hyperion robotics

peikko

75% MATERIAL SAVINGS IN FOUNDATIONS BY USING 3D PRINTING TECHNOLOGY

– ADDITIONAL BUSINESS LINE FOR PRECASTERS?

ABOUT PEIKKO GROUP

PEIKKO'S WORLD

We serve our customers locally with customer engineering as well as flexible, fast deliveries.

Headquarters
in Lahti, Finland

Certified manufacturing in
12 countries

Sales teams in
33 countries

Globally over
2 000 employees

Turnover 2022
314 million

Concrete generates over 2.8 billion tons of CO_2 every year

"The most widely used man-made material on earth generates

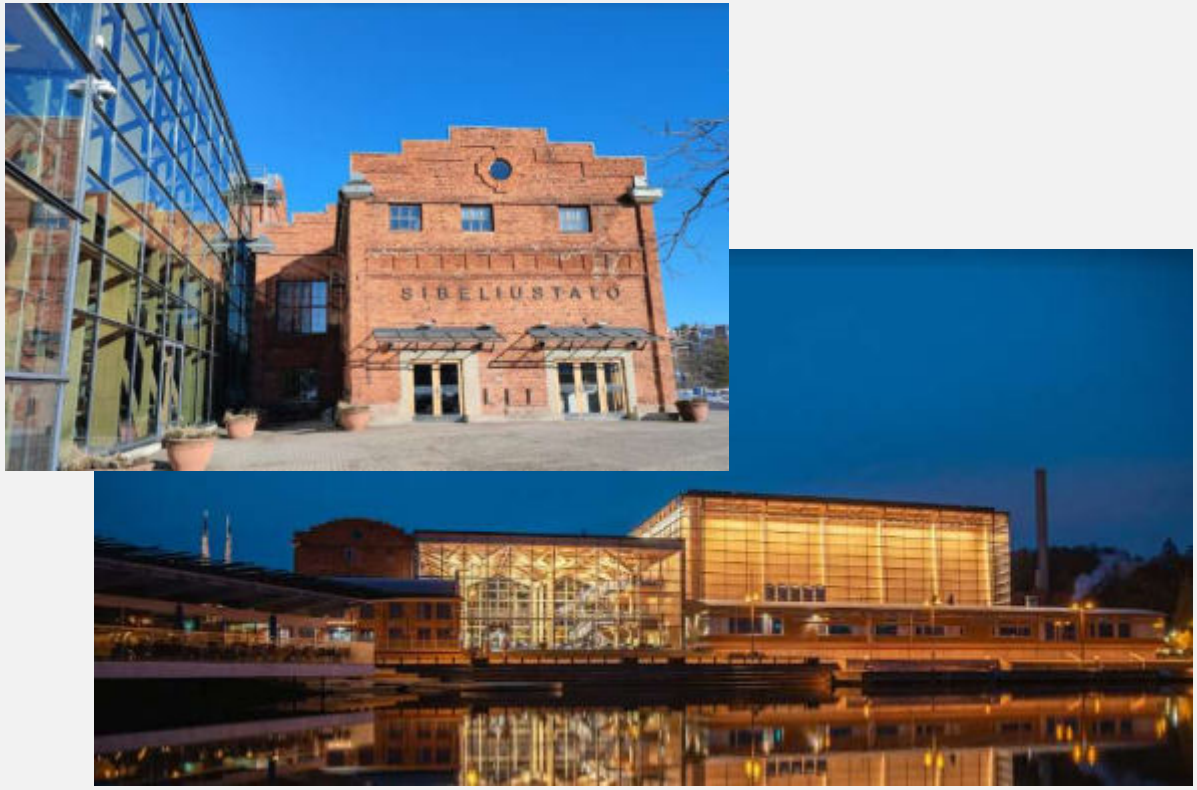
8% of global CO_2 emissions/year[1]"

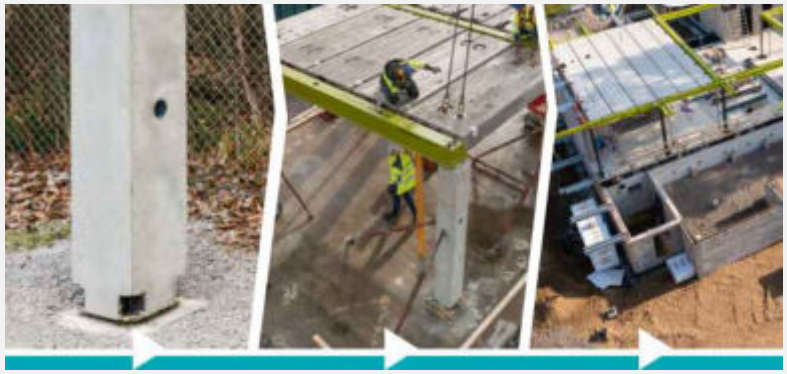
1. World Economic Forum: Link

Starting question – do we need a new structure?

Could we use part or a whole existing structure?

Could we transfer frame components from an existing structure ?





How could we optimize the structure to have less materials, with clever design & clever components?

Case HOLLOWCORE

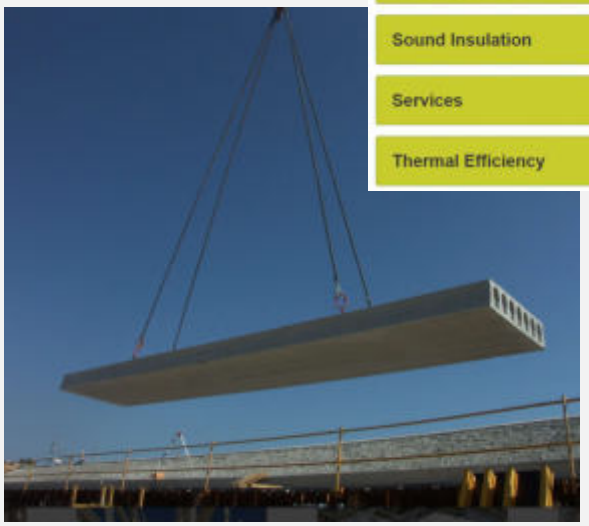
- Speed of Erection
- Lower Material Usage
- Long Spans
- Structural Efficiency
- Sustainable
- Quality

Lightweight

Depending on the profile of the slab, hollowcore can be up to 50% or more in terms of void/solid ratio.

This means that corresponding supports and elements within the structure can also be lighter in weight.

