

**joint post graduation
course on industry
4.0**

Enna Rane

Consair

- **Founded 2012**
 - **Design Factory based**
 - **First product 2015**
 - **2nd product version 2019**
 - **6-8 employees**
 - **350 k€ revenue/2019**
- 

CAMU D2 product is our entry point to the market

- **CAMU D2 is a source extraction workstation for dust control of dry mix blending**
- **CAMU D2 captures 99 % of the dust from dry mix blending the moment it is created**
- **CAMU protects the worker from the hazards of dust**
- **CAMU keeps the construction site and the completed building clean**
- **With dust in control, the drying time of concrete is not prolonged**



The background is a dark, high-contrast photograph of a construction site. On the left, a large tower crane is visible, its lattice structure extending upwards. In the center and right, several vertical rebar structures are under construction. In the foreground on the right, the silhouettes of two construction workers wearing hard hats are visible; one is pointing towards the left. The overall scene is dimly lit, with a cloudy sky in the background.

Consair

**Solving a 60 B€ problem for
the construction industry.**

**Why a 10 trillion € industry
cannot increase its
productivity?**

“Silica dust is the new asbestos”

Australasian Mine Safety Journal, July 24, 2018

“Dust management is a mandatory requirement in modern construction workflow”

A happy Consair customer



The construction industry has a major problem:

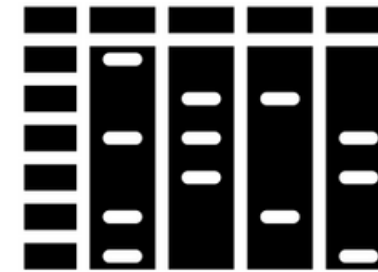
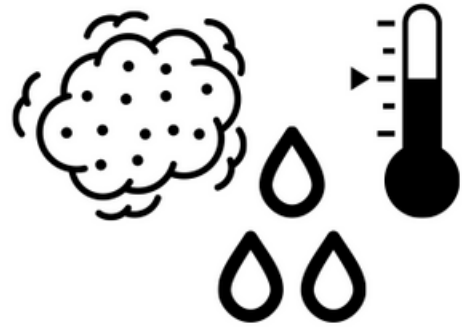
DUST

It is a

quality

as well as a **health issue**

Production time scheduling needs huge safety margins between tasks due to dust and moisture



Dust and humidity prevent progress of work: concrete does not dry quickly, painting work is slowed down due to dust etc.

Missing production environment data brings lots of uncertainty and unpredictability...

...which needs to be considered in production schedules.

This leads to astonishing rises in project cost.

**An average fixed cost for running a construction site for a day is 7 500 €*.
 The average sum of added schedule margins is 42 days.
 Conservative estimation of aggregated global cost is 60 B€.**

*source: customer data

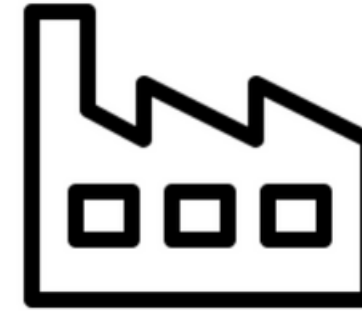
Solution: factory-like construction environment



Collect the environmental data with sensors



Understand the conditions in real-time



Standardize the production environment with smart devices



End result:
dust and moisture-free environment

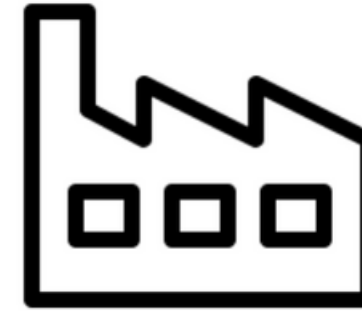
Mission 1



Collect the environmental data with sensors



Understand the conditions in real-time



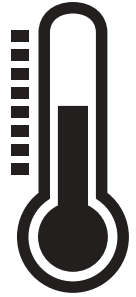
Standardize the production environment with smart devices



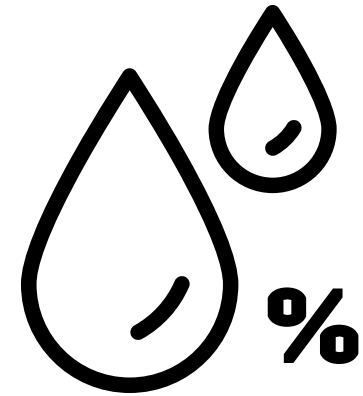
End result:
dust and moisture-free environment

