

A vertical decorative bar on the left side of the page, consisting of a series of orange rectangular segments of varying lengths, creating a textured, staircase-like effect.

# LEADING THE TRANSITION TO SUSTAINABLE AUTOMATED CONSTRUCTION

Created for the builders of tomorrow, our solution will save, upcycle  
and optimise today

Helsinki- January 2024

# ABOUT US

Hyperion Robotics is a Finnish technology company formed by experts in construction and 3D printing robotics.



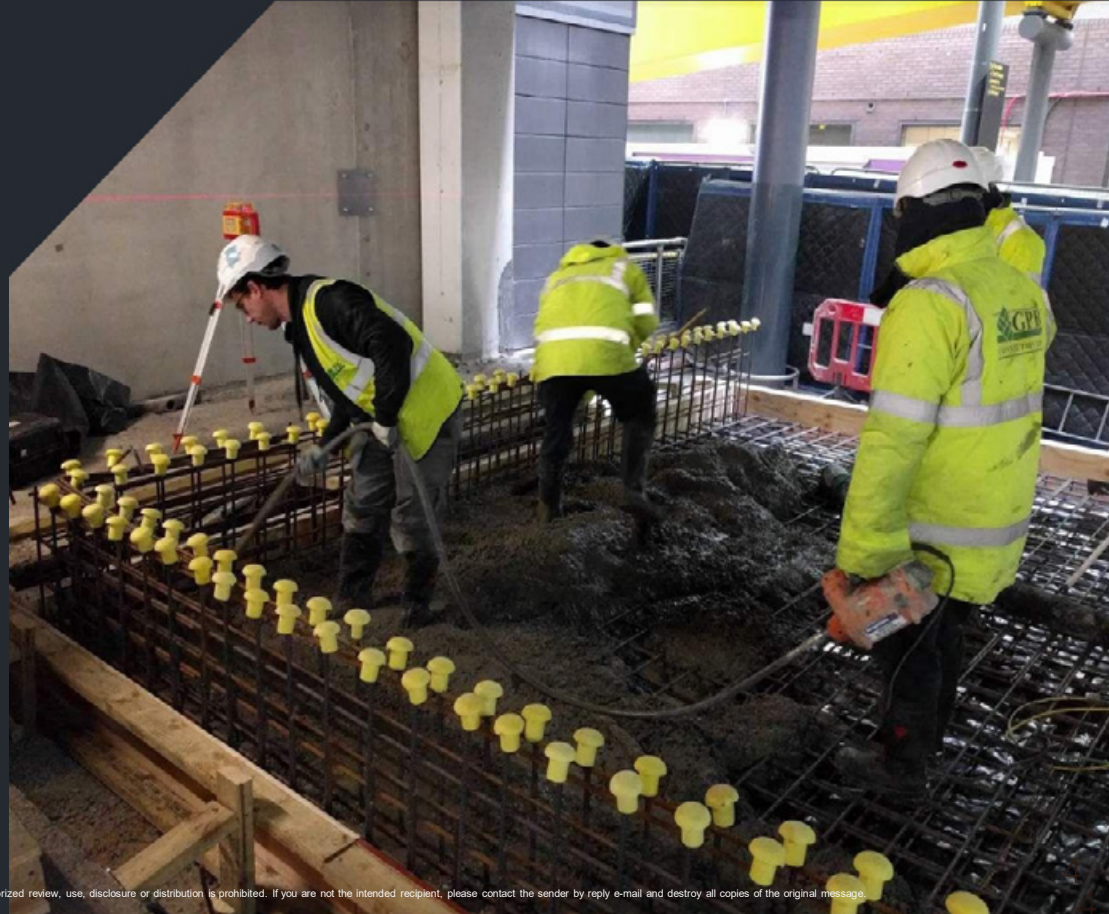




# CONCRETE: GREAT CONTRIBUTOR TO CLIMATE CHANGE

1. World Economic Forum: [Link](#)

# CONCRETE CONSTRUCTION NEEDS AUTOMATION



# FROM TYPICAL BULKY CONCRETE BLOCK...





# WHAT WE DO

We offer a fully integrated, highly adaptable concrete construction automation solution to save time, money and CO2.



