



让我们共同打造气候中和的未来
Building a climate-neutral future together



中华人民共和国
住房和城乡建设部



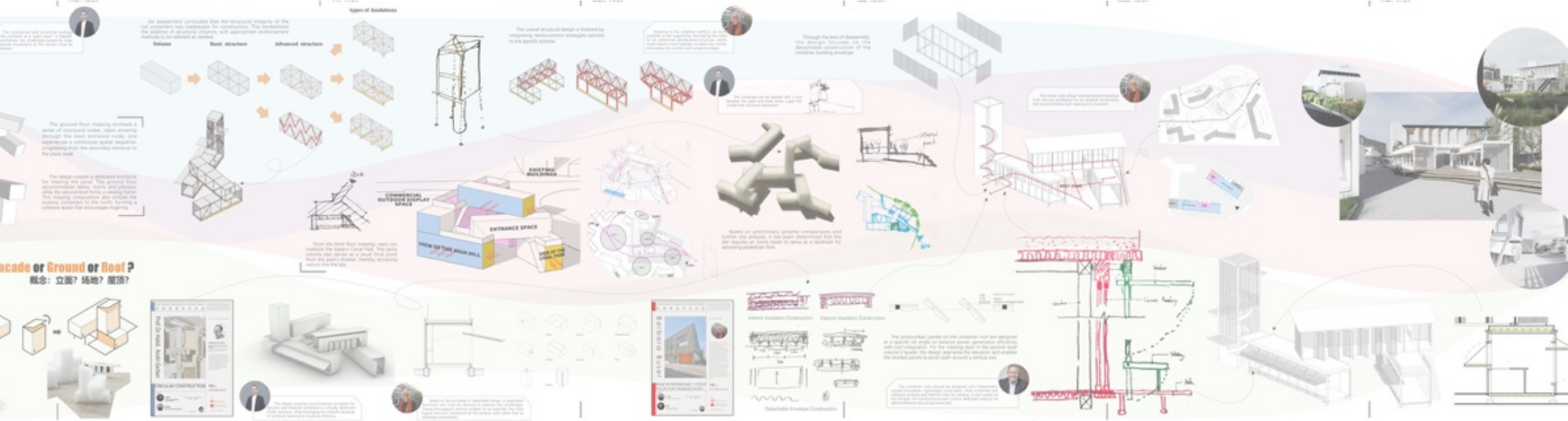
IBE 环能科技
中国建筑节能协会
CHINA ASSOCIATION OF BUILDING ENERGY EFFICIENCY



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra



skat Swiss Resource Centre and
Consultancies for Development



中瑞零碳建筑项目低碳建筑能力建设：南大模式

The Sino-Swiss Zero-Emission Building Project Capacity Building: The Nanjing University Model

吴佳维博士 南京大学建筑与城市规划学助理教授
Dr. WU Jiawei, Nanjing University School of Architecture and Urban Planning

目标

- 普及低碳建筑设计理念；
- 推广建筑碳排放评估方法及低碳建造技术；
- 探索以减碳为目标的建筑设计能力培养模式。

门径

以单体建筑设计为载体，讨论场所环境塑造、使用需求响应、结构材料优化与建筑性能提升，探索设计如何实现高效集成，着重研究减碳策略与建筑形态的主动融合，通过既有轻型建造体系的节点深化设计，实现建造效率与可持续性能的双向提升。

- 建筑群体互动
- 气候界面处理
- 构造技术创新
- 运营模式适配

GOALS

- To disseminate the concept of low-carbon building design.
- To promote building carbon emission assessment methods and low-carbon construction technologies.
- To explore a design capability training model aimed at carbon reduction.

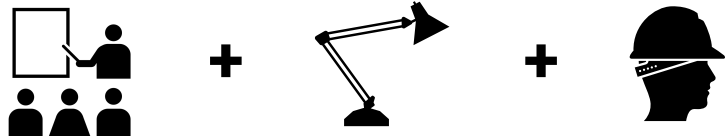
APPROACHES

Using individual building design as the vehicle, the program examines site environment shaping, response to usage demands, optimization of structural materials, and enhancement of building performance. It explores how design can achieve efficient integration, with a focus on the active incorporation of carbon reduction strategies into architectural forms. Through the detailed joint design of existing lightweight construction systems, the study aims to enhance both construction efficiency and sustainable performance.

- Interplay of Building Clusters
- Climate Interface Management
- Innovation in Construction Techniques
- Adaptation of Operational Models

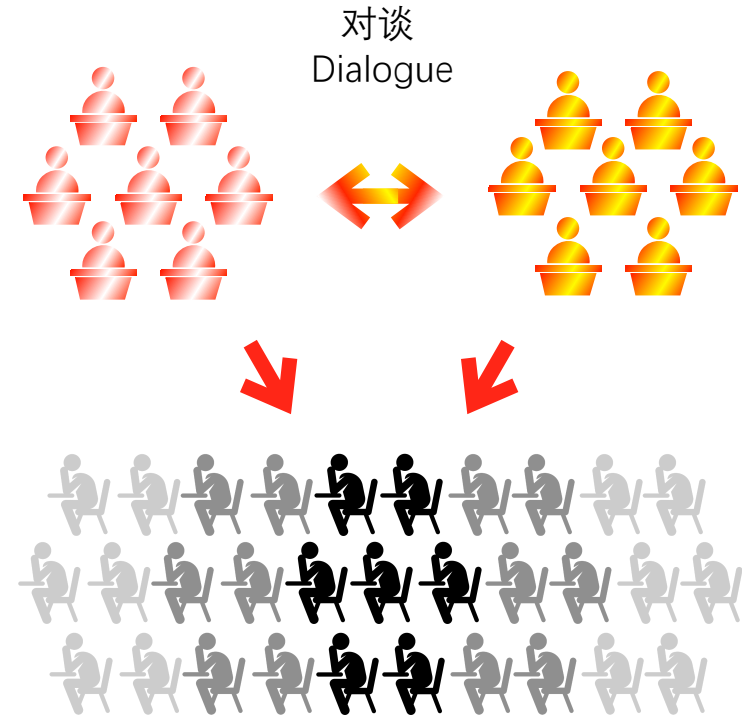
培训模式 Training Model

授课 + 实训 + 建造
讲座 设计工作坊 建造营



TO LEARN + **TO PRACTICE** + **TO BUILD**
LECTURES DESIGN STUDIO CONSTRUCTION
WORKSHOP

讲座模式 Lecture Fomat



线下 + 线上 + 回顾
In-person + Online + Lecture Recaps

瑞士发展合作署 (SDC) 中瑞零碳建筑项目大学知识传授项目
University Capacity Building Project of SDC
Sino-Swiss Zero Emission Building Project