Challenge for you:

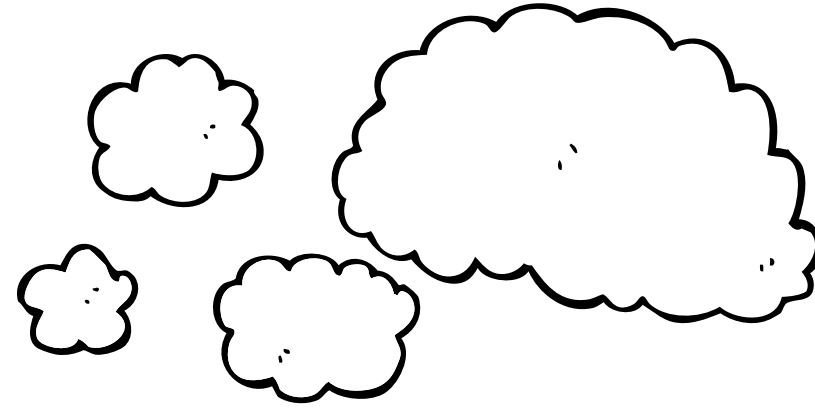
Design a system for monitoring construction site conditions



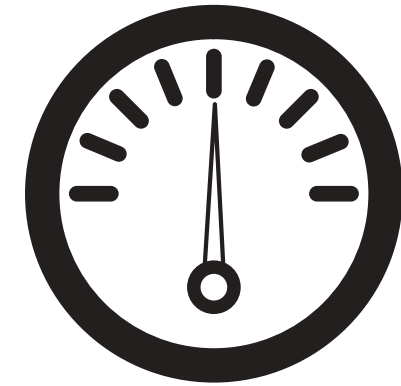
temperature



humidity



dust/particles



**barometric
pressure**

**Examples of environmental
conditions to measure**

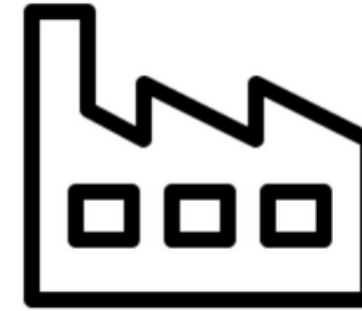
Mission 2



Collect the environmental data with sensors



Understand the conditions in real-time



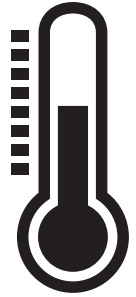
Standardize the production environment with smart devices



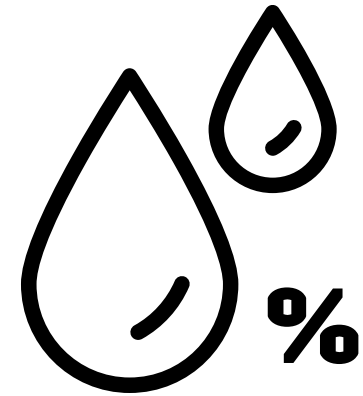
End result:
dust and moisture-free environment

Challenge for you:

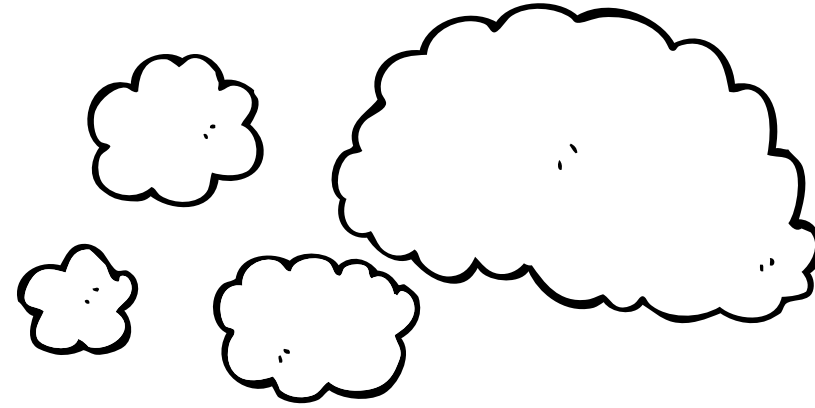
Design a system for maintaining quality construction site conditions



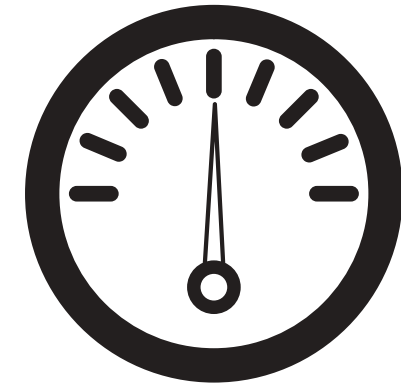
temperature



humidity



dust/particles



**barometric
pressure**

**Examples of environmental
conditions to block**

A few challenges...

