovation Institute, a federally-funded research and development organization, encourages factories across America to deploy digital manufacturing and design technologies, so those factories can become more efficient and cost-competitive.

TRANSFORMING AMERICA
Working with partners in industry, academia, the nonprofit sector and government, DMDII sponsors research projects in digital manufacturing and design; disseminates the lessons learned; and helps educate the workforce of tomorrow.
Industry 4.0 In this model people make their own products through digital fabrication methods. Process are highly automated, less employees are needed and therefore the production cost will be lower and therefore the cost of products should be lower.
3D Printing, Prototyping and Robots as helping ‘hands’
Interact between people and industry:
FabLabs, MakersLab, Prototyping spaces

In the way of interaction between people and possibilities of the new technologies. Places where professionals and beginners meets, discuss and creates. The this maker-movement has spread around the world and is manifested by many so-called MakerLabs and Fablabs appearing in cities.
(Future) Development of Pilsen
Proposed new redevelopment plan of Fisk: Sustainable Park / High Tech Industry
FOLLOW THE TRENDS:
Growing from East to West, Starting From Halsted Avenue

Current programs of Halsted Avenue. The art galleries and small businesses are the most present on this street. Furthermore, along this street, there are small scale buildings with mostly mixed commercial functions.
Several key creative art related buildings are located on the S. Canalport Ave and Cermak Road.

Follow this trend, this type of industries will grow gradually from the east part of Pilsen to the west part of Pilsen. In certain way-from South Canalport Avenue to Cermak Road. Some of the old industrial buildings are already reused for art related purposes.
Trend: **Growing diversity** in Pilsen due to gentrification.

Change in Race and Ethnicity: Between 2000 and 2010, Pilsen is becoming more diverse, the Hispanic and Latino population is declining by 25%, the Asian population and white population are increasing.
Population and Diversity

Trend: **Rise of population of Pilsen in the future.**

Population is now mainly composed of young communities, 1/3 of their population is under 19 years. Furthermore, like the City of Chicago, Pilsen are projected to grow over the next several decades, according to CMAP’s projections, Pilsen could gain approximately 2200 households by 2040.
Proposal: Let neighbourhood and industry work together and contribute to each other!
Core Concept: Bring Neighbourhood and Industry Attributes together

NEIGHBOURHOOD ATTRIBUTE

CREATIVITY

NEIGHBOURHOOD + INDUSTRY ATTRIBUTES
NEW ADVANCED MANUFACTURING

INDUSTRY ATTRIBUTE
Proposal: Digital Manufacturing and Design Center as mediator
The Master plan theme designated the theme for the future of Pilsen, according to the future trends. The proposal is interesting to locate middle between theme small scale manufacturing and Arts, because the center should have program of art design and manufacturing.
Global Master Plan Theme
The chosen location is on the east side of Pilsen, near the cross point between S Canal Port Avenue and W Cermak Road.
The mediating zone will mediate between industry and neighbourhood and channelling/attract people to this place. The proposal will have both ‘faces’ that create interaction between those.
Situation Analysis: Infrastructure

- Car Roads
- Slow traffic
- Truck Road
Situation Analysis: Surrounding Functions

[Map showing the surrounding functions such as Creative Arts, Civic, Commercial, etc.]
Lacuna Art Loft

Mana Arts

West Cermak Building

Dvorak Park
Program Concept
Traditional Process

Designers/Talents
Creativity/Knowledge

Industry/Company
> Manufacturing/Production

The Mass
> Showcase/Retail
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Creativity/Knowledge

Make/Production

Showcase/Retail

NEIGHBOURHOOD AND INDUSTRY FACES

INDUSTRY FACES

NEIGHBOURHOOD FACE

Interaction
Digital Design and Manufacturing Centre

NEIGHBOURHOOD AND INDUSTRY FACES

Creativity/Knowledge
ACTORS
- Professional Designers
- Beginner Designers
- Educating members/ Teachers
- Talents
- Students
- Creative Artists
- Industrial company staffs

INDUSTRY FACES
Make/Production
ACTORS
- Industry Professionals
- Industrial leaders
- Manufactures
- High tech Education Institutes

NEIGHBOURHOOD FACE
Showcase/Retail
ACTORS
- Retailers
- Families
- Youth
- Visitors
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Creativity/Knowledge
ACTORS
- Professional Designers
- Beginner Designers
- Educating members/ Teachers
- Talents
- Students
- Creative Artists
- Industrial company staffs

MAIN ACTIVITIES:
Design
Work
Education

Make/Production
ACTORS
- Industry Professionals
- Industrial leaders
- Manufactures
- High tech Education Institutes