南京大学建筑与城市规划学院研究生国际课程
Postgraduate International Programme, SAUP, Nanjing University

集装箱建筑低碳设计工作坊

LOW-CARBON
DESIGN IN
CONTAINER
ARCHITECTURE

Tutors
ZEB
SKAT
baubüro in situ
Intep
Prof. Dr. WU Jiawei
Prof. Dr. FU Xiao
LI Qian

LI Yin
Dr. André Ullal
Barbara Buser
Dr. LU Feng
SAUP NJU
SAUP NJU
ADINJU

Date
April 7th-18th, 2025

Location
Jianliang Building 211

南京大学建筑与城市规划学院
NANJING UNIVERSITY
School of Architecture and Urban Planning

让建筑用对气候和人的关系
Building a Relationship of People Together



LI Yin 李寅
ZEB



Dr. André Ullal
SKAT



Prof. Dr. WU Jiawei 吴佳维
SAUP



Li Qian 李倩
ADINJU



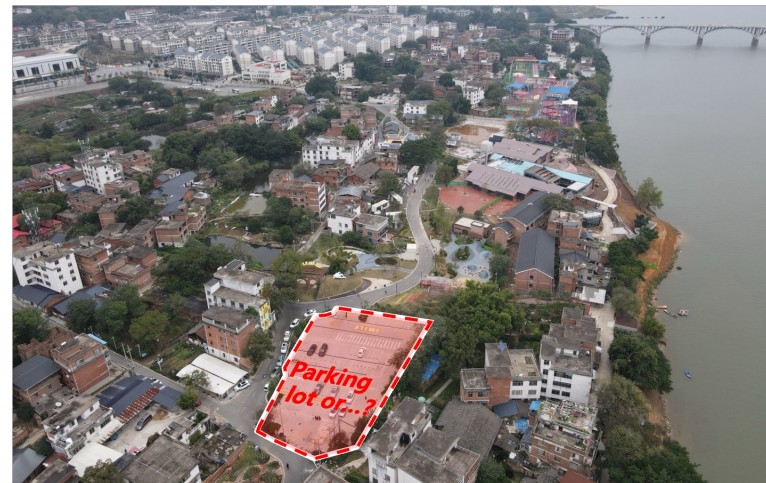
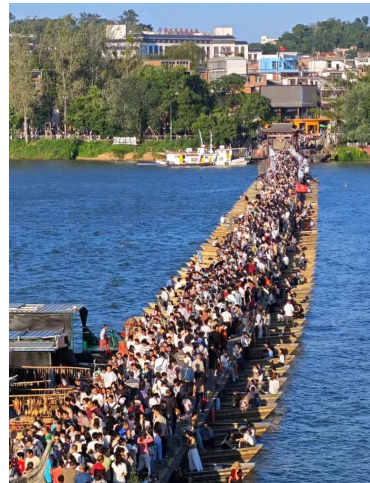
Barbara Buser
baubüro in situ



Dr. LU Feng
Intep



Prof. Dr. FU Xiao 傅筱
SAUP, ADINJU



Teaching Plan for the Low-carbon Building Design Workshop

日期/Date	9:00 ~ 12:00		14:30 ~ 17:30		19:00 ~ 21:00 (on-line lectures)
Mon. 4.7	工作坊开题 项目介绍 (吴佳维、李倩) 阶段 1: 场地 微气候策略 (李寅) <ul style="list-style-type: none"> • 城市设计 • 周边环境和思考策略 • 微气候 • 透水 and 蒸腾 	Workshop Opening Project Introduction (Wu Jiawei, Li Qian) Phase 1: Site Microclimate Strategy: Constellation (Li Yin) <ul style="list-style-type: none"> • Urban Design • Surrounding Environment and Strategic Thinking • Microclimate • Permeability and Transpiration 	设计辅导	Design Tutorial	Dr. André Ullal: Low-Carbon Design and Lightweight Construction 低碳设计与轻量化建造
Tue. 4.8	设计辅导	Design Tutorial	设计辅导: André Ullal (线上)	Design Tutorial: André Ullal (on-line)	
Wed. 4.9	阶段 2: 边界 建筑边界和气候边界 (李寅) <ul style="list-style-type: none"> • 灰空间 • 气候缓冲区 • 阴影区 • Box in Box 	Phase 2: Boundary Architectural Boundary and Climate (Li Yin) <ul style="list-style-type: none"> • Grey Space • Climate Buffer Zone • Shadow Area • Box in Box 	设计辅导: 傅筱	Design Tutorial: Prof. Fu Xiao	
Thur. 4.10	设计辅导	Design Tutorial	设计辅导: André Ullal (线上)	Design Tutorial: André Ullal (on-line)	Prof. Dr. Andri Gerber: Circular Construction 循环建造
Mon. 4.14	阶段 3: 建造 构造设计和低碳建材 (李寅)	Phase 3: Construction Constructional Design and Low-carbon Building Materials (Li Yin)	设计辅导	Design Tutorial	Barbara Buser: Reuse in Switzerland: 2 Pilot Projects by baubüro in situ 瑞士再利用实践: 现场建造事务所的 2 个项目
Tue. 4.15	设计辅导	Design Tutorial	设计辅导: Barbara Buser (线上)	Design Tutorial: Barbara Buser (on-line)	
Wed. 4.16	阶段 4: 运营 运营角度下的设计: 运营碳排放 (李寅) <ul style="list-style-type: none"> • Klee 机械通风还是自然通风? • 设计数据和运营数据 • 用户习惯(建筑空间引导的用户习惯) • Bregenz Museum 的运营数据 • 夜间冷却 	Phase 4: Operation Design from an Operational Perspective (Li Yin) <ul style="list-style-type: none"> • Klee Mechanical Ventilation or Natural Ventilation? • Design Data and Operational Data • User Habits (Spatially Influenced User Behavior) • Operational Data of Bregenz Museum • Night Cooling 	设计辅导: 傅筱	Design Tutorial: Prof. Fu Xiao	
Fri. 4.18	设计辅导	Design Tutorial	设计答辩: Barbara Buser and Roland Stulz (线上)	Design Review: Barbara Buser and Roland Stulz (on-line)	Prof. Adrian Altenburger: Interdisciplinary for Zero-Carbon Buildings 零碳建筑的跨学科路径

