Adaptable Community Centre

a multifunctional urban shelter to prepare

Diederik de Jonge
Peiling 5 | 28 juni 2013
Adaptable Community Centre

a multifunctional urban shelter to prepare
Adaptable Community Centre

a multifunctional urban shelter to prepare
Adaptable Community Centre
ia multifunctional urban shelter to prepare
making plans for one year,
we plant rice.

making plans for ten years,
we plant trees.

making plans for one hundred years,
we prepare people.

-old Chinese saying
pre-disaster
- fascination
- research focus
- problem statement
- proposed solution
- phases

during-disaster
- location
- concept
- climate
- plans

post-disaster
- materialization
- facade
- conclusion
pre-disaster
fascination
research focus
problem statement
proposed solution
phases

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**pre-disaster**

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pre-disaster | community center in its pre-disaster phase
pre-disaster

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“Everyone has the right to a **standard of living** for health and well-being of himself and his family, including **food, clothing, housing, medical care**, necessary **social services** and the right to **security** in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.”

Universal Declaration of Human rights (Article 25.1)
disaster hot zones of the world
focus areas in the research

urbanisation

natural disaster

poverty & displacement
focus areas in the research

urbanisation

natural disaster

poverty & displacement
IN 2008 more of us lived in cities than in rural areas.
% of population living in cities
focus areas in the research

urbanisation

poverty & displacement

natural disaster
Drought 7%
Storm 23%
Epidemic 12.4%
Volcano 0.2%
Landslide 1.3%
Earthquake 43.4%
Flood 12.7%

Source: EM-DAT: The OFDA/CRED International Disaster Database
Focus areas in the research:

- Urbanisation
- Natural disaster
- Poverty & displacement
1 billion
people call ‘slums’ home today

The UN defines a slum as a household that lacks access to one or more of the following:

- access to improved water
- access to improved sanitation
- security of tenure
- durability of housing
- sufficient living area
2 billion people call ‘slums’ home tomorrow

The UN defines a slum as a household that lacks access to one or more of the following:

- access to improved water
- access to improved sanitation
- security of tenure
- durability of housing
- sufficient living area
urbanisation

natural disaster

poverty & displacement

linking the focus areas
Source: Shelter after Disaster

Picture: Manila, Tondo Slum, 80,000 people per square meter
pre-disaster
  fascination
  research focus
  problem statement
  proposed solution
  phases

during-disaster
  location
  concept
  climate
  plans

post-disaster
  materialization
  facade
  conclusion
high density urban slum
high density urban slum

disaster strikes
pre-disaster problem statement
Pre-disaster | Problem Statement

High density urban slum

Disaster strikes

Current situation
pre-disaster | problem statement
**Problem Statement**

High density urban slum

Disaster strikes

(proposed situation)
pre-disaster problem statement
high density urban slum

proposed situation

pre-disaster solution...
High dense urban slum

Proposed situation

Slum-upgrading...
pre-disaster
fascination
research focus
problem statement
proposed solution
phases
during-disaster
location
concept
climate
plans
post-disaster
materialization
facade
conclusion
prevent

urban shelter solution:

strong and adaptable construction
slum-upgrading:
adding sanitation and other facilities in combination with education
prevent  prepare  cure

save shelter:
social stabilization by community spaces and proper sanitation
prevent  prepare  cure  re-build

build better:
proposed solution
proper relief aid and re-building by multifunctional rooms and training facilities
finance

prevent prepare cure re-build

governmental organizations

pre-disaster | proposed solution
management

prevent | prepare | cure | re-build

governmental organizations

slum-upgrading organizations
Pre-disaster | Proposed solution
relief-aid

prevent | prepare | cure | re-build

governmental organizations
slum-upgrading organizations
local communities
non-governmental organizations
pre-disaster
- fascination
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- problem statement
- proposed solution
- phases