Traditional Pad Foundation

Hyperion Pad Foundation

# HYPERION 3D PRINTING MICRO-FACTORIES



Kuka robotic arm

Extruder head

Safety fence

PLC

hyperion  
robotics

Small size foundation,  
produced in 10 minutes

Mixer pump

Silo

Robot operator's station

# OUR NETWORK

We are working with clients, who lead global industries

**Metso:Outotec**



**TECHINT**  
Engineering & Construction

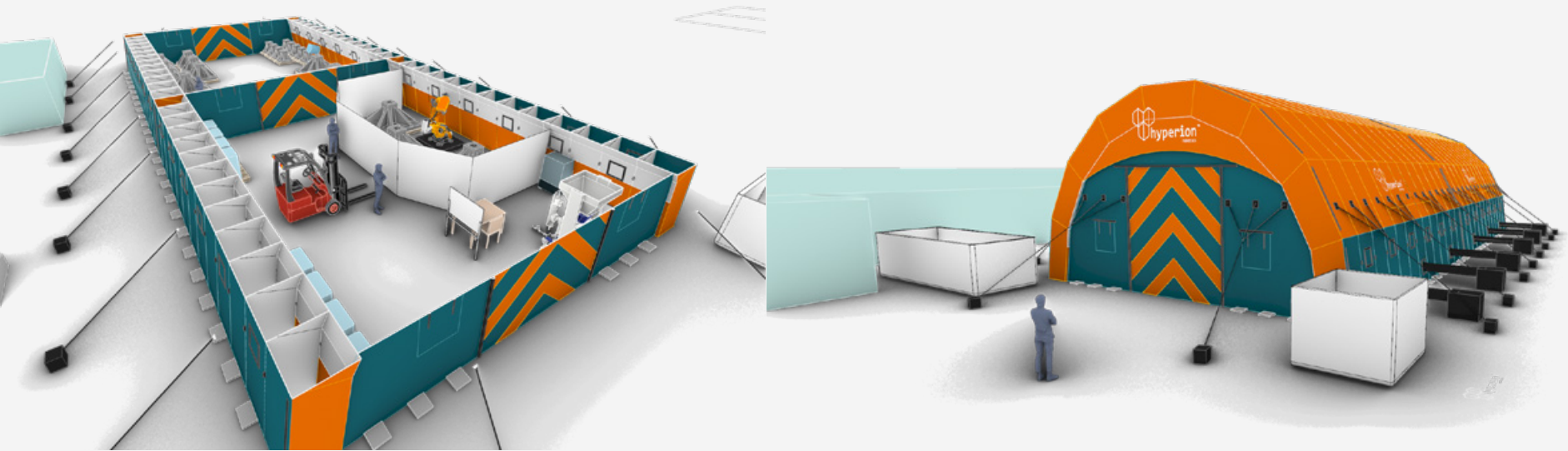
We leverage the expertise of our strategic partners



**KUKA**



# HYPERION 3D PRINTING MICRO-FACTORIES



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# HYPERION 3D PRINTING MICRO-FACTORIES



# KEY BENEFITS

## Sustainability



Up to  
**90%**  
improvement

- Mortar is made out of waste stream products
- Material is placed where it is needed
- Zero waste

## Cost



Up to  
**30%**  
reduction

- Faster production & installation on site
- Less labour and less materials
- No formwork

