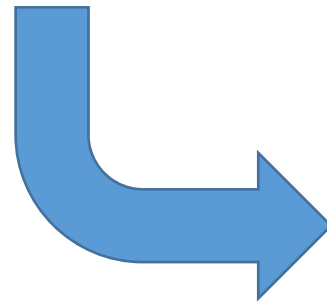




**Industria 4.0: dalle foreste fino
agli edifici multipiani**



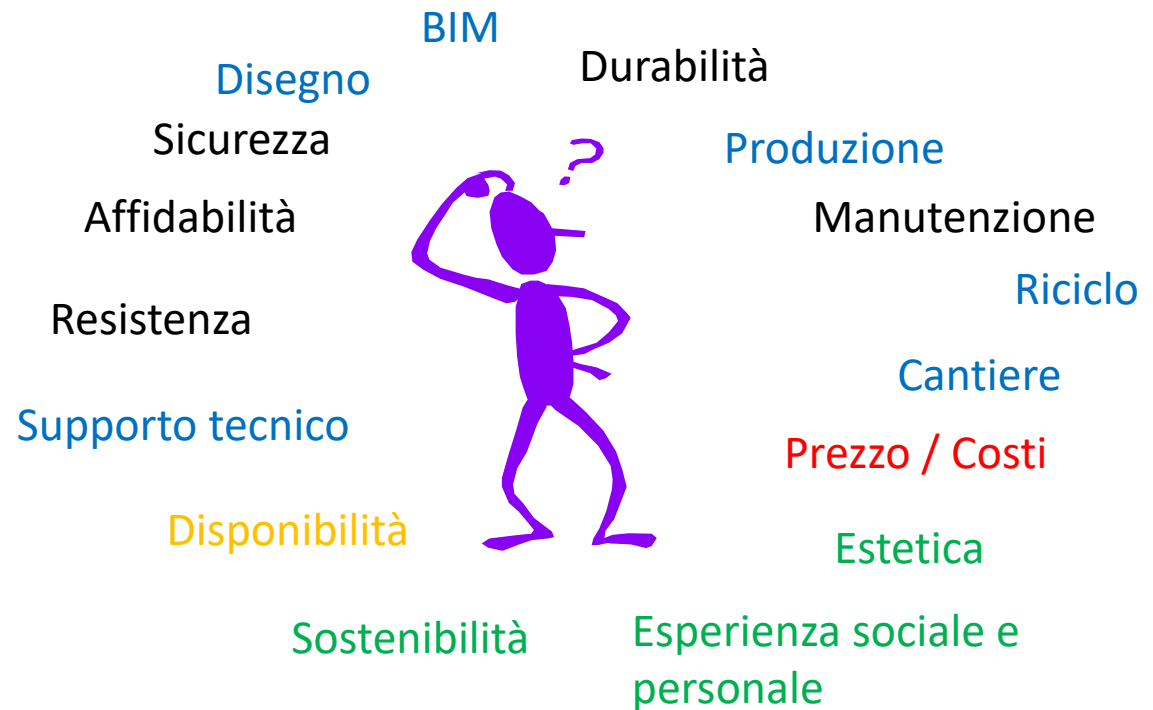
Come sarà l'industria '5.0' nel 2050?



Progettazione nel 2050....



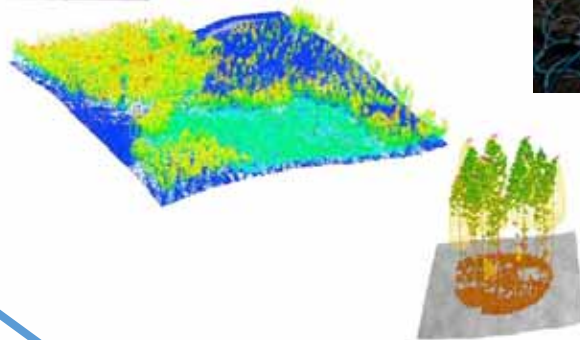
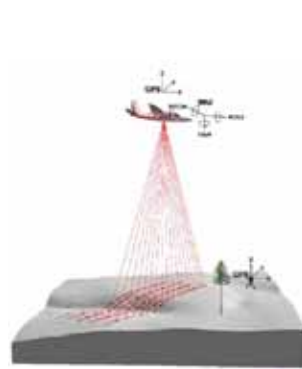
Sumitomo forestry, Tokyo, 350 m
70 Piani
Completamento: 2041
185.000 m³ di CLT



- L'industria del legno è completamente sostenibile (ma non solo l'industria del legno... !!!)
- È capace di offrire servizi integrali: dalla foresta fino al restauro, recupero e riciclo.
- L'industria del legno non ha paura di collaborare con altre 'vecchie' industrie come quelle di calcestruzzo/prefabbricati, acciaio....
- Il lavoro è più che mai automatizzato e robotizzato.

Google trees per conoscere le risorse!