MAIN ACTIVITIES:
Prototyping
Manufacturing

Showcase/Retail
ACTORS
- Retailers
- Families
- Youth
- Visitors

MAIN ACTIVITIES:
Retail
Exhibiton
Meeting
Leisure

INDUSTRY FACES

NEIGHBOURHOOD AND INDUSTRY FACES

Interaction

Interaction

Interaction

Interaction
Shape development: According to Urban Conditions
1. Key buildings and urban elements will be connect by visual lines
2. Horizontal condition: Urban boundary of mediating zone, as horizontal boundary
3. Vertical conditions: Vertical streets and park creates boundaries, push lines and cut through lines.
4. Reshape the main line to horizontal and vertical conditions: the main line bounces inside the horizontal mediating zone, vertical streets creates openings in the main line, park cuts it through.
5. Within the main routing, lines connecting the end points
6. Creating spaces and functions along the main line
7. Fine-tuning the form, create the surroundings
Design themes
Materialisation and Character: Industrial and Transparency
Current material and character of Pilsen’s industrial buildings: Closed heavy, feeling: The Spirit of Place
Contrast to the closed atmosphere of manufacturing buildings in the corridor. open character, transparency, inviting. Continue the Spirit of Place in a more ‘open’ way.
Accessibility
Interior: Industrial, large open and flexible spaces
Inviting, accessible GreenRoof: for public functions such as roof garden, leisure. Stormwater buffer and water collecting.
Building Organisation
Workspaces
Studios and Gallery
Manufacturing and Social Space
Manufacturing and Social Space
Meeting / Exhibition Space
Roof to west
Roof to east
Vertical Circulation
BUILDING TECHNOLOGY
Structure
Construction materials

Prefab hollow slap: Massiveness, stiffness with concrete pressure layer, Floor heating

Fire proof coated castellated beams: Ducts and wiring, light, cheap, fire safety

Round column, concrete filled: more flexible connections than HEB and square columns, fire safety
Dilatation and In-situ slabs on the corners
Flexibility: flexible walls and glass
Stiff connection Column and Beam

Tafelconstructie: momentvast aan de verbindingen en kracht afvoeren naar fundering

Structure principle: "Table-structure"
Structure Exploded View

Roof:
- Green roof system with water collection function

Floorslabs:
- Kanaalplaat HPV260-5
- Kanaalplaat HPV400-4

Columns and beams:
- Main beam: Raatligger HEB400
- Secondary beam: H-ligge HRA250
- Columns: Round steel columns filled with concrete
- Stiff connection between beams and columns
Climate and sustainability
Facade

- Semi-transparent
- PV Sunshading: Generates power and prevents overheating in hot summerdays
- Enough ventilation for the PV’s -> higher efficiency
3838 m² of PV Solar Shading panels provides 1330497 kWh energy annually.

Residential Electricity Consumption Per Capita

The slope of this curve indicates whether residential electricity consumption is growing faster (upward slope) than population (downward slope) in Illinois. The smaller the slope (more horizontal), the stronger the correlation between residential electricity consumption and population growth.

Source: EIA SEDS database

| Per capita consumption of electricity in Illinois homes in 2011 (kWh) | 3,659 |
| U.S. per capita consumption of electricity in homes in 2011 (kWh) | 4,566 |
| State rank | 35 |

1330497 kWh/3659 kWh = providing 363 peoples annual electricity consumption or 121 households in state Illinois.
Green Roof

- Stormwater mitigation
- Roof Garden
- Water collecting
Bufferzone and ventilation diagram

Winter:
- Buffer warm up by Solar irradiation
- Energy exchange > WTW ventilation, heat pump> aquafier
- Private spaces: extra climatized if needed
- Collective spaces: extra climatized if needed

Summer:
- Buffer less warm up by using PV sunshading
- Energy exchange > WTW ventilation, heat pump> aquafier
- Private spaces: extra climatized if needed
- Collective spaces: extra climatized if needed
Scheme Summer

Hybrid Ventilation with WTW

Natural ventilation: Pre-cooled if necessary

- Floor cooling
- Pre-cooled natural ventilation

Heat Pump with heat exchanger in Technical/Storage room

Solar sun shading rotate with the sun
Generate enough power (1330497kWh/annum) for 120 households annually in Chicago

Aquifer (Geothermal Storage), 200 meter deep

Electricity Transformer Battery
Scheme Winter

Hybrid Ventilation with WTW

Natural ventilation:
Pre-heated if necessary

Solar sun shading rotate with the sun
or let more sun warmth in to warm up the buffer spaces

- Floor Heating
- Pre-heated natural ventilation

Heat Pump with heat exchanger in Technical/Storage room

Generate enough power (1330497kWh/An) for 120 households annually in Chicago

Aquafier (Geothermal Storage), 200 meter deep

Electricity Transformer Battery
From S. Canalport Ave.
From Cemark Rd.
Digital Design and Manufacturing Centre > Neighbourhood and Industry in Harmony.
THANK YOU.