## Execution Time



Up to  
**50%**  
reduction

- Streamlined design & engineering phase
- Processes running in parallel

## Health & Safety



Up to  
**50%**  
improvement

- Minimum labour required
- Minimum time spent on site doing hard labour

# HYPERION CONSTRUCTION APPLICATIONS



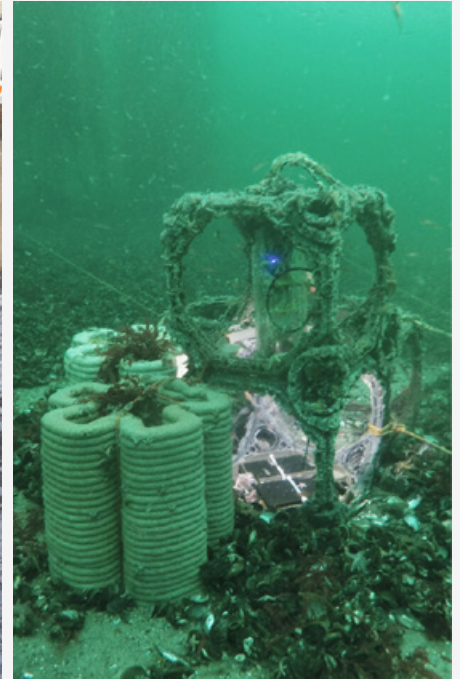
Water tanks



Foundations



Trenches and Nodes



Artificial reefs and Marine Infrastructure



# CHARACTERIZATION OF HYPERION 3D MORTAR



	Hyperion 3D mortar		Conventional concrete
<b>Compressive strength (x)</b>	<b>49.9</b>	MPa	40 to 45 MPa for C32/40 and C35/45 classes
<b>Compressive strength (y)</b>	<b>53.4</b>	MPa	
<b>Compressive strength (z)</b>	<b>51.53</b>	MPa	
<b>Bending Tensile strength (y)</b>	<b>7.05</b>	MPa	3 to 3.2 MPa for C32/40 and C35/45 classes
<b>Bending Tensile strength (z)</b>	<b>5.64</b>	MPa	
<b>Density</b>	<b>2079</b>	kg/m <sup>3</sup>	2400 kg/m <sup>3</sup>
<b>Chloride penetration coefficient</b>	<b>1.83 x 10<sup>-12</sup></b>	m <sup>2</sup> /s	Based on fib Bulletin 34, this concrete is considered as a high quality material in subject to chloride exposure
<b>Freeze Thaw</b>	<b>M<sub>32</sub>= 0.26</b>	kg/m <sup>2</sup>	XF3, XF1 with design life of 50 years as per EN 206

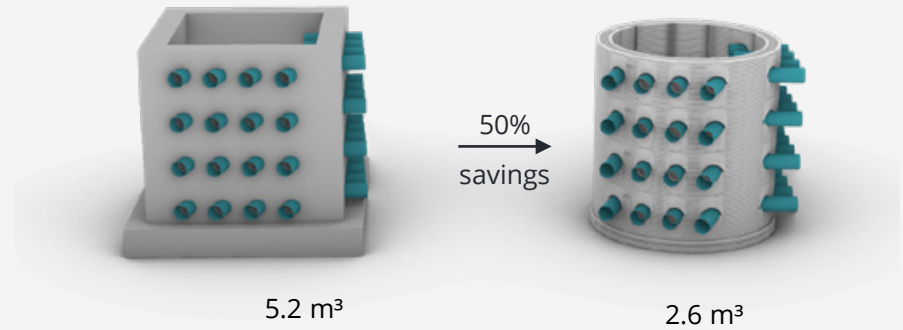
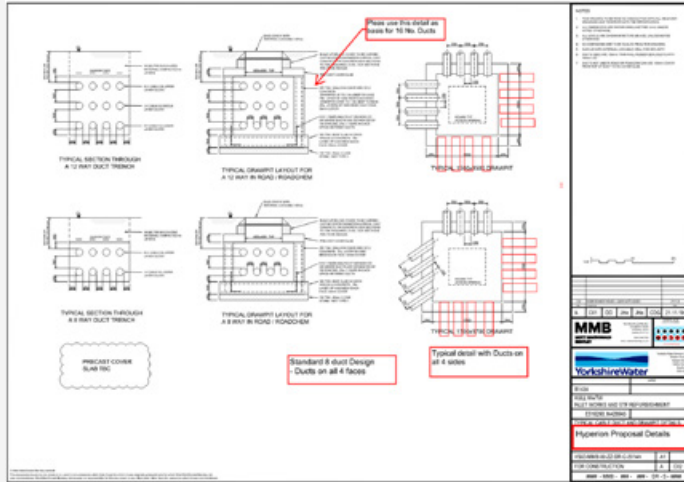