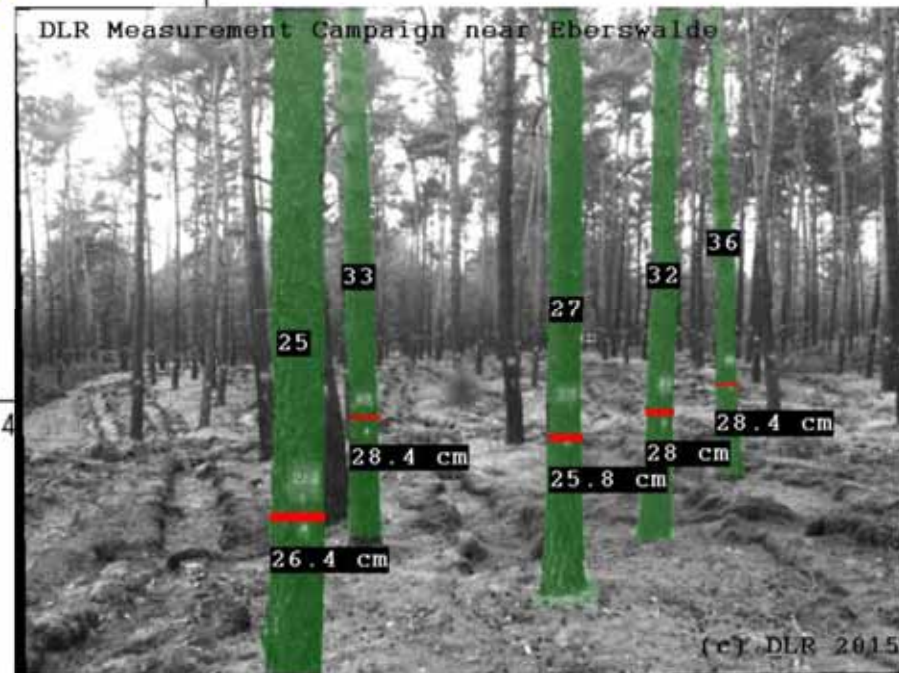
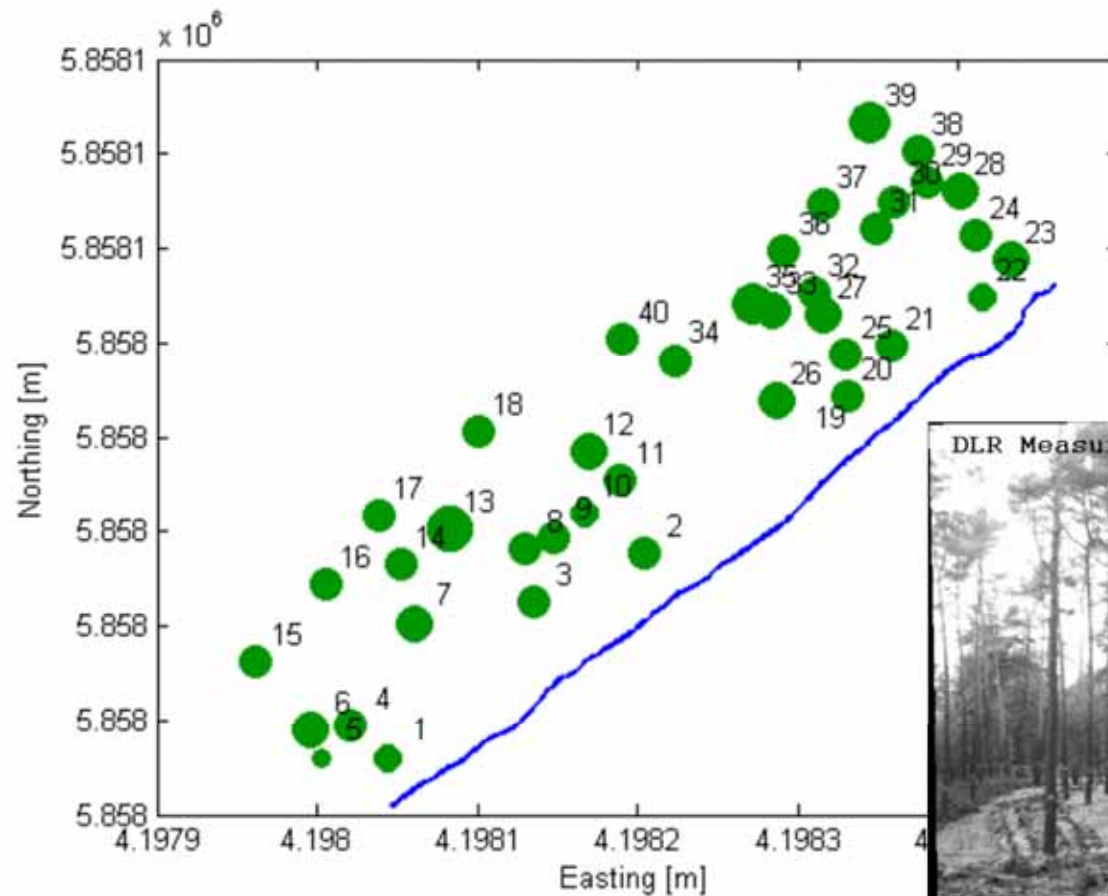
Sorveglianza aerea
Scanner laser (TLS)
Stereophotografia



Dati nodi (Diametro, Angolo)
Qualità del tronco: Forma
Diametro, Lunghezza



Google trees per conoscere le risorse!