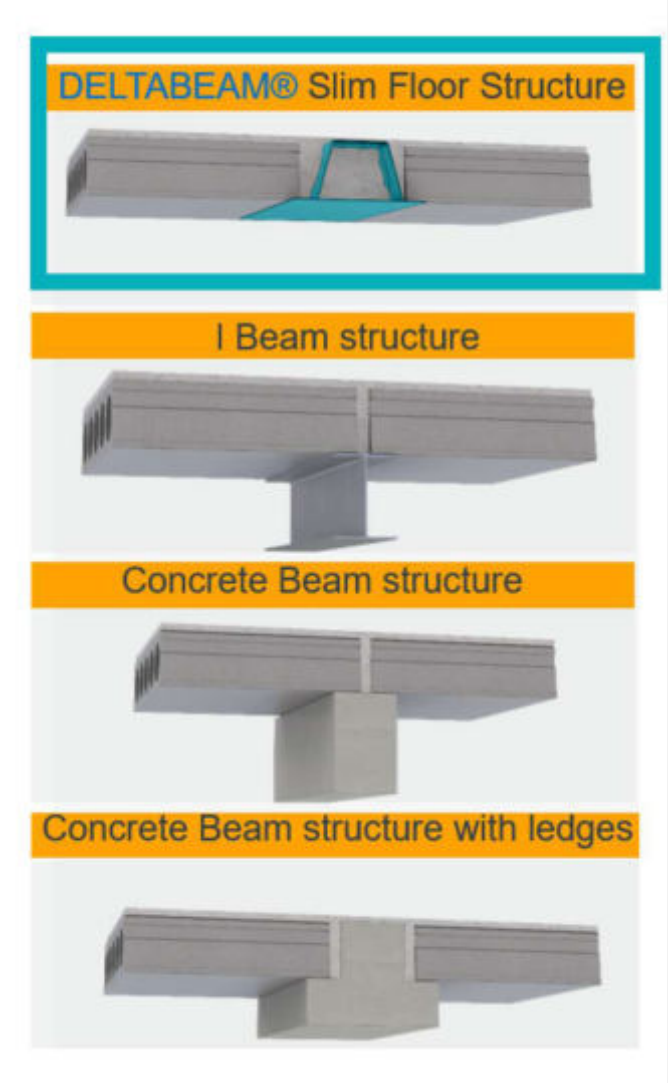
- Diaphragm Action
- Fire Resistance
- Sound Insulation
- Services
- Thermal Efficiency



peikko hyperion

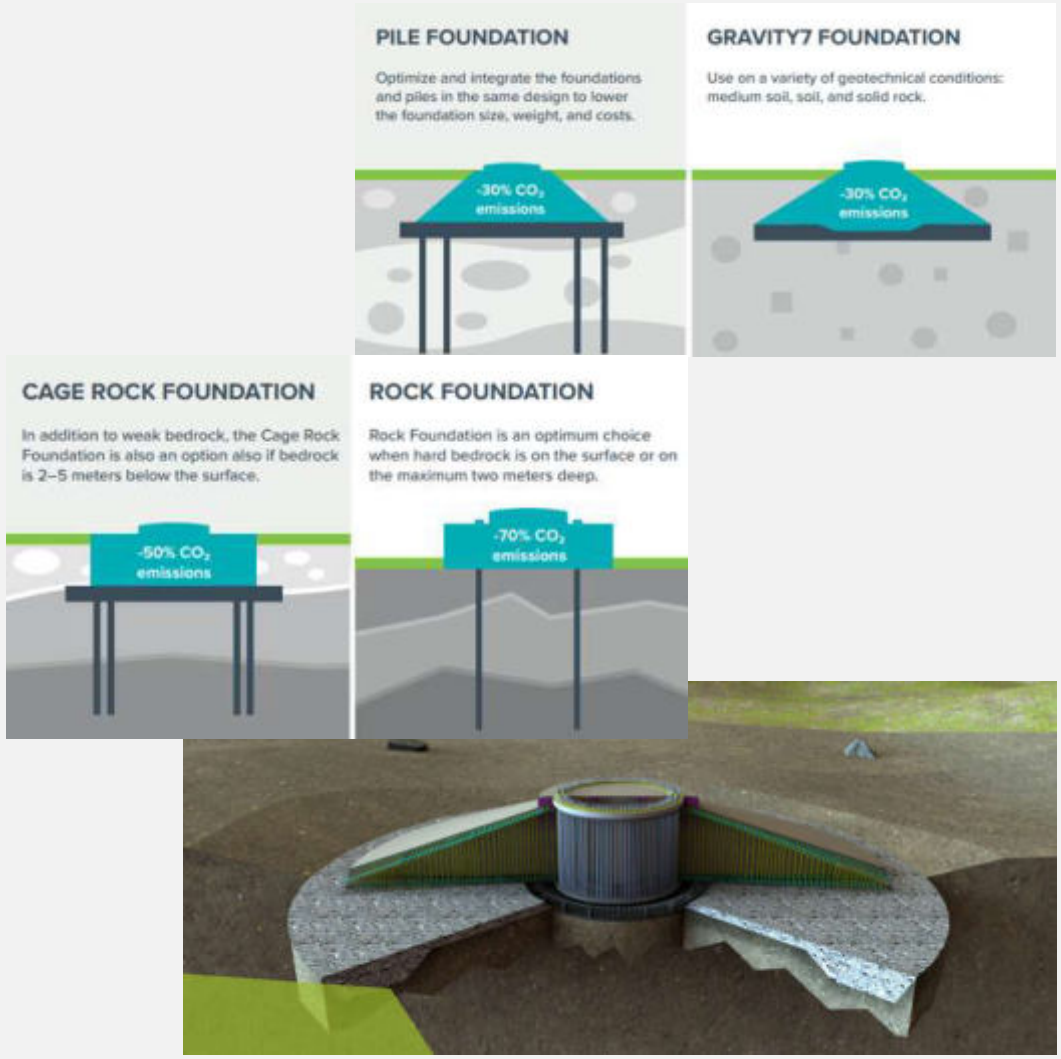
How could we optimize the structure to have less materials, with clever design & clever components?

Case DELTABEAM®



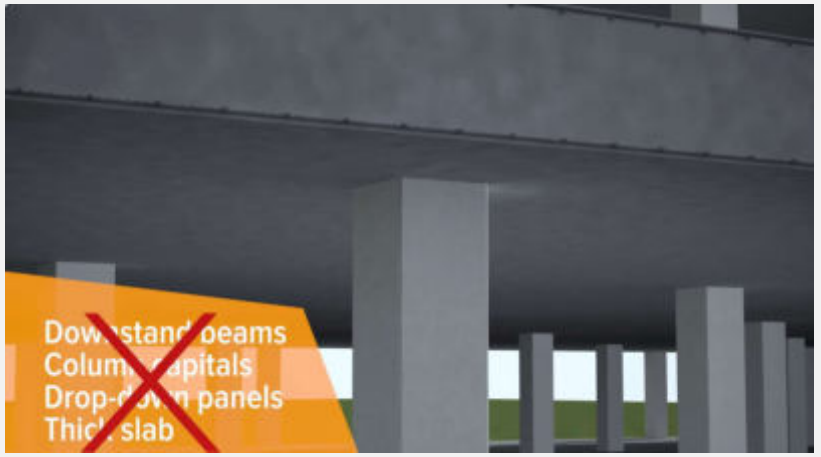
How could we optimize the structure to have less materials, with clever design & clever components?