瑞士发展合作署 (SDC) 中瑞零碳建筑项目大学知识传授项目
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南京大学建筑与城市规划学院研究生国际课程
Postgraduate International Programme, SAUP, Nanjing University

LOW-CARBON DESIGN AND LIGHTWEIGHT CONSTRUCTION

07/04
Dr. André Ullal
瑞士 skat 咨询责任有限公司, 弗里堡工程与建筑学院 (HEIA)

对话
朱亮翔, 香港中文大学建筑学院副教授
陈东华, 陈东华建筑事务所创始人, 华南理工大学建筑设计院设计导师

CIRCULAR CONSTRUCTION

10/04
Prof. Dr. Habil. Andri Gerber
苏黎世应用科学大学 (ZHAW)

对话
王帅中, 香港中文大学建筑学院助理教授
吴佳维, 南京大学建筑与城市规划学院助理教授

REUSE IN SWITZERLAND - 2 PILOT PROHJECTS BY BAUBÜRO IN SITU

14/04
Barbara Buser
瑞士现场建造事务所 (baubüro in situ)

对话
丁沃沃, 南京大学建筑与城市规划学院教授
张旭, 东南大学建筑学院副教授, 旭可建筑合伙人、主持建筑师

INTERDISCIPLINARY FOR ZERO-CARBON BUILDINGS

18/04
Prof. Adrian Altenburger
卢塞恩应用科学与艺术大学 (HSLU)

对话
张时聪, 中国建筑科学研究院研究员
金星, 南京大学建筑与城市规划学院教授
傅筱, 南京大学建筑与城市规划学院教授

遗忘的耐候性

23/04
Prof. Dr. 傅筱
南京大学建筑与城市规划学院

材料回用的机会和挑战

28/04
Prof. Dr. 宋晔皓
清华大学建筑学院

Low-Carbon Construction LECTURE SERIES 低碳建造系列讲座

召集人
吴佳维
南京大学建筑与城市规划学院助理教授
路枫
中瑞零碳建筑项目中方本地首席顾问
李寅
中瑞零碳建筑项目日方本地首席顾问


时间 7:00 ~ 9:00PM GMT+8
ZOOM 会议号: 862 3882 0476
密码: 445566

主办
中瑞零碳建筑项目中方本地首席顾问
南京大学建筑与城市规划学院
School of Architecture and Urban Planning

协办 综合性大学建筑联合会

Low-Carbon Construction Lecture Series
低碳建造系列讲座

Dr. André Ullal



Andri Ullal is an Architect and Building Specialist with 30+ Years of Experience in a range of international projects. He has worked in architectural, engineering and construction sectors, and has been involved in a wide range of projects, including the design and construction of a number of high-profile buildings. He is currently working on a number of projects in the field of sustainable architecture and is a member of the Swiss Agency for Development Cooperation and Education (SDC).

07/04
7:00-9:00PM GMT+8

主讲人: 朱亮翔, 陈东华

Low-Carbon Construction Lecture Series
低碳建造系列讲座

Prof. Dr. Habil. Andri Gerber



Prof. Dr. Andri Gerber is an architect and building specialist with 30+ years of experience in a range of international projects. He has worked in architectural, engineering and construction sectors, and has been involved in a wide range of projects, including the design and construction of a number of high-profile buildings. He is currently working on a number of projects in the field of sustainable architecture and is a member of the Swiss Agency for Development Cooperation and Education (SDC).

10/04
7:00-9:00PM GMT+8

主讲人: 王帅中, 吴佳维

Low-Carbon Construction Lecture Series
低碳建造系列讲座

Barbara Buser




Barbara Buser is an architect and building specialist with 30+ years of experience in a range of international projects. She has worked in architectural, engineering and construction sectors, and has been involved in a wide range of projects, including the design and construction of a number of high-profile buildings. She is currently working on a number of projects in the field of sustainable architecture and is a member of the Swiss Agency for Development Cooperation and Education (SDC).

14/04
7:00-9:00PM GMT+8

主讲人: 丁沃沃, 张旭

Low-Carbon Construction Lecture Series
低碳建造系列讲座

Prof. Adrian Altenburger



Prof. Adrian Altenburger is an architect and building specialist with 30+ years of experience in a range of international projects. He has worked in architectural, engineering and construction sectors, and has been involved in a wide range of projects, including the design and construction of a number of high-profile buildings. He is currently working on a number of projects in the field of sustainable architecture and is a member of the Swiss Agency for Development Cooperation and Education (SDC).

18/04
7:00-9:00PM GMT+8

主讲人: 张时聪, 傅筱

Low-Carbon Construction Lecture Series
低碳建造系列讲座

Prof. Dr. Fu Xiao



Dr. Fu Xiao is a Professor at the School of Architecture and Urban Planning of Nanjing University. She is an expert in the field of weather-resistant architecture and has been involved in a number of high-profile projects. She is currently working on a number of projects in the field of weather-resistant architecture and is a member of the Swiss Agency for Development Cooperation and Education (SDC).

23/04
7:00-9:00PM GMT+8

主讲人: 傅筱

Low-Carbon Construction Lecture Series
低碳建造系列讲座

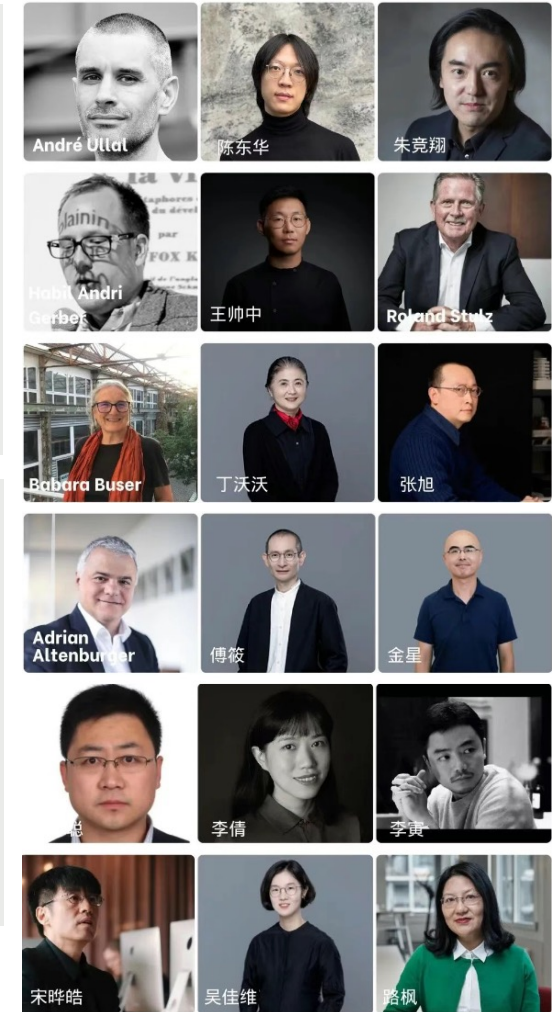
Prof. Dr. Song Yehao



Prof. Dr. Song Yehao is a Professor at the School of Architecture and Urban Planning of Tsinghua University. He is an expert in the field of material reuse and has been involved in a number of high-profile projects. He is currently working on a number of projects in the field of material reuse and is a member of the Swiss Agency for Development Cooperation and Education (SDC).

