HOUSING + FORM : FABRICATION

THE 1K : PINWHEEL HOUSE
ARCHITECT’S RESPONSIBILITY

432 PARK AVENUE
MOST EXPENSIVE RESIDENTIAL IN THE WORLD

SICHUAN
2 YEARS AFTER EARTHQUAKE DISASTER
WHAT’S HAPPENING...
LOCAL ENGAGEMENT  AFFORDABLE COST  FAST | SAFE | COMFORT

THEIR NEEDS = OUR AIMS
FACE OF DIFFICULTIES

TURN INTO OPPORTUNITIES

COST

MATERIAL

TRANSPORTATION

SPEED

TECHNOLOGY

FAST ERECT

DISASSEMBLE

LABOR

MACHINE

SPATIAL

COMFORT

FLEXIBILITY

SUSTAINABILITY

CLIMATE

STRUCTURE

MEP

LOCAL

PRE-FEB

LOCALITY

DISTANCE

TRANSPORTATION

LOCATION

CLIMATE

SAFETY

CITY SYSTEM

PERMANENT

LOCAL

MATERIAL

FLEXIBLE

DISASSEMBLE

LABOR

MACHINE

SANITY

NO MATTER IN DEVELOP/ UNDEVELOP COUNTRIES...LOW/HIGH-TECH

STILL NEED TO FACE

VERNACULAR BUT MODERN

RAPID BUT SAFE

SIMPLE BUT INNOVATIVE

LOCAL BUT GLOBAL
1K HOUSE I THE PINWHEEL HOUSE

2 PROJECTS WITH 1 CONCEPT
CHINA I US
PINWHEEL CONCEPT

PINWHEEL UNIT PROTOTYPE

1 UNIT

2 UNITS

3 UNITS

4 UNITS

4 UNITS + COURTYARD = 1 HOUSE

IF YOU KNOW HOW TO BUILD 1/4, YOU KNOW HOW TO BUILD THE WHOLE HOUSE!

HOUSE PROTOTYPE

1 HOUSE

2 HOUSES

3 HOUSES

4 HOUSES = 1 CLUSTER

CLUSTER UNIT PROTOTYPE

1 CLUSTER

2 CLUSTERS

3 CLUSTERS

4 CLUSTERS = 1 COMMUNITY

SHARING MODULE PARTITIONS LOWER COST!

If you know how to build 1/4, you know how to build the whole house!

Sharing module partitions lower cost!
PINWHEEL CONCEPT

LIVING + SERVICE MODULE
ALLOW EXPANSION + CONTRACTION

SPATIAL FLEXIBILITY
PRIVACY + PUBLICITY

OPEN COURTYARD
PUBLICITY

INBETWEEN

RIGID BOUNDARY
PRIVACY

NATURAL RESOURCES
MAX. NATURAL SUNLIGHT + VENTILATION

1 FAMILY

2 FAMILIES

3 FAMILIES
USD 6,000 | 90m² | 40 DAYS

EARTHQUAKE DISASTER IN 2008 | SICHUAN | CHINA
CUI’S FAMILY, A FAMILY OF 3
SITE LOCATION

LIMITED AND UNSTABLE ELECTRICITY SUPPLY
NO DIRECT ACCESS OF PUBLIC TRANSPORTATION
INADEQUATE BUILDING TOOLS
SITE CONDITION

OLD HOUSE

NEW HOUSE
PROGRAM

BEDROOM 19.0m²

COURTYARD 19.0m²

LIVING/ DINING 19.0m²

KITCHEN 13.0m²

BATHROOM 6.0m²

STORAGE

HOLLOW BRICK WALL

FLEXIBLE TRANSLUCENT PANELS

WINDOW/ DOOR
BRICK FABRICATION

SELF FABRICATION
- INFILL BLOCK
- FUNCTION BLOCK
- CORNER BLOCK
- DOUBLE LAYER INFILL
- CORNER + FUNCTION
- BLOCK LAYOUT

MATERIAL AVAILABLE
FULFILL MULTIPLE FUNCTIONS

TESTING WITH STEEL BAR
AFFORDABLE COST

TOTAL CONSTRUCTION COST

USD 5,970
RMB 40,000

UNIT COST

66.3
444.4

LABOR COST

USD 1,045
RMB 7,000

MATERIAL COST

USD 4,925
RMB 33,000

DIFFERENT COMBINATION COST

USD 4,735
RMB 33,000

USD 4,516
RMB 33,000

USD 3,955
RMB 25,000

ROOF

Extruded Polystrene Panel roof
light structure + high insulation

BEAM

wood beam
concrete layer

WALL

bended-end steel bar
steel bar
wood, frosted glass, PC panel
hollow brick blocks
insulation + reinforcement passage

