Rebuilding Sichuan Schools

四川灾后农村小学重建概念设计

CHINA-U.S. CENTER FOR SUSTAINABLE DEVELOPMENT
中 美 可 持 续 发 展 中 心

我们能做什么
The Need and Our Approach

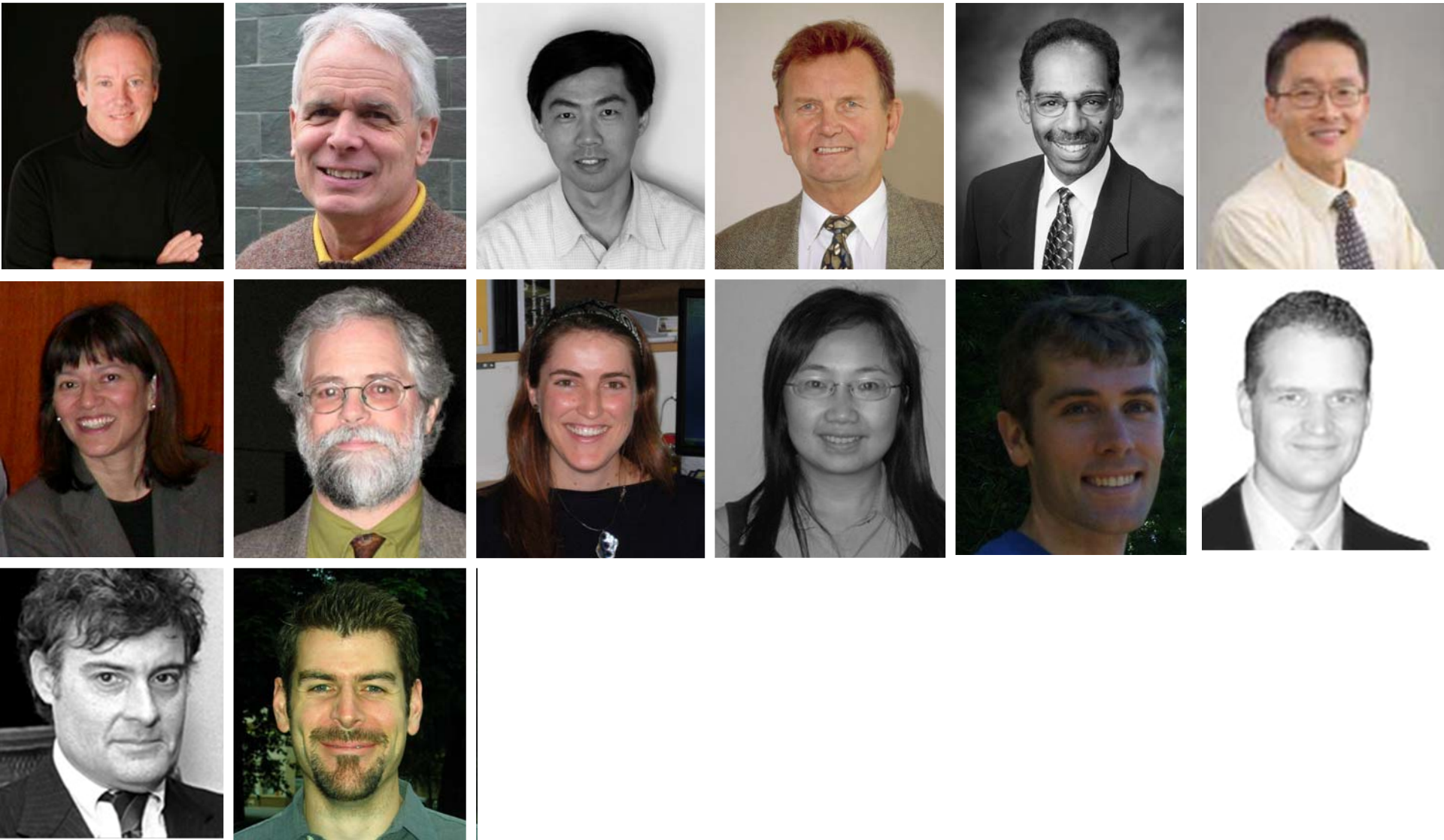
成千所学校的倒塌夺去了许多孩子的生命
Thousands of schools collapsed or were damaged killing many schoolchildren.

四川需要改建和新建5000多所学校
There is a need to build/renovate over 5,000 schools in Sichuan Province.

中美可持续发展中心通过这个特别的机遇，与中国政府和设计及建筑行业的伙伴合作，支援学校的建设，
The China – U.S. Center has a unique opportunity to work with the Chinese government and design/building industry innovators to contribute to this massive effort.

中心创建了一套合作模式，制定了设计导则和设计样板，计划在四川修建一所安全，快速，经济，可持续的，可供推广的试点学校。
The Center has developed a collaborative approach, a design protocol, a design template and is planning to build a safe, sustainable, cost effective and rapidly scalable prototype school in Sichuan Province.

设计团队的专家
The team of Specialists



设计团队的合作
The team of Collaboration

设计团队的合作
The team of Collaboration

设计路径原则的创造
Create a Design Roadmap

设计及建设路径原则
Design & Rebuilding Roadmap

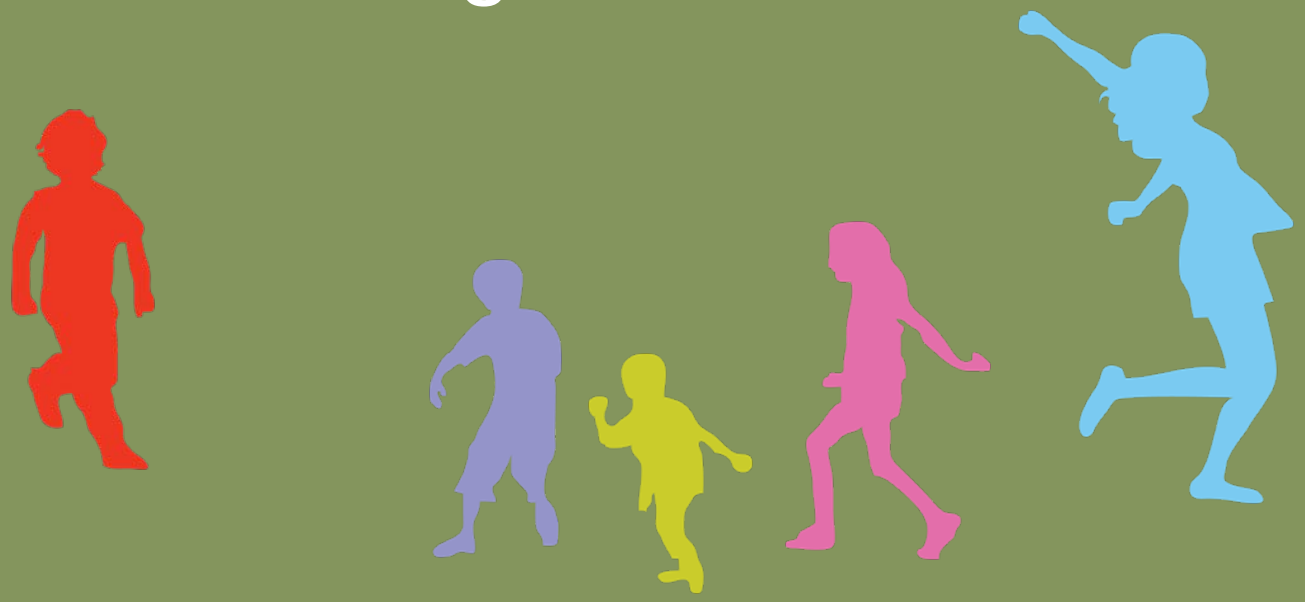
Safe
安全

Fast
快速

Cost-effective
经济

Sustainable
可持续发展

设计
Design



建筑设计理念
Building Design Concept

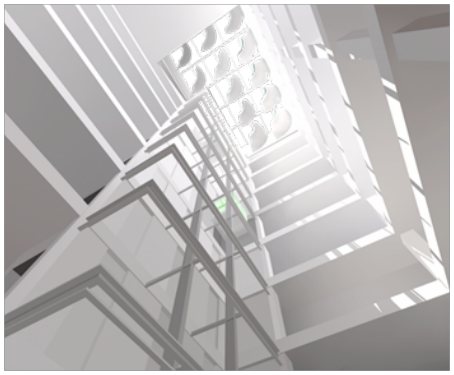
系统化设计
System Approach

工业化预制系统
Prefabrication System

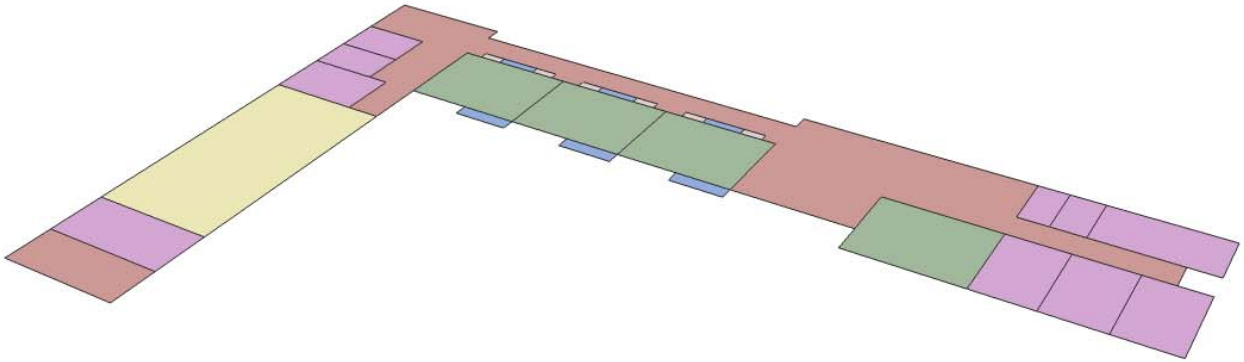
模块式设计手法
Modular Design

可持续发展
Sustainability

适应性和推广性
Expandability and Adaptability

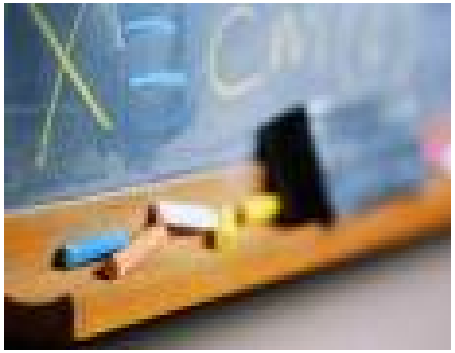


建筑系统 – 明确的内部交通系统
Building Systems – Clear circulation system

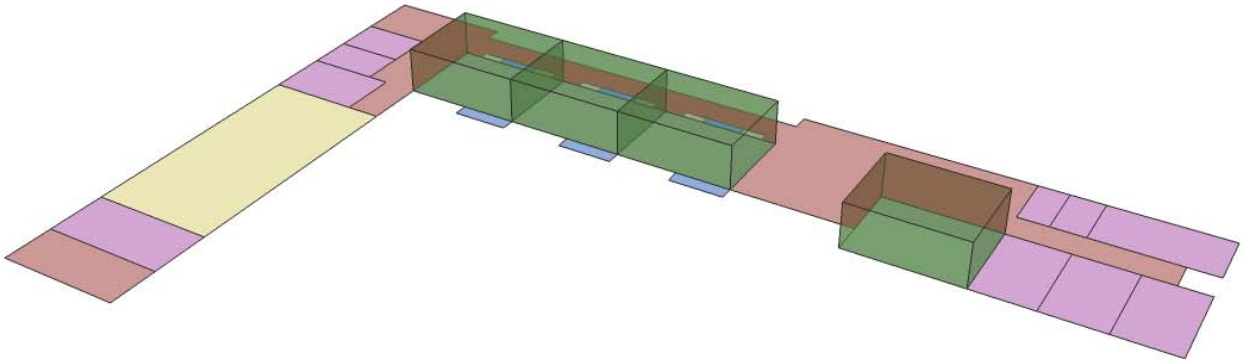


First Floor
首层平面

- Classroom 教室
- Support 辅助用房
- Green Features 绿色设施
- Circulation 交通系统
- Multifunction 多功能教室



建筑系统
Building System



First Floor
首层平面

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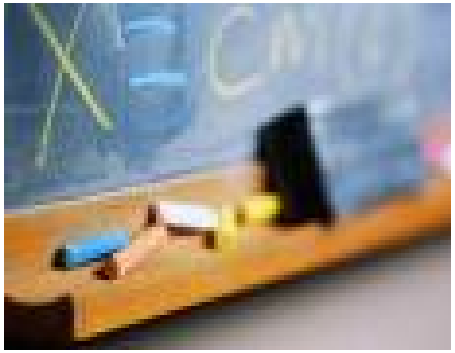
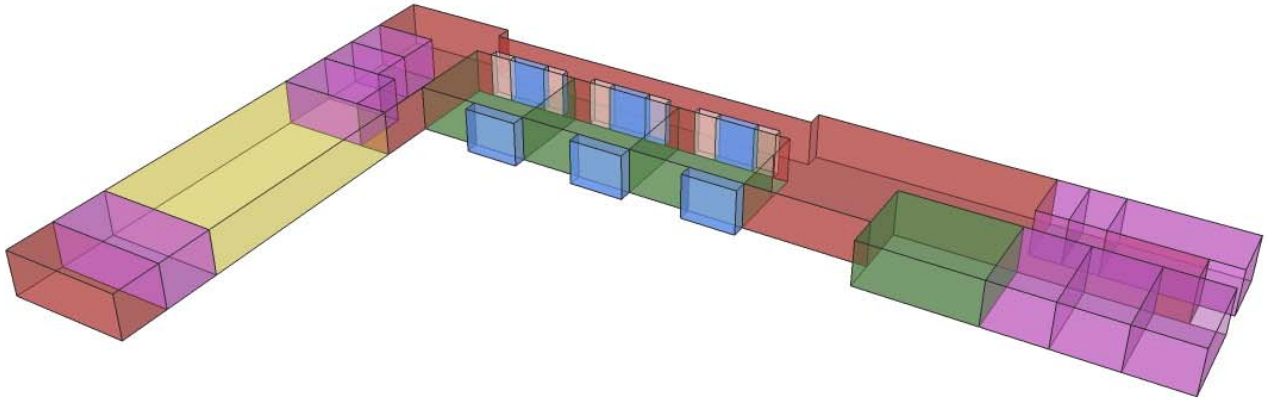