# Drawpits for Esholt Water Treatment Plan



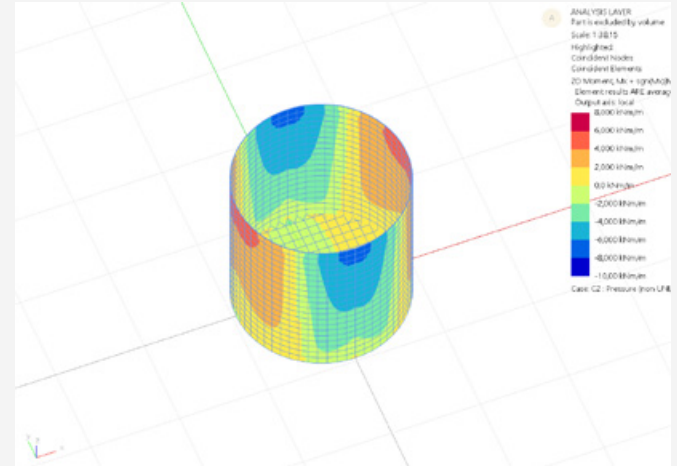
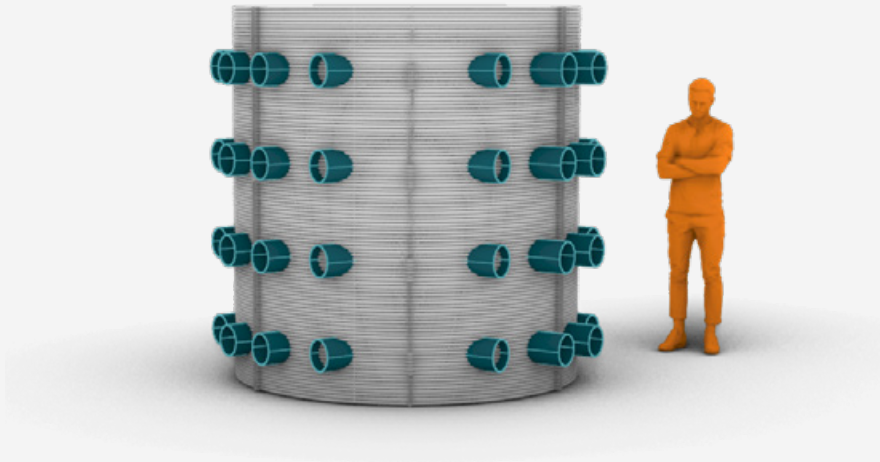
Summary of the deployment  
By Henry Unterreiner, Head of engineering

## 2. DESIGN & ENGINEERING





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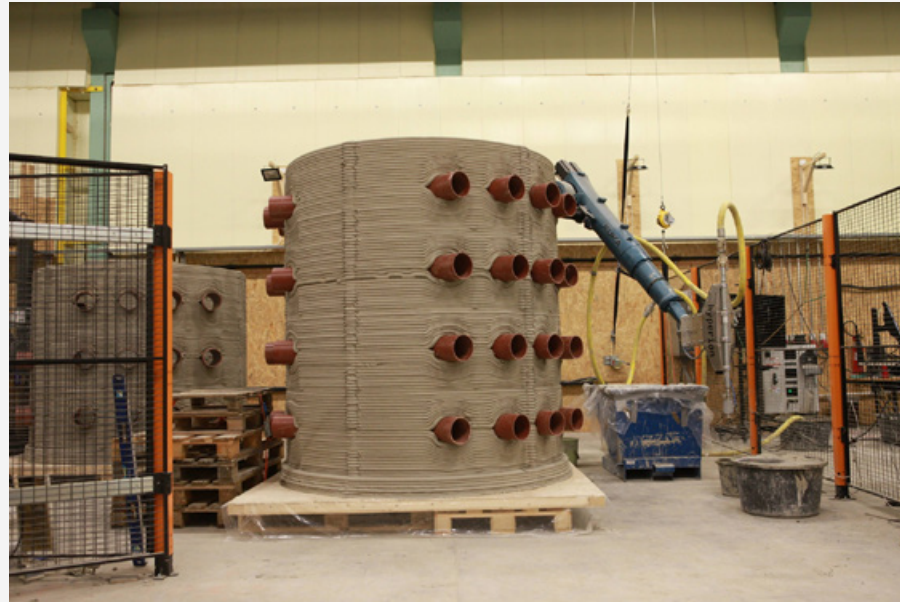


Hand calculations and FEM analysis ,EN 1990 and EN 1992

### 3. PRODUCTION - Printing



2 drawpits being manufactured by Hyperion's robotic arm.



2 drawpits completed and awaiting final placement of rebar and cast infill

perion



hyperio



## 4. SHIPMENT



Driver of the crane positioning the drawpits near the flatbed truck



View from the top of the lifting arrangement.



The lifting operation was performed outside of Hyperion's facility

# 5. DELIVERY

All of MMB's team was both excited and pleased to witness the delivery of the first drawpits ever printed in the world.



