

# Case Studies

Reversible Design & Design for

Disassembly

Group 6: Parsons School of Design

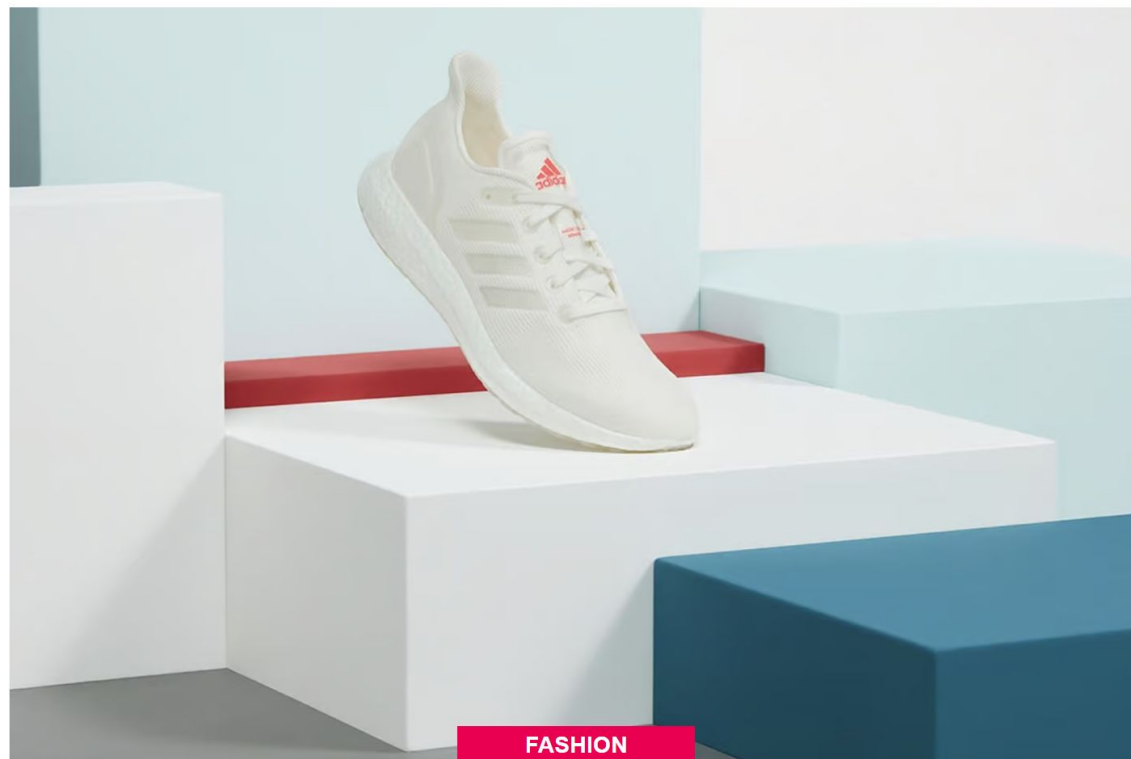
WHAT IS  
REVERSIBLE DESIGN  
AND DESIGN FOR  
DISASSEMBLY?

**FASHION PROJECTS DESIGNED WITH  
DISASSEMBLY IN MIND**



## Adidas UltraBoost DNA Loop

### Adidas launches new fully recyclable shoe



By Danielle Wightman-Stone  
14 Oct 2020



“MADE TO BE REMADE” is their slogan

How Does Adidas Accomplish a recyclable shoe?

- ★ Homogeneous Material & No Glue
- ★ User Participation: Creator Club Focus Groups
- ★ System of Return & Reuse: Closing the Loop

A big part of this process is not only thinking about the materials, but also the consumer behavior must come into consideration

“To make this a success we need to understand the human element, how people can be encouraged to return the shoes to be recycled, because while we control the creation, we can only influence what happens when the shoes leave us. We can’t get there alone.”

“The aim of design for a circular economy is to maintain product integrity over multiple use cycles (for instance, through repair, refurbishment, and remanufacturing) and to focus on closing loops (through recycling), while at the same time building economically viable product-service systems [4].”