28/04
7:00-9:00PM GMT+8

主讲人: 李寅



TITLE

STRUCTURE
TEAM 1



SITE
AND
PROGRAMME
TEAM 2



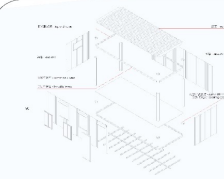
ENVELOPE
TEAM 3



DAY 01
Mon. 07/04



The ancient pontoon bridge has long served as a vital link between the two riverbanks. However, there is now a noticeable disparity in spatial vitality across the two sides, with the project site further challenged by outdated facilities. It is recommended that the design incorporate experiential commerce and art-driven placemaking.

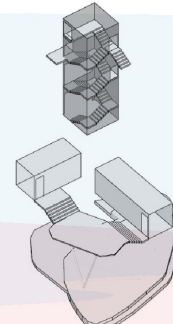
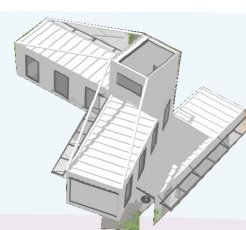
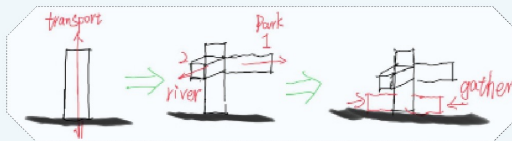


Key Considerations in Container Design
The design is developed based on a container structural system. In broad terms, container architecture is defined as modular, lightweight prefabricated construction that utilizes similar materials.

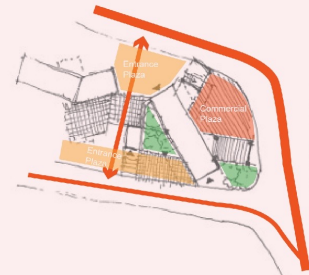
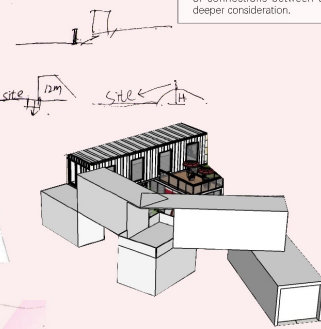
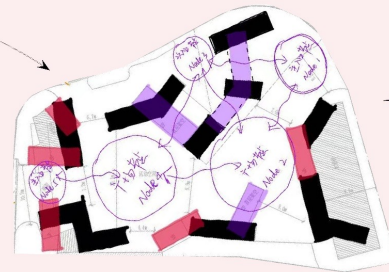


DAY 02
Tue. 08/04

The design strategy, rooted in structural principles, leverages the containers' inherent strength to cantilever them from a vertical core axis, framing views toward the Gan River and the Canal Park.



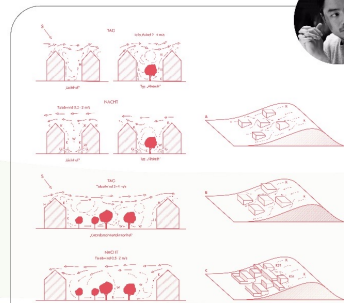
The design presents an intention of cantilevered containers that respond to different view corridors. While the vertical juxtaposition demonstrates structural possibility, the treatment of connections between containers demands deeper consideration.



Both schemes, driven by site context, focus on guiding pedestrian flow and creating nodal spaces.



The design addresses visitor circulation by guiding their paths, pauses, and decision points. Spatial strategy extends beyond building massing to encompass human-scale ground elements, including platform levels, paving materials, and the integration of hard and soft surfaces.



Site & Context: Microclimatic Strategy
Site analysis begins with the microclimatic perspective. The layout of adjacent buildings directly impacts the site's wind environment. This impact is regulated through deliberate site strategy.

Low Carbon Construction Lecture Series
Dr. André Utqi
LOW CARBON DESIGN AND LIGHTWEIGHT CONSTRUCTION
07/04
PROFESSOR GUANG



Embodied Carbon and Material Selection
The "Building Materials Pyramid" provides a holistic understanding, enabling a systematic comparison of materials based on performance and environmental impact to inform selection logic.

DAY
Wed.

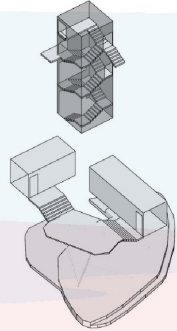
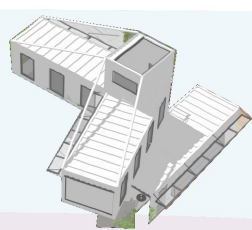
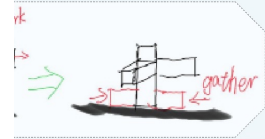
02
08/04

DAY 03
Wed. 09/04

DAY 04
Thur. 10/04

DAY
Fri. 11/04

structural principles, leverages the
theftier them from a vertical core
River and the Canal Park.



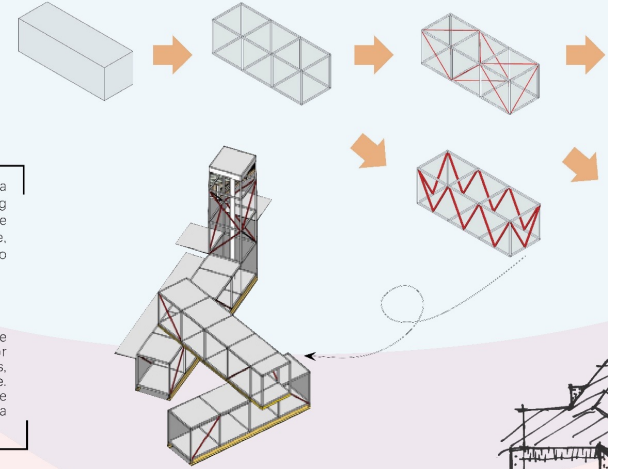
Difficulties in resolving angled
junctions between volumes within
the initial oblique structural
framework prompted a shift to an
orthogonal system for the detailed
design phase.