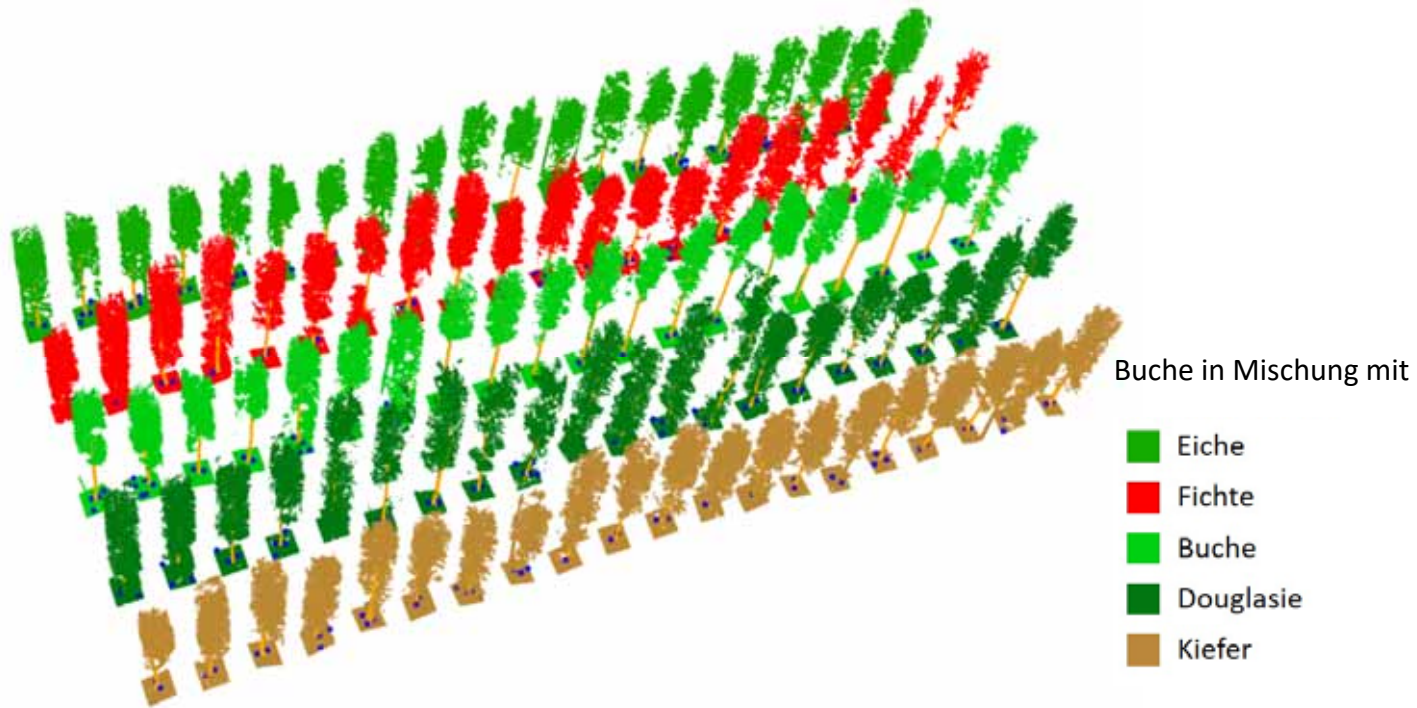


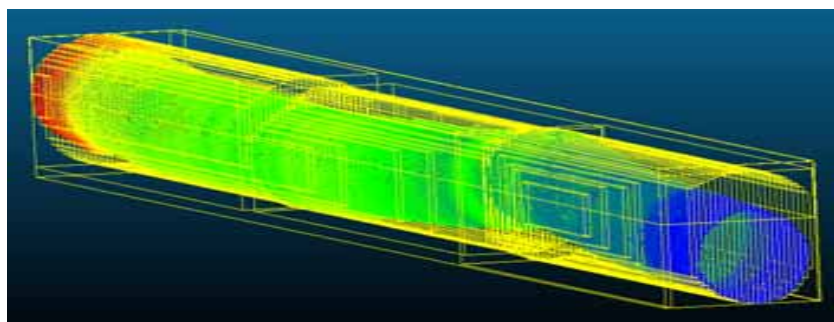
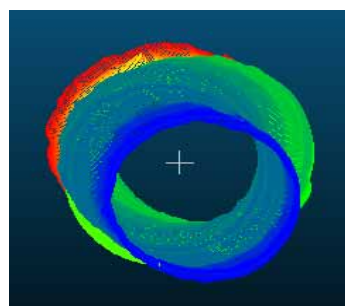
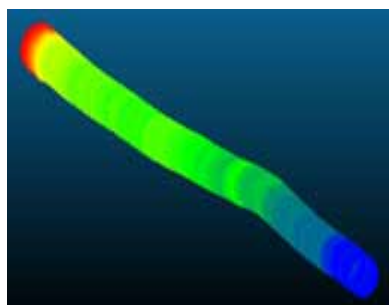
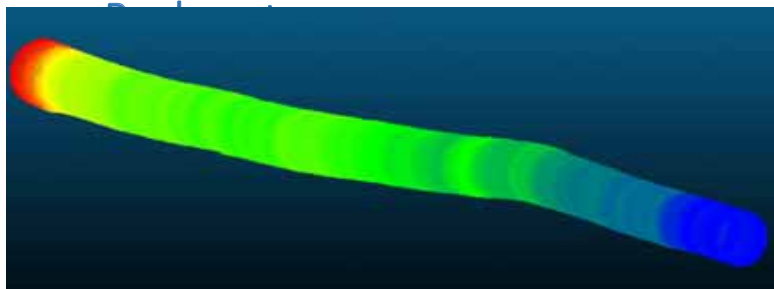
Courtesy DLR
www.dlr.de