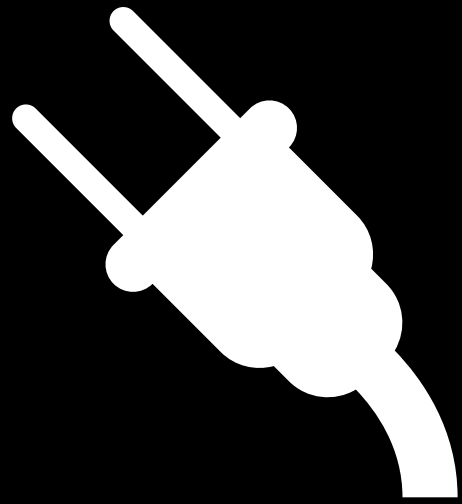


A photograph of a construction site. In the foreground, a large, dark, cylindrical bucket filled with concrete sits on a metal stand. To its right, a red bucket is placed on a metal chair. The floor is covered in dust and debris. In the background, a wheelbarrow and other construction materials are visible. A white text box with the words "Harsh conditions" is overlaid at the bottom of the image.

Harsh conditions

Various stakeholders

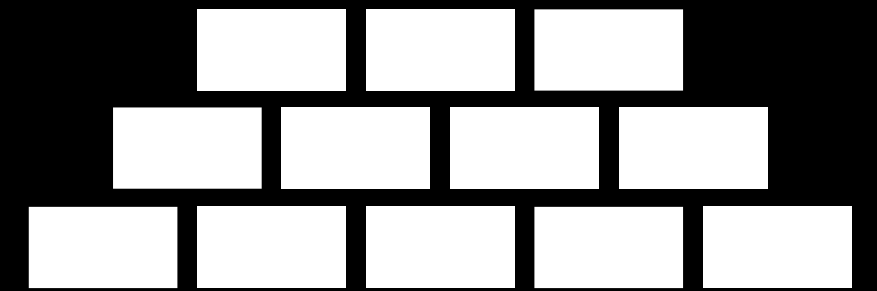




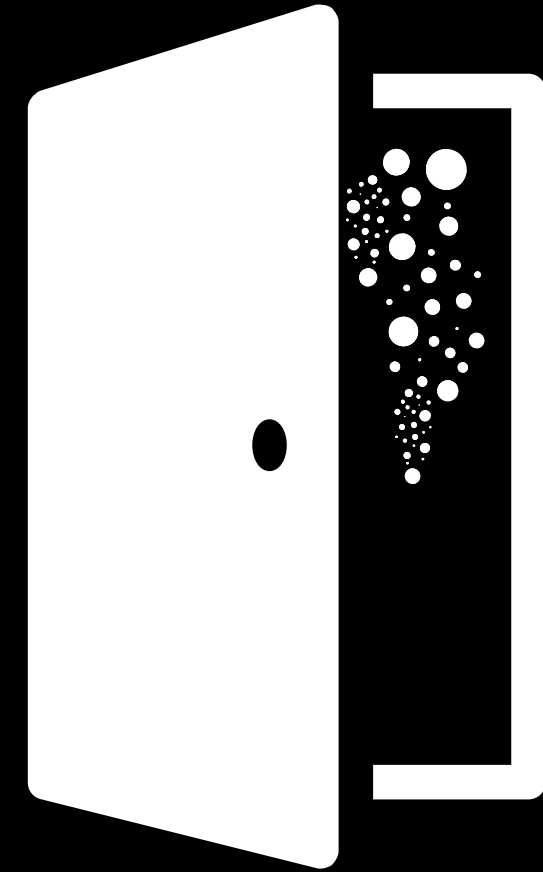
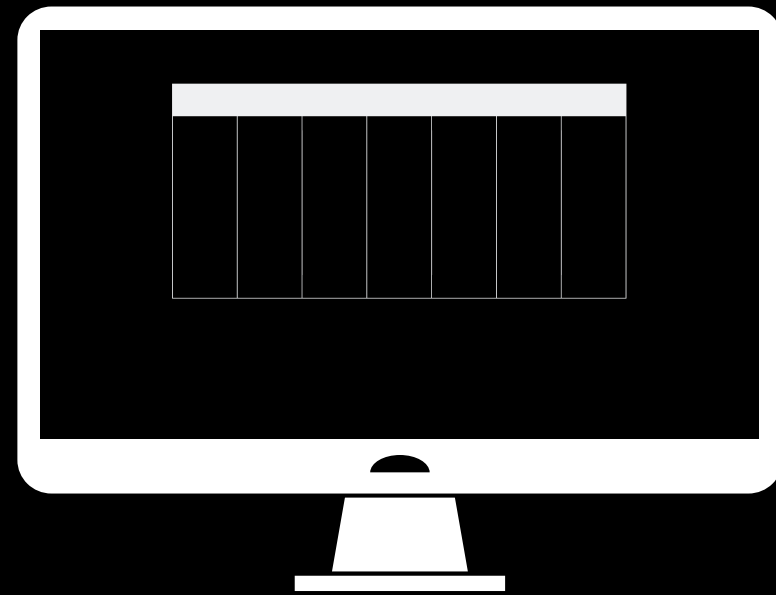
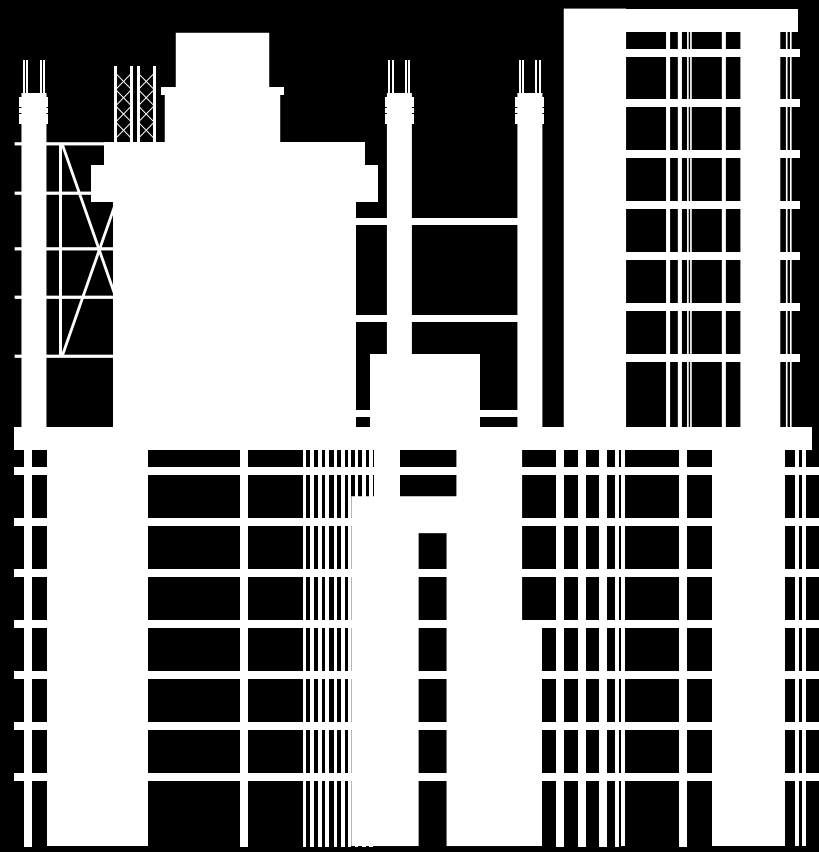
**Lack of building
technology
(electricity, connections)**



**Thick concrete walls,
electromagnetic sources of
interference**



**Environment is constantly
changing**



**Site monitoring requires many
monitoring devices...**

**and access to workers might mean
access to dust and humidity**

1. Design a system for monitoring construction site conditions

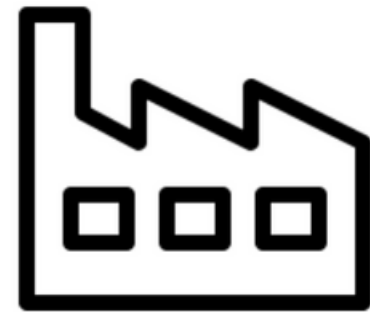


Collect the environmental
data with sensors



Understand the conditions
in real-time

2. Design a system for maintaining quality construction site conditions



Standardize the
production environment
with smart devices



End result:
dust and moisture-free
environment