The conceptual and structural analogy
of the container as a "giant beam" is feasible.
Nevertheless, the challenges posed by large
rotational movements at the corners must be
addressed.



An assessment concluded that the structural integrity of the
cut containers was inadequate for construction. This necessitates
the addition of structural columns, with appropriate reinforcement
methods to be selected as needed.

Volume Basic structure Advanced structure



The ground-floor massing encloses a
series of courtyard nodes. Upon entering
through the main entrance node, one
experiences a continuous spatial sequence,
progressing from the secondary entrance to
the plaza node.

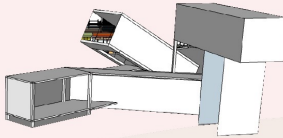
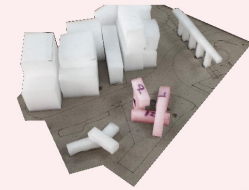
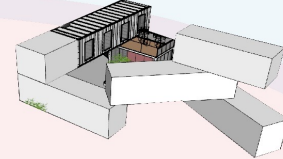
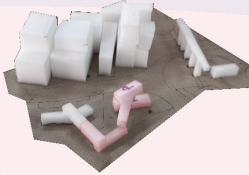
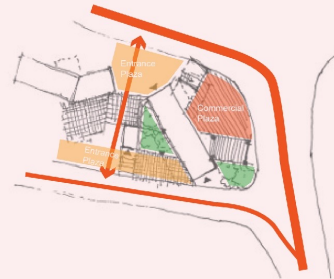
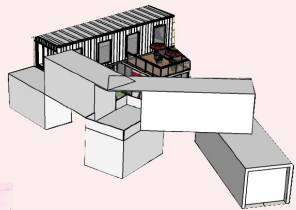
The design creates a dedicated enclosure
for viewing the canal. The ground floor
accommodates tables, chairs, and planters,
while the second level forms a viewing frame.
This massing composition also echoes the
existing containers to the north, forming a
cohesive space that encourages lingering.

From the third-
overlook the east
volume also serve
from the park's th
visitors into the site

The design presents an intention of
cantilevered containers that respond to different
view corridors. While the vertical juxtaposition
demonstrates structural possibility, the treatment
of connections between containers demands
deeper consideration.



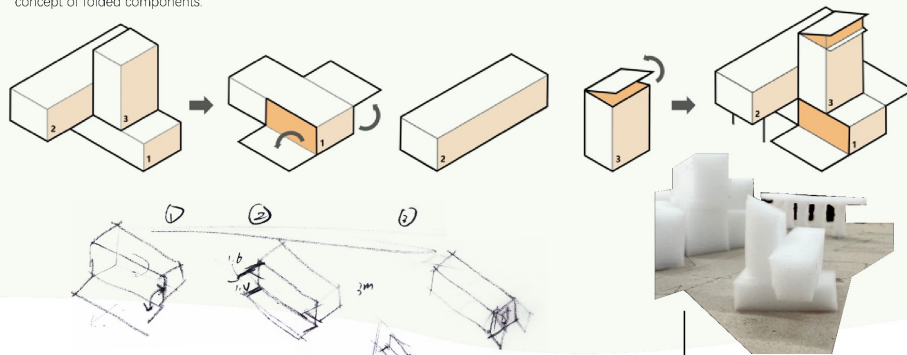
site 10m



Both schemes, driven by site context,
focus on guiding pedestrian flow and creating
nodal spaces.

CONCEPT: Facade or Ground or Roof? 概念: 立面? 场地? 屋顶?

The design approaches the massing as a product,
where shading and canopy functions are derived
from the container's own form by introducing a
concept of folded components.



By guiding their
strategy extends
n-scale ground
materials, and the

THE CONSTRUCTION MATERIAL PYRAMID



Embodied Carbon and Material Selection

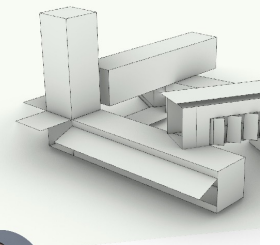
The "Building Materials Pyramid" provides a holistic
understanding, enabling a systematic comparison of
materials based on performance and environmental
impact to inform selection logic.



Low-Carbon Construction Lecture Series
低碳建造系列讲座

Prof. Dr. Habibi Andri Gebher

CIRCULAR CONSTRUCTION 10/04



The design employs environmental simulation
extreme and seasonal conditions to critically de
HVAC solutions, while leveraging the inherent sin
of container stacking for structural efficiency.

10/04

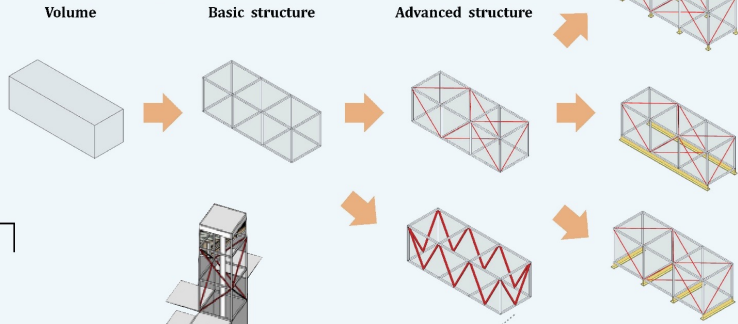
DAY 05
Fri. 11/04

DAY 06
Mon. 14/04

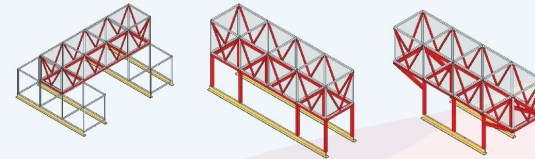
DAY
Tue.

types of foundations

An assessment concluded that the structural integrity of the cut containers was inadequate for construction. This necessitates the addition of structural columns, with appropriate reinforcement methods to be selected as needed.



The overall structural design is finalized by integrating reinforcement strategies tailored to the specific scheme.



Stacking is the simplest method, as each container is self-supporting, eliminating the need for an additional cantilevered structure, which would require more materials, increase cost, and be unnecessary for a small-scale container project.

Through the lens of disassembly, the design focuses on the detachable construction of the container building envelope.