建筑系统
Building System



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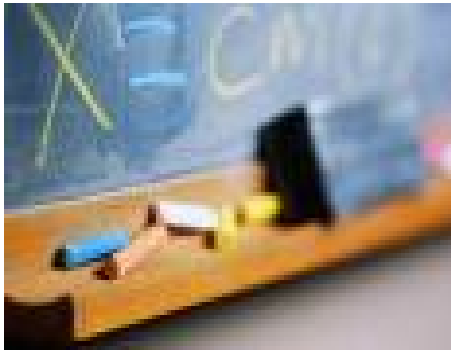
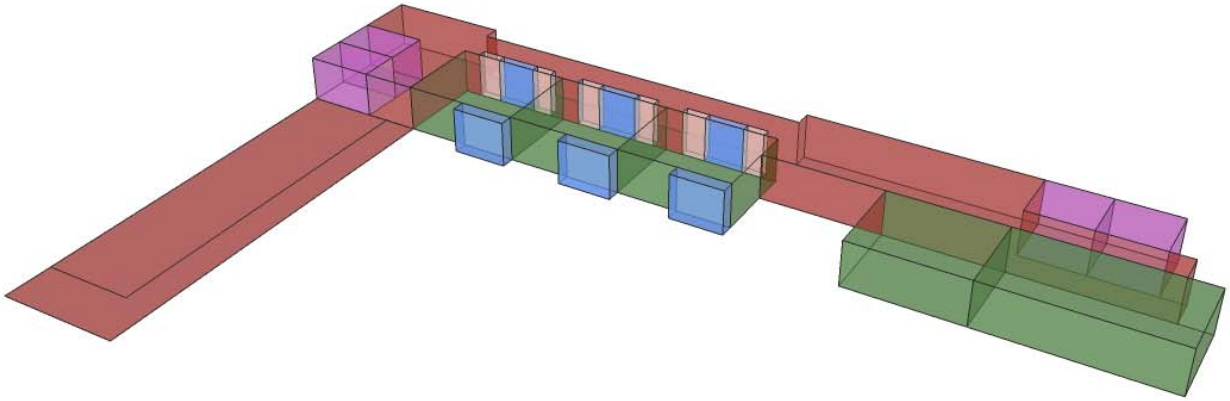
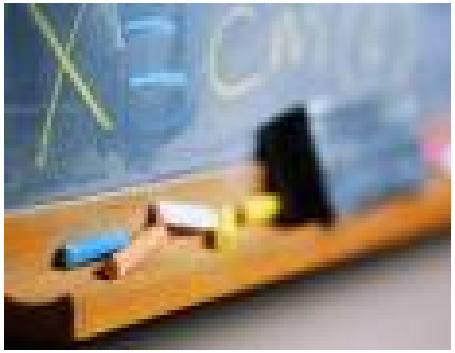


建筑系统
Building System



Second Floor
二层平面

- Classroom 教室
- Support 辅助用房
- Green Features 绿色设施
- Circulation 交通系统
- Multifunction 多功能教室



建筑系统
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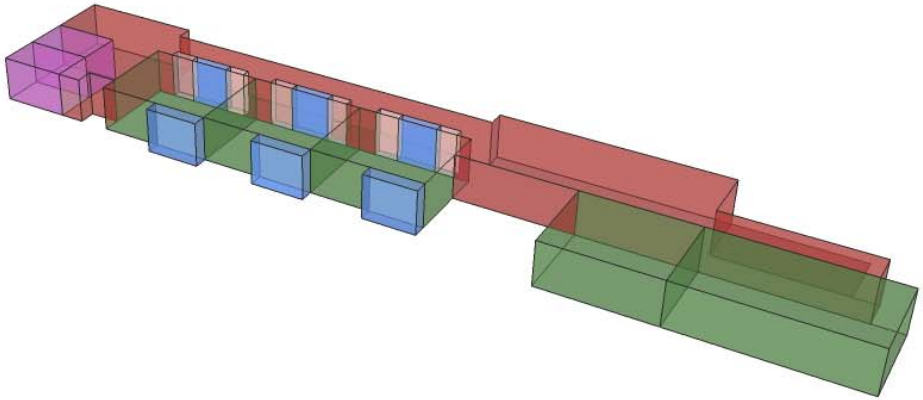
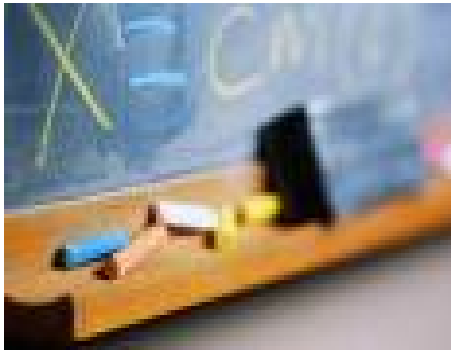
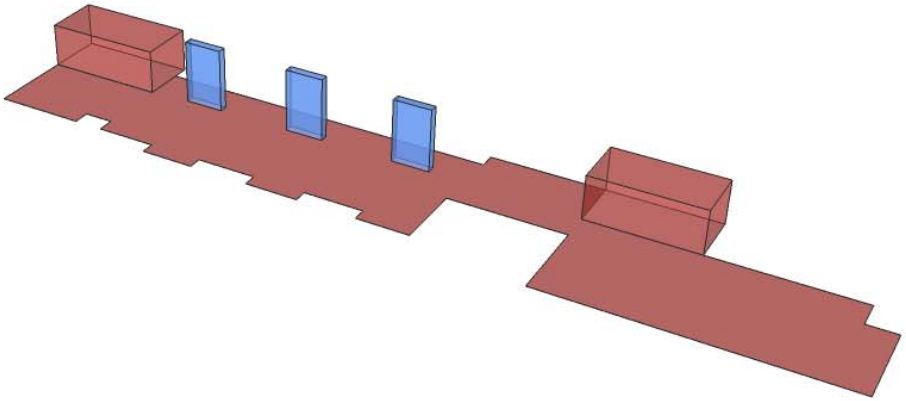


Third Floor
三层平面

- Classroom 教室
- Support 辅助用房
- Green Features 绿色设施
- Circulation 交通系统
- Multifunction 多功能教室

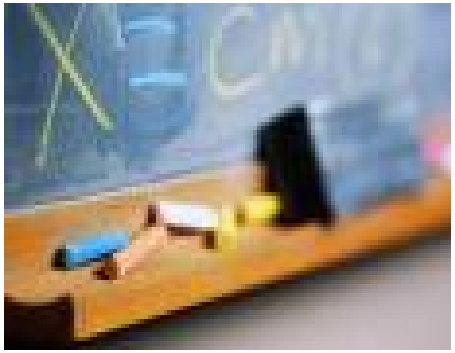


建筑系统
Building System



Roof Plan
屋面平面

- Classroom 教室
- Support 辅助用房
- Green Features 绿色设施
- Circulation 交通系统
- Multifunction 多功能教室



建筑系统
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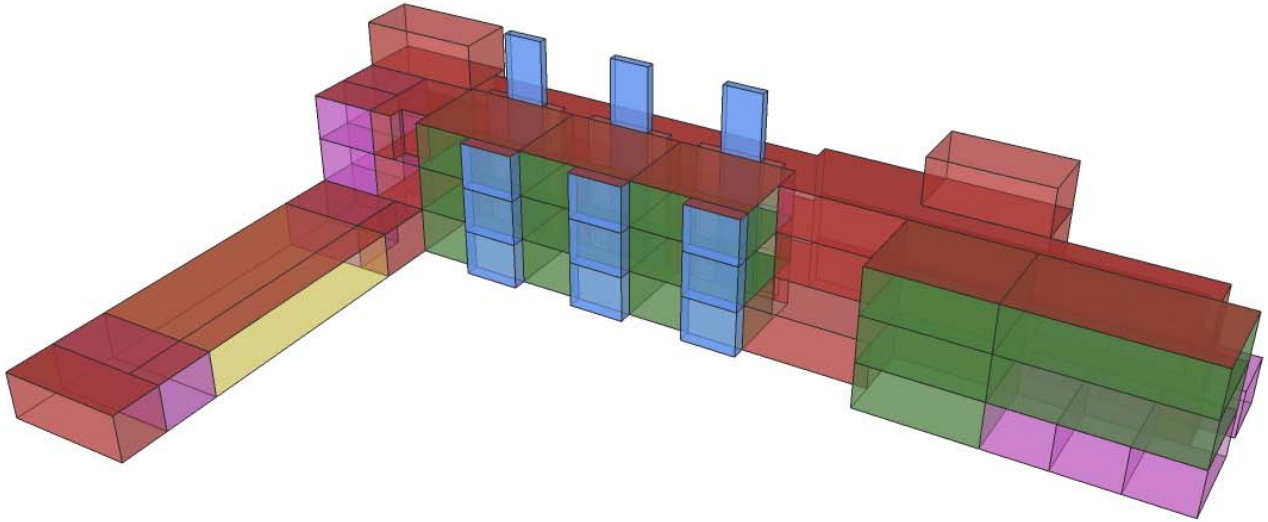


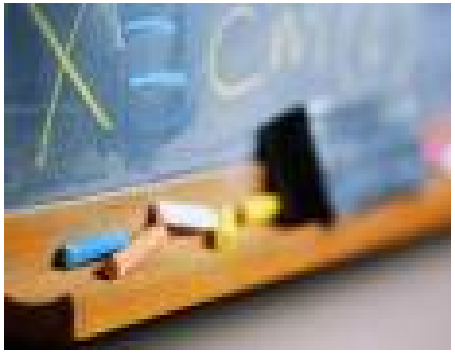
Classroom
教室

Support
辅助用房

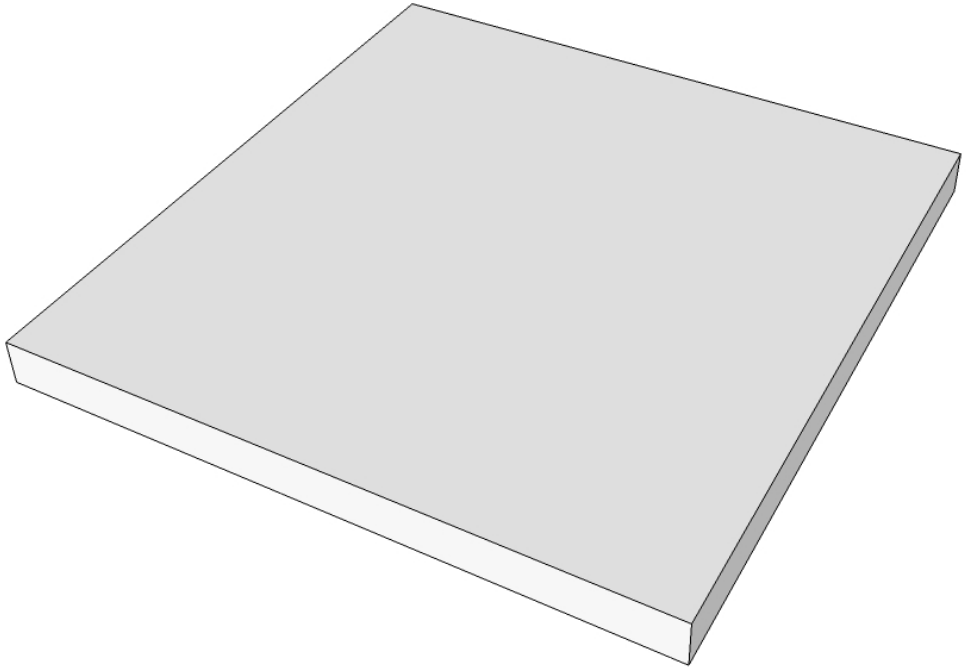
Green Features
绿色设施

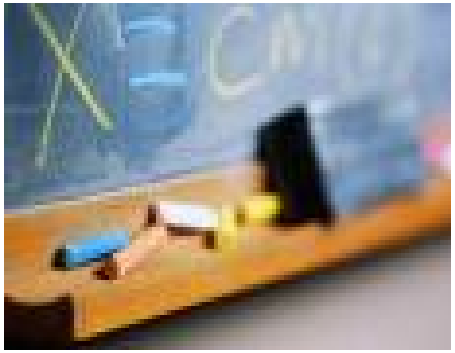
Circulation
交通系统

Multifunction
多功能教室



建筑元素 – 单元模块
Building Components – Basic Module





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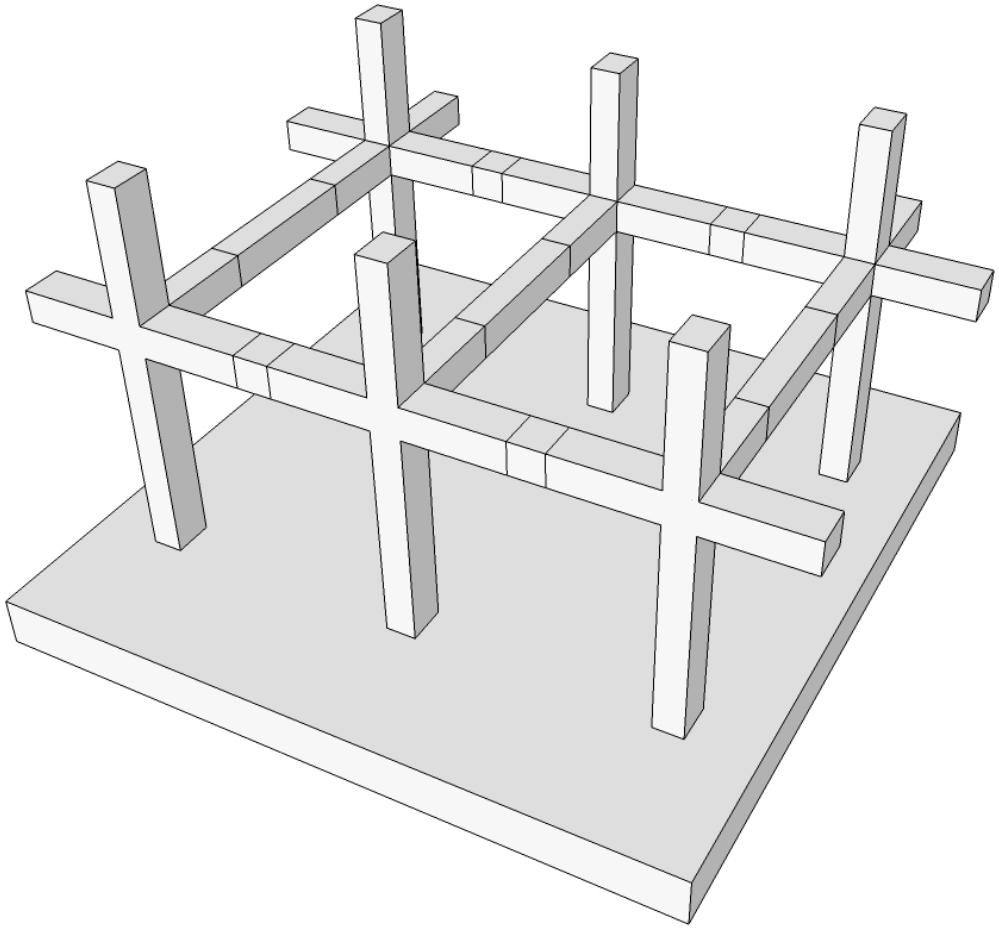