3D-Scanning nelle foreste (latifoglie)

- capire la qualità e la variabilità





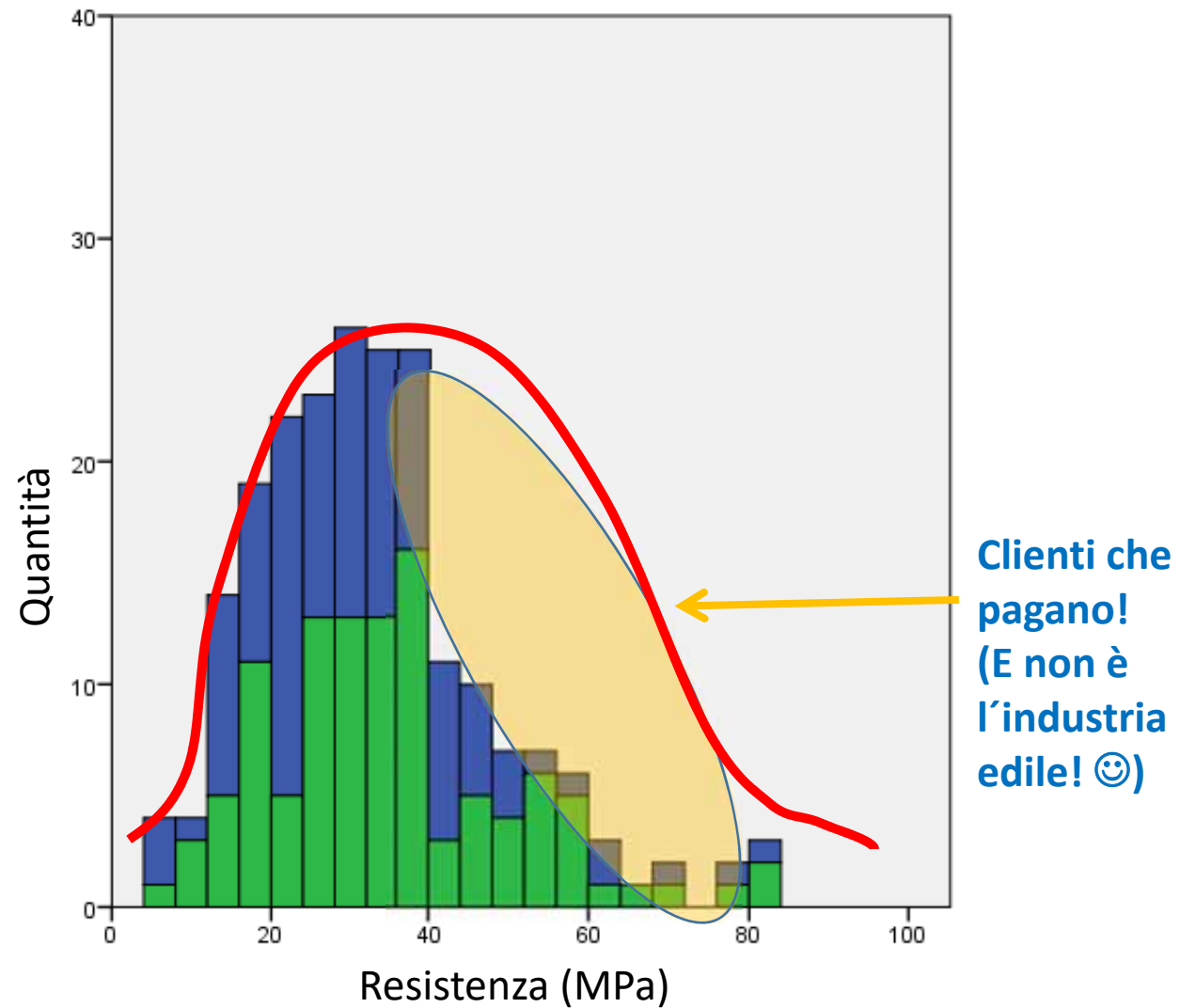
Shape, Volume, Quality

Yield!