The containers can be stacked with a void between the upper and lower levels, a gap that reveals their structural separation.

Door massing encloses a 3 nodes. Upon entering an entrance node, one inuious spatial sequence, the secondary entrance to

tes a dedicated enclosure anal. The ground floor les, chairs, and planters, zel forms a viewing frame. position also echoes the to the north, forming a encourages lingering.

From the third-floor massing, users can overlook the eastern Canal Park. This same volume also serves as a visual focal point from the park's theater, thereby attracting visitors into the site.

COMMERCIAL OUTDOOR DISPLAY SPACE

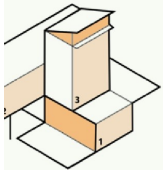
ENTRANCE SPACE

VIEW OF THE HIGH HILL

VIEW OF THE CANAL PARK

EXISTING BUILDINGS

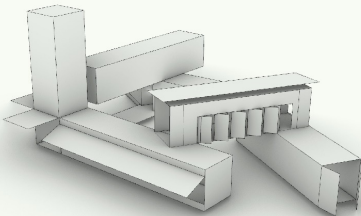
For Roof? 场地? 屋顶?



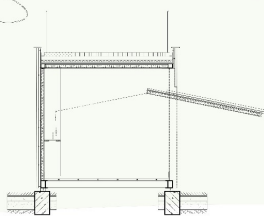
Low-Carbon Construction Lecture Series
低零建造系列讲座

Prof. Dr. Habil. Andre Gerber

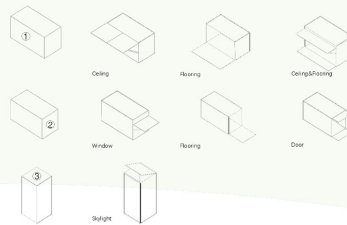
CIRCULAR CONSTRUCTION 10 Oct



The design employs environmental simulation for extreme and seasonal conditions to critically determine HVAC solutions, while leveraging the inherent simplicity of container stacking for structural efficiency.



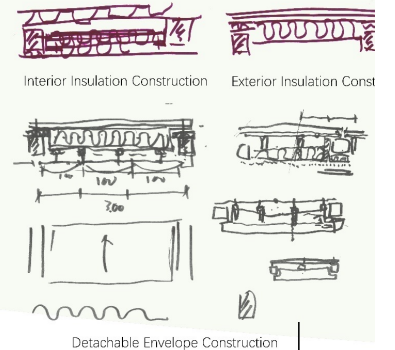
Based on the principles of detachable design, a reasonable minimum unit must be defined to address new challenges. Taking the support-remove window as an example, the most logical minimum unit should be the window itself, rather than its individual components.



Low-Carbon Construction Lecture Series
低零建造系列讲座

Barbara Buser

REUSE IN SWITZERLAND - 2 PILOT PROJECTS BY BAUBURO IN SITU 14 Oct

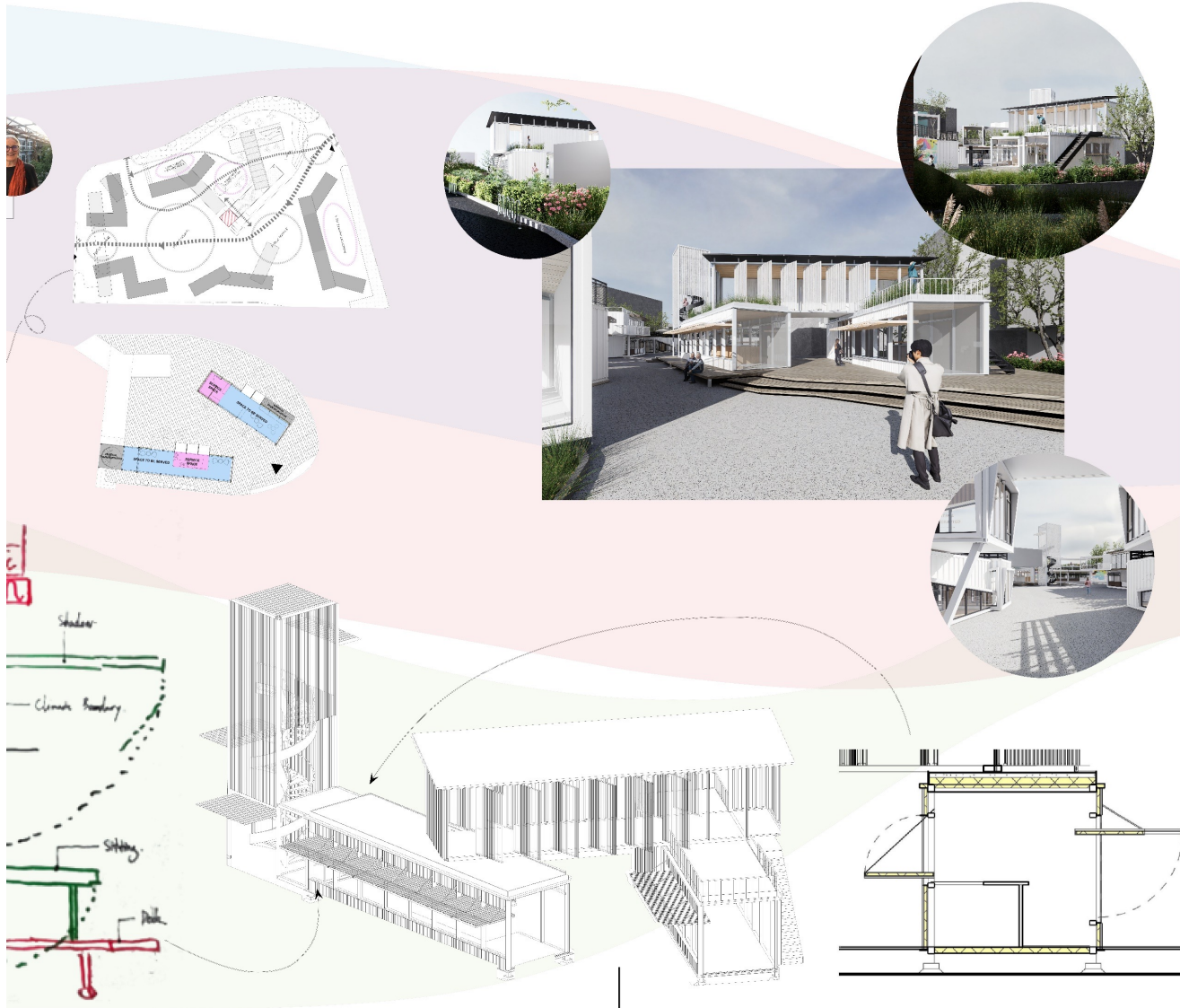


Detachable Envelope Construction

08
16/04

DAY 09
Thur. 17/04

DAY 10
Fri. 18/04



We concur with the separation of the climate-control envelope and sun-shading components to address air leakage issues associated with large pivot windows. Additionally, the second-floor rotating windows can positively influence the architectural space by enhancing natural ventilation, daylighting, and facade articulation.