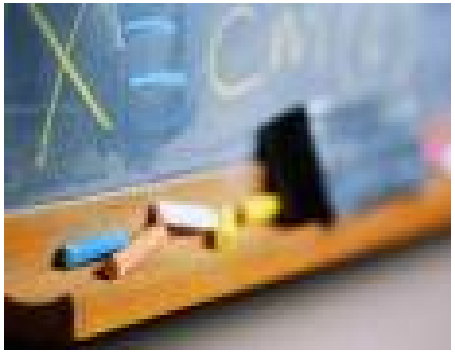

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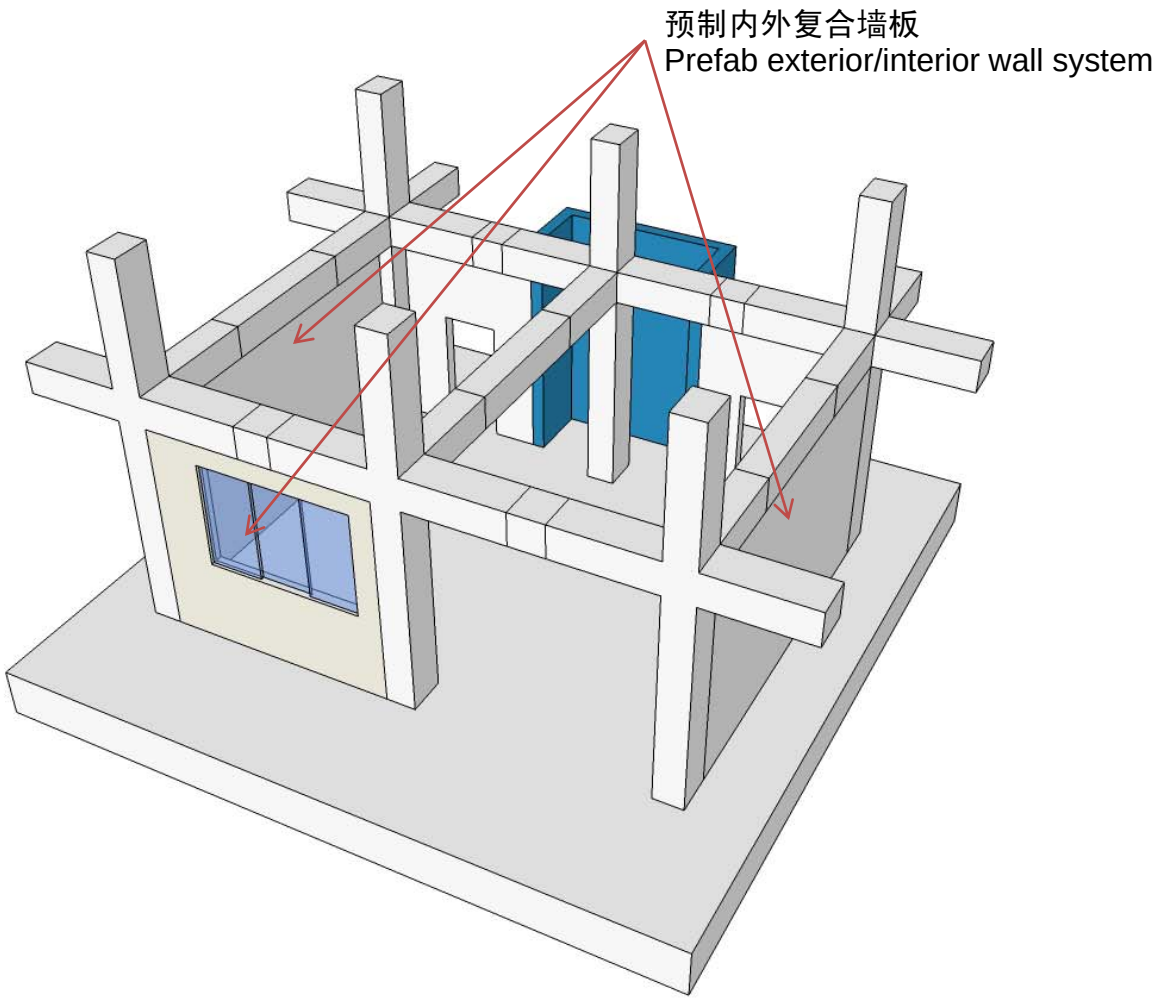

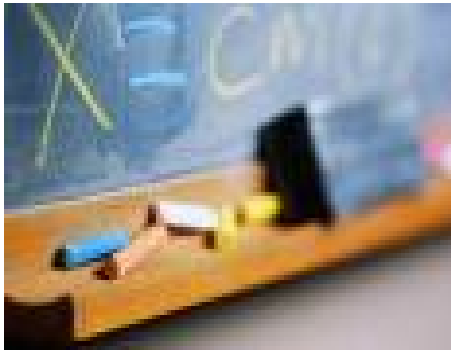

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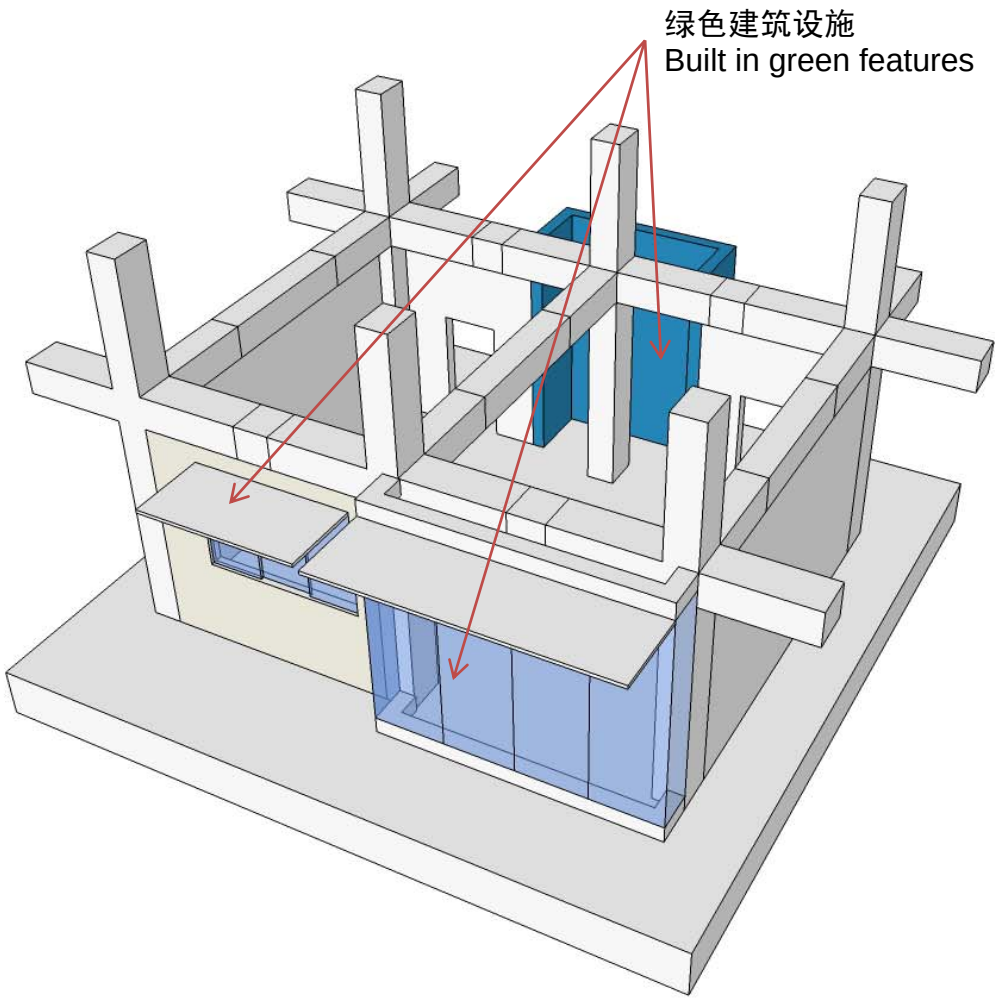
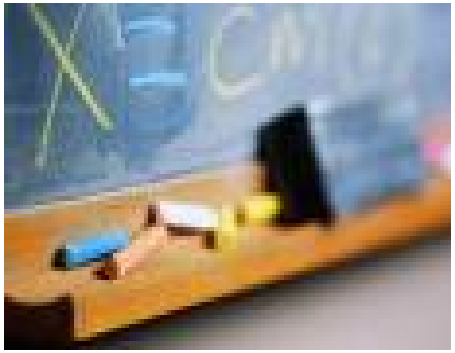