FOUNDATION

concrete infilled
refill rammed earth
40 DAYS CONSTRUCTION | FOUNDATION

BEFORE CONSTRUCTION

DAY 1 GRID LINES SET UP

DAY 1 GRID LINES SET UP

DAY 2 FOUNDATION EXCAVATION

DAY 3-6 RAIN - FOUNDATION FLOODING

DAY 7 FOUNDATION FLATTENED WITH CONCRETE
40 DAYS CONSTRUCTION | WALL

DAY 8  FIRST BRICK LAYER
DAY 10  BRICK WALL IN PROGRESS
DAY 11  ADDING STEEL BARS

DAY 13  WALL FINISH WITH STEEL BARS
DAY 16  WOOD COLUMNS INSTALLATION
40 DAYS CONSTRUCTION I BEAM AND ROOF

DAY 18  TIED BEAM WITH WALLS
BEAM DETAIL
DAY 20  WOOD BEAM INSTALLATION
DAY 22  EPS ROOF PANELS INSTALLATION
DAY 23  ROOF FINISH
40 DAYS CONTRUCTION I INTERIOR

- Day 25: Wood Frame Installation
- Day 32: Floor Slab and Wall Painting
- Day 40: House Finish

- Courtyard View
- Interior View
- Day View
USD 31,300 | 1,175 ft² | 10 DAYS

WILDFIRE DISASTER IN 2017 | LOS ANGELOS | US
UNIT SYSTEM I 24’ x 12’
WALL FABRICATION SYSTEM

- EXTERIOR WOOD PANELS
- XPS/RIGID INSULATION PANEL
- BREATHING SHEET
- OSB/GYPSUM BOARD
- LIGHT-GAUGE STEEL FRAME
- CAVITY INSULATION

WALL PANELS:

- WALL PANEL 1: 24' (6E.Q.)
- WALL PANEL 2: 12' (3E.Q.)
- WALL PANEL 3: 12' (3E.Q.)
- WALL PANEL 4: 8' (H)

Other Components:

- WOOD INTERIOR PANEL
- FIRE RESISTANT PLASTER BOARD
- LIGHT-GAUGE STEEL FRAME
- CAUTION INSULATION
- BREATHING SHEET
- OSB/GYPSUM BOARD
- XPS/RIGID INSULATION PANEL
SYSTEM COMPOSITION | COST

**TOTAL MATERIAL COST**
USD 31,300

**UNIT COST**
USD 26.7

**ON-SITE STRUCTURE**
- **STEEL FRAMEWORK**
  USD 5,300
  36 SETS

**CONCRETE FOUNDATION**
USD 500
16 SETS

**PREFABRICATION PANELS**
- **FLOOR PANELS**
  USD 15,600
  12 SETS
  24 SETS PV PANELS

- **WALL PANELS KIT + BATHROOM SET**
  USD 3,400
  64 SETS

- **ROOF PANELS**
  USD 3,000
  24 SETS

**APPLIANCES**
- **KIT + BATHROOM SET**
  USD 3,500
CONSTRUCTION PROCESS

DAY 1-3 FOUNDATION SETTING

DAY 4-5 ON-SITE STEEL FRAME

DAY 6 INSTALLING FLOOR PANELS

DAY 6 INSTALLING WALL PANELS

DAY 7 INSTALLING KIT & BATHROOM

DAY 8-9 INSTALLING ROOF PANELS

DAY 9 MEP CONNECTION TO CITY SYSTEM

DAY 10 1 HOUSE COMPLETED!

1 HOUSE IN 1 TRUCK!

PLUMBING PARTITION

ALL WALLS

ALL ROOFS

ALL FLOORS
MAKE A BETTER LIFE
BUILD A BETTER HOME
THANK YOU!