He pointed out the inherent contradiction between "prefabrication" and "rooftop planting," stating that this conflict must be resolved through integrated design. Regarding dehumidification, he emphasized that subsequent detailed design physics will require a careful balance between active and passive approaches.

Low-Carbon Construction Lecture Series
低碳建造系列讲座

Prof. Adrian Allenbunger

INTERDISCIPLINARY FOR ZERO-CARBON BUILDINGS

18/04
17:00-19:00 (GMT+8)

户光伏板转换效率23%计算

14	16	8	7
10667.5	12234.6	6117.0	5341.2
2451.2	2809.4	1406.9	1228.5

16片效果最好

用电分配:
四个集装箱照明: 386.4*4=1545.6kwh
两个集装箱空调: 1380*2=2760kwh
两个集装箱插座: 1380*2=2760kwh
共计电4581kwh

风洞	1	2	3	4
耗风	621.6	721.6	450.0	516.6

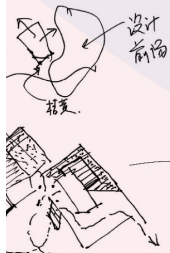


The Grasshopper definition can be optimized to streamline the computational process, enabling direct output of total annual solar radiation data for both daytime and nighttime periods.

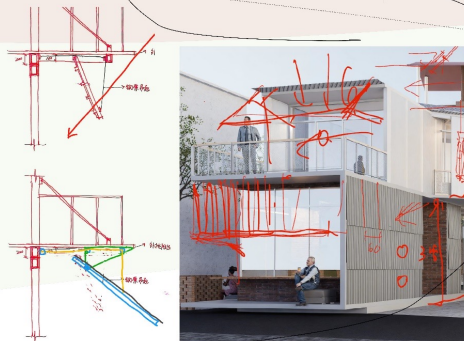
Upper components, a simulation was late the solar radiation received by panels. This data was then integrated to perform an electricity balance the proportion of electrical appliance n be offset by the PV system's power a proposed layout.



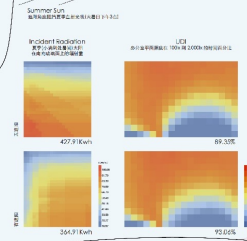
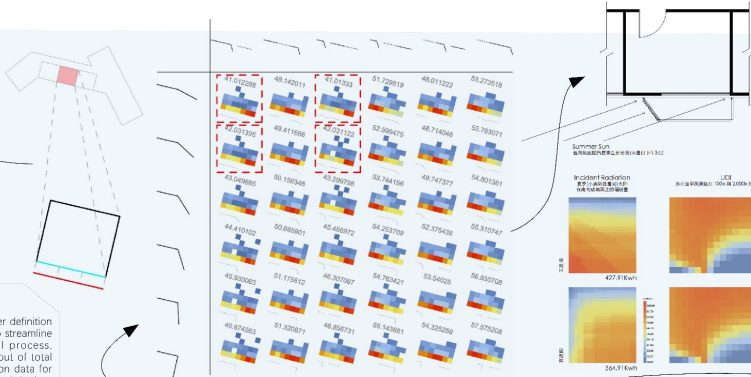
The design should be considered from a larger urban scale. The current scheme does not place sufficient emphasis on the main square, and the subdivision of the site into too many small plazas disrupts the management of overall pedestrian flow. It would be beneficial to integrate the entrance plazas into a cohesive whole and use color coding of architectural volumes to signify the degree of public access within the spaces.



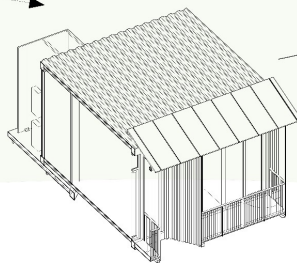
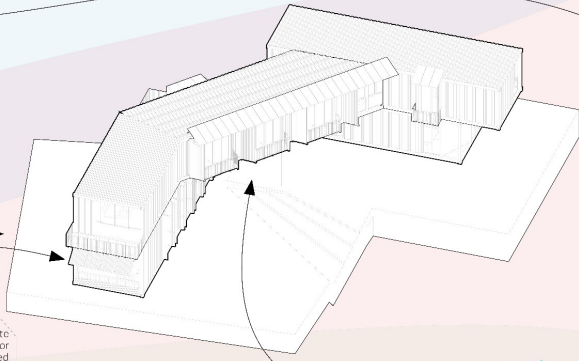
The design should evaluate whether the individual balconies for each office should be articulated as separate volumetric elements rather than as a continuous strip, while integrating shading considerations into the overall design development.



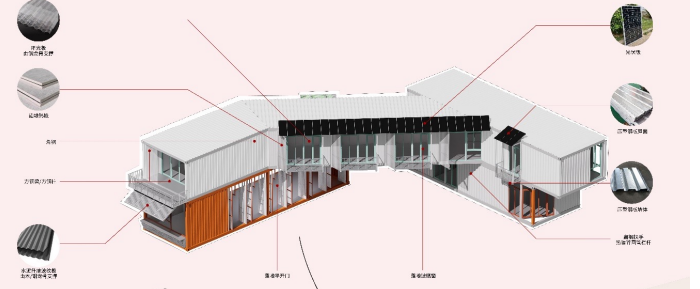
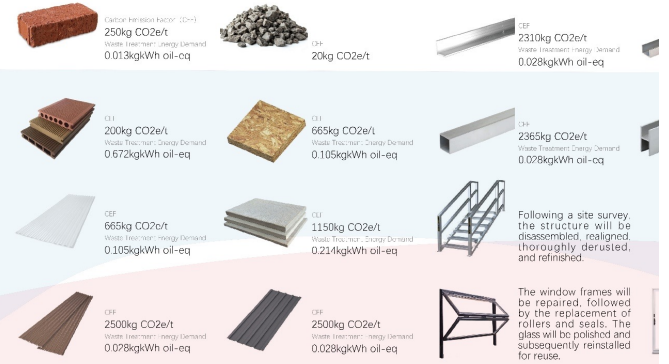
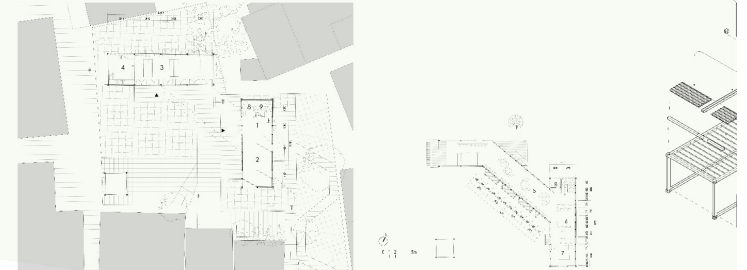
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Following the finalization of the container door leaf operation mechanism, solar radiation simulations were conducted for the shading components at various opening angles to provide data-driven support for determining the optimal shading configuration.

