PLANNING FOR A DIRECT REUSE
ANDREA KLINGE | ZRS ARCHITEKTEN INGENIEURE
INTERACTIVE CIRCULAR ECONOMY WORKSHOP | NATUREPLUS | 24.09.2021
Innovative deconstruction concept for wooden buildings

Innovative **sorting system** based on robotics

Development of **building components** and **prefabricated elements** based waste wood

Concept for a 7-storey residential building that fulfils the highest energy efficiency standards

Proof of concept through two **2-storey demonstrators** in the cold and warm climate
Main Obtained Results

Task 3.3 – Design concept for the development of components for new residential/commercial buildings

> 100 Years +/- 50 Years < 20 Years (lifespan)

3.3.2-8 Development of suitable layouts for the case study building

Increasing the lifespan of buildings

Separation of elements with different lifespans

Modular design

Ease of repair and maintenance

Material Simplicity

> Avoidance of composite materials to allow recycling at the end of the life cycle
RE⁴ EU RESEARCH PROJECT FOR CIRCULAR CONSTRUCTION
FLEXIBLE, ADAPTABLE FLOOR LAYOUTS

Flexibler Holzskelettbau
Flexible Wohnungsgrößen
Tag- / Nachtnutzungen

Kleinwohnungen
L-Wohnungen
Durchgesteckte Wohnungen

Wohnungstypologien
FLEXIBLER HOLZSKELETTBAU VERSCHIEDENE WOHNUNGSGRÖSSEN TAG / NACHT NUTZUNGEN
4,75
4,90
4,75
3,05
3,05
3,05
3,05
3,05
3,05
3,05

3 / 4 Zimmer-Wohnungen
Wohnfläche 86 m²
Nutzfläche 76 m²

4 / 5 Zimmer-Wohnungen
Wohnfläche 98 bis 117 m²
Nutzfläche 88 bis 103 m²

1,5 bis 2,5 Zimmer-Wohnungen
Wohnfläche 34 bis 50 m²
Nutzfläche 30 bis 48 m²

ARCHITEKTUR
Efficient use of waste wood cross sections
Prefabricated facade element made of waste wood

Assembly of the facade element at the demonstrator in Madrid
RE\(^4\) EU RESEARCH PROJECT FOR CIRCULAR CONSTRUCTION
OTHER ELEMENTS AND COMPONENTS FROM WASTE WOOD

Concept models 1:20

Concept models 1:20 and 1:1

Timber beams and insulation from waste wood

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PREFABRICATED, REVERSIBLE PARTITION WALL SYSTEM FROM WASTE WOOD

Concept model

Prototype - final surface made of RC Clay In-Situ
**Timber construction**
Non-visible special connectors
Steel angles
Screws, bolts
> Dry connections that are easily removable if appropriate connectors are used

**Concrete construction**
Bolt connections
Anchor plates
Beam shoe
> Connections must be poured out in order to create a frictional connection
# PRACTICAL EXAMPLES
TORFREMISE SCHECHEN, GERMANY
LIVING AND WORKING
WORKSHOP BUILDING FOR KONRAD ZUSE SCHOOL
2-STOREY TIMBER CONSTRUCTION WITH REVERSIBLE SUPPORT STRUCTURE
WORKSHOP BUILDING FOR KONRAD ZUSE SCHOOL
REVERSIBLE CONNECTIONS FOR COLUMNS AND WALLS

Reversible connector | base plate - column / walls
WORKSHOP BUILDING FOR KONRAD ZUSE SCHOOL
REVERSIBLE CONNECTIONS FOR JOISTS

Reversible non-visible heavy-load connector: Column - Beam | Main and secondary beams
WORKSHOP BUILDING FOR KONRAD ZUSE SCHOOL
NON-LOAD BEARING PREFABRICATED TIMBER FACADE ELEMENT

Non load-bearing wooden facade
TIERPARK BERLIN
RENOVATION OF A GDR ADMINISTRATION BUILDING
AL AIN, ABU DHABI, UAE

JAHILI FORT - REUSE OF EARTHEN MATERIALS
AL AIN, ABU DHABI, UAE
JAHILI FORT - REUSE OF EARTHEN MATERIALS
RE4 - EU RESEARCH PROJECT
CIRCULAR CONSTRUCTION
RE4 - EU RESEARCH PROJECT
CIRCULAR CONSTRUCTION

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LESSONS LEARNED
RE4 AND PRACTICAL PROJECTS IN A NUTSHELL

How the change the current system?
Penalties for building demolition before a building reached its end of life
Incentives for resource efficient dismantling
Higher prices for virgin resources and disposal
Design for disassembly and reuse
Avoidance of harmful substances in any kind of building product
Obligation for LCA and LCC assessments
THANK YOU FOR YOUR ATTENTION!

FOR MORE INFORMATION: WWW.ZRS.BERLIN