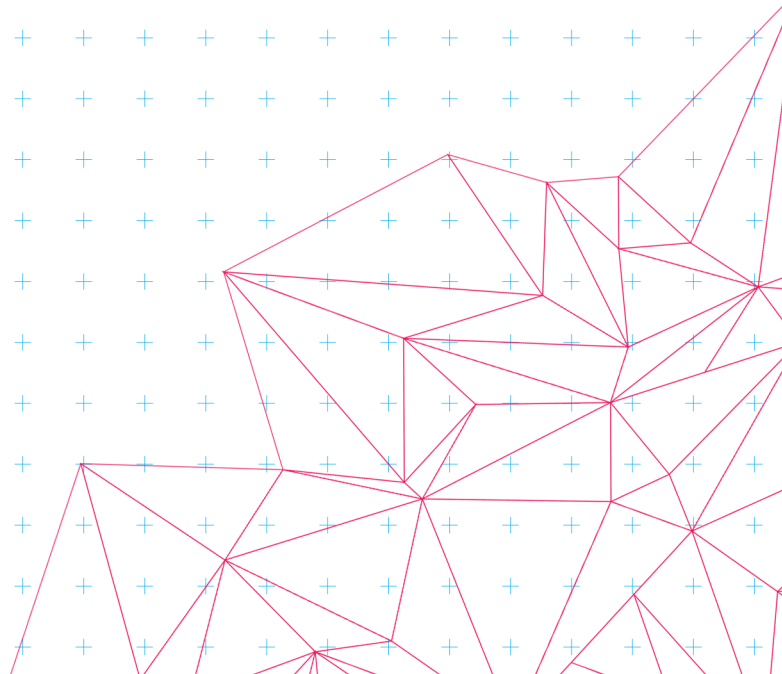


Challenge name	Modular buildings
Challenge owner	Janssen de Jong Groep
	<input checked="" type="checkbox"/> Company <input type="checkbox"/> Research <input type="checkbox"/> Student team
	Daan Arts and/or Karel Kalis
Email challenge owner	
Phone challenge owner	
Preferred way to contact	<input checked="" type="checkbox"/> email <input checked="" type="checkbox"/> Phone call <input type="checkbox"/> SMS / what's app <input type="checkbox"/> Other; ...
Brief summary	Our goal is to “lego-lize” the construction industry. We are aiming towards demount-ability and reusability of our components and joint used in our buildings and houses. The challenge is to come up with ways to introduce modularity (and circularity) in the house-building process.

About the challenge owner

Janssen de Jong Groep is a large group of specialized construction companies based in The Netherlands, operating in all segments of the construction industry from development, construction and maintenance and renovation and circular repurposing of materials.

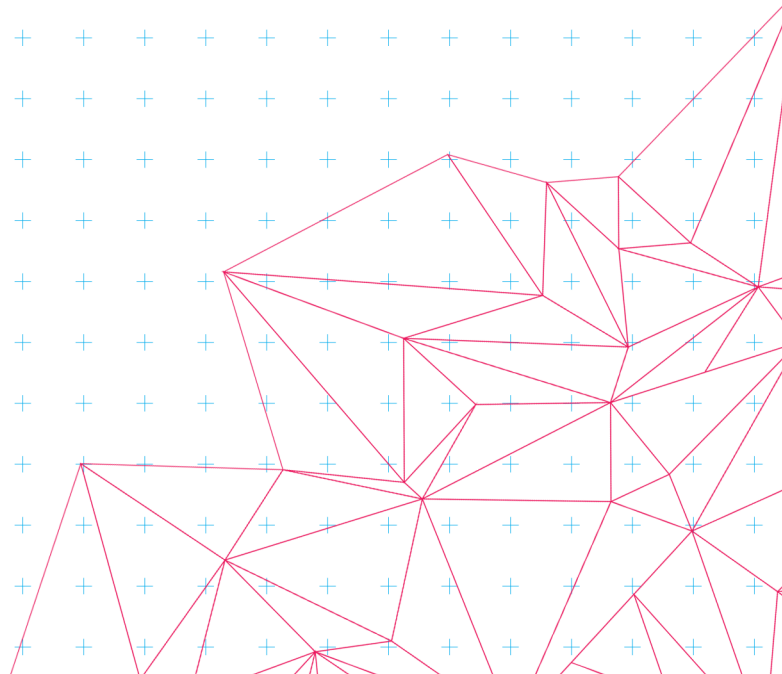


Challenge description

In our journey towards a 100% circular construction industry we are searching for methods to make our buildings' superstructures demountable and reusable. We believe that making our components universal (like LEGO parts) than we can build anything we need now, demount it in for instance 30 years and make something where we have need for then.

