Cree Building System
UNECE Forest, Land and Housing Division
Harald Professner, Geneva

Building the Natural Change
40%

- resource consumption
- energy consumption
- $\text{CO}_2$ emission
- solid waste

Source: UNEP, Sustainable Buildings & Construction Initiative, 2009
<table>
<thead>
<tr>
<th>Item</th>
<th>Weight (kg)</th>
<th>Volume (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jeans</td>
<td>0.6</td>
<td>32</td>
</tr>
<tr>
<td>Mobile</td>
<td>0.3</td>
<td>500</td>
</tr>
<tr>
<td>Computer</td>
<td>5</td>
<td>1500</td>
</tr>
<tr>
<td>Gold ring</td>
<td>0.005</td>
<td>2000</td>
</tr>
</tbody>
</table>
Each building is a prototype!

**Situation:**
- chaotic process
- high consumption of resources
- inefficient execution
Sustainability & Processes

Digitalization

New value chains

Revolution in the construction industry
01 LifeCycle Tower
Research Project 8+

TEAM:
Arch. Schluder
Rhomberg Bau
Wiehag
TU Vienna
LifeCycle Tower

- Timber based construction system for multi-story buildings
- Industrial pre-fabrication
- Energy and Resource efficient
- Power generation

FFG: Austrian Research Promotion Agency
bmvi: Austrian Ministry for Transport, Innovation and Technology
**CO₂ Equivalents**

![Graph showing CO₂ equivalents for wood construction and reinforced concrete]

- **Wood construction**: Total: 882 t CO₂
  - EOL Maintenance total: 1.473.248 kg CO₂
  - Maintenance total: 585.337 kg CO₂
  - EOL Production total: 1.552.772 kg CO₂
  - Production total: 8.290.611 kg CO₂
  - EoL = End of Life

- **Reinforced Concrete**: Total: 10.375 t CO₂
  - EOL Maintenance total: -29.095 kg CO₂
  - Maintenance total: -53.105 kg CO₂

- 92% decrease in CO₂ emissions from the end of life to the production phase.
How much CONCRETE does your Building need?

1 $m^3$/10m²

3 $m^3$/10m²
What is the WEIGHT of your Building?

300 kg/m²  |  700 kg/m²
Which ecological BACKPACK does your Building carry?

460 kg/m² | 1275 kg/m²
How much CO$_2$ will you produce?

150 kg$_{co2}$/m$^2$  

750 kg$_{co2}$/m$^2$
02 DESIGN
Traditional method
Design - Bid - Build

Hierarchical Organization
Owner-Architect-Engineer

Traditional Design Process

Integrated design process

Design Team Leader (architect, engineer, project manager, owner's rep)

End User (if known)

HVAC

IAQ

Acoustics

Fire

Communications

Security

Commissioning

Facility/Building Engineer

Contractor

Cost Consultant


Light

Commissioning Agent

Owner

Architect

Contractors

Engineers

Cost Consultants
Smart Design

Reduction of:

- **prototypes** \(\rightarrow\) standardization
- **complexity** \(\rightarrow\) no special solutions
- **embodied energy** \(\rightarrow\) renewable raw materials
- highest **technology** \(\rightarrow\) sequential adaption
- **interfaces** \(\rightarrow\) module
- **operation & maintenance** cost \(\rightarrow\) quality
- **errors** \(\rightarrow\) BIM/collision check
SMART Design
Industrial manufacturing

Core

Columns/Posts

Slabs

MEP

Facade
DAY 1

PREFABRICATED ELEMENTS

FACADE ELEMENT INSTALLATION 10 MINUTES
DAY 2

PREFABRICATED ELEMENTS

FACADE ELEMENT INSTALLATION 10 MINUTES
DAY 4

PREFABRICATED ELEMENTS

FACADE ELEMENT INSTALLATION 10 MINUTES
DAY 5
PREFABRICATED ELEMENTS
FACADE ELEMENT INSTALLATION 10 MINUTES
DAY 6
PREFABRICATED ELEMENTS
FACADE ELEMENT INSTALLATION 10 MINUTES
DAY 7
PREFABRICATED ELEMENTS
FACADE ELEMENT INSTALLATION 10 MINUTES
05 PROJECTS
Certified Cree Architects

BEHF
- Hermann Kaufmann
- Tom Kaden
- Schwarz
- Weinhäupl
- Dietrich | Untertrifaller
- Auer - Weber

Snøhetta
- Werner Sobek
- Baumschlager Eberle
- Fink + Jocher
- Ingenhoven
- Heinz Neumann
- Wurm

Waugh Thistleton
- Matteo Thun
- SEHW

Maurer
- Moser
- Behnisch

CEI
- Bayer & Zilker
- n-v-o
- Gensler
Wagnertec
Office extension
BTV
Office- and Residential Building
LCT Next

Rhomberg HQ
Be part of our revolution!