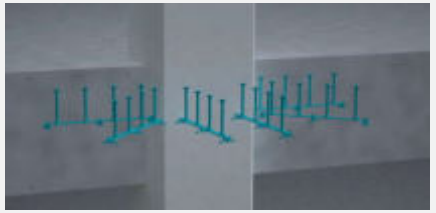
Case Wind Turbine Foundations



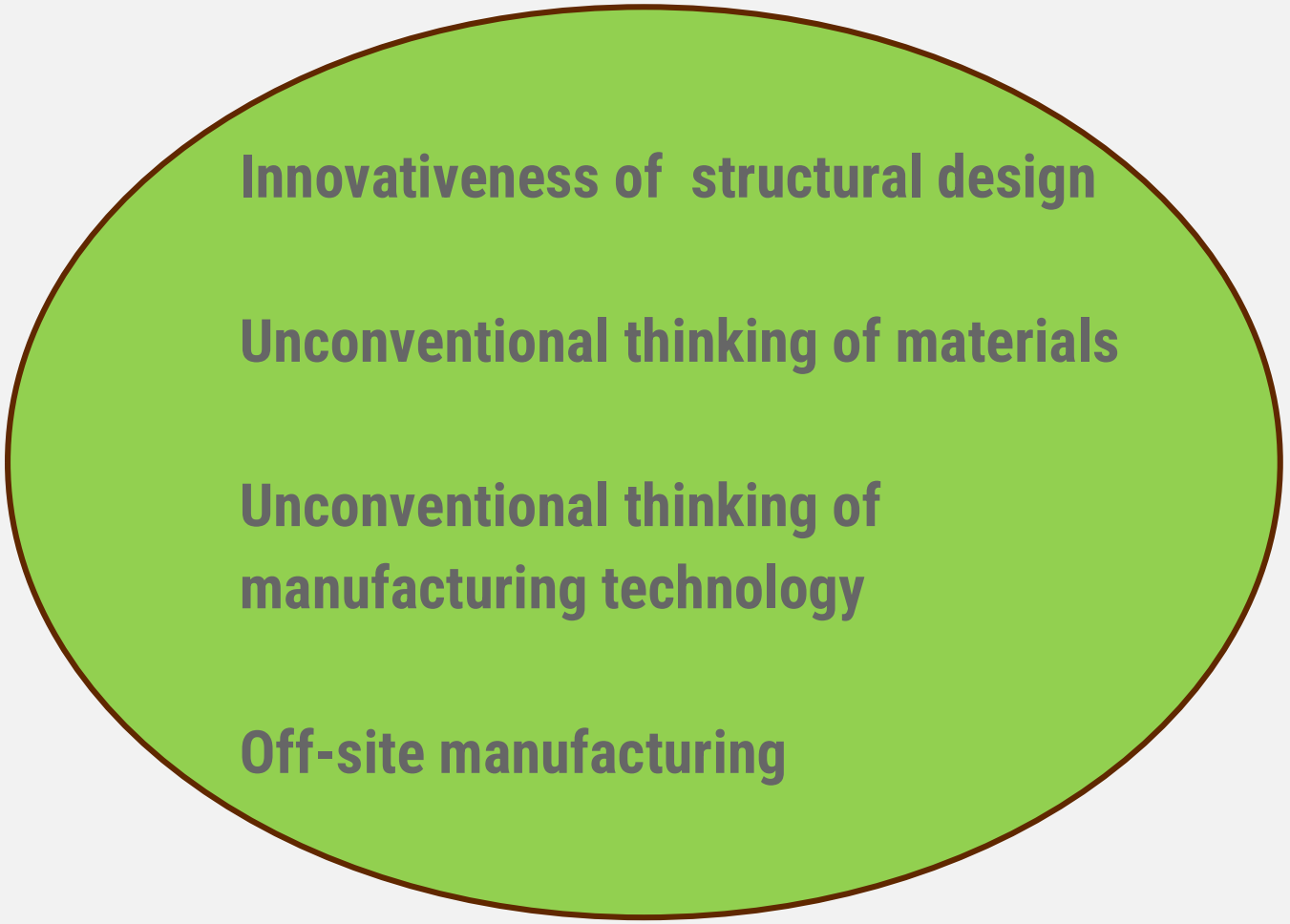
How could we optimize the structure to have less materials, with clever design & clever components?

Case PSB® Punching Shear





Incredients of brightest solutions?



ABOUT HYPERION ROBOTICS

Finnish technology company

25 team members, 14 different nationalities

Experts in engineering, construction, 3D printing, materials science and business.