during-disaster
- location
- concept
- climate
- plans

post-disaster
- materialization
- facade
- conclusion
stage 1: Education

- Information centre
- General education
- WASH - facilities
- Build Better
- Flood resistant
- Typhoon resistant
- Community mobilisation
- Health care
- Accessibility
- Emergency office
- Re-construction
- Build Back Better
- Emergency Shelter
- Safety boxes
- Food/Water supply
- Public space
- General items
- Communication
- Earthquake resistant

stage 2: Facilitation

- Information centre
- General education
- WASH - facilities
- Build Better
- Flood resistant
- Typhoon resistant
- Community mobilisation
- Health care
- Accessibility
- Emergency office
- Re-construction
- Build Back Better
- Emergency Shelter
- Safety boxes
- Food/Water supply
- Public space
- General items
- Communication
- Earthquake resistant

stage 3: Alarming

- Information centre
- General education
- WASH - facilities
- Build Better
- Flood resistant
- Typhoon resistant
- Community mobilisation
- Health care
- Accessibility
- Emergency office
- Re-construction
- Build Back Better
- Emergency Shelter
- Safety boxes
- Food/Water supply
- Public space
- General items
- Communication
- Earthquake resistant

stage 4: Sheltering

- Information centre
- General education
- WASH - facilities
- Build Better
- Flood resistant
- Typhoon resistant
- Community mobilisation
- Health care
- Accessibility
- Emergency office
- Re-construction
- Build Back Better
- Emergency Shelter
- Safety boxes
- Food/Water supply
- Public space
- General items
- Communication
- Earthquake resistant

stage 5: Relief Aid

- Information centre
- General education
- WASH - facilities
- Build Better
- Flood resistant
- Typhoon resistant
- Community mobilisation
- Health care
- Accessibility
- Emergency office
- Re-construction
- Build Back Better
- Emergency Shelter
- Safety boxes
- Food/Water supply
- Public space
- General items
- Communication
- Earthquake resistant

stage 6: Re-building

- Information centre
- General education
- WASH - facilities
- Build Better
- Flood resistant
- Typhoon resistant
- Community mobilisation
- Health care
- Accessibility
- Emergency office
- Re-construction
- Build Back Better
- Emergency Shelter
- Safety boxes
- Food/Water supply
- Public space
- General items
- Communication
- Earthquake resistant

pre-disaster | phases
minimum design requirements
standards
construction requirements
location/climate

chapter 4

ARCHITECTURE FOR CRISIS
Design of a Transitional Community Center as an Urban Base for Relief.
circle of building use
phases of building use
during-disaster focus
standards

education

facilities

sheltering

rebuilding

relief aid

education requirements

pre-disaster

construction requirements

location/climate

facility requirements

alarming requirements

shelter requirements

rebuilding, exit-strategy

relief aid requirements

after-disaster focus
full circle of an adaptable community center
Why this focus on different phases?

community centre
Well, since there are different cultures.....
that all use very different building types...

community centre
in a very different way!

community centre
So, using a metaphor, in the form of a tree...
base is given by nature,
base is given by nature, appearance by season!
So, the focus on phases will increase the level of adaptability
adaptable base is given by designer....
design option from western point of view...

OPEN-ENDED STRUCTURE
(icon of adaptability)

Adaptable design
(basic structure)

GLOBAL VIEW
(slum upgrading, prevention and emergency help)

Local Influences
(culture & climate issues solved by designer)

design result
final appearance by local users!

OPEN-ENDED STRUCTURE
(icon of adaptability)

Adaptable design
(basic structure)

GLOBAL VIEW
(slum upgrading, prevention and emergency help)

Local Influences
(culture & climate issues solved by designer)

LOCAL VIEW
(slum inhabitants view)

Local Influences
(culture & climate issues solved by users)

goal
pre-disaster
fascination
research focus
problem statement
proposed solution
phases

during-disaster
location
concept
climate
plans

post-disaster
materialization
facade
conclusion
why the philippines?