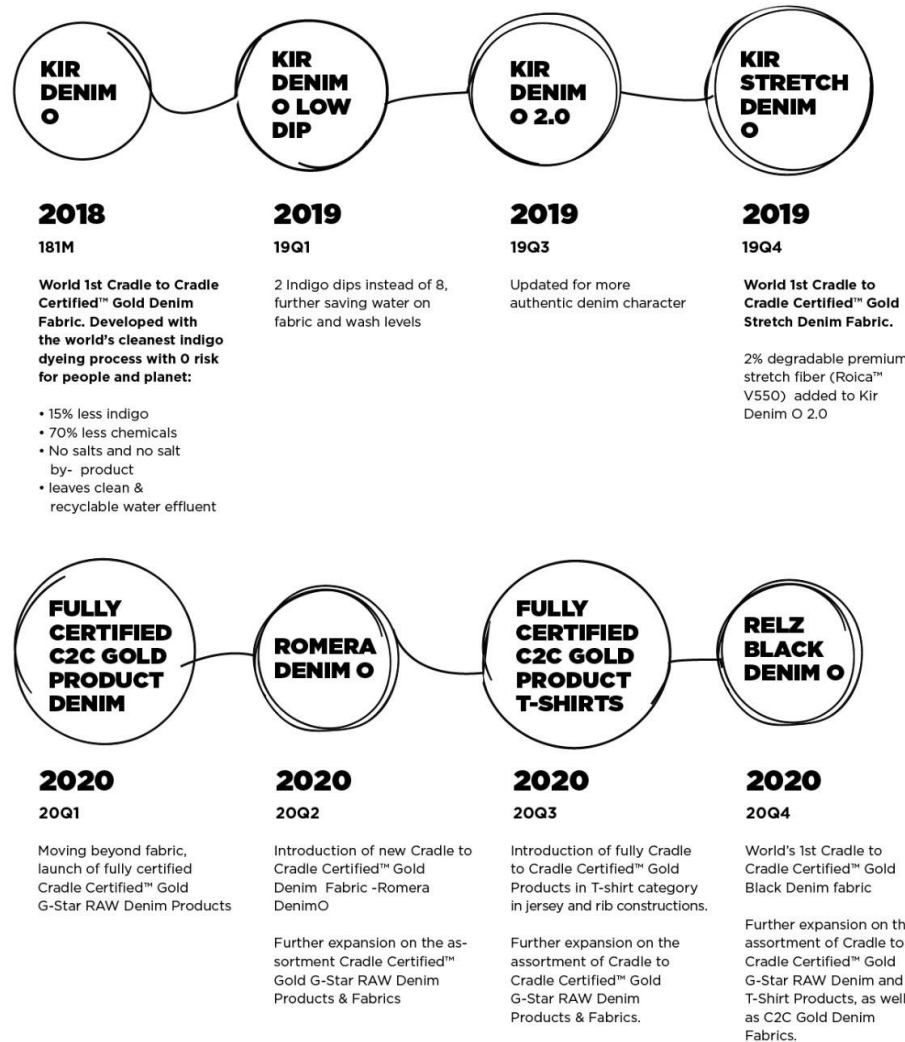
*Sustainability* 2020, 12, 7659 2 of 14; doi:10.3390/su12187659 www.mdpi.com/journal/sustainability



G-Star Raw

**CRADLE TO CRADLE JOURNEY**

**G-STAR RAW SUSTAINABLE EVOLUTION FABRIC & PRODUCT**



**CRADLE TO CRADLE CERTIFIED INNOVATIONS**

- ★ No concept of waste; all materials are reutilized in cycles – the goal of designing in closed loops
- ★ “Cradle to Cradle Certified is the only certification in the world designed for a circular product economy”
- ★ Design through the lens of 5 key perspectives: **Water Stewardship, Social Fairness, Material Reutilization, and Renewable Energy**

**G-STAR RAW “OUR MOST SUSTAINABLE JEANS EVER”**

Cradle to Cradle Certified Gold denim fabric

- ★ 100% organic cotton
- ★ Dyed using zero harmful chemicals
- ★ Not a single drop of water wasted
- ★ Buttons, yard, and labeling was Cradle to Cradle Gold Certified
- ★ Result = 100% recyclable product

“The aim of design for a circular economy is to maintain product integrity over multiple use cycles (for instance, through repair, refurbishment, and remanufacturing) and to focus on closing loops (through recycling), while at the same time building economically viable product-service systems [4].”