OUR NETWORK

OUR CLIENTS AND COLLABORATORS

peikko

TARMAC
A CRH COMPANY

IBERDROLA

Metso:Outotec

TECHINT
Engineering & Construction

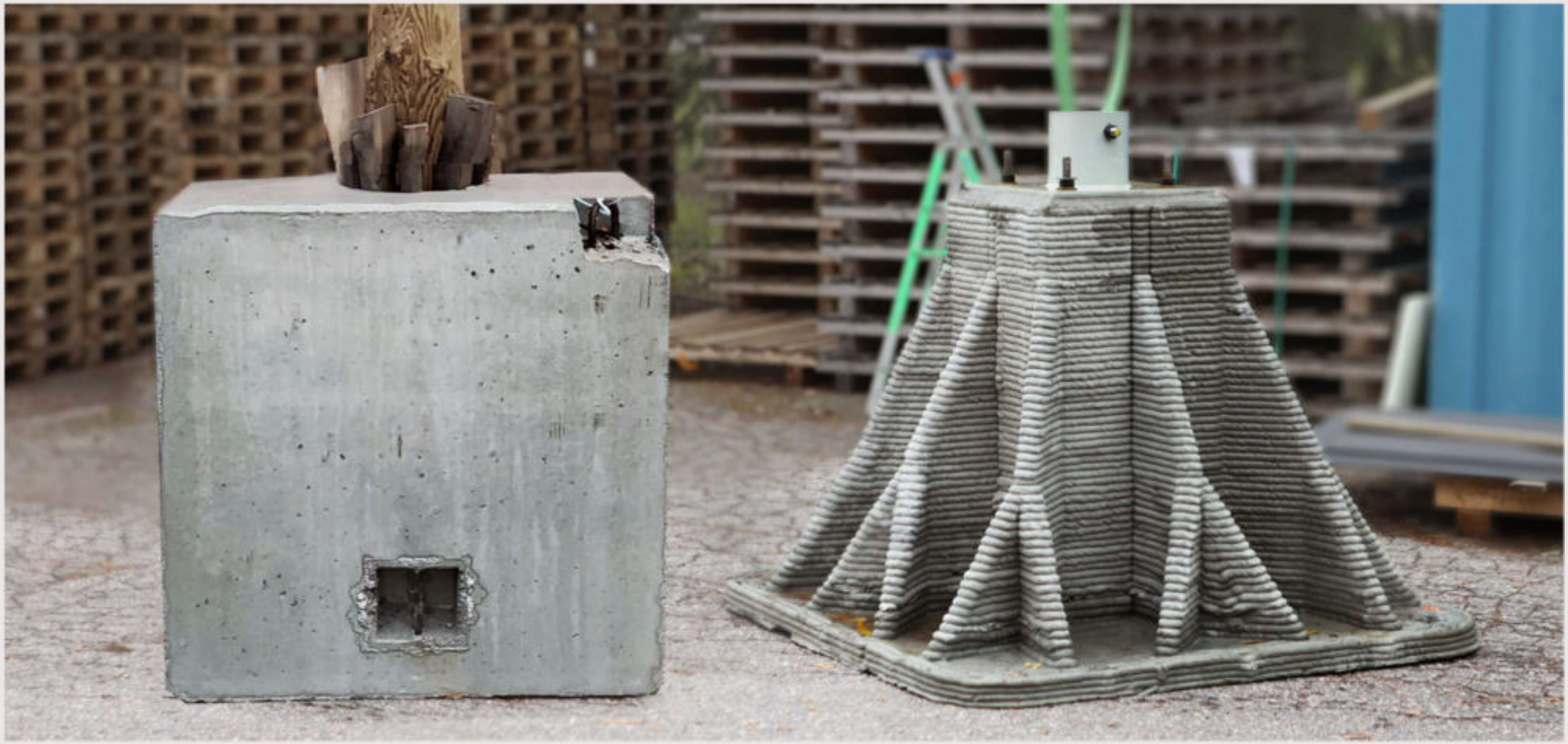
KUKA

YorkshireWater

Bentley
MMB MOTT MACDONALD BENTLEY

Fraunhofer

LOW-CARBON AND EFFICIENT INFRASTRUCTURE ELEMENTS



WE ARE DECARBONIZING CONSTRUCTION

Hyperion is on a mission to help our clients reach their ambitious net zero goals. At the core of what we do, we promote sustainability and circularity in all of our products and services.

Up to 75% Less material

By placing material where it is most needed, Hyperion is able to save up to 75% material whilst providing the same resistance. Steel reinforcement is equally reduced

3X Faster to deliver

By integrating design and manufacturing with our automated process and eliminating the need for molds we produce structures much faster, reducing lead-times by more than 50%, offering a faster and competitive solution.

Up to 90% Less CO2

By combining design optimization, upcycling of industrial waste materials and logistics optimization we can follow a highly sustainable and circular construction process