结构设计理念
Structural Design Concept

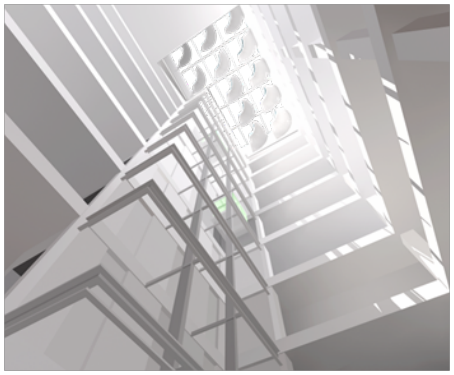
系统化设计
System Approach

模块化和规模化设计手法
Modular and Scalable Design

工业化预制系统
Prefabrication System

迅速并且经济可行
Fast and Cost-Effective

质量控制系统
Quality Control Program



结构系统的选择
Structural Systems - Options

后张预应力装配的预制混凝土框架结构体系
Post-tensioned Precast Concrete Frame System

后张预应力装配的预制混凝土抗震墙结构体系
Post-tensioned Precast Concrete Shear Wall System

螺栓连接的钢刚性框架结构体系
Steel Frame System with Bolted Connections

普通预制混凝土框架结构体系
Conventional Precast Concrete Frame System

结构系统 – 结构构件预制系统的益处
Structural Systems – Benefits of Precast system

最优的质量控制

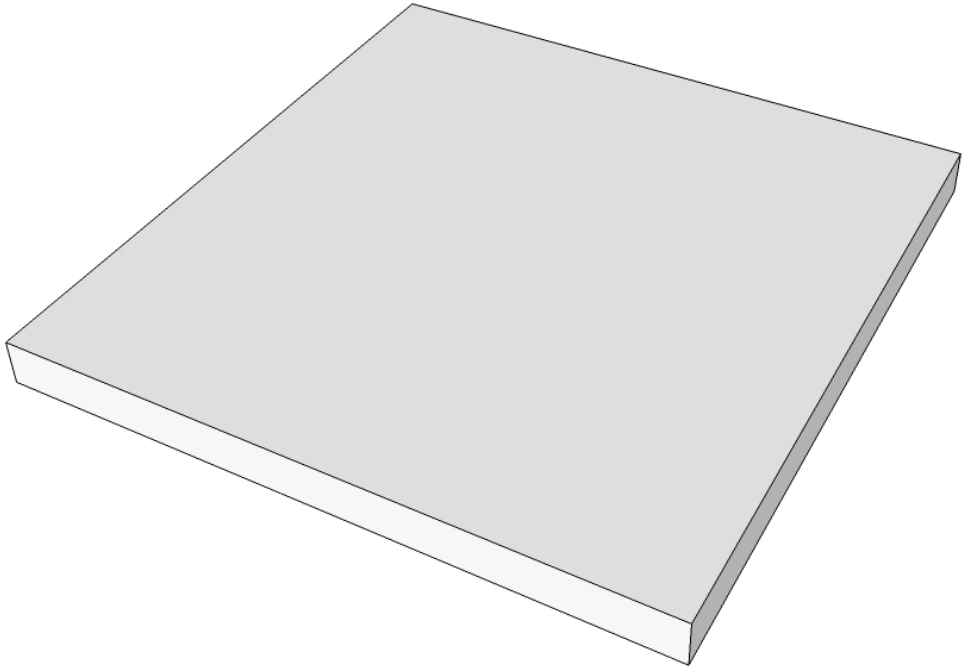
Good Quality Control

提高施工速度

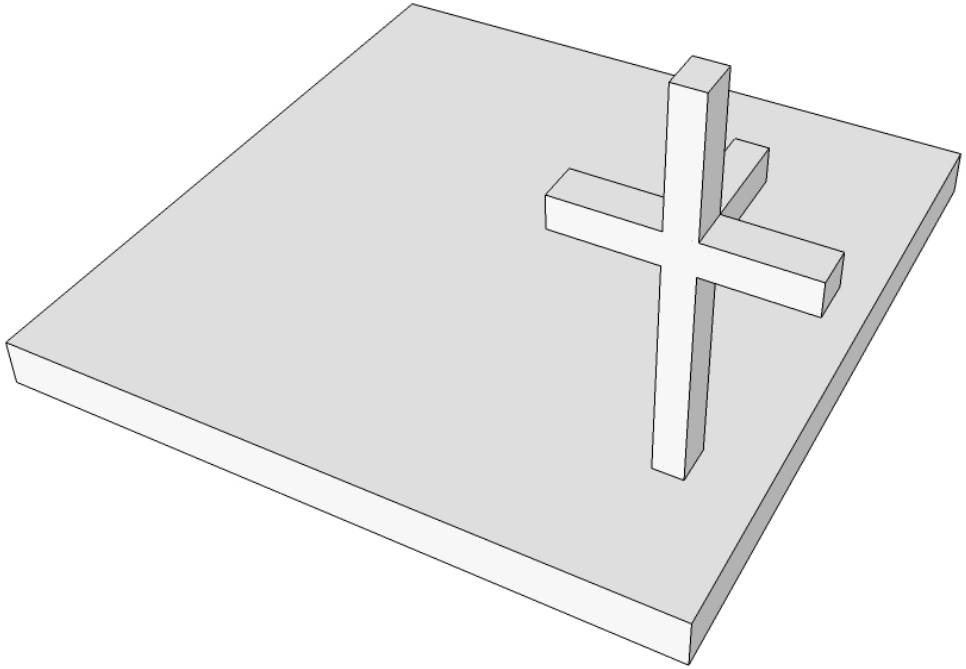
Speedy Construction

减少施工造价
Cost Savings

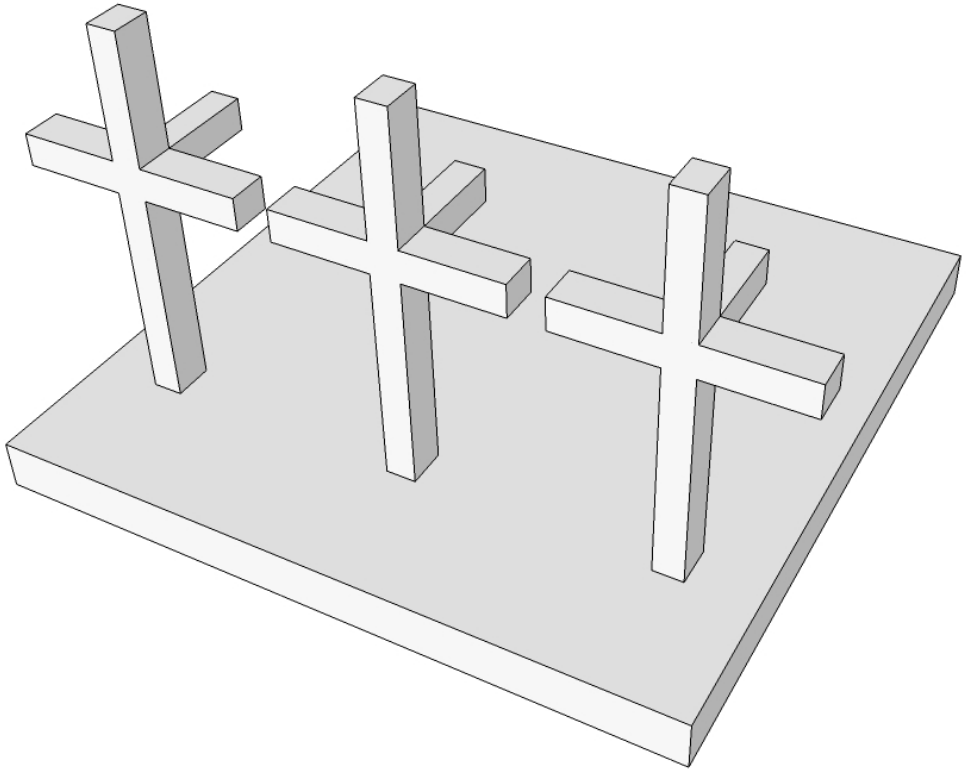
结构元素
Structural Components



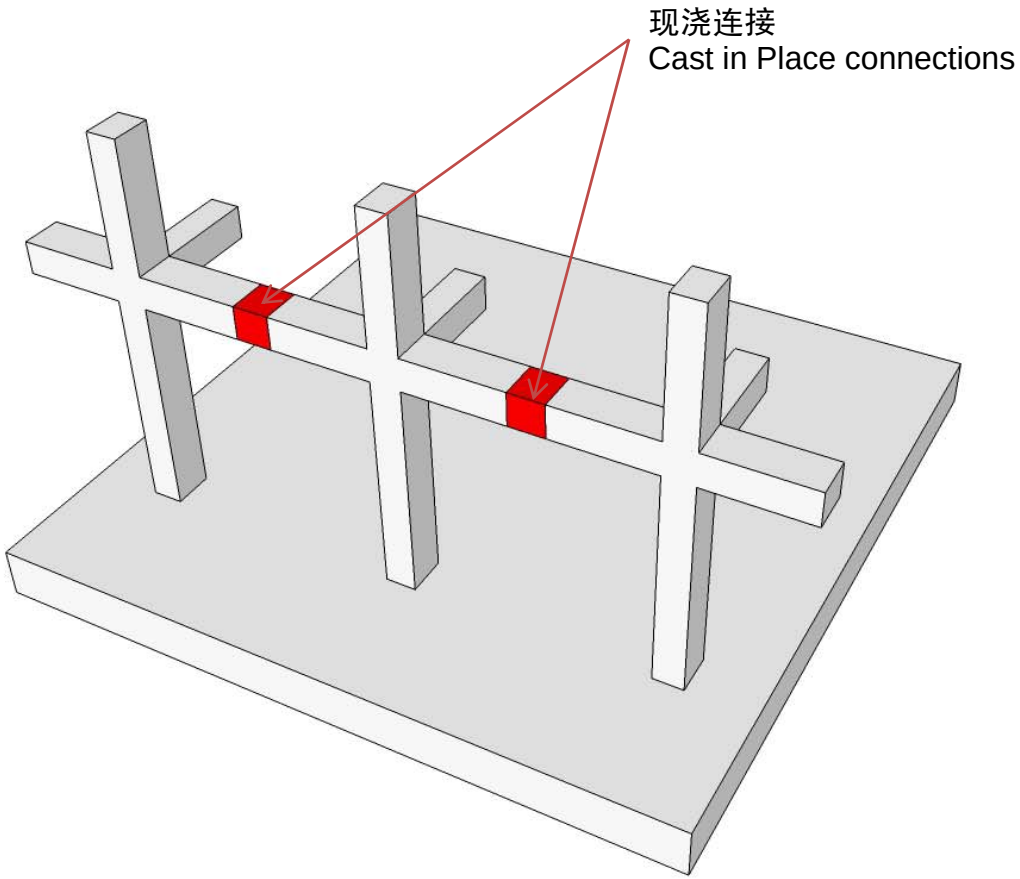
结构元素 – 预制构件
Structural Components – Prefab Module



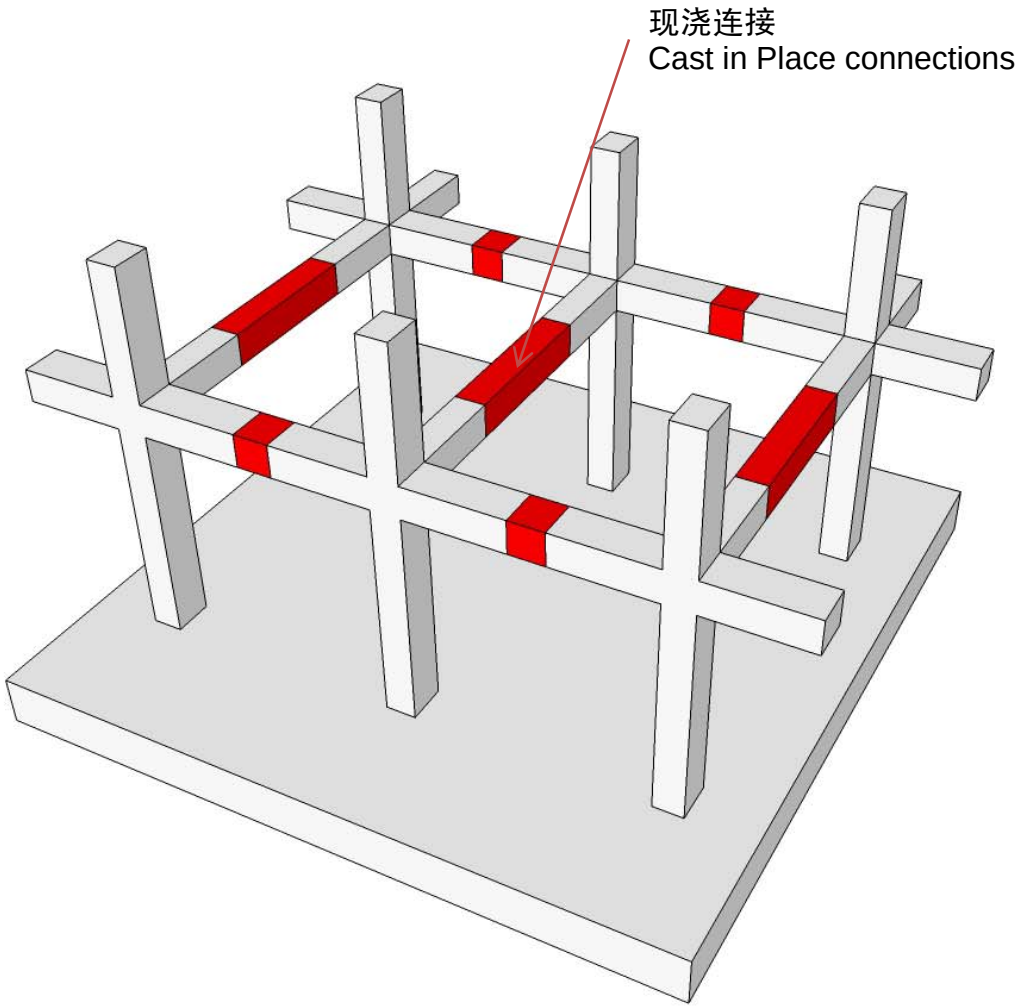
结构元素 – 预制构件组合
Structural Components – Prefab Modules



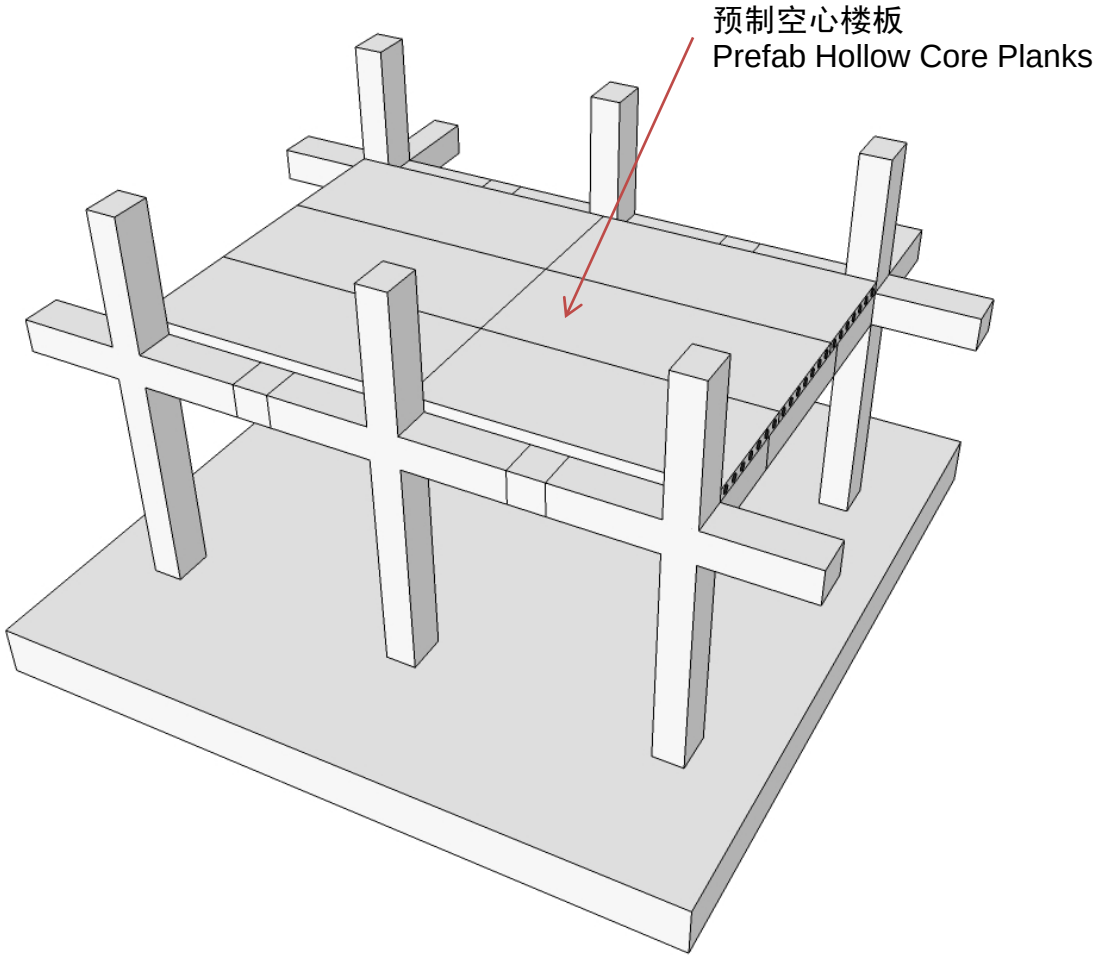
结构元素 – 预制构件连接
Structural Components – Prefab Module Connections



