Stanford University | A/E/C Global Teamwork | Atlantic Project
Michael Spittler | Hossein Nasseri | Robert Bingel | Anirudh Rao | Maria Escalona | Markus Reuter

SE Robert Bingel and Markus Reuter @ Bauhaus University
CM Michael Spittler @ University of Wisconsin
SE Anirudh Rao and CM Hoss Nasseri @ Stanford University
A Maria Julia Escalona @ University of Puerto Rico

ATLANTIC TEAM
2009
ATLANTIC PROJECT 09
ATLANTIC PROJECT
University of Wisconsin @ Madison, School of Engineering

ARCHITECTURE  STRUCTURAL ENGINEERING  CONSTRUCTION MANAGEMENT
PREFACE: ABOUT THE SITE
- borders south coast of Lake Mendota
- two climates: extreme winter/summer
- variety of outdoor activities
- adjacent to Lakeshore Natural Preserve and the Muir Woods
- North: lake
- Southwest: woods
- South: mountain (slope)
- East: campus building
TYPES OF USERS
1. Students
2. Faculty Members
3. Visitors

SERVICES
- bathrooms
- elevators
- server room
- tech. support

VISITORS
- seminar rooms
- auditorium
- coffee shop

STUDENTS
- sm. classroom
- lar. classrooms
- student offices
- instruc. labs

FACULTY
- faculty lounge
- depart. office
- senior offices
- administration

storage
CONCEPT 1 DOUBLE DIAMOND

The conceptual phase of the project developed regarding the word TRANSITION, both as a noun or verb. Transition, derived from the prefix trans, is a symbolic or physical movement, going across,

LAND <----> WATER

+ ZERO WASTE

ARCHITECTURAL PROCESS AND DESIGN

1 SKETCHES AND PROGRAM ANALYSIS

2 STUDY MODELS AND FLOOR PLANS

3 ARCHITECTURAL/ENGINEERING/CONSTRUCTION MANAGERS/

ARCHITECTURE STRUCTURAL ENGINEERING CONSTRUCTION MANAGEMENT
GROUND FLOOR

TOTAL BUILDING AREA:
38,000 SQ FT
SECOND FLOOR

LARGE CLASSROOM
VERTICAL CIR.
FACULTY LOUNGE
ADMINISTRATION
FACULTY OFFICES
SERVER ROOM

ARCHITECTURE
STRUCTURAL ENGINEERING
CONSTRUCTION MANAGEMENT
SECTION AA

SECTION BB

ARCHITECTURE | STRUCTURAL ENGINEERING | CONSTRUCTION MANAGEMENT
LAKE MENDOTA

ARCHITECTURE

STRUCTURAL ENGINEERING

CONSTRUCTION MANAGEMENT
CONCEPT 2

The platonic shape of the square offers an indefinite number of solutions, which can be presented in the architectural design. A FRACTURE as the characteristic appearance of a broken surface, was experimented as the idea behind breaking the cube.

SOLID <----> CLEAR

ARCHITECTURAL PROCESS AND DESIGN:

1 SKETCHES AND PROGRAM ANALYSIS

2 STUDY MODELS AND FLOOR PLANS

3 /ARCHITECTURAL/ /ENGINEERING/ /CONSTRUCTION MANAGERS/

+ ZERO WASTE

ARCHITECTURE

STRUCTURAL ENGINEERING

CONSTRUCTION MANAGEMENT
TOTAL BUILDING AREA:
44,000 SQ FT

AUDITORIUM
VERTICAL CIR.
MECHANICAL ROOM
ENTRANCE
Stanford University | A/E/C Global Teamwork | Atlantic Project
Michael Spittler | Hossein Nasseri | Robert Bingel | Anirudh Rao | Maria Escalona | Markus Reuter

SECTION AA
EAST

140’

WEST

- 36’
- 24’
- 12’
- 0’

FACILITY OFFICE
SMALL CLASSROOM
UPSTAIRS LOUNGE
FACILITY LOUNGE
VERTICAL STAIRWAY
LARGE CLASSROOMS
AUDITORIUM
SMALL CLASSROOM

SECTION AA
Scale 1”=1’

SECTION BB
SOUTH

120’

NORTH

- 42’
- 36’
- 24’
- 12’

FACILITY LOUNGE
SERVICE TECH ROOM
BUNKER ROOM
UPSTAIRS LOUNGE
VERTICAL STAIRWAY

SECTION BB
Scale 1”=1’

ARCHITECTURE
STRUCTURAL ENGINEERING
CONSTRUCTION MANAGEMENT
Snow Load: 18.5 psf

Roof Live Load: Depending on use

Faculty Offices: 50 psf

Classroom Live Load: 40 psf

Auditorium: 60 psf

Server Room, Corridors: 100 psf

Wind Load: 30 psf

Soil Uplift

Seismic Load: negligible compared to wind
DIMENSIONS

- 16”x16” columns
- 16” foundation slab
- 24” joists
- 10” walls
- 12” floor system
- 8” ceilings
19' 19' 19' 19' 19' 19' 19'

- **Column**
- **Opening**
- **Wall**
- **Joist**
- **Shear wall for anchoring cantilever**
- **Staircase and elevator**
- **Cantilever to north and west of building**

**First Floor**

**Architecture**  **Structural Engineering**  **Construction Management**

**Double Diamond**  **ICicle**
Shear wall for anchoring cantilever

Shear walls on top of each other

3-D MODEL: NORTH-EAST
LOAD PATH - ICICLES
GROUND FLOOR

DIMENSIONS

- 16"x16" columns
- 16" foundation slab
- 24" joists
- 10" walls
- 12" floor system
- 8" ceilings
First Floor