HYPERION PRODUCTION FACILITY AND MICRO-FACTORIES

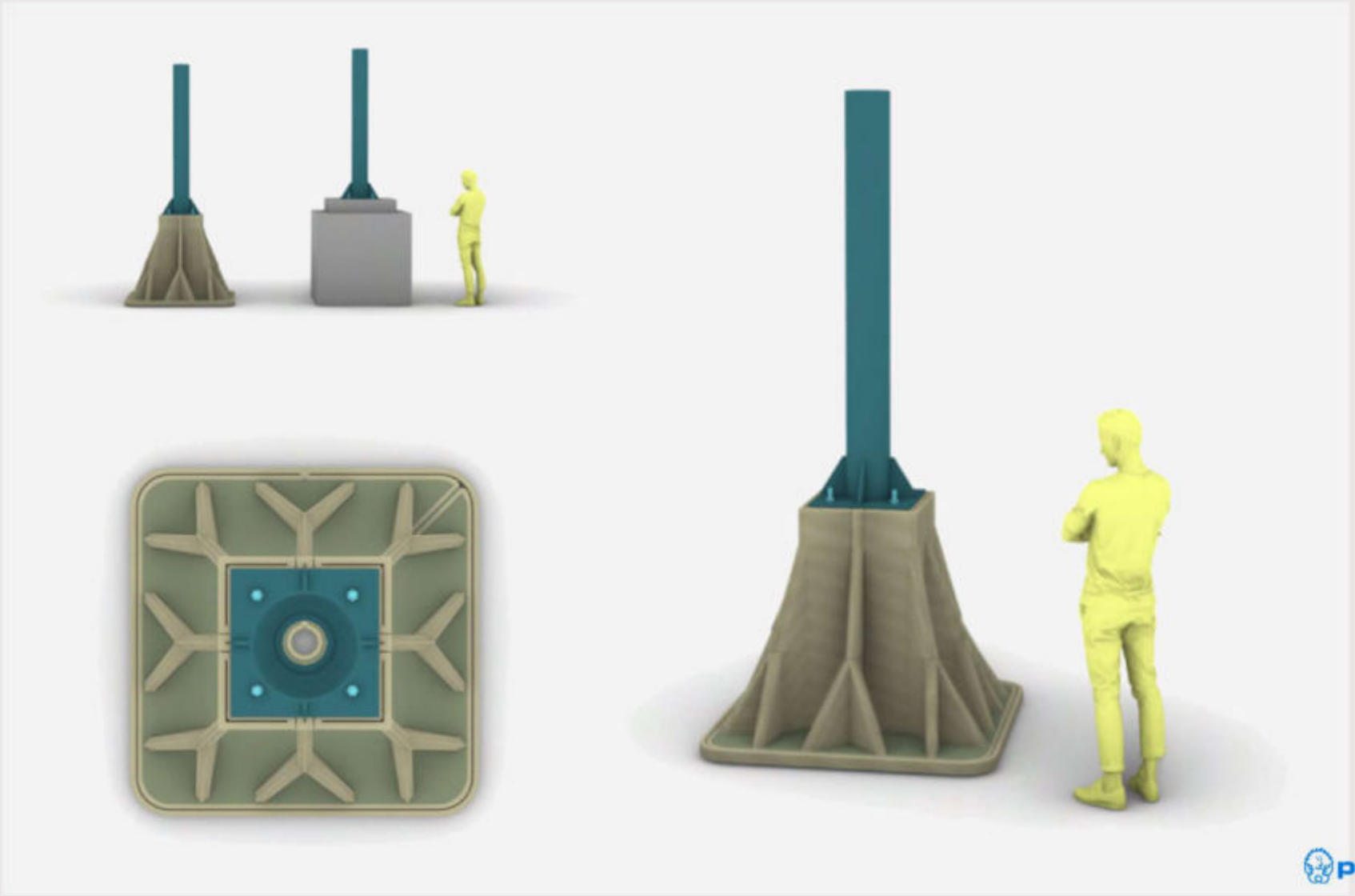
hyperion

LOW-CARBON FOUNDATION

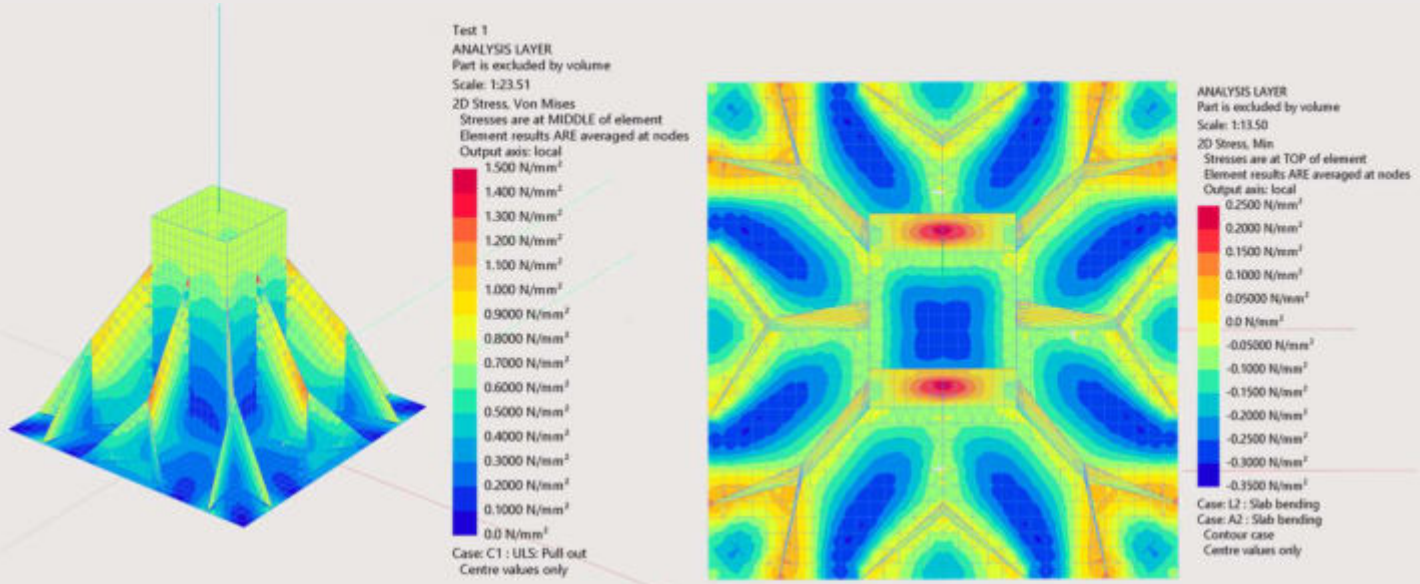
IBERDROLA

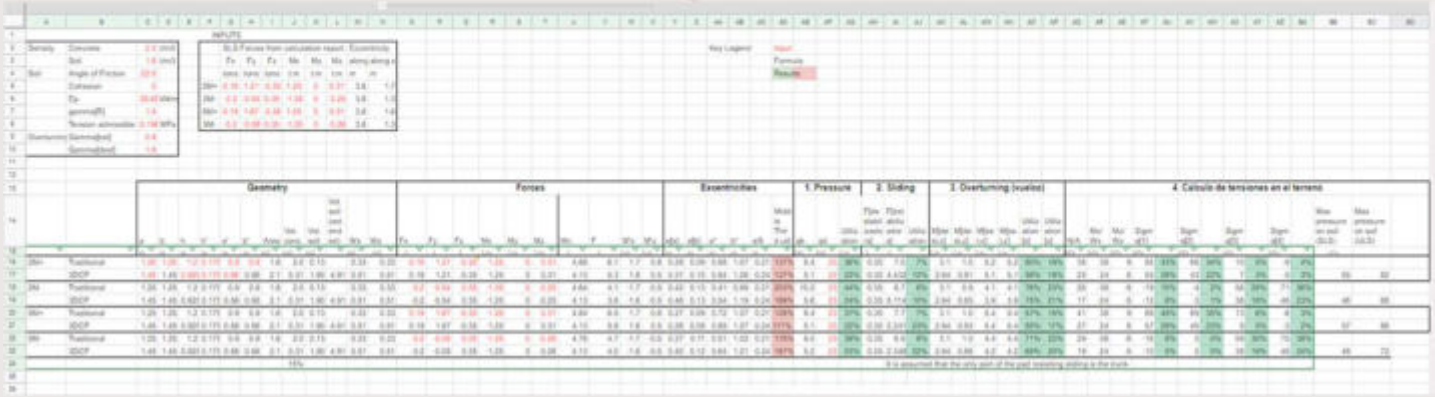
peikko

OPTIMIZED PAD FOUNDATION



DESIGN AND ENGINEERING



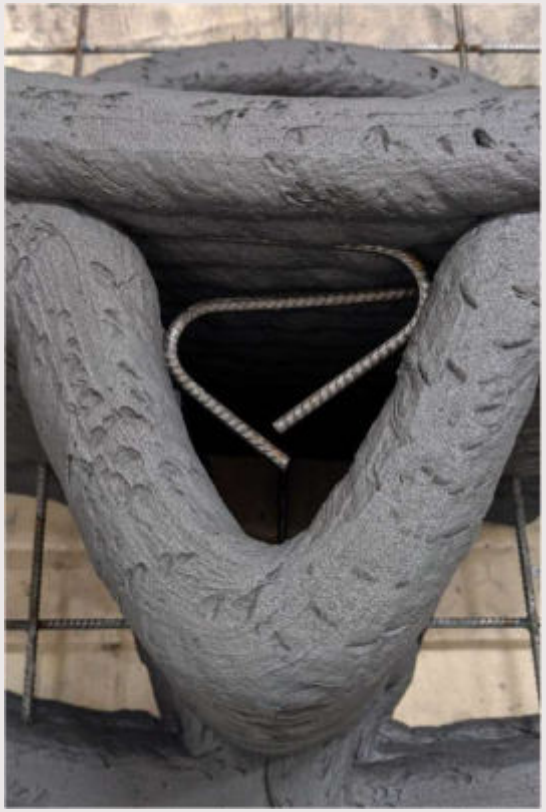


3D PRINTING MANUFACTURING

peikko hyperion

DELIVERY TO SITE AND INSTALLATION

CODE COMPLIANCE IS IN OUR DNA



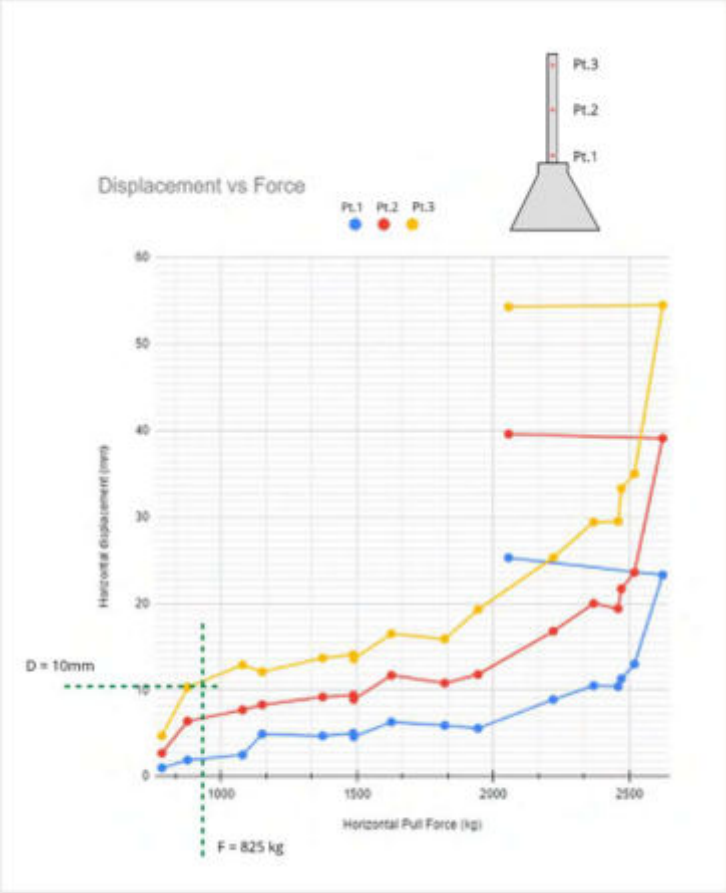
CHARACTERIZATION OF HYPERION 3D MORTAR

eurofins

	Hyperion 3D mortar		Conventional concrete
Compressive strength (x)	**49.9**	MPa	40 to 45 MPa for C32/40 and C35/45 classes
Compressive strength (y)	**53.4**	MPa	
Compressive strength (z)	**51.53**	MPa	