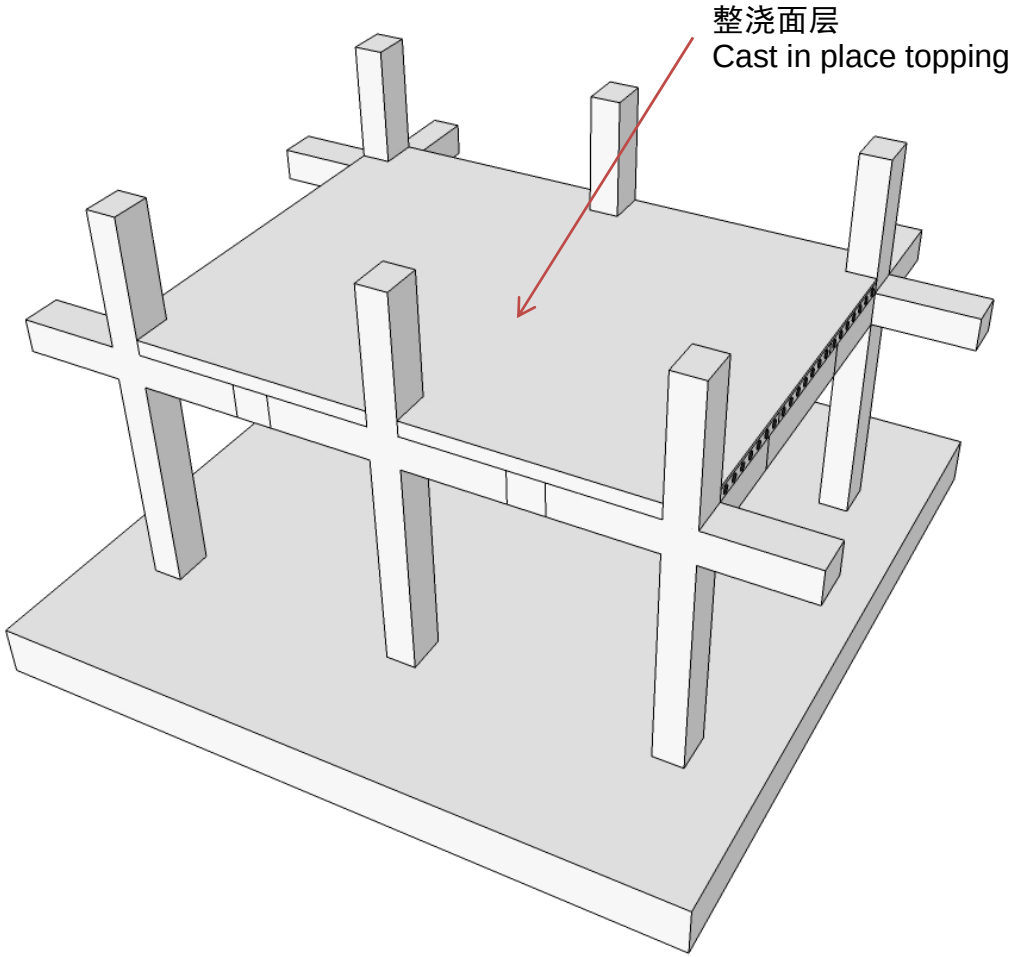
结构元素 – 预制构件连接
Structural Components – Prefab Module Connections



结构元素 – 预制空心楼板
Structural Components – Prefab Hollow Core Planks



结构元素 – 整浇面层
Structural Components – Cast in Place topping



MERIDIAN PARK COLUMNS

MERIDIAN PARK BEAM POUR BACK

可持续发展理念
Sustainable Design Concepts

保护并恢复场地生态
Protect & restore site habitat

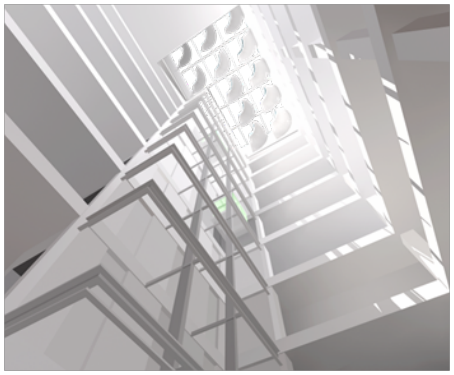
低运行费用
- 节水
- 节能

Low operating cost
- Water Efficiency
- Energy Efficiency

可再生能源
Renewable Energy

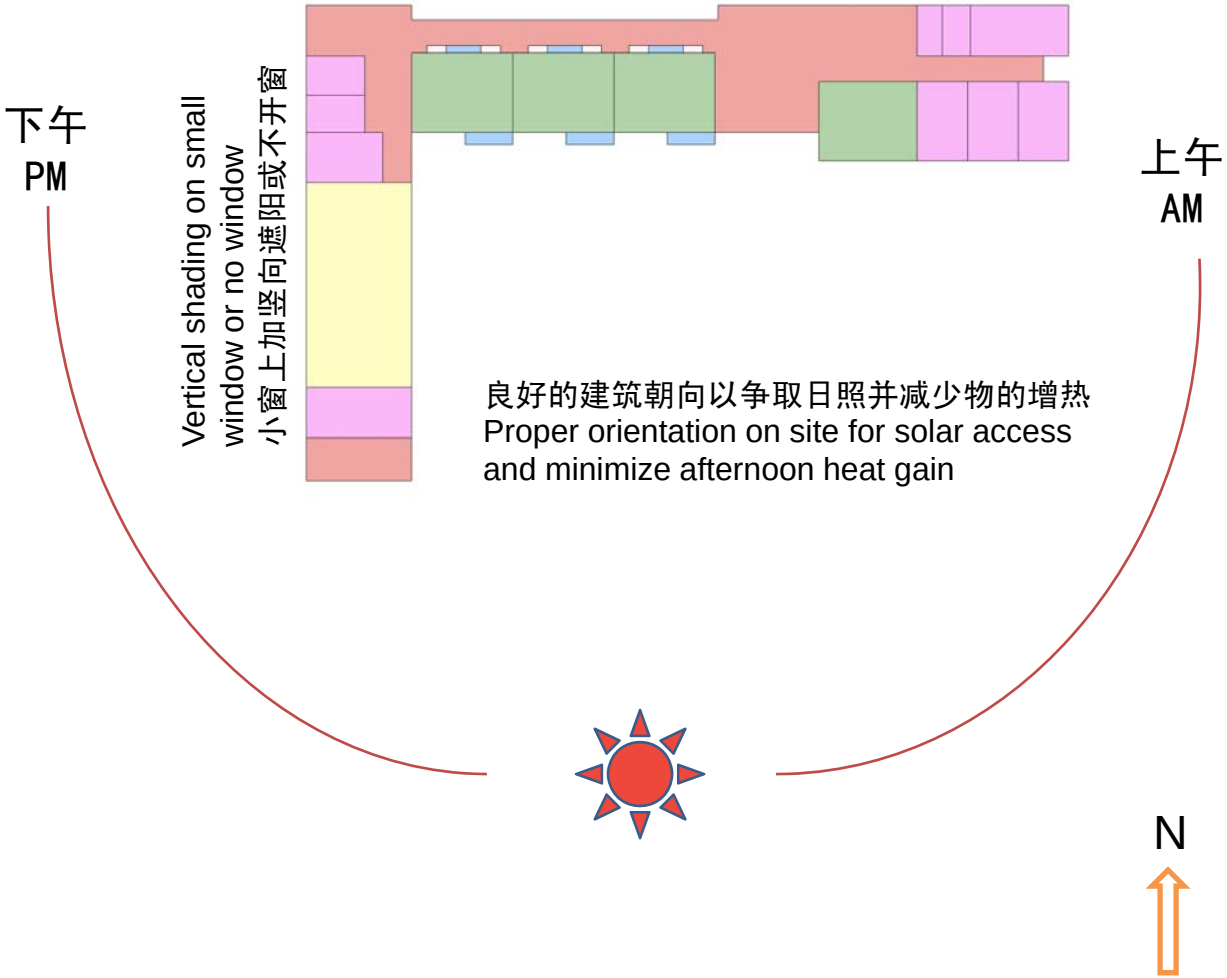
利用回收的材料
Reuse and Recycle Materials

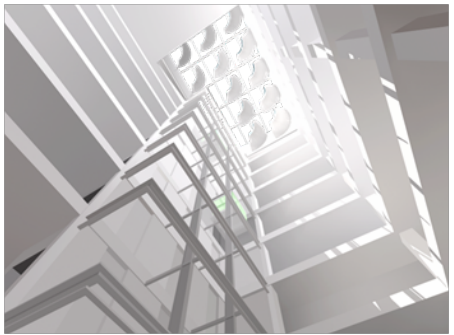
健康安全及使用寿命长的材料
Healthy Long-lasting Materials



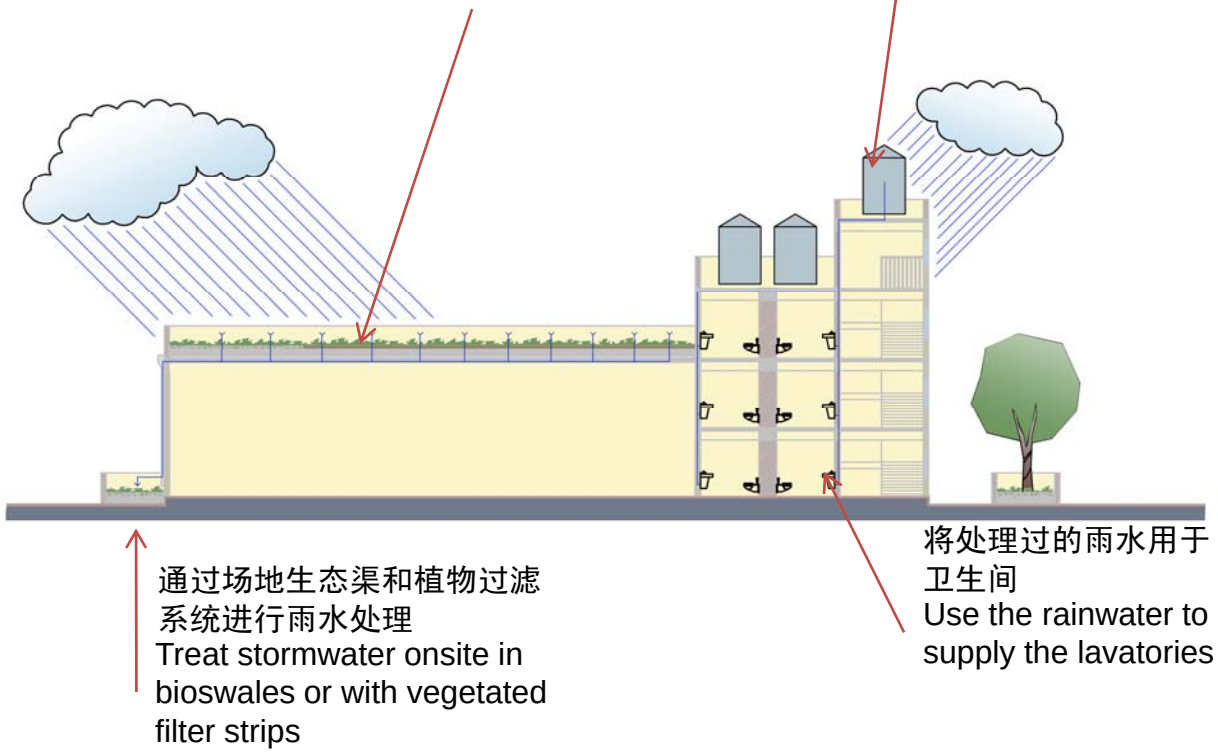
场地 – 良好朝向并保护和恢复场地生态

Site – Proper orientation and Protect & Restore Site Habitat

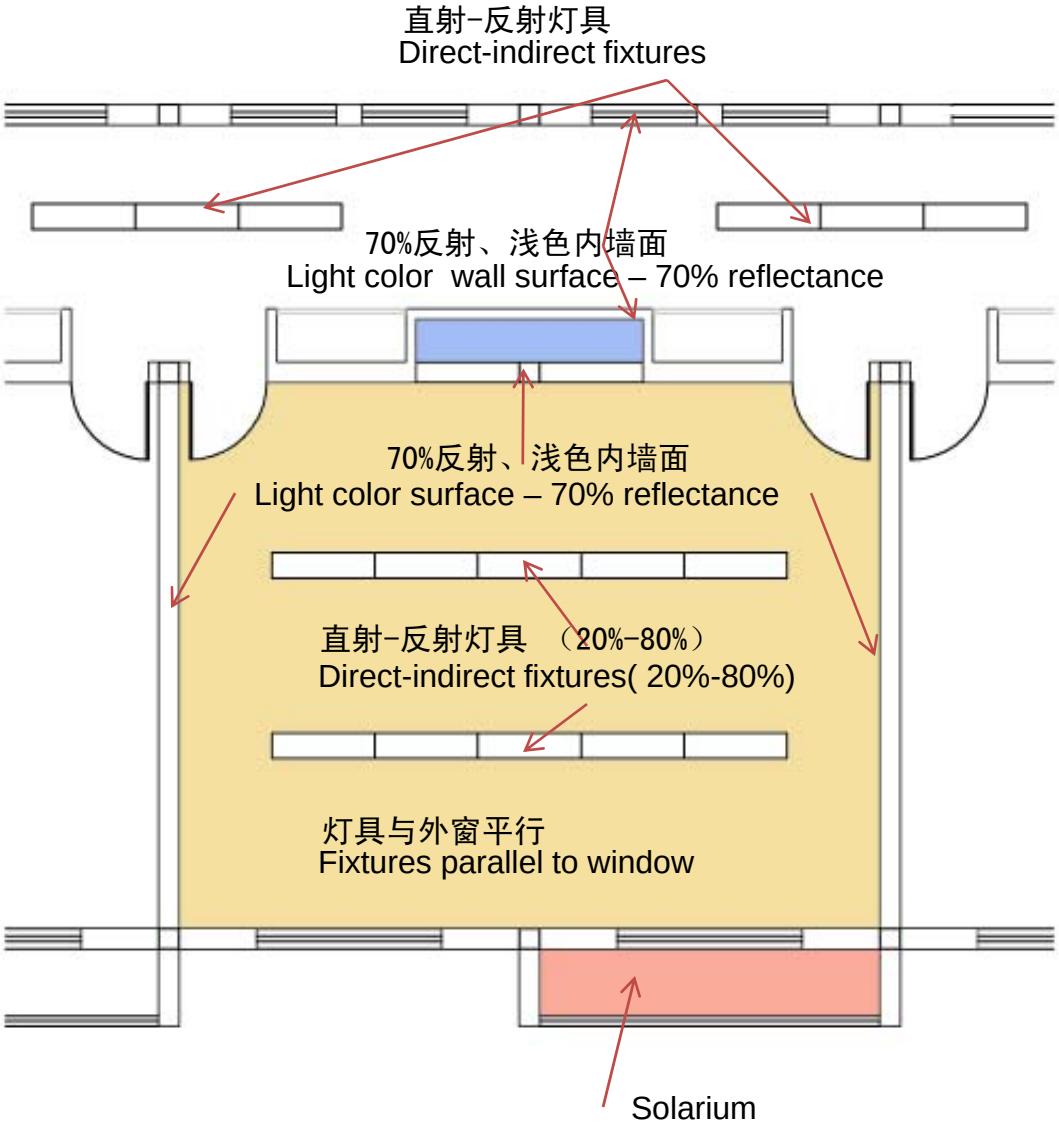




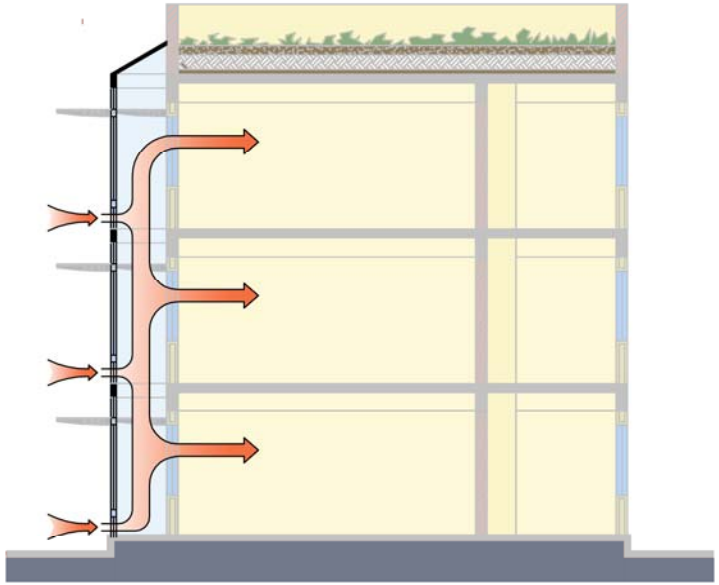
水系统 – 雨水收集
Water System – Rainwater Harvesting