MMB's team inspecting the drawpits



Lifting of the drawpits out of the truck which came from Finland

## 6. INSTALLATION ON SITE

The drawpits were lifted in position in november once the excavation and temporary works was performed.

Electrical and Data cables were ran through the drawpits and the pipes were sealed.





# YORKSHIRE WATER

## Esholt Water Treatment Works

**3D printed drawpits delivery**

22 September 2023



**MMB**  
MOTT MACDONALD  
BENTLEY



# PAD FOUNDATION USE-CASE



# OPTIMIZED PAD FOUNDATION



Compared to traditional mass concrete foundations, this foundation has 2 main material benefits:

- It **utilises only 25%** of the typical amount of material
- It **saves up to 80%** of excavated material removal from site







# 3D PRINTING PRODUCTION



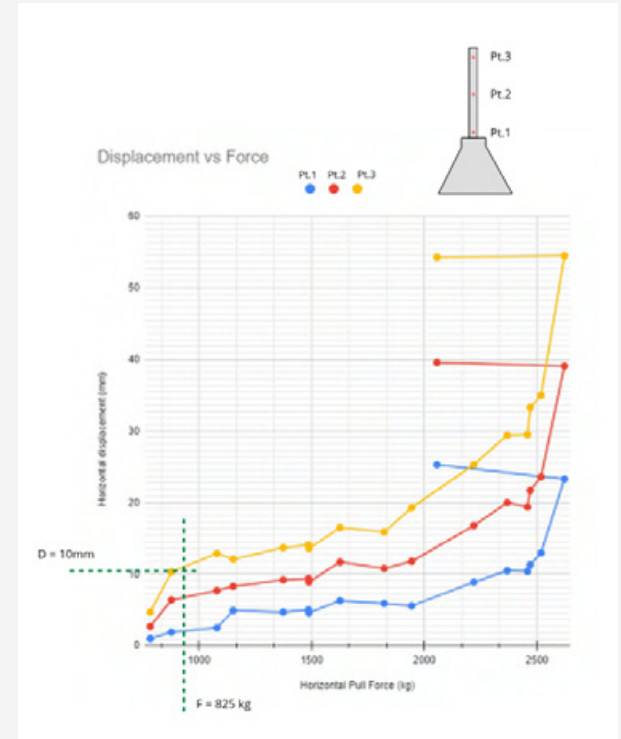


# HYPERION CONSTRUCTION APPLICATIONS



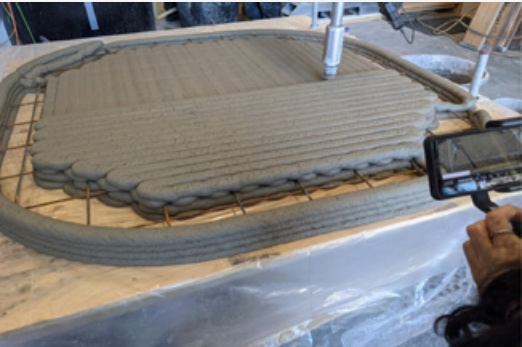
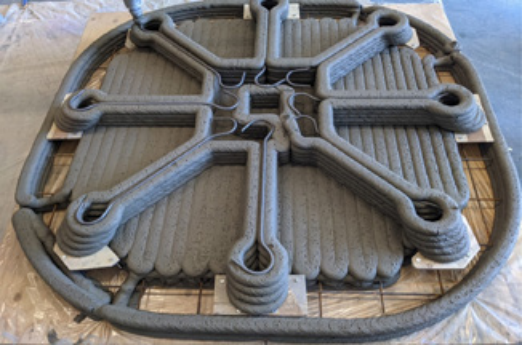