Bending Tensile strength (y)	**7.05**	MPa	3 to 3.2 MPa for C32/40 and C35/45 classes
Bending Tensile strength (z)	**5.64**	MPa	
Density	**2079**	kg/m^3	2400 kg/m^3
Chloride penetration coefficient	**1.83×10^{-12}**	m^2/s	Based on fib Bulletin 34, this concrete is considered as a high quality material in subject to chloride exposure
Freeze Thaw	$M_{32}= 0.26$	kg/m^2	XF3 with design life of 50 years

peikko hyperion

CODE COMPLIANCE AND REGULATIONS

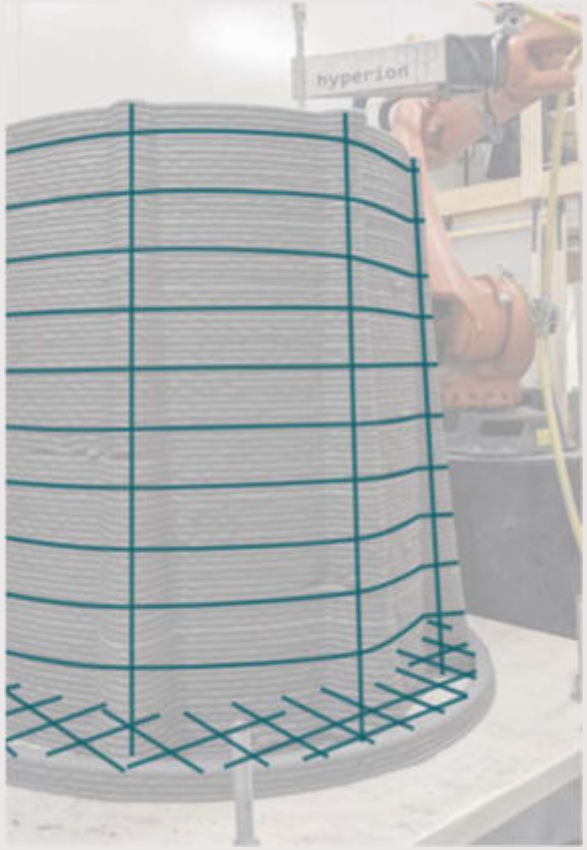


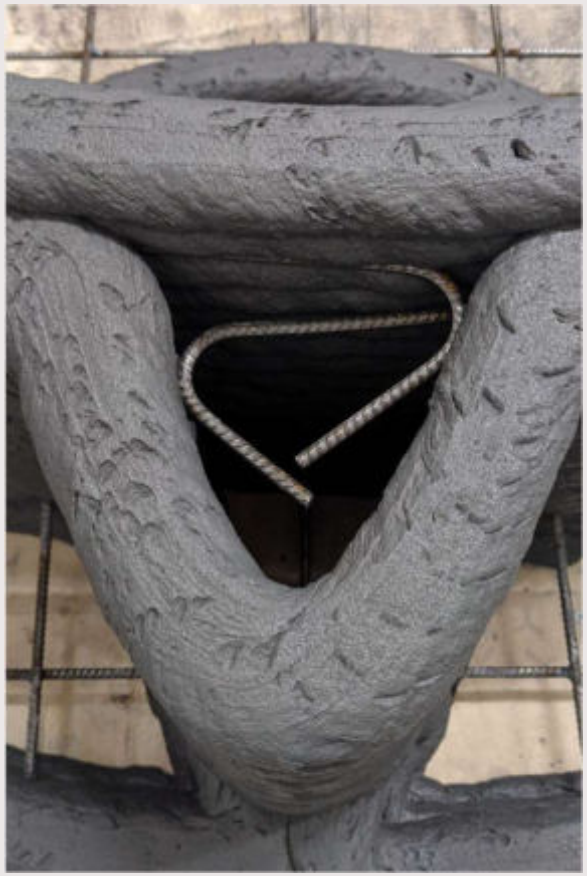
factor of safety of 3x

peikko hyperion

WE BUILD REINFORCED CONCRETE STRUCTURES

All our structure incorporate standard B500 grade reinforcement following the guidance of EN 1992-1.