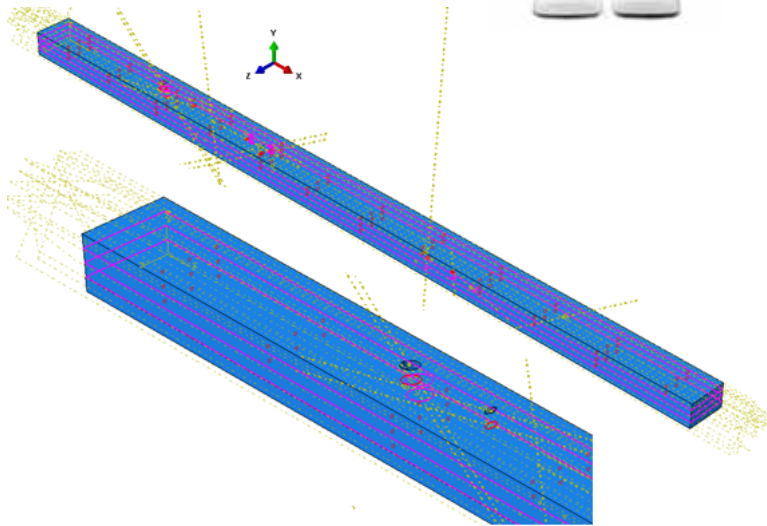
- Lunghezza
- Dimensioni molto più variabili
- Spigolo, Qualità della superficie, Dimensione e tipo della sega, ecc.



Esempio di Qualità (faggio)



‘Copia digitale’



Modello Legno Lamellare
‘virtuale’:

- Nodi
- Fibri
- Colla



Lamellare di faggio
Tavole di bassa qualità



Produzione di
travi + BIM

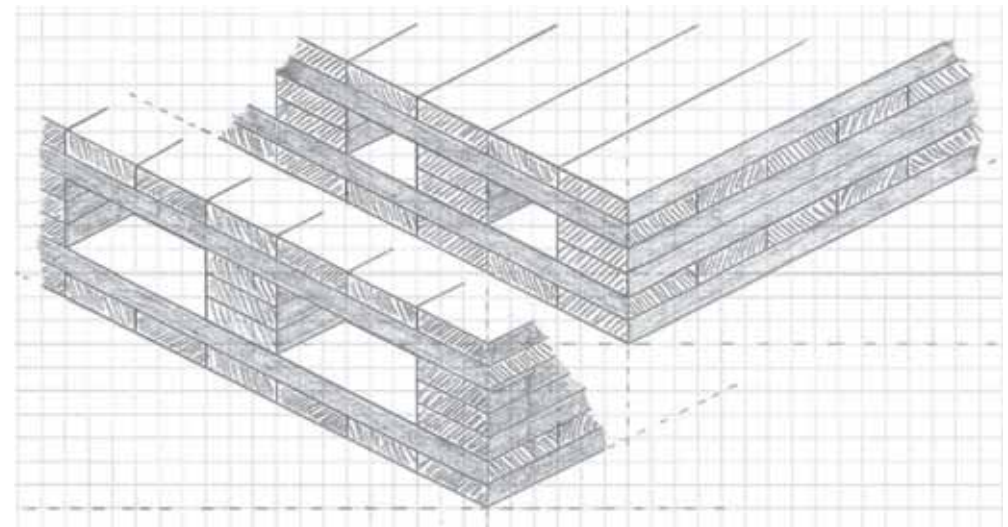


Ottimizzazione CLT

HCCLT – Hollow Core Cross Laminated Timber (EN 16351 – Legno Lamellare incrociato)



Prototipo
Derix – Brettsperrholz



Student: Bart van Aken, TUD

HCCLT – Hollow Core Cross Laminated Timber produzione automatica



Derix – Brettsperrholz



Van Aken, TUD

HCCLT – Hollow Core Cross Laminated Timber



Produzione automatica

Derix – Brettsperholz

Student: Bart van Aken, TUD

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Costruire con CLT: Hotel Jakarta Amsterdam



SeARCH Architects - Architettura
Pieters Bouwtechniek – Ingegneria
TU Delft – Ingegneria

Hotel Jakarta Amsterdam



Grande spazio libero nel interno
dell'albergo
Giardino tropicale

Legno (CLT) + Clima tropicale (?)

SeARCH Architects - Architettura
Pieters Bouwtechniek – Ingegneria
TU Delft – Ingegneria