- located on Pacific ring of Fire
  (higher risk for earthquakes)
- seasonal Monsoon Rains
  (widespread flooding every year)
- seasonal Typhoons
  (every year about 10 reach land)

Source: Population Division of the Department of Economic and Social Affairs of the United Nations
20 million people live in slums (that is 20% of the entire population)

highest density slums on earth (80,000 people per km² in Tondo)

33 natural disaster per year (occurred in 2011)
Parola (Tondo)
pop: 72,327 per sq/km
pre-disaster
- fascination
- research focus
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- proposed solution
- phases

during-disaster
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- climate
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post-disaster
- materialization
- facade
concept of structure
a solid and sturdy construction
(minimum requirements to withstand natural disasters)
a solid and sturdy construction
(minimum requirements to withstand natural disasters)

flexible and interchangeable spaces
(to increase adaptability of the building)
a solid and sturdy construction
(minimum requirements to withstand natural disasters)

flexible and interchangeable spaces
(to increase adaptability of the building)

functional routing to link and separate spaces
(linking in pre-disaster phase, separate during and after-disaster phase)
How to combine these contrasting requirements?
regular polygon
equilateral

20 meter

20 meter

research:
B.4 Re-entrant corners
required floor area & maximum height

research:
A.2 Low height-to-base ratio
placement of program

- Education
- Community
- Facilities

most private and secured part of building
first level of privacy, community is buffer between public and education
most public part of building, connected to central square

research:
5.1 Education
5.2 Facilitation
lifted safe-house

research:
A.1 Outside floodplain
A.2 Elevation of building
basic vertical seismic system
use of extra thick wall

research:
5.3 Alarming
no view and relation with site!

research:
5.1 Education
5.2 Facilitation
slide basic structure inside

research:
C.5 Experience solid structure of building
creating clear and identical resistance...
and great views around!

so, strength of shear wall system...

plus freedom and views of framed system!

research:
A.5 Identical resistance on both axes
clear defined spaces

research:
5.4 Sheltering
vertical routing

research:
A.5 Identical vertical resistance
clear internal routing
powerfull appearance

research:
5.3 Alarming
stronger structure

research:
A.8 Torsinal forces
increase & decrease of spaces

research:
Program requirements
create clear entrances
safety and security

research:
5.5 Relief aid
pre-disaster
- fascination
- research focus
- problem statement
- proposed solution
- phases

during-disaster
- location
- concept
- climate
- plans

post-disaster
- materialization
- facade
climate
design strategies

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2105

38,7° ▲
27,4° ~
20,1° ▼

= 25 mm
climate concept

design strategies

Sun Shading
- avoid direct sunlight on facade

Adaptive Comfort
- adjustable openings

Fan-Forced Ventilation
create ventilation and interaction

research:
create cross-ventilation
pull out facade

research:
avoid direct sunlight on facade
creating elevated porches

research: create porches and cantilevers
connecting spaces

research:
create shaded outdoor areas
create gallery for entrances and ventilation
add typhoon resistant roof

22 degrees

too shallow

too steep

just right

research:
A.5 Use hip roofs
large roof creates much shadow around building
rain water collecting roof
no direct sunlight on facade & internal light
optimal ventilation by sidedness
daylight
ventilation
water management
pre-disaster
- fascination
- research focus
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- proposed solution
- phases

during-disaster
- location
- concept
- climate plans

post-disaster
- materialization
- facade
ground floor
(facilities)
emergency facilities
emergency situation: earthquake
first floor
(community)
mobilisation areas
emergency situation: floods
second floor
(education)
during-disaster | plans

gathering areas
emergency situation: typhoons
During disaster, a typhoon is there, shelter is closed, and the waiting starts...
pre-disaster
fascination
research focus
problem statement
proposed solution
phases

during-disaster
location
concept
climate
plans

post-disaster
materialization
facade
conclusion
post-disaster

the building has survived, ready for starting up the relief-aid phase
pre-disaster
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post-disaster
materialization
facade
conclusion
heavy concrete base

light floor/structure added

typhoon / tropical roof

typhoon resistant facade
pre-cast concrete
bamboo
residual wood
stormproof steel plate
pre-cast concrete  

bamboo  

residual wood  

stormproof steel plate

post-disaster | materialization
pre-cast concrete  |  bamboo  |  residual wood  |  stormproof steel plate
pre-cast concrete  

bamboo  

residual wood  

stormproof steel plate
pre-disaster
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conclusion
Galvalume Plus - Stormproof
- double fixation
- slats 30x74 mm (h.o.h. 300 mm)
- beam 44x100 mm (h.o.h. 600 mm)
- structural panel 12 mm
- steel panel 6 mm
- structural panel 12 mm
- beam 75x200 mm (h.o.h. 600 mm)
- Tonzon Insulation (aluminum sacks)