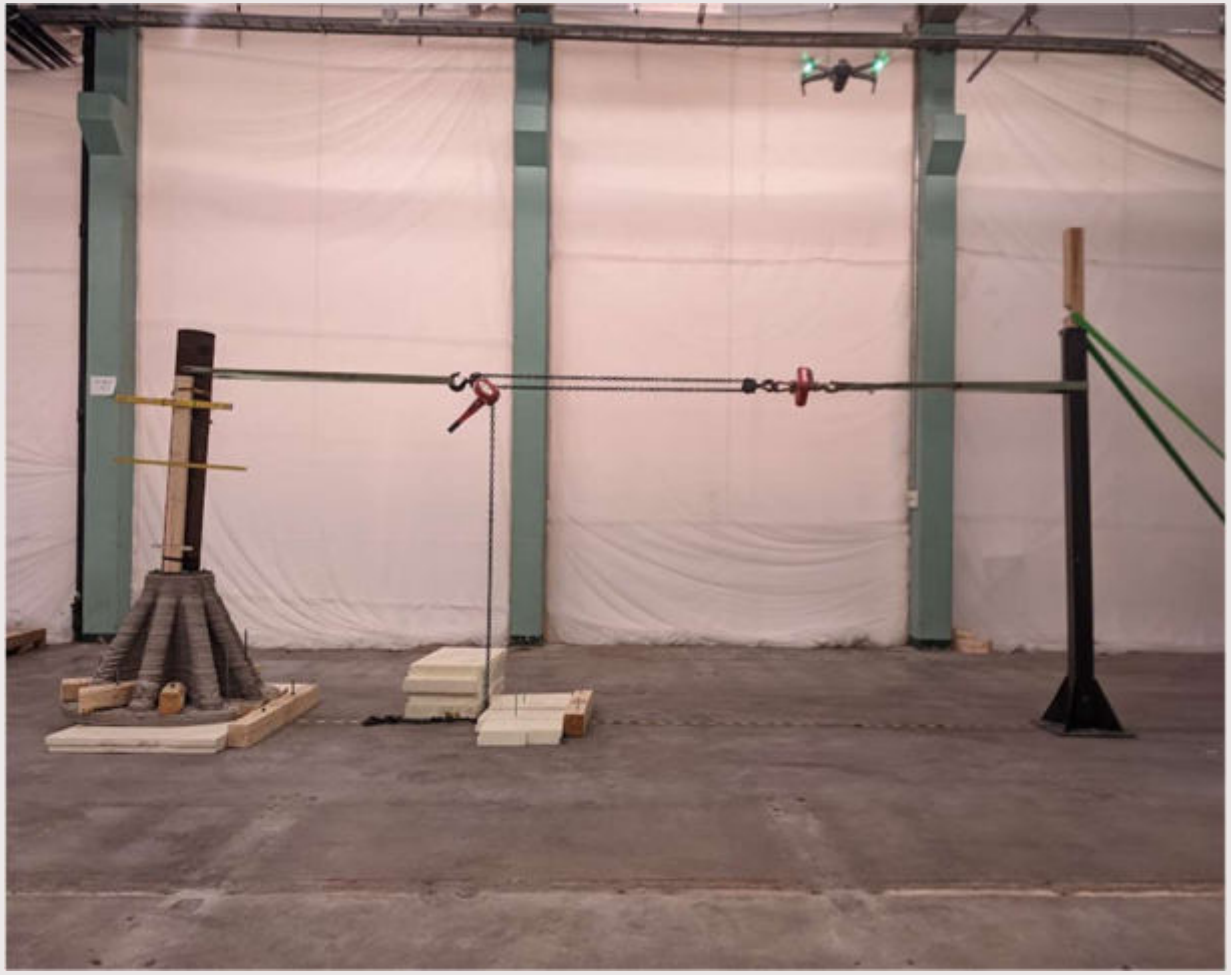




peikko hyperion

FURTHER DEVELOPMENTS

FULL-SCALE TESTING



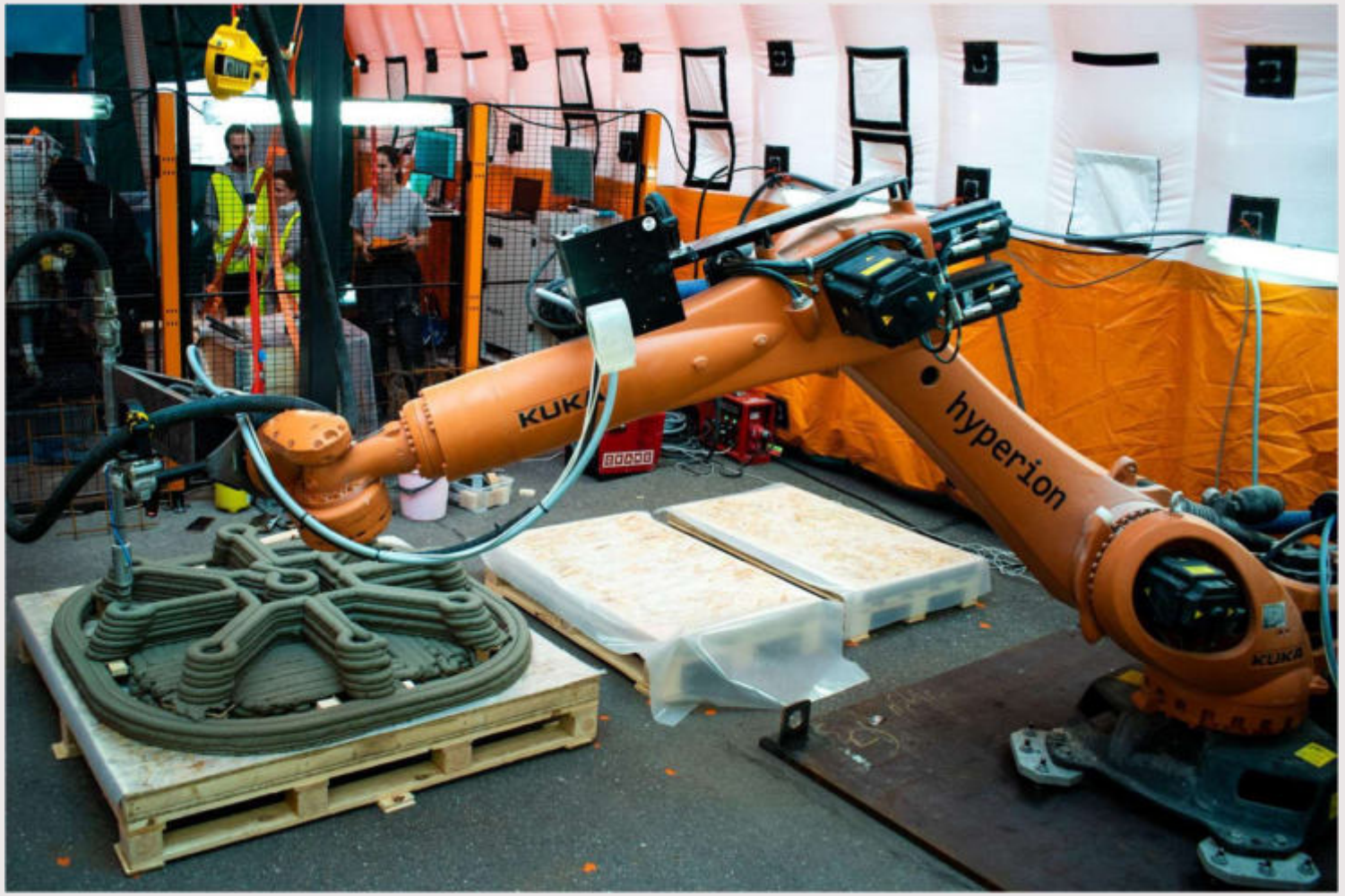
FULL-SCALE TESTING

peikko hyperion

DEPLOYMENT OF MICRO-FACTORY

peikko hyperion

DEPLOYMENT OF MICRO-FACTORY



peikko hyperion

DEPLOYMENT OF MICRO-FACTORY

peikko hyperion

HYPERION CONSTRUCTION APPLICATIONS

Foundations are a great application due to the amount of materials we can save but we can also produce many more products!

Water tanks

Pad foundations

Trenches for underground systems

Artificial reefs and Marine Infrastructure

HYPERION CONSTRUCTION APPLICATIONS

And many more.

Staircases

Inspection chambers

Retaining walls and noise barriers

Footbridges and beams

LOW-CARBON MATERIAL POSSIBILITIES

Hyperion's material catalogue of sustainable construction materials includes both cementitious and alkali activated concrete.