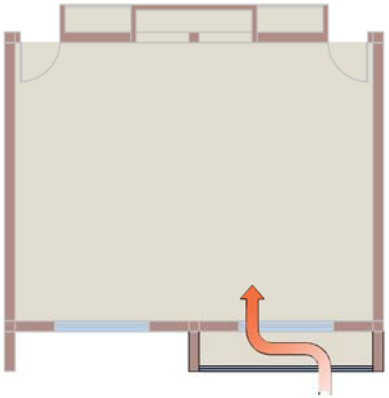


照明系统 – 典型教室
Lighting Systems – typical classroom

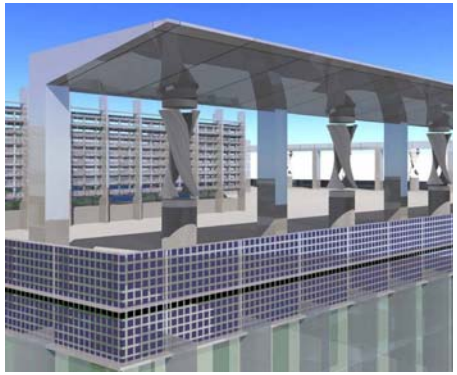


冷热系统 – 采暖系统
Heating and Cooling – Heating system

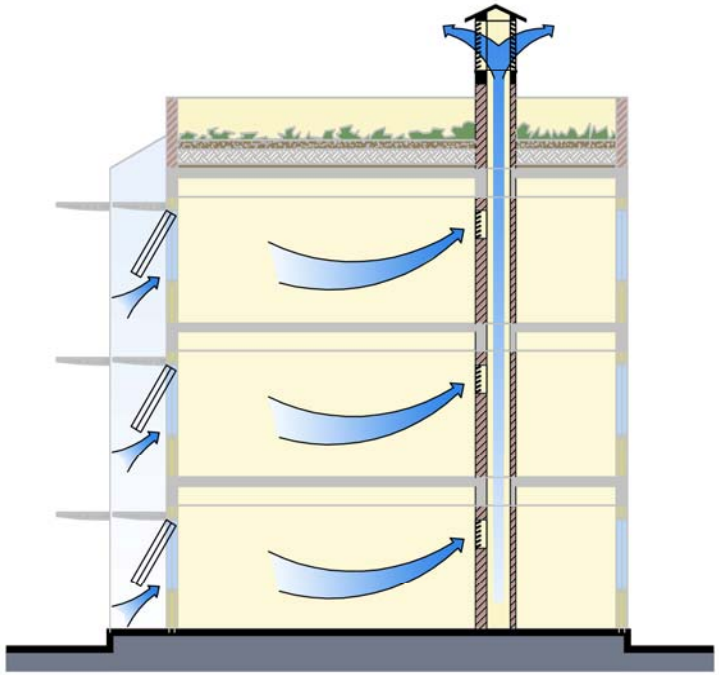


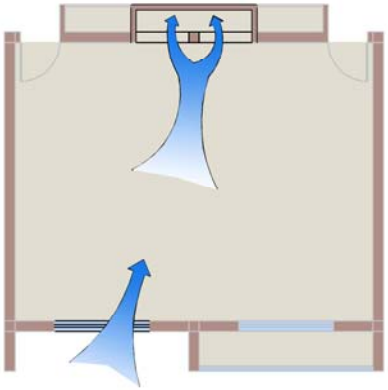


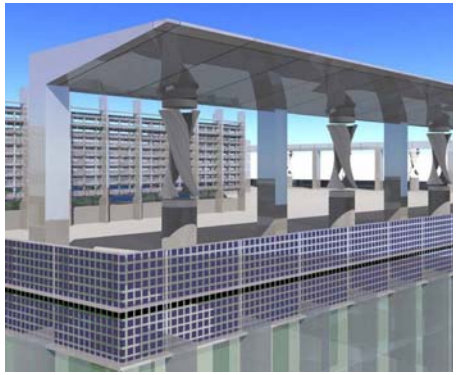
南向被动式太阳能采暖系统
South facing solarium passive heating system



冷热系统 – 通风与制冷
Heating and Cooling – Ventilation and Cooling





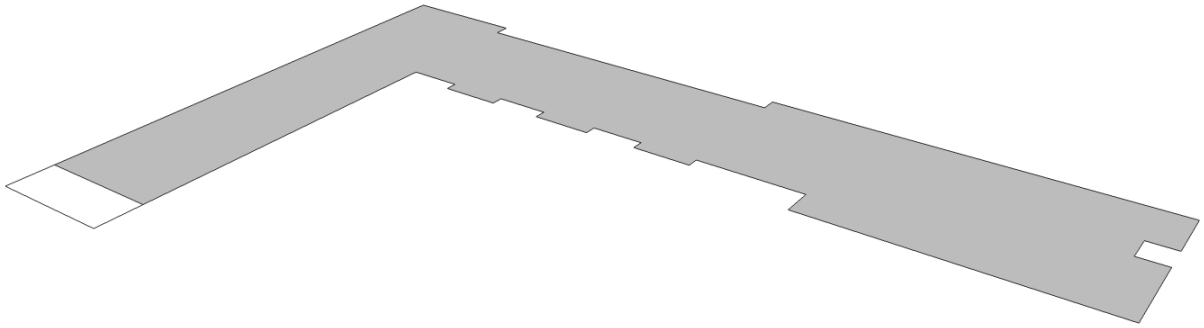


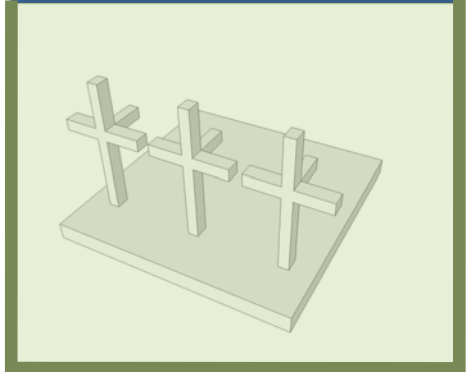
采用可开启的窗户和竖向通风井，改善自然空气流通
Use operable windows to promote stack ventilation.

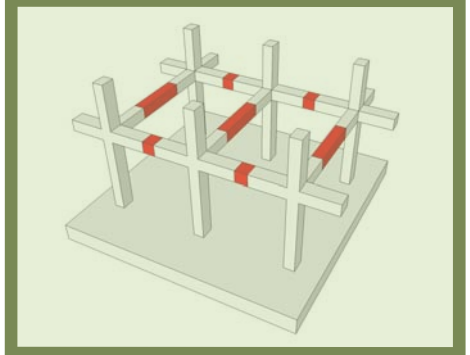
过程与实施

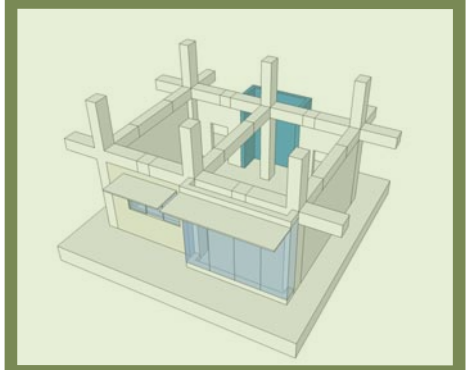
Realization

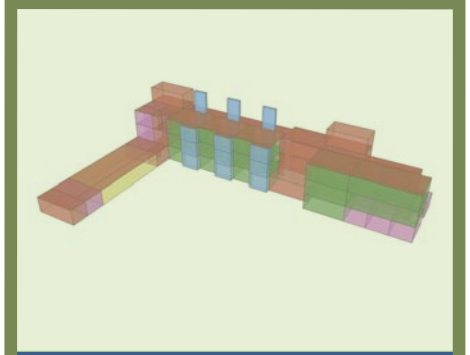
过程与实施
Realization











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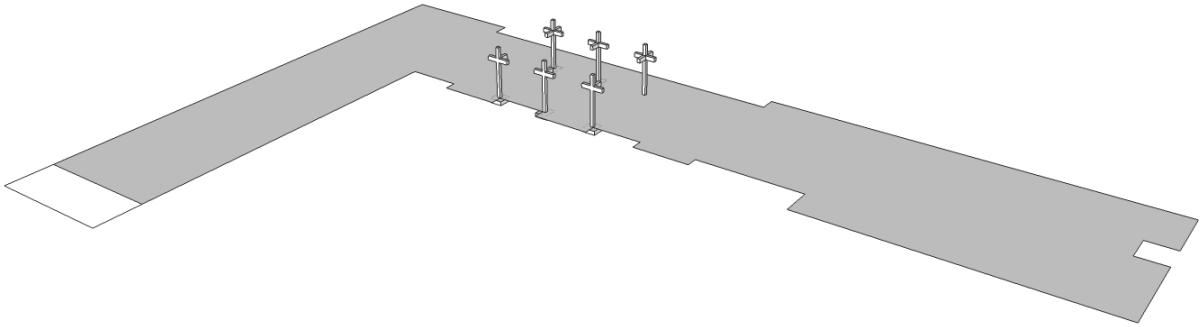

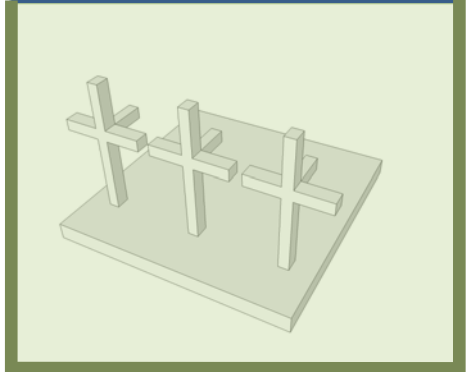

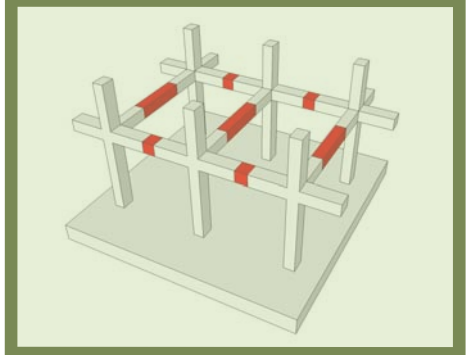

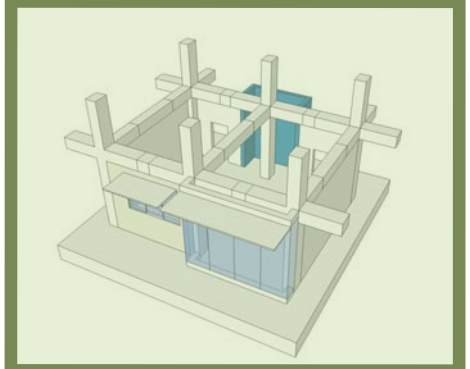

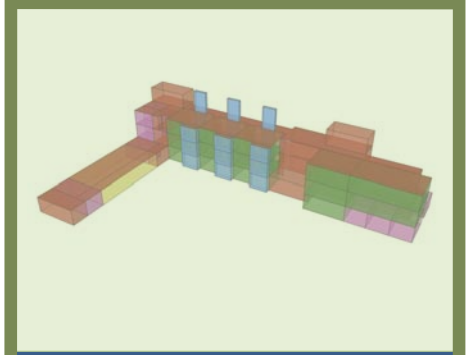

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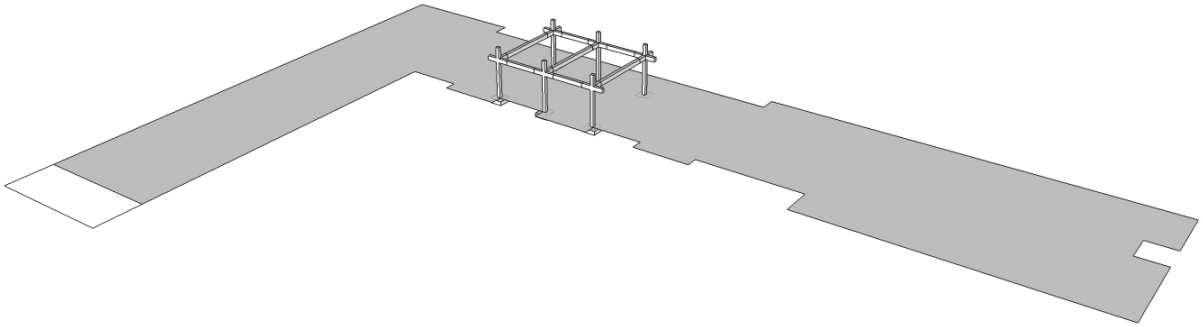