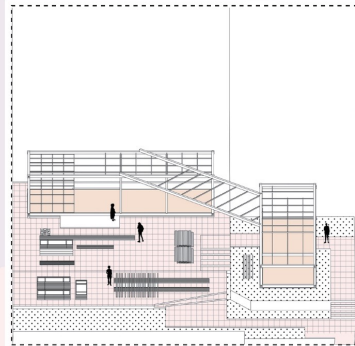
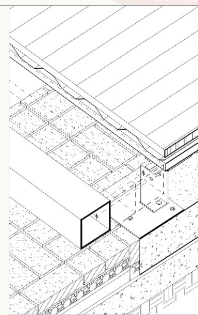
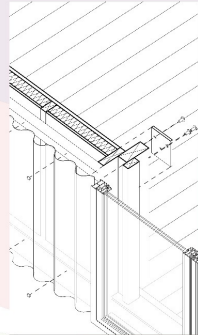


Regarding the design of shading for the café and additional components for the office balconies, fixed corrugated panels were ultimately selected based on project constraints. Their angles were determined according to the results of the energy simulation.

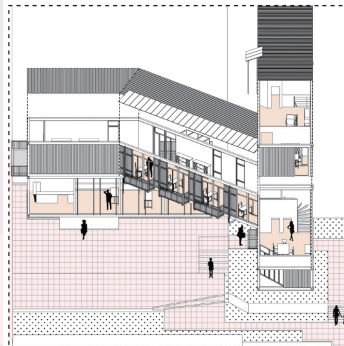


Following a site survey, the structure will be disassembled, realigned, thoroughly dusted, and reinstalled.

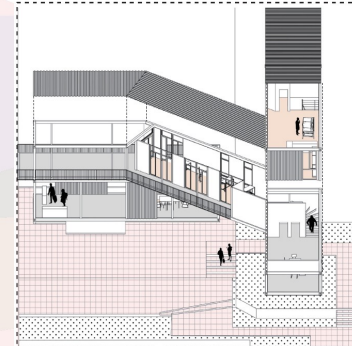
The window frames will be repaired, followed by the replacement of rollers and seals. The glass will be polished and subsequently reinstalled for reuse.



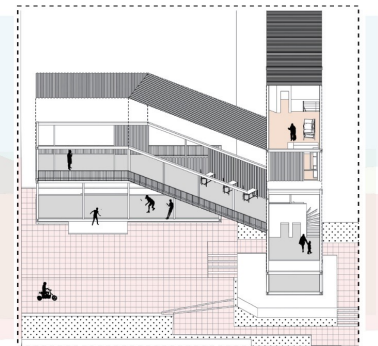
Construction Phase Scenario
The prefabricated components for the container units are manufactured off-site and then transported locally. Their assembly will employ local labor, generating supplemental economic benefits for the rural community.



Initial Operational Phase
The building primarily accommodates functions such as a marketplace, indoor activity rooms, a children's reading room, and offices, maintaining the complete program as originally conceived in the design.



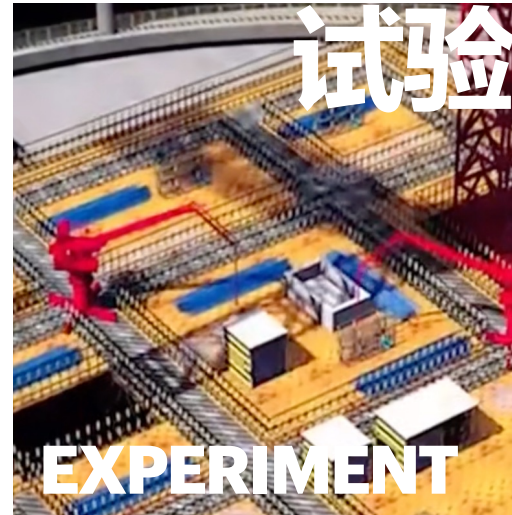
Scenario After 5 Years of Use
Following the deterioration of select building envelope components, they will be dismantled and replaced. The climate boundary on the ground floor will be eliminated, and the overhanging section on the second floor will be removed to enlarge the terrace area.



Scenario After 10 Years of Use
The hot and humid climate of Ganzhou has accelerated the deterioration of ground-floor building components, prompting a full opening of the ground level. On the second floor, the interior sections will undergo comprehensive waterproofing renewal to ensure sustained weather resistance.

- 低碳路径知识体系复杂，已超越传统建筑教育的封闭范畴。
 - 城市更新应以气候中和为核心，驱动建筑教育的系统性革新。
 - 实现低碳目标，必须依靠跨学科与国际合作的协同路径。
-
- The knowledge system for low-carbon pathways is complex and transcends the confines of traditional architectural education.
 - Urban renewal should place climate neutrality at its core, driving systematic innovation in architectural education.
 - Achieving low-carbon goals necessitates a collaborative approach built on interdisciplinary and international cooperation.

培养中国城市更新领域的低碳践行者

CULTIVATING LOW-CARBON PRACTITIONERS FOR CHINA'S URBAN RENEWAL

全球共识：减碳已成当务之急

GLOBAL CONSENSUS: CARBON REDUCTION AS URBAN IMPERATIVE

关键瓶颈：低碳知识割裂之困

CRITICAL GAP: DISCONNECTED LOW-CARBON KNOWLEDGE

课程愿景：共建跨国知识体系

COURSE VISION: BUILDING A TRANSNATIONAL KNOWLEDGE SYSTEM



让我们共同打造气候中和的未来
Building a climate-neutral future together



中华人民共和国
住房和城乡建设部



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

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