In the current ways of construction connections and joints are often poured (concrete) or glued (wood) which makes them permanently connected and not easily demountable. Steel constructions are an example of demountable construction. Can we apply these ideas on concrete and wood?

The challenge is to think about building processes for the future, allowing us to build houses quicker, more sustainable, and in ways that allow us to reuse as many materials as possible, ultimately leaving the world a better place.



Input and involvement of challenge owner

We will be guiding the process with the challenge group from our Innovation Hub. Team leads will support the challenge team with regular meetings and guidance.

There are possibilities for the challenge team to work in our company to promote collaboration and team energy to make this challenge a “two way street”

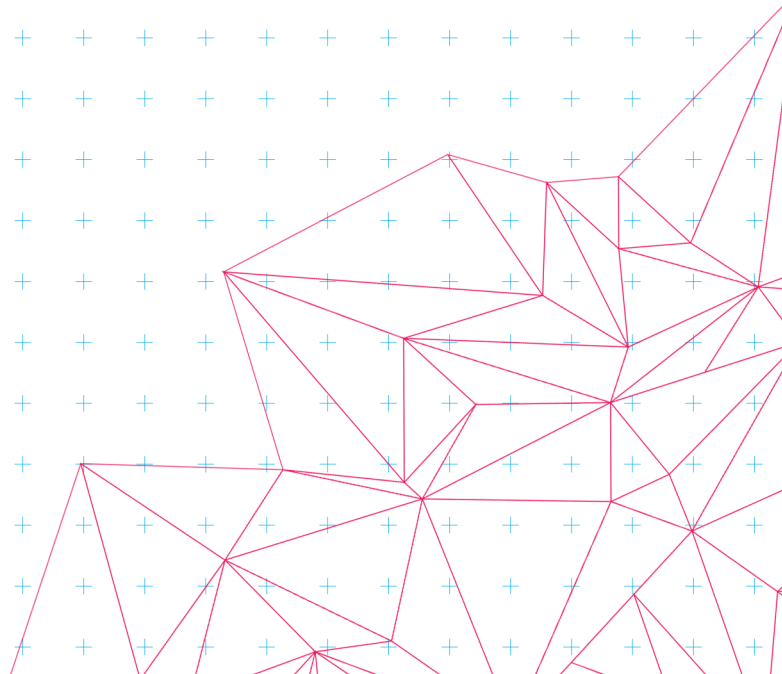
Resources

What resources are necessary for the students to work on the challenge?

Enthusiasm about the challenge (banishing waste out of our processes), eagerness to learn and discover unbeaten paths.

What resources do you offer to students?

Expertise, knowledge, time, tools (laptop), workplace at the office, a warm bath of co-workers, our network to find the right companies to collaborate with us during the challenge.



Roles of different disciplines (only for ISBEP)

Automotive Technology	
Biomedical Engineering	
Architecture, Urbanism and Building Sciences	Designing with circularity in mind is necessary to make this challenge succeed. Structural engineering is a big part of this challenge because the structural integrity of these buildings needs to remain intact when it is demountable.
Computer Science and Engineering	When modular components are applied to the building process, an IT system needs to be created that allows for the tracking of which components go where. Additionally, an interface needs to be created that shows data in an easy-to-understand manner,
Data Science	
Electrical Engineering	
Industrial Design	New demountable connections are industrial components. The expertise from this field is very welcome to have in this challenge.
Medical Sciences and Technology	
Psychology and Technology	
Chemical Engineering and Chemistry	Demountability of "wet connections" can require expert knowledge of chemical products bonding methods and adhesives.
Sustainable Innovation	Sustainable innovation is key in this challenge. Re-using building materials helps greatly in reducing the need for linear resources, therefore contributing to a more sustainable construction industry.
Industrial Engineering	Bringing modular buildings to the market requires knowledge of logistics systems and/or value-based design.
Applied Physics	Creating lego-like building blocks for houses requires knowledge of the structural integrity of the houses, so an AP student can apply much of their knowledge about these topics.
Applied Mathematics	
Mechanical Engineering	Creating structures that should be able to withstand pressure, vibration, and live long lives without degrading is complex, and knowledge about materials and (fluid) mechanics can be applied to optimize this process.