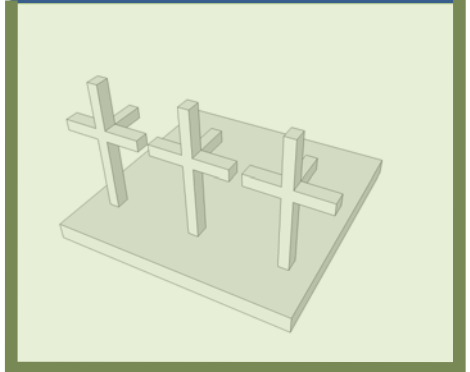

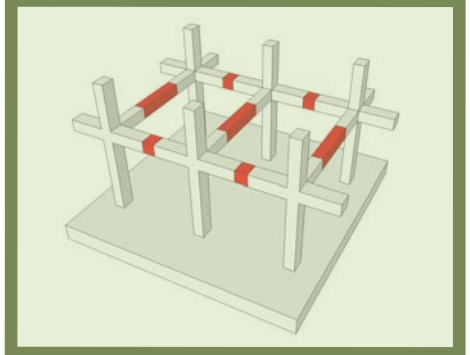

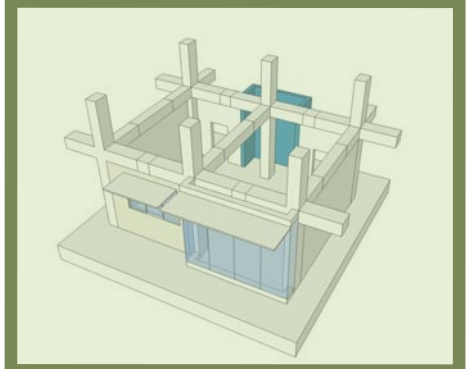

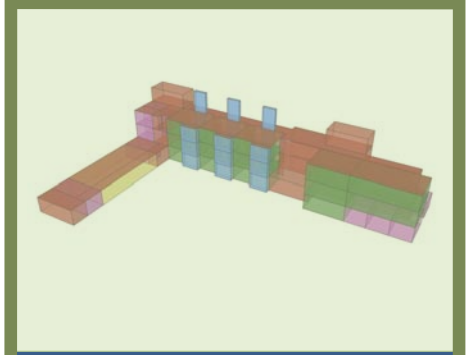

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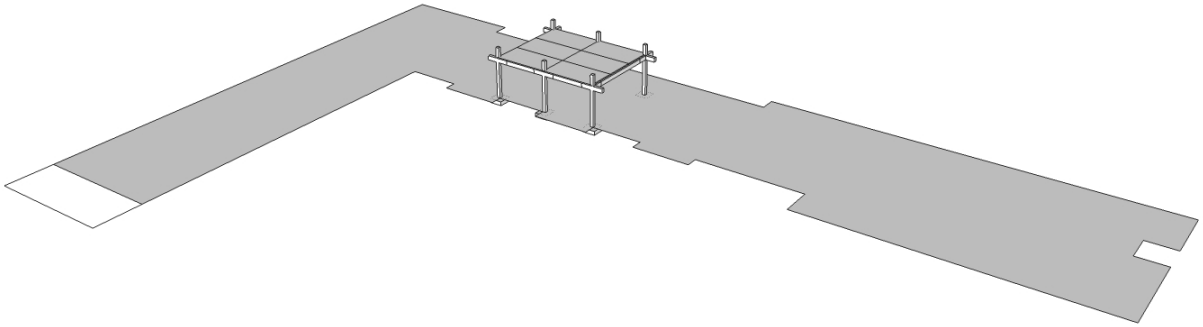

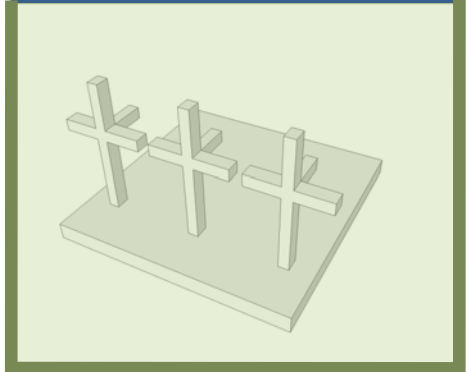

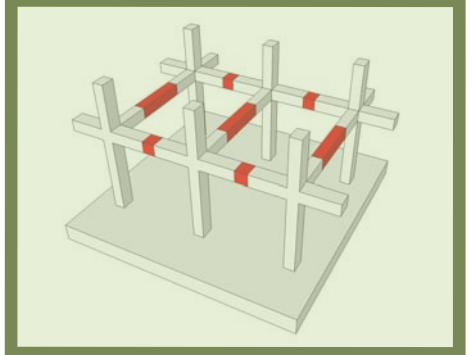

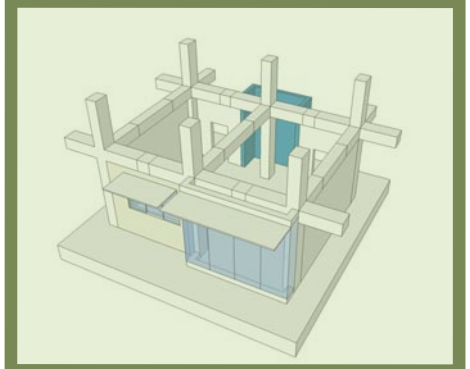

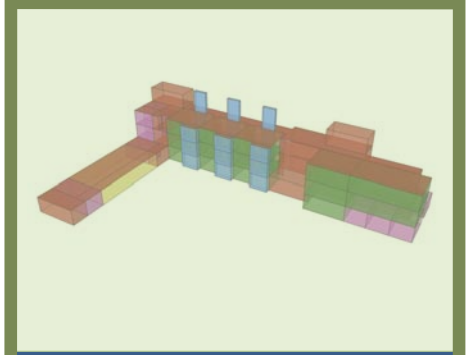

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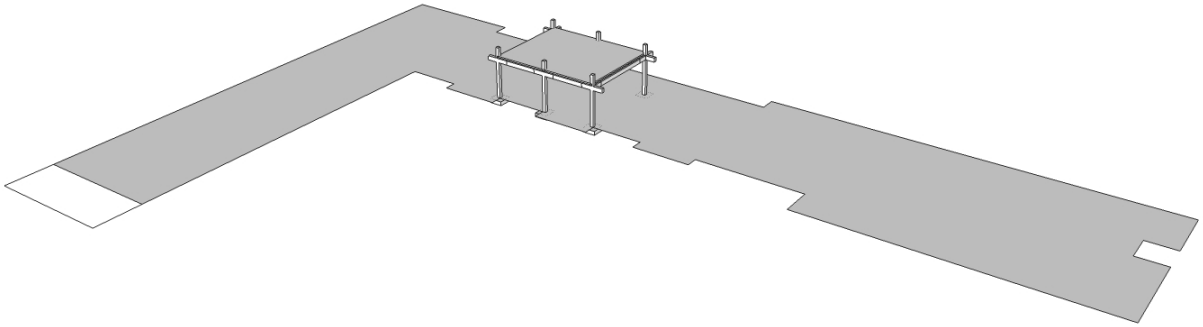

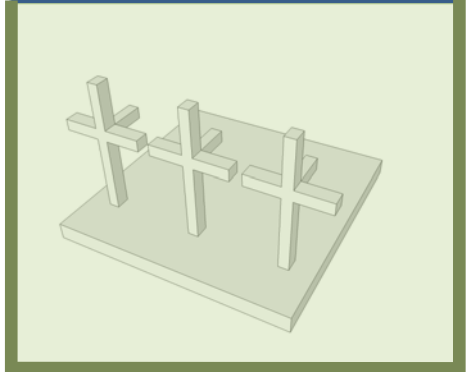

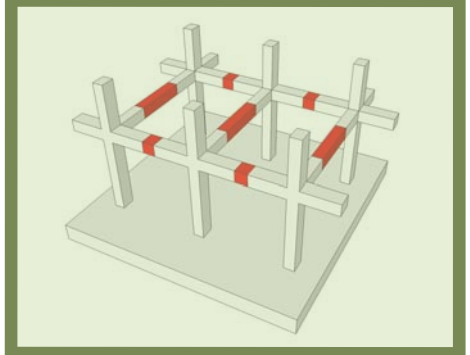

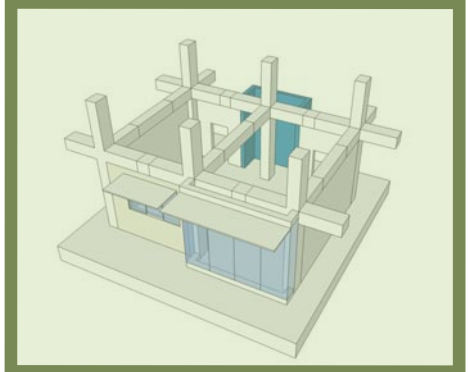

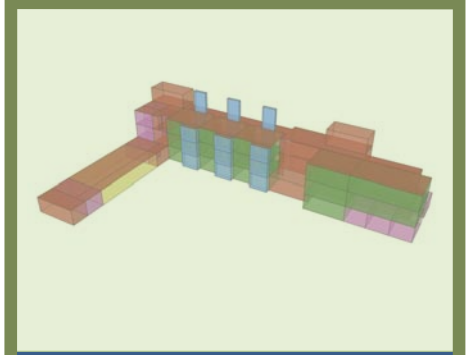

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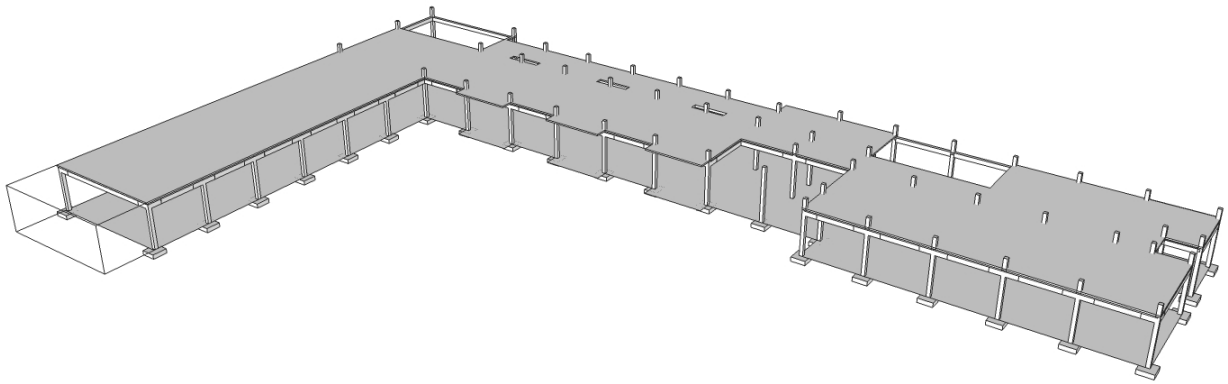

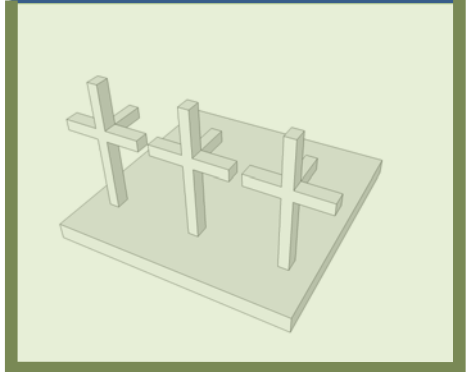

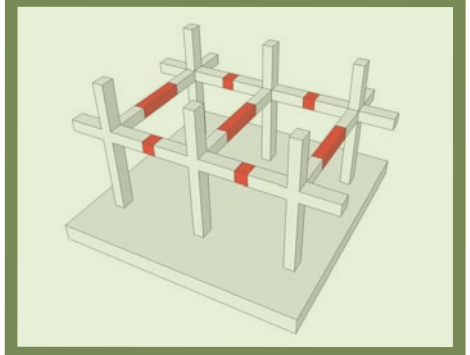

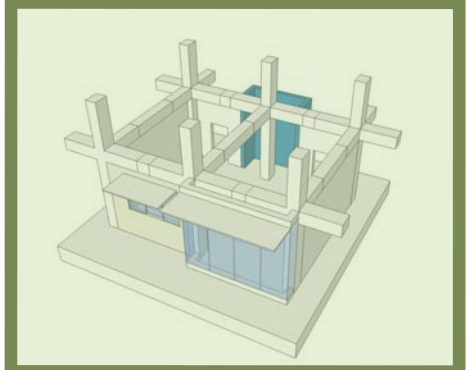

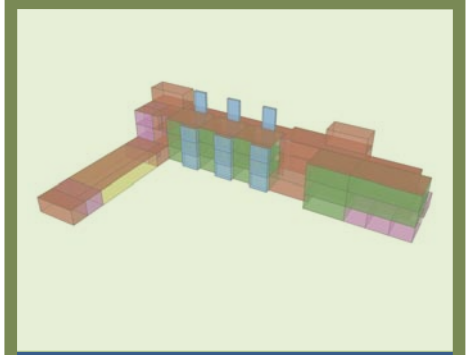

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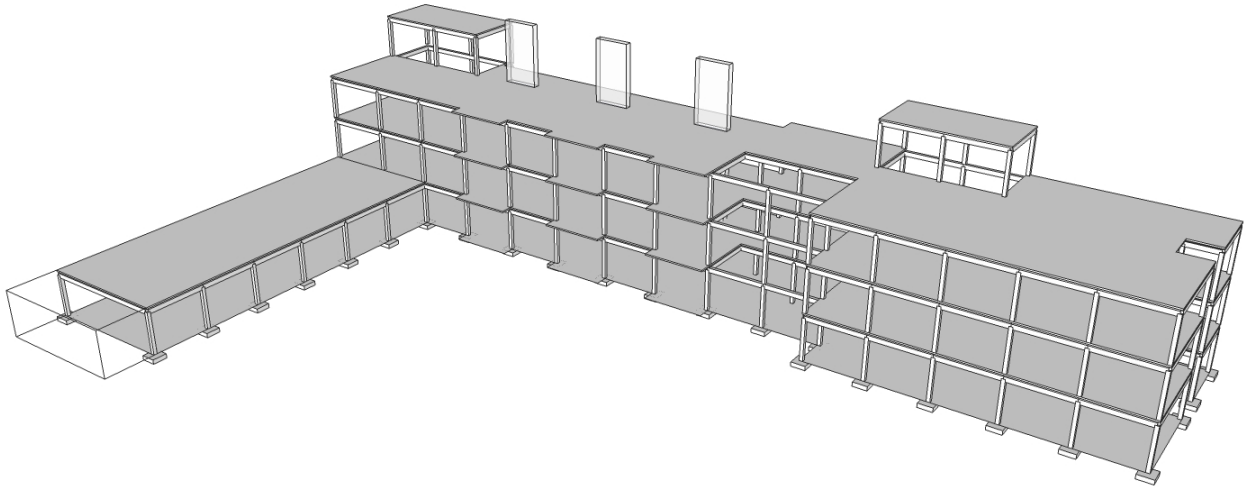