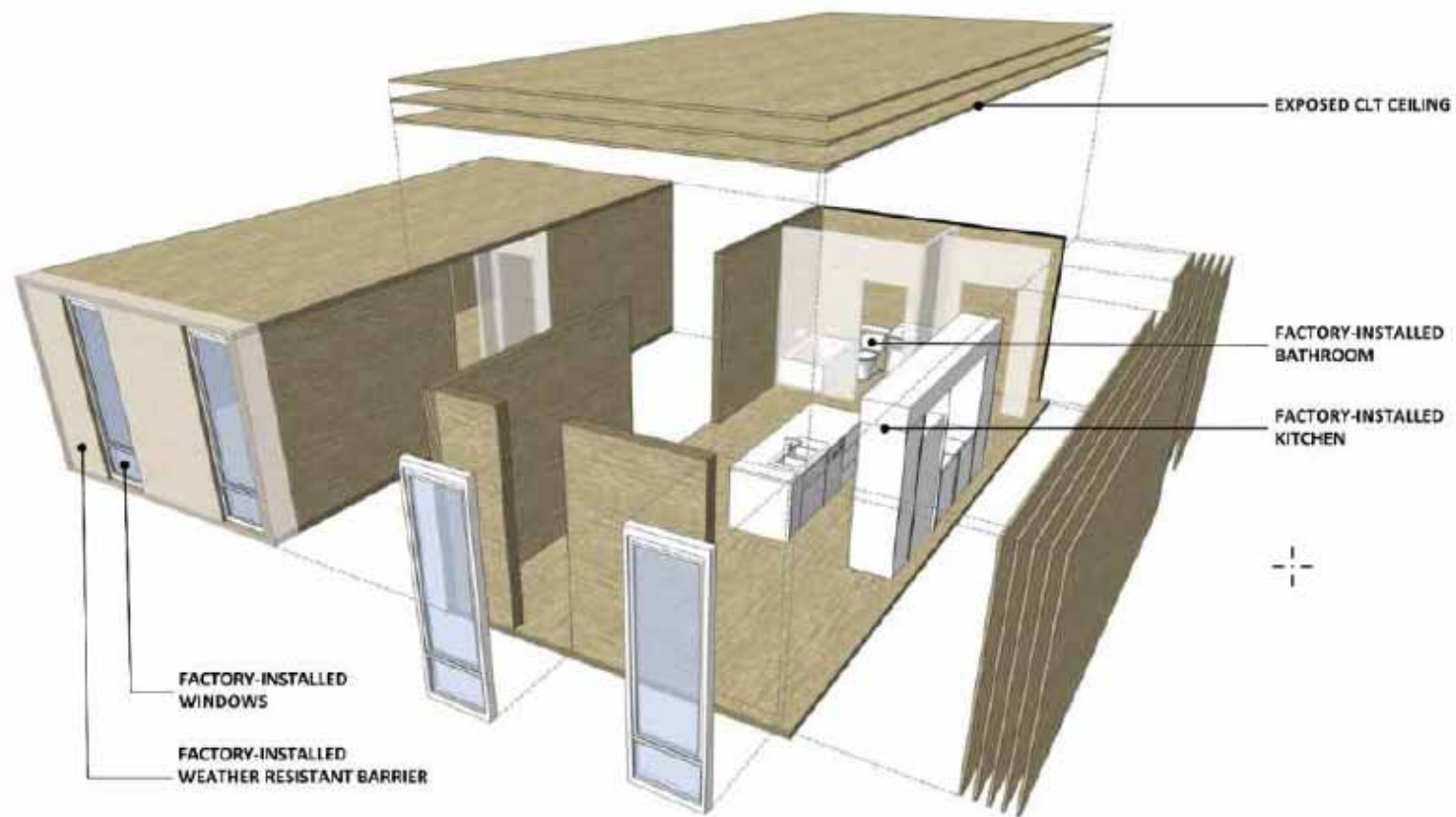
8 Piani
Mancanza di un nucleo



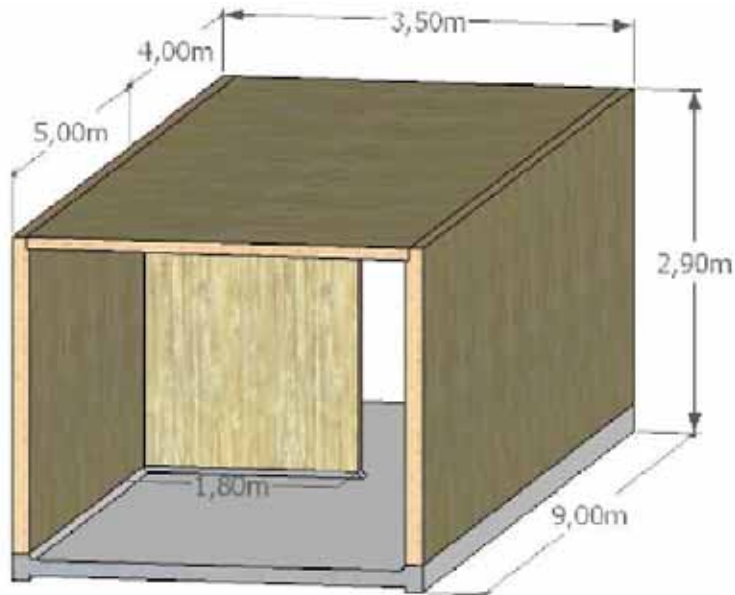
(Cantiere stretto)