Staircase and elevator

Shear wall for anchoring cantilever

Cantilever to north, west and east of building

Column
Opening
Wall
Joist

25'
20'
15'
25'
20'
20'
15'
20'
20'
20'
20'
20'
20'

ARCHITECTURE
STRUCTURAL ENGINEERING
CONSTRUCTION MANAGEMENT

DOUBBLE DIAMOND
ICICLE
shear walls on top of each other

3-D MODEL: NORTH - EAST
• Prefabrication

• Ground water table

• Access to Liminology

Fenced off site
ENERGY, HEATING, AND COOLING

- UW-Madison Central Heating and Cooling System

- Charter Street Heating Plant

- West Campus Cogeneration Facility
MEP SYSTEMS

Underfloor System With Concrete

Traditional System With Steel

12"

Floor

Underfloor Plenums

Concrete Slab

12"

12"

30"

Floor

Ceiling

6"

13'

8' 6"

Floor

Steel I-Beam

Concrete Slab

12"

6"

3'

13'

8' 6"

Floor

Ceiling
LIFE CYCLE COST ANALYSIS

Present Value: \[ PV = C \times \left[ \frac{1 - 1 / (1 + i)^n}{i} \right] \]

- Operations Costs = $12.2 million
- Maintenance and Repair Costs = $13.4 million
- Replacement Costs = $5.3 million
- Residual Value (assumed 2% of total) = $.6 million

Total Life Cycle Cost for 50 year building = $30 million

\( C \) = Total Cost
\( i \) = interest rate (assumed 2.5%)
\( n \) = study period (50 years)
SUSTAINABILITY

Triple Bottom Line

- Sustainable Sites → 8 pts
- Water Efficiency → 3 pts
- Energy and Atmosphere → 10 pts
- Materials and Resources → 10 pts
- Indoor Environmental Quality → 12 pts
- Innovation and Design Process → 3 pts

LEED Gold Certification → 44 pts

ARCHITECTURE  STRUCTURAL ENGINEERING  CONSTRUCTION MANAGEMENT
ZERO WASTE

- Maximized assignable square footage

- Bubble Deck System

- Concrete Form Reuse

- Cellular Beams

- 100% Recycled Steel

- On-Site Cleaning Contract

- Movement sensored lighting
Atlantic Team’s Communication

ARCHITECTURE

STRUCTURAL ENGINEERING

CONSTRUCTION MANAGEMENT
HOW WE DO WHAT WE DO

The grids are too large!!

I agree! They are too big

Ok, I’ll redesign with a smaller grid
WE WANT TO IMPROVE . . .

• Clear task assignments and on time completion

• Keep track of thought processes very clearly
Concept 1 Concrete Design

$8.05M

Concept 1 Steel Design

$7.45M

Concept 2 Concrete Design

$9.34M

Concept 2 Steel Design

$8.75M

ARCHITECTURE

STRUCTURAL ENGINEERING

CONSTRUCTION MANAGEMENT
Water proofing the foundation walls

Installing and sealing windows

HVAC system commissioning
# MACDADI EVALUATION

<table>
<thead>
<tr>
<th>Item</th>
<th>Item's Weight</th>
<th>Assessed Behavior</th>
<th>Qualitative Threshold values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>$7.5 M</td>
<td>Concept 1 - S: 1</td>
<td>&gt;9.0</td>
</tr>
<tr>
<td>Schedule Duration</td>
<td>1 yr</td>
<td>Concept 1 - C: 0</td>
<td>8.0 - 9.0</td>
</tr>
<tr>
<td>Organization Risk</td>
<td>&lt; 30%</td>
<td>Concept 2 - S: -1</td>
<td>7.5 - 8.0</td>
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<tr>
<td>Lifecycle Cost</td>
<td>&lt; $3.5 M</td>
<td>Concept 2 - c: -2</td>
<td>7.2 - 7.5</td>
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<tr>
<td>Sustainability - LEED Point</td>
<td>45</td>
<td></td>
<td>&lt;7.2</td>
</tr>
<tr>
<td>Structural challenges</td>
<td>2</td>
<td></td>
<td>&gt;14 mo</td>
</tr>
<tr>
<td>Required height for slab and beams</td>
<td>2.5 ft</td>
<td>&gt;4.5M</td>
<td>&gt;11 mo</td>
</tr>
<tr>
<td>Minimum Interior Columns</td>
<td>&lt;= 20</td>
<td></td>
<td>45% -50%</td>
</tr>
<tr>
<td>Concept Strength</td>
<td>4</td>
<td></td>
<td>35% - 45%</td>
</tr>
<tr>
<td>Spaces Quality</td>
<td>5</td>
<td></td>
<td>25% - 35%</td>
</tr>
<tr>
<td>Creativity of Design</td>
<td>2</td>
<td></td>
<td>&lt;25%</td>
</tr>
<tr>
<td>Simplicity of Design</td>
<td>4</td>
<td></td>
<td>&gt;4'</td>
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Assessed by the Structural Engineers

<table>
<thead>
<tr>
<th>Assessed by the architect</th>
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</thead>
</table>

**ARCHITECTURE**

**STRUCTURAL ENGINEERING**

**CONSTRUCTION MANAGEMENT**
WE RECOMMEND
DOUBLE DIAMOND STEEL