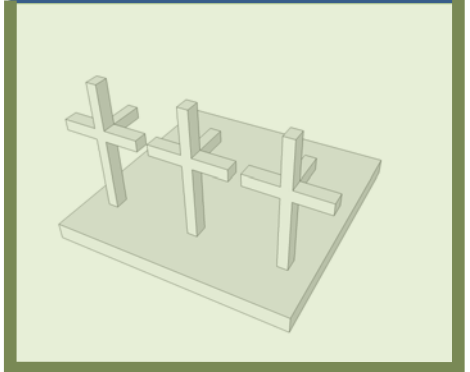

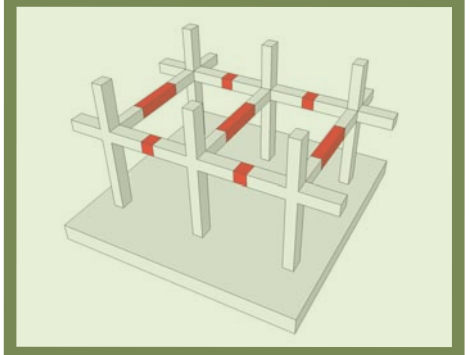

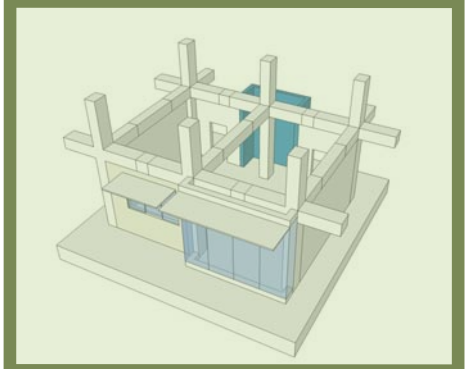

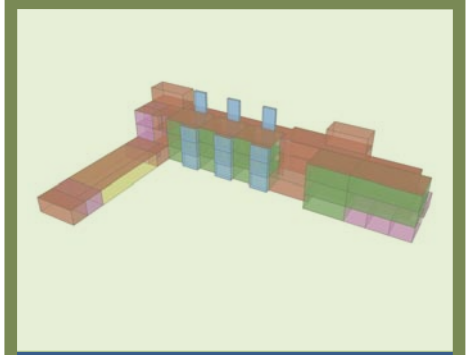

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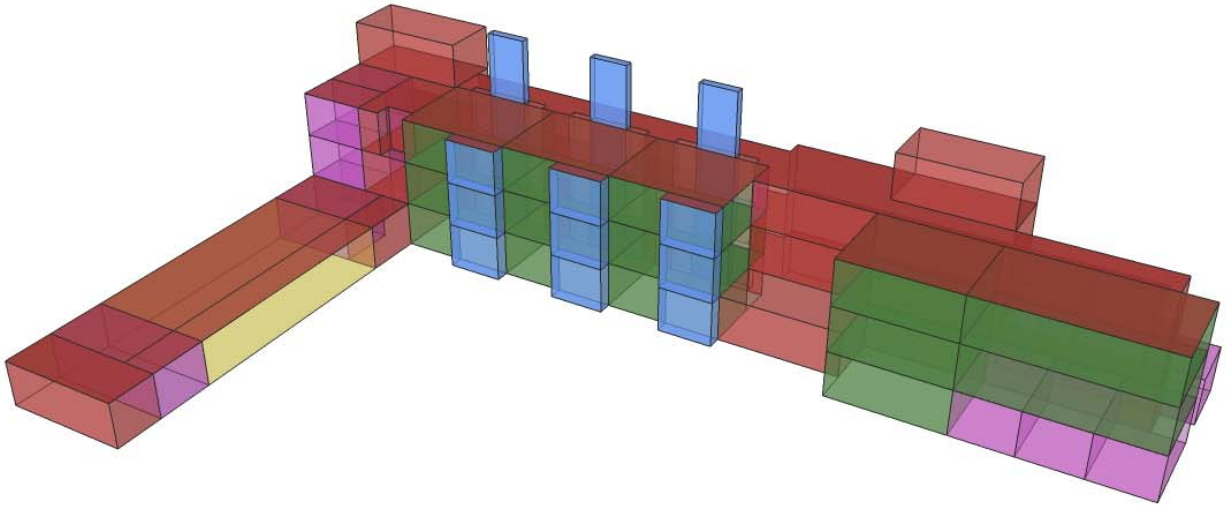

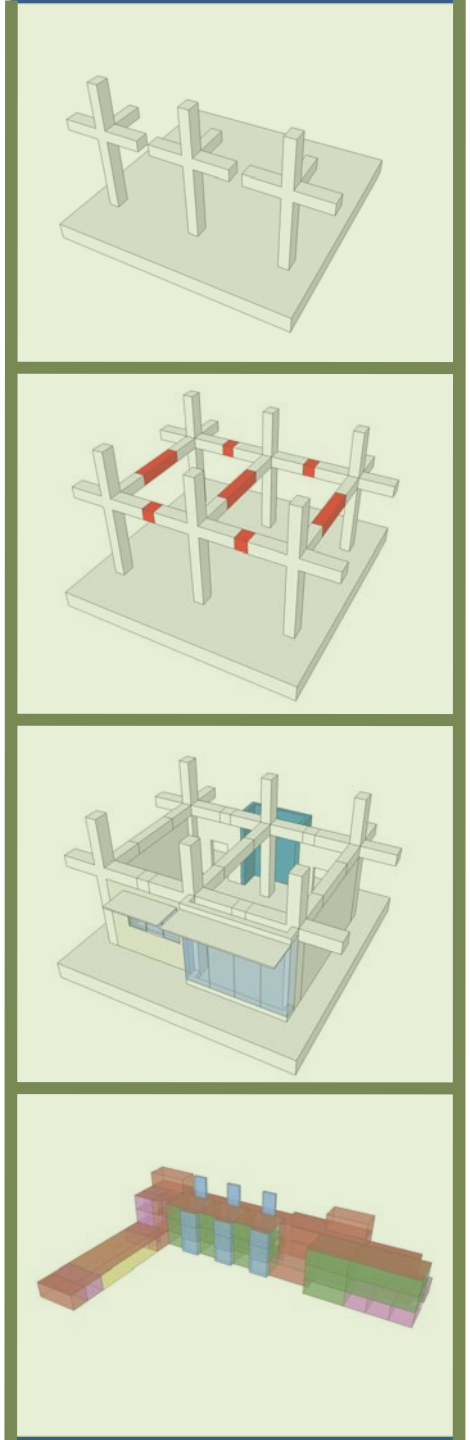

中国建设部的演讲
Presentation at Ministry of Construction China

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Visiting School Site at Qingchuan County

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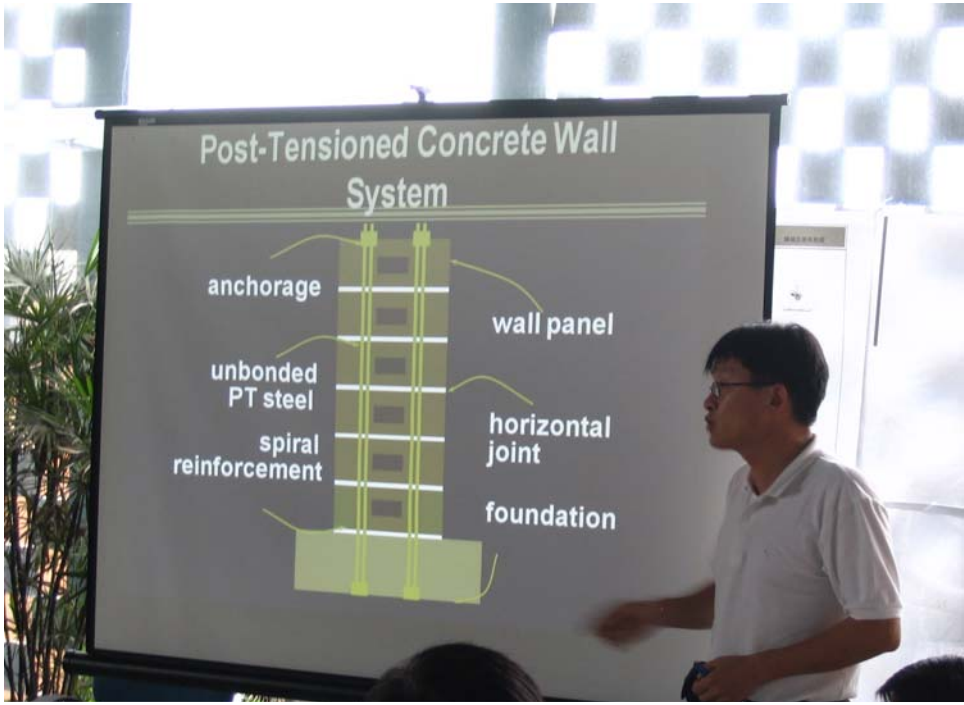

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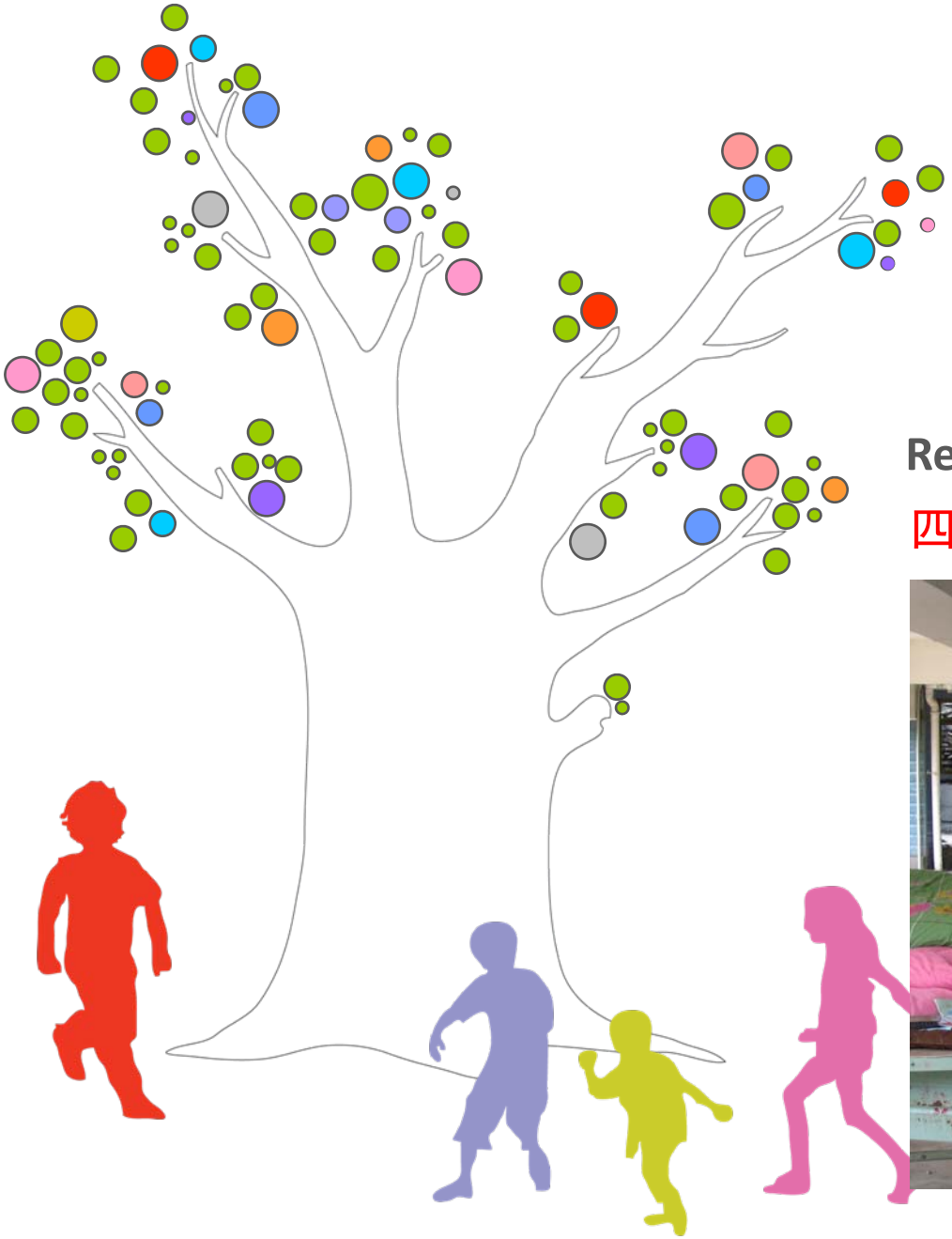

Rebuilding Sichuan Schools

四川灾后农村小学重建概念设计

CHINA-U.S. CENTER FOR SUSTAINABLE DEVELOPMENT
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