Hotel Jakarta Amsterdam

Sistema modulare 3D - Prefabbricato

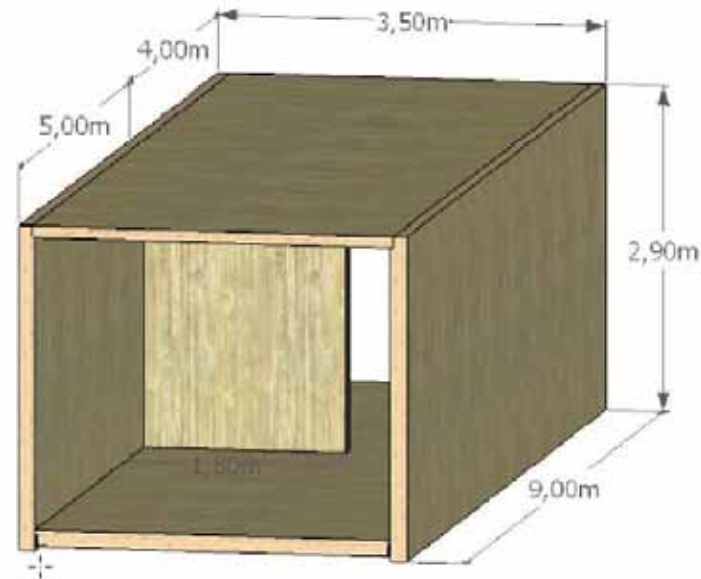


Hotel Jakarta Amsterdam: opzioni



- Rigidezza calcestruzzo vs. CLT
- Rischio incendio (Sprinkler)
- Acustica
- Durabilità

SeARCH Architects - Architettura
Pieters Bouwtechniek - Ingegneria
TU Delft - Ingegneria



- Sostenibilità
- Produzione del prefabbricato
- Trasporto + Clima
- Robustezza (cantiere e durante l'uso...)
- Manutenzione, Pulizia, ecc.)





Hotel Jakarta Amsterdam



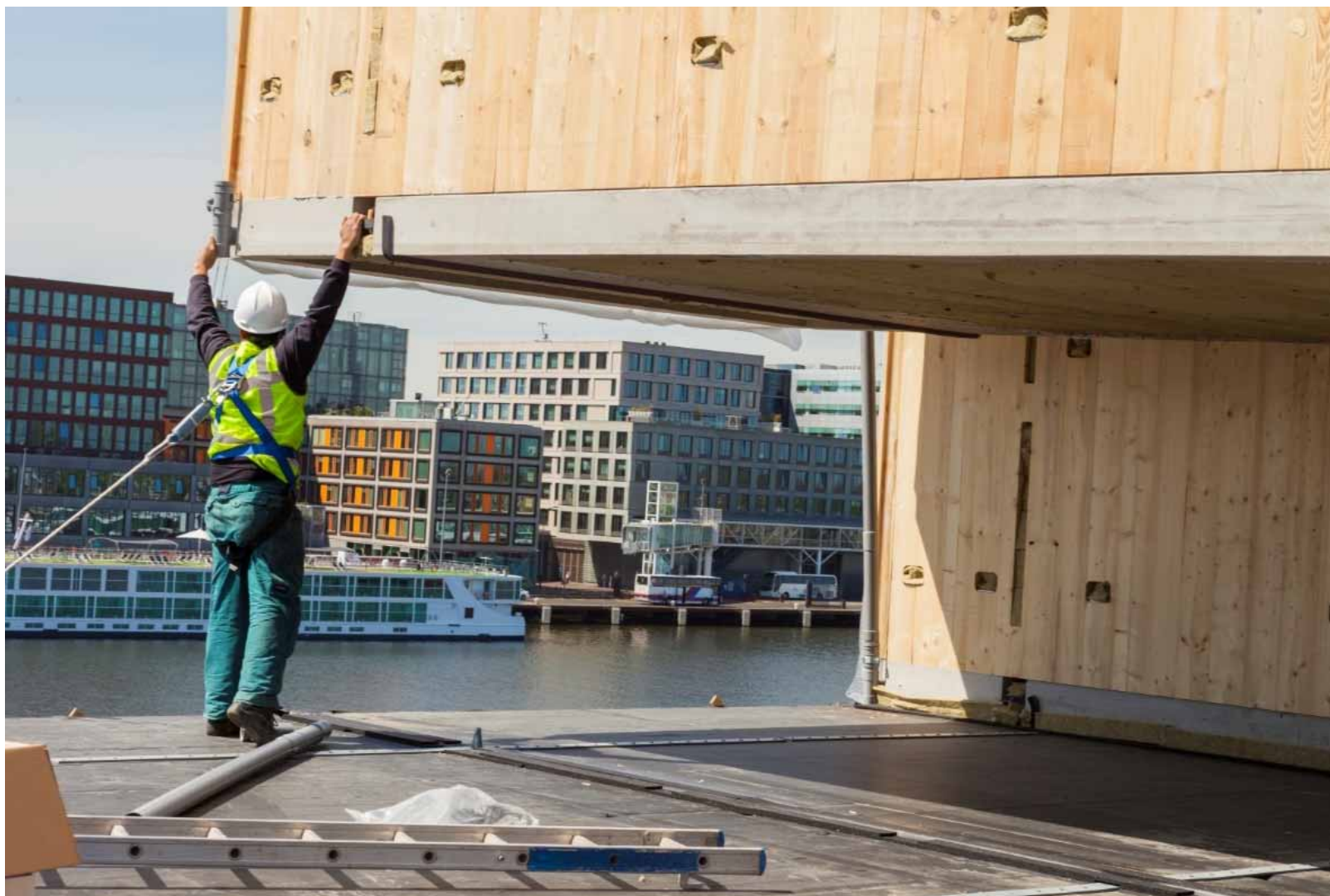
Stanza intera prefabbricato



SeARCH Architects - Architettura
Pieters Bouwtechniek – Ingegneria
TU Delft – Ingegneria