**FURNITURE** DESIGNED WITH DISASSEMBLY  
IN MIND

# DESIGNED FOR REVERSIBLE ASSEMBLY

## IKEA

“Our ambition is to be circular and climate positive by 2030”  
(<https://about.ikea.com/en/sustainability/a-world-without-waste>)

Circular loops Ikea is working with:

- ★ Reuse
- ★ Refurbishment
- ★ Remanufacturing
- ★ Recycling



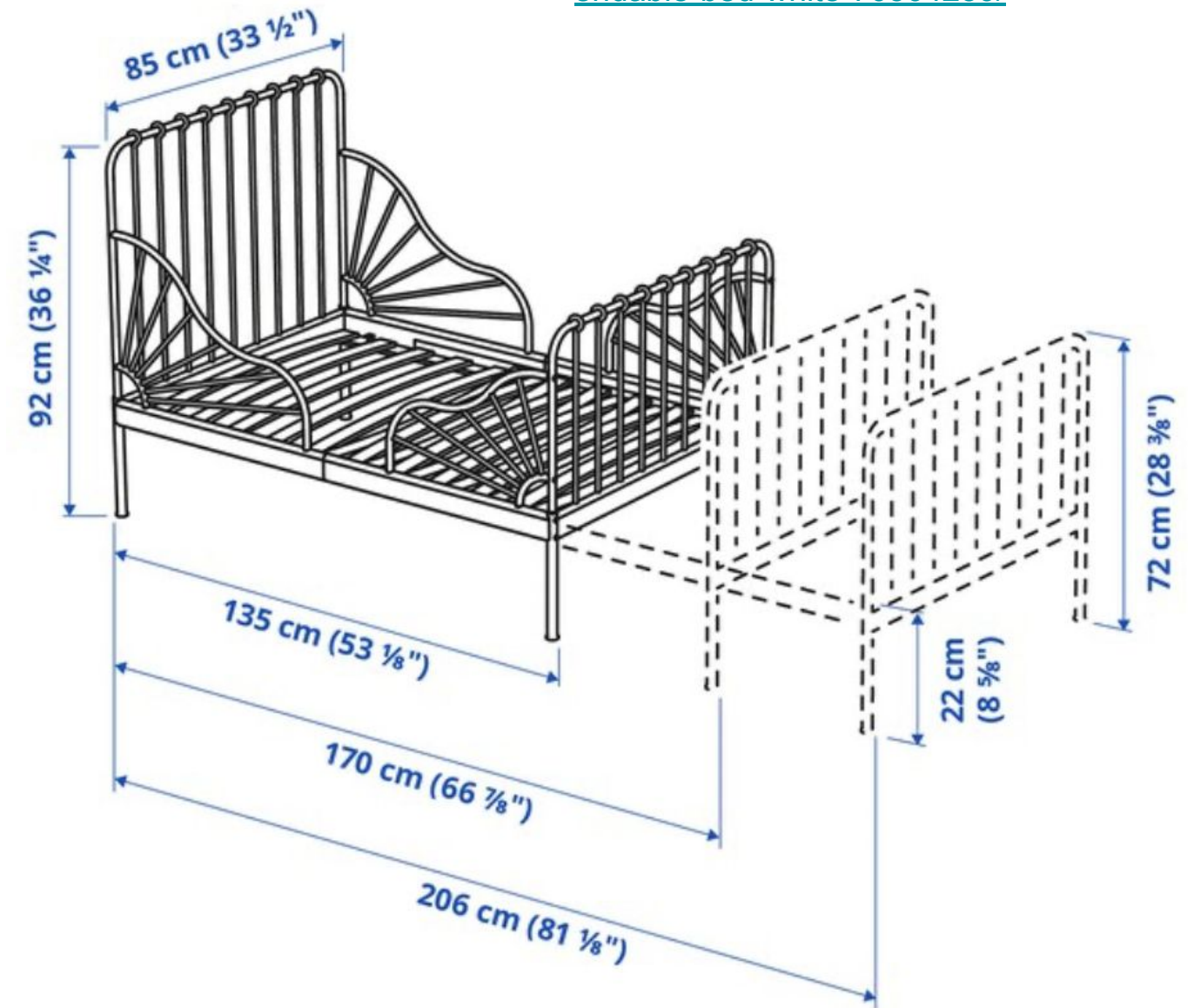
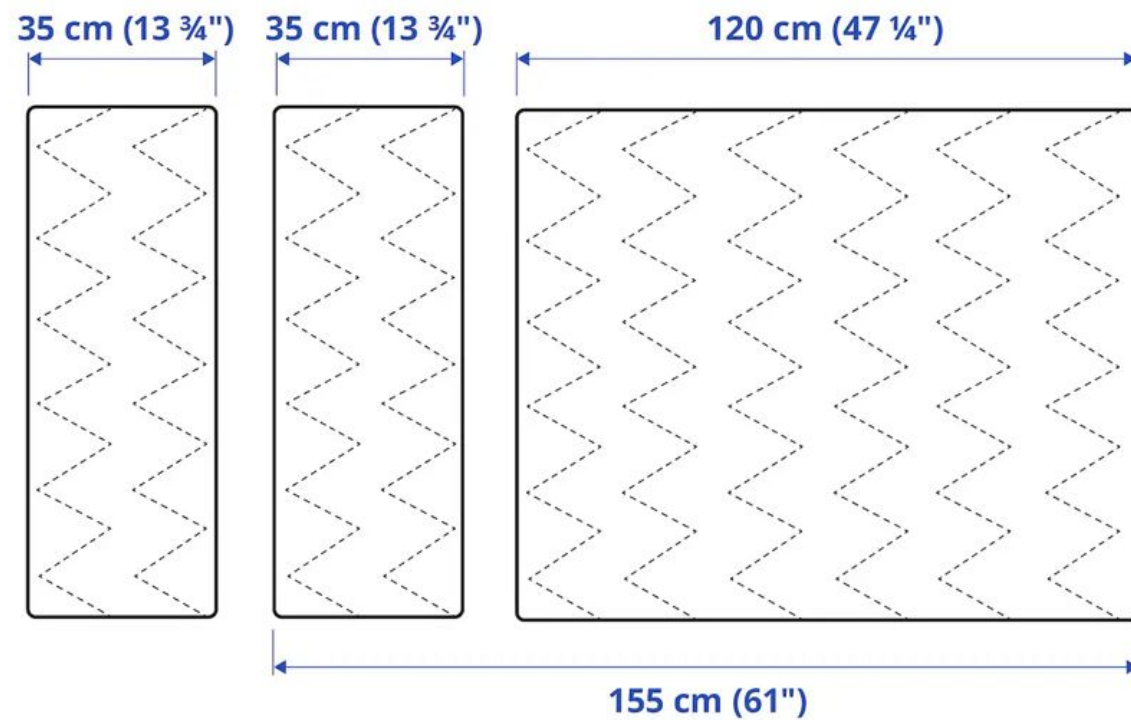
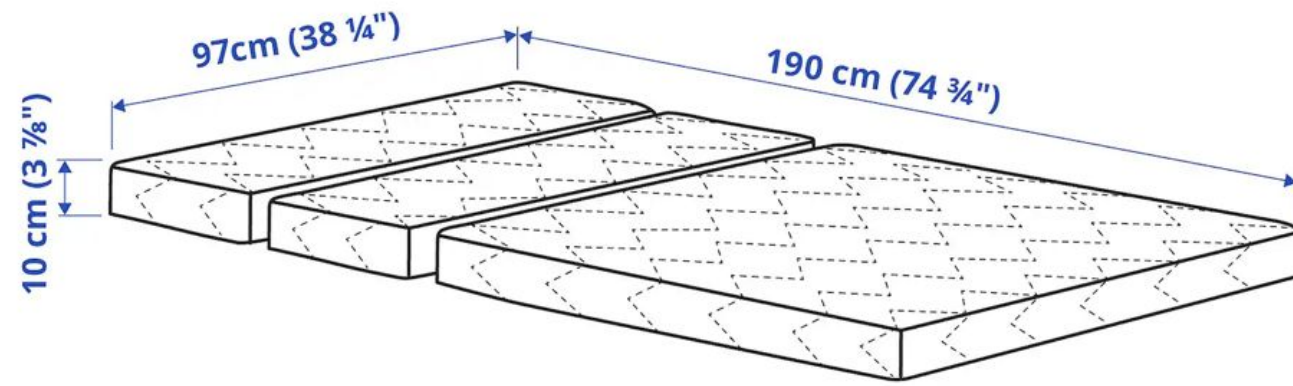
<https://about.ikea.com/en/sustainability/a-world-without-waste/designing-for-a-circular-future>