Detail 1
vertical | scale 1:5
connection valves

Detail 2
vertical | scale 1:5
connection floor

Detail 3
vertical | scale 1:5
reinforced gutter

Detail 4
vertical | scale 1:5
connection valves

Detail 5
vertical | scale 1:5
connection floor

Detail 6
vertical | scale 1:5
closed valve

Detail 7
horizontal | scale 1:5
opened valve

Detail 8
horizontal | scale 1:5
closed valve

detailing
scale 1:5
D.J de Jonge
basic structure to resist forces

- Galvalume Plus - Stormproof
- double fixation
- slats 30x74 mm (h.o.h. 300 mm)
- beam 44x100 mm (h.o.h. 600 mm)
- structural panel 12 mm
- steel panel 6 mm
- structural panel 12 mm
- beam 75x200 mm (h.o.h. 600 mm)
- Tonzon Insulation (aluminum sacks)

vertical | scale 1:5
connection valves

detail 3

vertical | scale 1:5
connection floor

detail 2

vertical | scale 1:5
reinforced gutter

detail 1

vertical | scale 1:5
ridge with valves

detail 5

vertical | scale 1:5
connection valves

detail 6

vertical | scale 1:5
connection floor

detail 4

horizontal | scale 1:5
closed valve

detail 8

horizontal | scale 1:5
opened valve

detail 7

manually movable
ridge valves

- Galvanume Gutter Plus - Stormproof 10 mm
- laminated beam 100x500 mm
- cladding (residual wood + wreck wood)
- slats 22x74 mm (h.o.h. 300 mm)
- beam 44x125 mm (h.o.h. 300 mm)
- structural panel 12 mm
- steel panel 6 mm
- structural panel 12 mm
- beam 44x75 mm (h.o.h. 600 mm)
- energy-efficient lighting fixtures
- half bamboo poles 30 mm
- structural panel 12 mm
- structural panel 12 mm

- steel railing
- beam 44x125 mm (h.o.h. 300 mm)
- structural panel (12 mm)
- steel panel (6 mm)
- structural panel (12 mm)
- beam 44x75 mm (h.o.h. 600 mm)
- structural panel (12 mm)
- structural panel (12 mm)

- steel beam 50x50 mm
- milled rail system
overdimensioned laminated continuous beams

transfer of forces on the facade

one meter grid

manual operation of valves

many 'ribs' give extra strength

strong reduction of incidence of horizontal direct sunlight

D.J de Jonge

post-disaster | facade
stormproof and constructional plane roofing

- Galvalume Plus - Stormproof
- double fixation
- slats 30x74 mm (h.o.h. 300 mm)
- beam 44x100 mm (h.o.h. 600 mm)
- structural panel 12 mm
- steel panel 6 mm
- structural panel 12 mm
- beam 75x200 mm (h.o.h. 600 mm)
- Tonzon Insulation (aluminum sacks)
manual controlled facade valves
pre-disaster
- fascination
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during-disaster
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post-disaster
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- facade
- conclusion
okay, almost done!
remember this one?

OPEN-ENDED STRUCTURE
(icon of adaptability)

GLOBAL VIEW
(slum upgrading, prevention and emergency help)

LOCAL VIEW
(slum inhabitants view)
local design
basic structure
Philippines
Europe
china
afrika
south-america
north-america
relief aid is ongoing and re-building phase is starting up!
Adaptable Community Centre

....as a place to become educated
....as a place for cleansing the body
....as a place for social gathering
....as a place for craftsmanship and trade
....as a place to shelter in emergency

....for a save place before, during and after urban emergencies!
Thank you!