# FULL SCALE TESTING

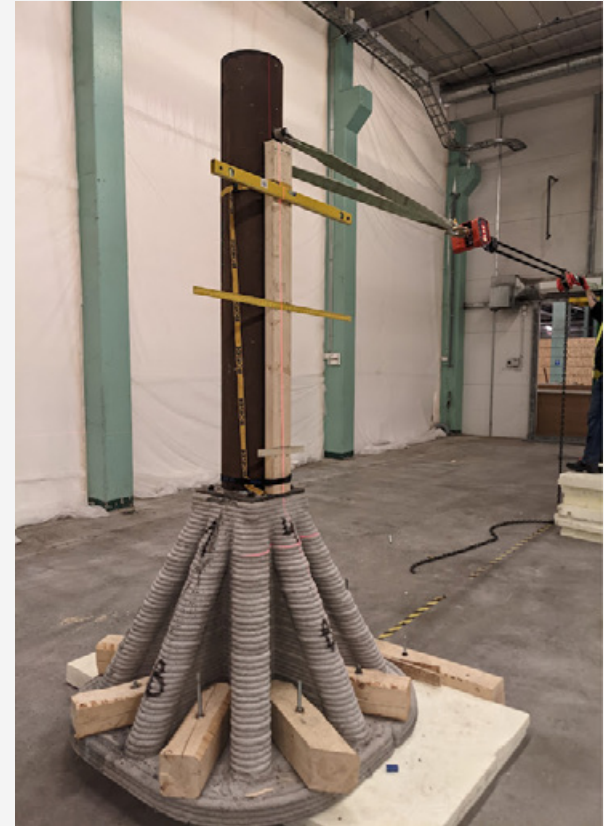
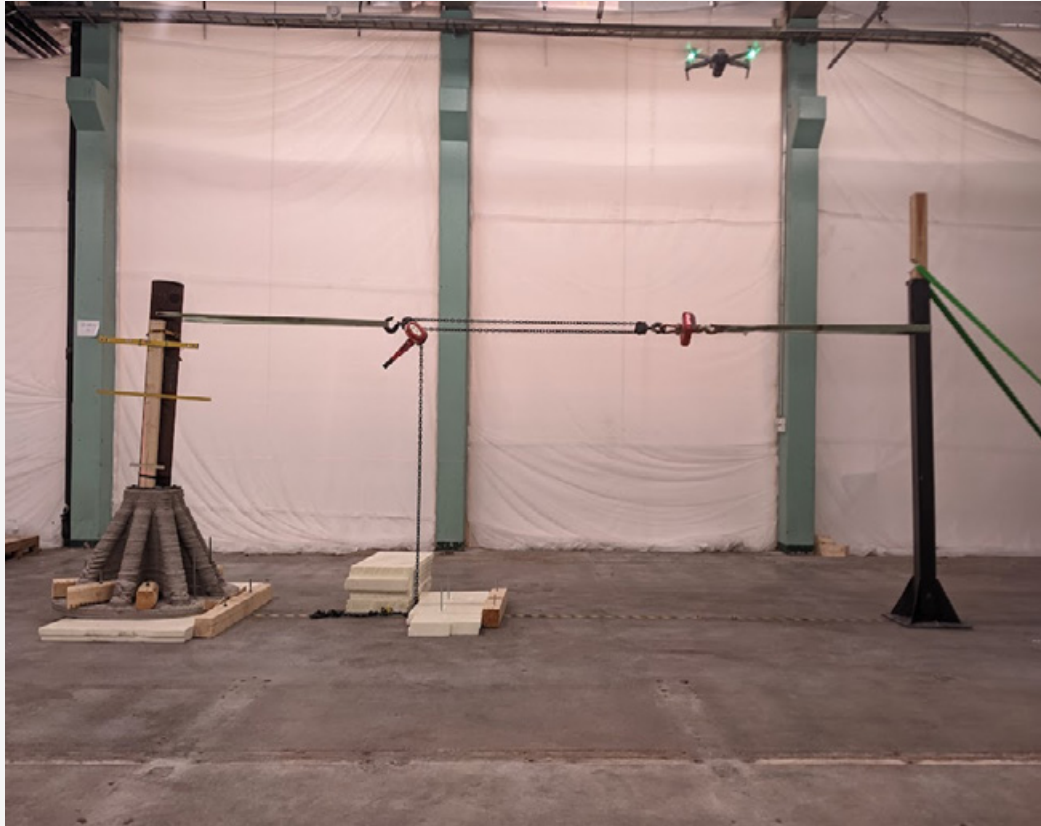


Both tests resulted in a **factor of safety of 3x** which correlated with the calculations

# OPTIMIZED FOUNDATION V2



# FULL SCALE TESTING







hyperion  
robotics

LET'S  
3D PRINT  
A SUSTAINABLE  
FUTURE TOGETHER

[contact@hyperionrobotics.com](mailto:contact@hyperionrobotics.com)

hyperion  
robotics