## Ikea's Circular Product Design Principles:

Calculating a products lifespan + The emotional factor + Functional sustainability is key

1. Designing for renewable or recycled materials
2. Designing for standardisation
3. Designing for care
4. Designing for repair
5. Designing for adaptability
6. Designing for disassembly and reassembly
7. Designing for remanufacturing
8. Designing for recyclability





## IKEA Extendable Beds

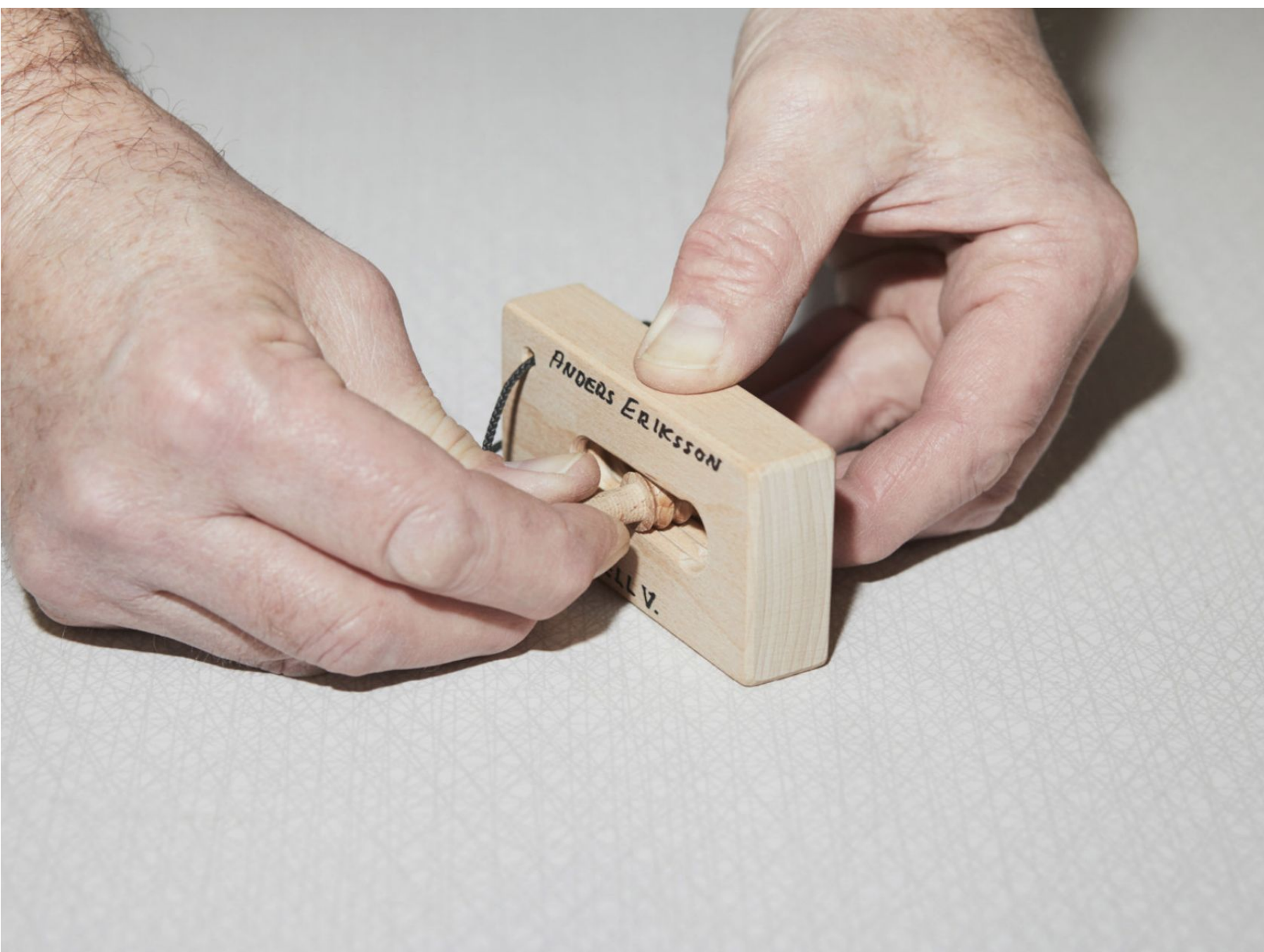
### WHAT ARE THEY?