All materials are tested using 3rd party accredited laboratory Eurofins.fi and material certificates can be provided upon request.

Hyper-Cem
(105 kg eCO2/ton)

Cement-based mix

Hyper-Geo
(15 kg eCO2/ton)

Cement-less alkali circular, activated mix

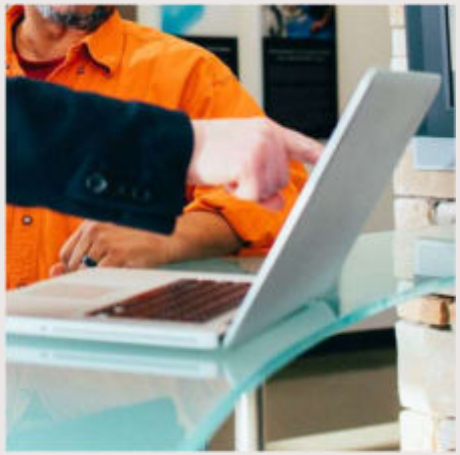
Hyper-Carbon
(28 kg eCO2/ton)

Carbon based mix

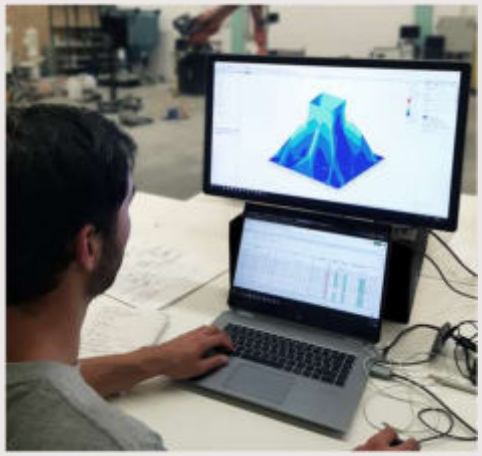
CEMENT-FREE WATER TANK

peikko hyperion

HOW DO WE WORK



1. Scope definition and planning

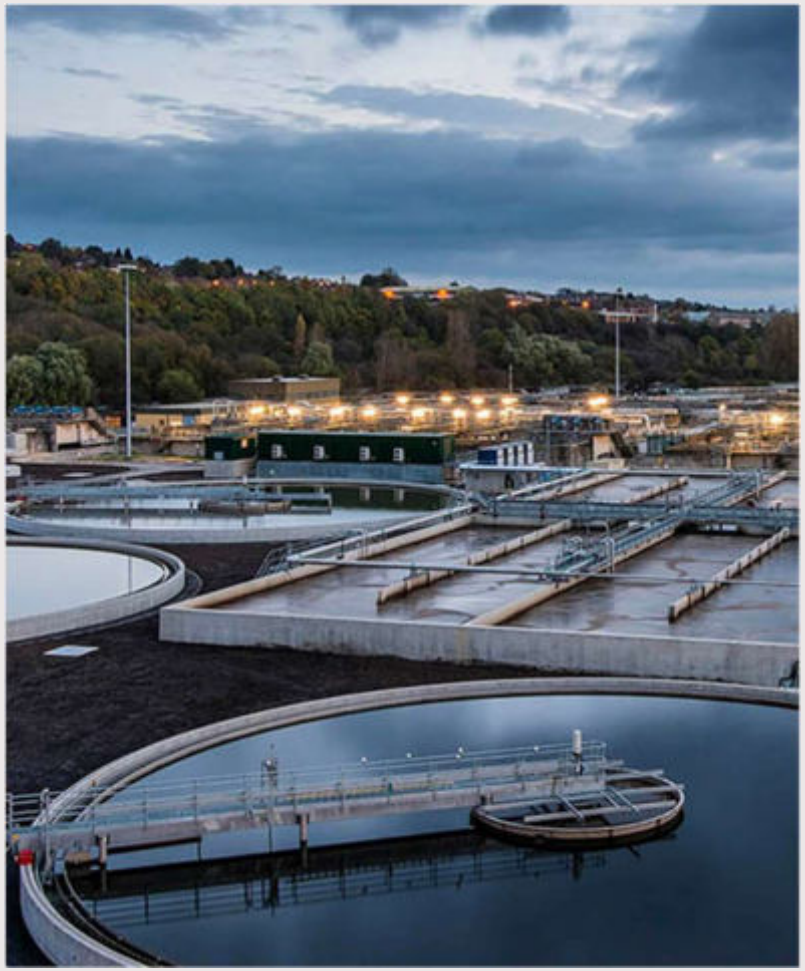


2. Design and engineering

3. Onsite and offsite production

4. Delivery

WATER INFRASTRUCTURE



peikko hyperion

LET'S 3D PRINT A BETTER FUTURE TOGETHER

Peikko Group Corporation
Topi Paananen, CEO
topi.paananen@peikko.com

Hyperion Robotics
Fernando De los Rios, CEO
fd@hyperionrobotics.com

peikko hyperion robotics