Bauhütte 4.0 - Perspectives for the construction of tomorrow

EM4I - Energy Materials for Innovation - 4th webinar

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VISION FOR URBAN TIMBER CONSTRUCTION

„The fight against climate change can only succeed through radical digitalization and inevitably leads us to building with wood/ renewable materials on an urban scale.

By realizing timber construction, we are making a clear contribution to climate protection and creating affordable living space.‘’

Transforming the city from a CO2 source to a CO2 sink
In order to make the energy supply of the Schumacher Quarter as efficient and sustainable as possible, it is to receive a so-called "LowExergy Network". This enables a particularly low flow temperature of only 40°.

The SQ is to be built largely of wood. In addition, the site is to be built according to the so-called "sponge city" model with the aim to retain rainwater in the settlement. In the hot months, this evaporates and cools down the neighbourhood; in winter, it slowly seeps into the groundwater. This reduces drainage costs and supports biodiversity.
COMMON GOAL

**Schumacher Quarter as a model quarter for urban timber construction**

- Understanding urban spaces as a reflection of a sustainable society
- Resolving the tension between individual design and standardized, collective planning
- Ensure individualization in economic, urban timber construction
- Increasing urbanization and forest cultivation must be considered strategically integrated

**Goal:**

- Establish agile and ambidextrous (economic-ecological) design and execution processes.
VALUE CHAIN "URBAN TIMBER CONSTRUCTION SYSTEM"

[Urban development Planning level]
- From forest to city
  - [Forest]
- [sustainable B-Plan] → [Design] → [Housing and operation] → [urban Systems] → [City]

[Vertical networking of digital technologies]
- From Digital Model to Realization
  - [Digital Planning] → [BIM - AR/VR - LCA] → [Smart Building]
  - [Skelettbau] [Tafelbau] [Massivholzbau] [Hybridbau] [Experimentalbau]

[horizontal networking in the value chain]
- From logs to building
  - [Carry out timber harvest] → [Log processing] → [Raw wood processing] → [Carry out prefabrication] → [Carry out construction] → [Maintain building]
  - [Forestry company] → [Sawmill] → [Wood Processor] → [Prefabricator] → [Constructions] → [Facility Manager]

Circular Economy

From Digital Model to Realization
- Generate data
- Capture data

[Forest] [Sawmill] [Wood Processor] [Prefabricator] [Constructions] [Facility Manager]

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INTEGRATED PROCESS CHAIN, URBAN TIMBER CONSTRUCTION SYSTEM
In order to achieve the climate goals of the state of Berlin, the construction industry must be rethought and radically revolutionized. Bauhütte 4.0 is the orchestrator of the forest-to-urban value chain and develops horizontal as well as vertical networking.

The networking of the regional and supra-regional timber construction industry is indispensable in order to be able to meet the demand for urban timber buildings.

Urban housing construction in wood must become affordable and competitive. To this end, Bauhütte 4.0 is developing new ways of digitalisation, networking and standardisation.

Bauhütte 4.0 creates economic efficiency effects through crowd production and the connection of small digitally driven companies, regional timber construction companies and large anchor companies.

Cooperative planning (early involvement of timber construction companies) in timber construction creates economic efficiency through time savings, open standards and must follow a standardised process.
BAUHÜTTE 4.0 - FUNCTIONS

- Construction and operation of the Bauhütte 4.0 as an **innovation factory** for urban construction in wood
- Bauhütte 4.0 as the center of the new **forest-to-urban value chain**
- Bauhütte 4.0 as a **driver** for innovation, production, networking and participation

1. **Production**
   Production of the residential units of the SQ

2. **Research & Development**
   Applied research value chain urban timber construction

3. **Innovation**
   Innovations and standards through partnership
   -> Development of business location, innovation needs

4. **Wooden buildings**
   Different construction principles
   -> Model quarter
Goal: Competitive advantage through
• Competitive production costs
• High quality
• Minimal resource consumption & efficiency

Recommendation for action: Detailed analysis of various options for financing the urban wood building system:
• Public
• Partnership
• Private

Unlocking research, innovation and production potentials
"THE GREATER THE VARIETY OF DESIGN PRINCIPLES, THE GREATER THE MODEL CHARACTER"

"THE HIGHER THE WOOD CONTENT, THE GREATER THE MODEL CHARACTER"

[Design principles]
1. [Skeleton construction]
2. [Panel construction]
3. [Solid wood construction]
4. [Hybrid construction]
5. [Experimental Construction Hybrid]
6. [Experimentalbau-Innovativ]

[Manufacturing processes]

[Wood share]

[50%]
[70%]
[90%]
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