Extendable beds are ingeniously engineered to offer adjustable dimensions, allowing users to modify the size of the bed as required. Commonly found in various styles, such as for children, teenagers, and guest rooms, these beds often come with extendable frames, sliding mechanisms, or pull-out features to enable expansion or contraction.

### PURPOSE

The design purpose of extendable beds goes beyond versatility. They promote sustainable consumption by reducing the need for new furniture purchases whenever circumstances change. The use of durable materials and easy-to-repair components further enhances their longevity, minimizing waste and contributing to a circular economy.





# IKEA Wedge Dowel

## WHAT ARE THEY?

IKEA's wedge dowel is a smart and innovative alternative to traditional hardware like screws, nails, and cam locks used in furniture assembly. The wedge dowel system consists of pre-cut wooden dowels that have wedge-shaped ends, which fit snugly into corresponding pre-drilled holes in the furniture components.

<https://ikeamuseum.com/en/explore/the-story-of-ikea/the-wedge-dowel/>

## PURPOSE

IKEA's wedge dowel is a revolutionary furniture assembly system that simplifies and improves the construction of their flat-pack products. The design purpose of the wedge dowel is to make furniture assembly faster, easier, and more user-friendly for customers while reducing the environmental impact by using fewer materials and eliminating the need for additional hardware.

TEXTILE AND APPAREL

FURNITURE

BUILDINGS?

**BUILDING PROJECTS DESIGNED WITH  
DISASSEMBLY IN MIND**



## Circular Buildings

**Goal:** *Extending Service Life and Closing Material Loops*

**How the first circular building was achieved:** “In order to achieve these goals, designers and engineers worked together to refine the application of a prefabricated construction based on a low-waste, self-supporting, and structurally demountable integrated panel (SIP) wall system, connected to the recycled steel structural frame by reusable clamps. The heat-treated timber for the cladding and decking was sustainably sourced too (Figure 1).”

### **Key aspects of circular buildings:**

- ★ Developed
- ★ Created to be used multiple times without unnecessary resources being used
- ★ Used in a way that does not pollute the environment
- ★ The structure does not contribute to ecosystem degradation
- ★ It is constructed in an economically responsible way
- ★ It exists and works to help people and the earth
- ★ Elements of the structure are demountable and reusable
- ★ Elements taken from earth can be put back into it