180 Hotel rooms in 12 days

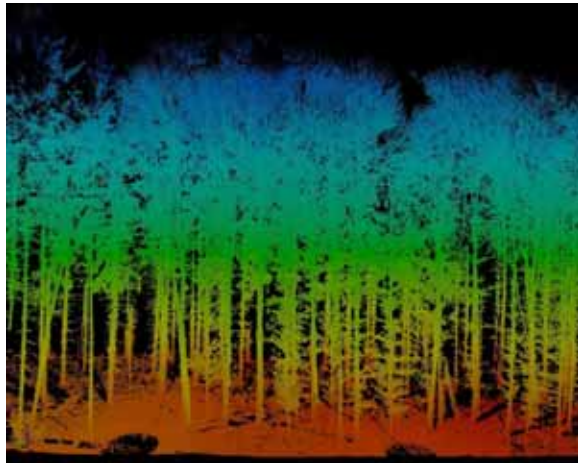


Hotel Jakarta Amsterdam





in 2050...



Forest resources are digitally mapped



2/3 of world population live in cities
(Cina + India +)



All materials are recycled



Society is aging



Everyone / Everything is connected...



Energy is cheap

2050: industry 5.0 ?



Earpods?
Brainpods!



Brain-Computer
interaction will
support / solve
design
problems



<https://stewartperry.com/construction-trends/robotics-in-construction/>

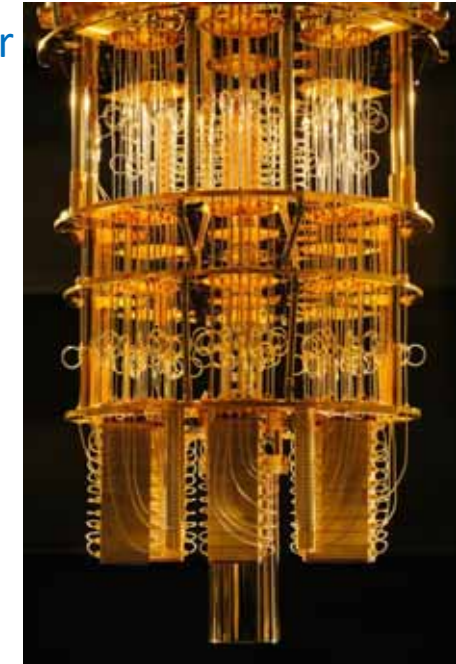


ETH-Zürich

automatizzazione e robotizzazione



<https://sourceable.net/>



Quantum computers



Katerra.com: Job listing

Component Designer Location : Montreal, CAN Posted : 05/23/2019 View Opening	Junior Artificial Intelligence Developer Location : Toronto, CAN Posted : 05/21/2019 View Opening	Senior Artificial Intelligence Developer Location : Toronto, CAN Posted : 05/21/2019 View Opening
Senior HVAC Systems Engineer Location : Toronto, CAN Posted : 05/21/2019 View Opening	Technical Recruiter Location : Toronto, CAN Posted : 05/21/2019 View Opening	Component Designer Location : CAN - Vancouver Posted : 05/21/2019 View Opening
Electronic Engineer Location : Shanghai, CHN Posted : 05/21/2019 View Opening	Mechanical Engineer Location : Shanghai, CHN Posted : 05/21/2019 View Opening	Account Manager Location : Shanghai, CHN Posted : 05/21/2019 View Opening
Global Commodity Manager - Mechanicals & FG Location : Shanghai, CHN Posted : 05/21/2019 View Opening	Material Program Manager Location : Shenzhen, CHN Posted : 05/21/2019 View Opening	Recruiter Location : Bangalore, IND Posted : 05/23/2019 View Opening
Quantity Surveyor Location : Bangalore, IND Posted : 05/23/2019 View Opening	Backend Developer Location : Bangalore, IND Posted : 05/21/2019 View Opening	Implementation Consultant Location : Bangalore, IND Posted : 05/21/2019 View Opening
Lead - Backend Developer Location : Bangalore, IND Posted : 05/21/2019 View Opening	Lead - UI Developer Location : Bangalore, IND Posted : 05/21/2019 View Opening	Software Quality Assurance Engineer Location : Bangalore, IND Posted : 05/21/2019 View Opening
UI Developer Location : Bangalore, IND Posted : 05/21/2019	Architect Location : Pune, IND Posted : 05/21/2019	Architect Location : Pune, IND Posted : 05/21/2019

Fondamentale in 2050 (ma anche prima):

- Manodopera scomparire sempre di più
- Dove troviamo le risorse (il legno?)
- Di che tipo di personale ne abbiamo bisogno?
- Tecnici e ingegneri: architetti, civile or ingegneri di software?
- Come collaboriamo nella rete di produzione?
- Chi, dove, come e cosa insegniamo? Istituti tecnici, Politecnici...
- Sistema di Ricerca e Sviluppo ancora adatto?



Come lavora lei in 2050?

Non dobbiamo guardare principalmente alle strutture nuove...

- invecchiamento del popolo...
- ci saranno sempre più case per 1€ sul mercato..
- patrimonio immobiliare...
- cambio climatico...
- rischio sismico...



Price \$799.99
Add to cart!