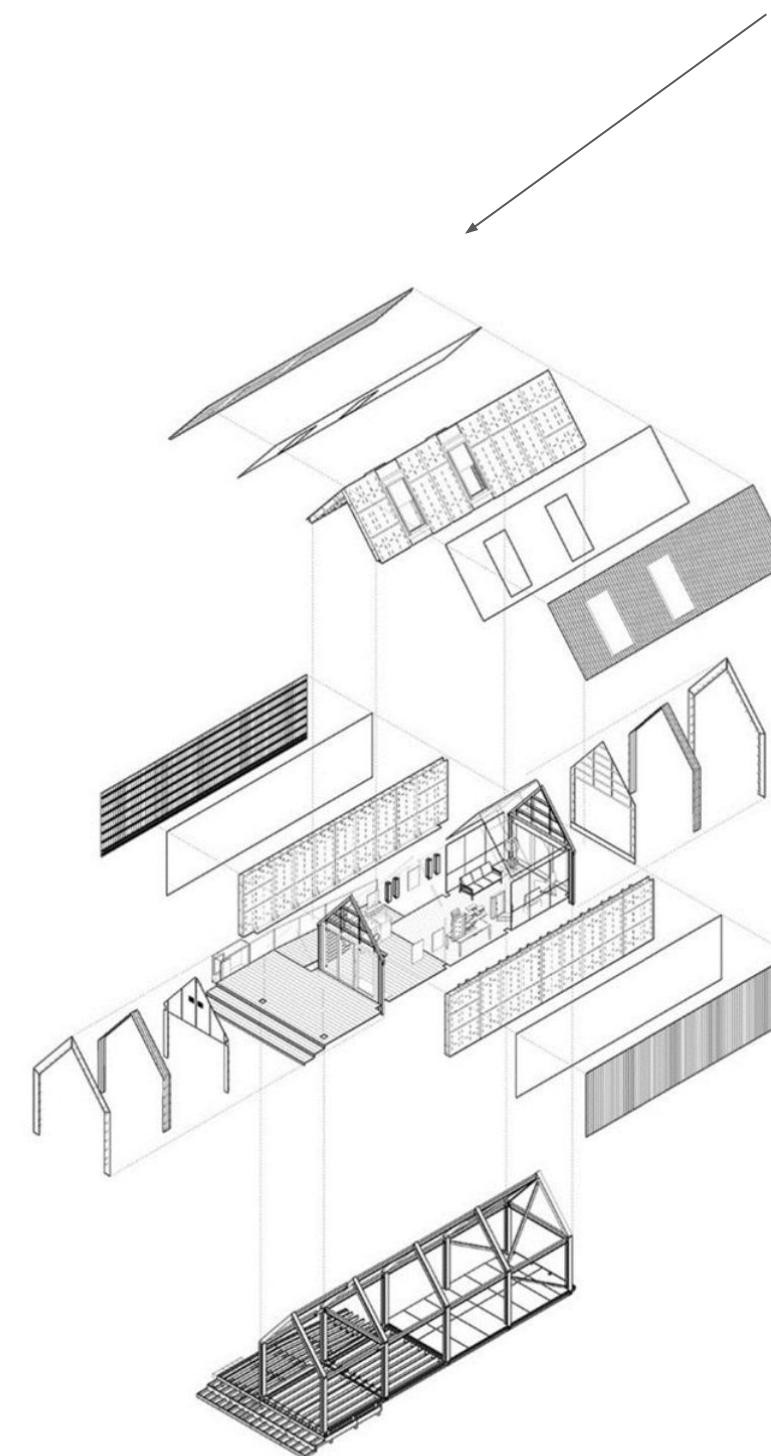


Figure 1. Exploded axonometric of the circular building prototype. Source: © Arup Associates.

## CHALLENGES TO CIRCULAR FASHION

1. How do you scale and accelerate innovation wider and faster in order to make a real impact?

1. Collaborating and sharing is key

2. How can structural arrangements function as reversible assembly systems?

2. Incorporating design features that allow for easy disassembly and reassembly of the components without causing damage or compromising the integrity of the structure

3. Does a building necessarily only have to be built once, or can it be given an extended life through disassembly?

3. Can be extended through consideration of modular construction techniques, employing reversible assembly systems, choosing materials that are easy to disassemble and separate, and providing clear documentation for future deconstruction.

CHALLENGES

QUESTIONS

TEXTILE AND APPAREL

FURNITURE

BUILDINGS