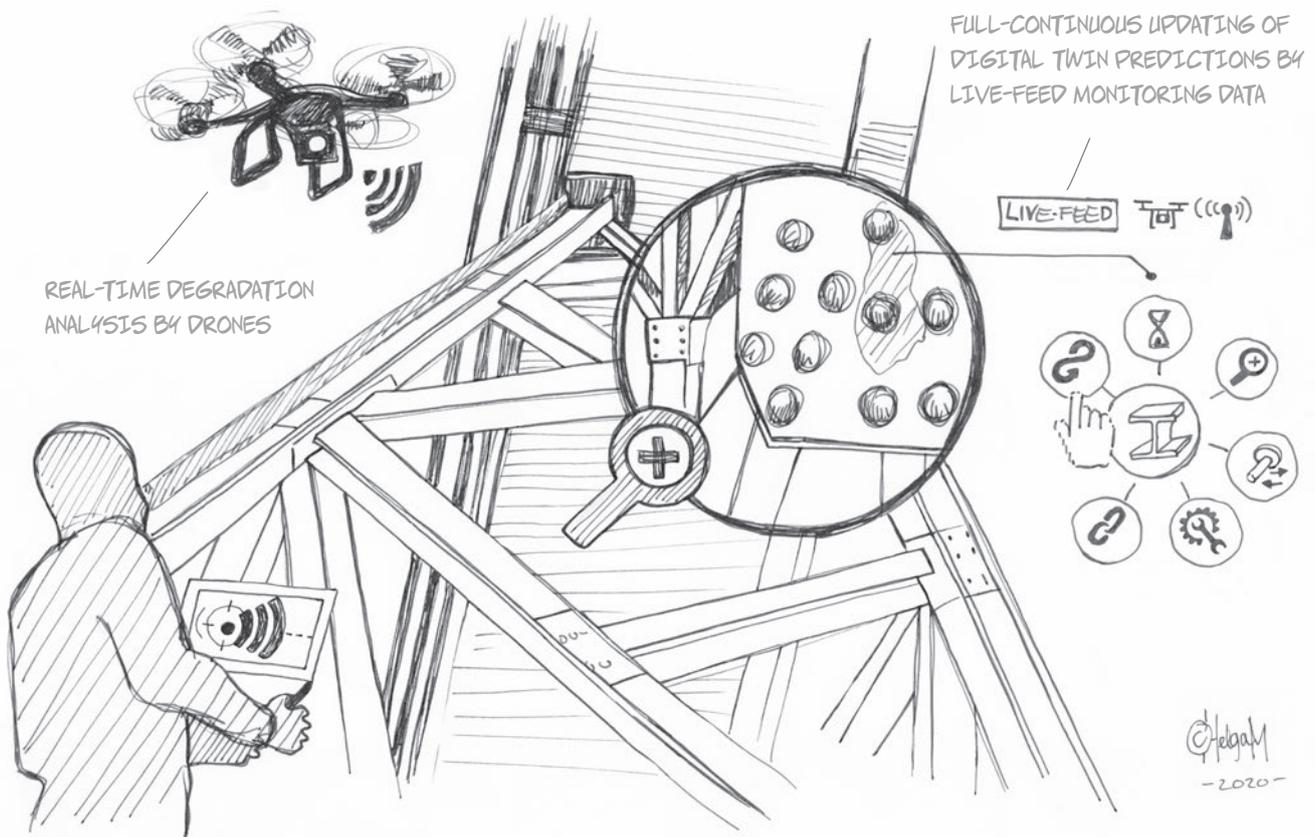


Reduce & Reuse primary material

Innovative health monitoring methods to boost the durability of steel infrastructure



The collapse of the Morandi bridge is an example of catastrophic failure caused by metal fatigue and corrosion. In succession, a number of highway bridges in the Netherlands needed immediate repair. Research shows that a major part of our steel infrastructures, in particular bridges, are facing safety issues due to aging and deferred maintenance. Replacement by complete new structures from primary material is in many cases unnecessary. A better option is to improve the durability of existing steel infrastructure by accurate health monitoring and being able to predict future maintenance cycles.

‘A 50% reduction of primary material usage’

To increase the lifespan and durability of steel infrastructures the project partners will develop new methods for monitoring, health analysis and a maintenance strategy. The central approach is to develop innovative Digital Twins (DT): accurate virtual models of the objects for Structural Health Monitoring (SHM) and maintenance of both the steel structures and their components. Pairing of the virtual and physical objects allows in-depth data analysis and monitoring to prevent future problems before they even occur. One of the key novelties is to achieve a full-continuous updating of the Digital Twin predictions by processing large streams of live-feed monitoring data.

Reduce and Reuse

Main project targets: a 50% reduction of primary material usage and CO₂-emissions for the steel structures in our 2030 infrastructure, by:

- Doubling the service life of structures, significantly improving their sustainable, financial and socioeconomic use.
- Enabling the reuse of at least 50% of all steel parts of depleted infrastructures.

Innovative and multidisciplinary approach

Digital Twin advancements will go hand in hand with the development of new monitoring tools, such as real-time degradation analysis enabled by drones, technology for in-situ curing and preventing degradation, and new business models for the reuse of components. To achieve all this the consortium is formed throughout the innovation chain of steel construction. The project will also focus on changing the present stigma from ‘new is better’ to a longer use of infrastructure, which implies demonstrating for relevant stakeholders the urgent need of extending the lifetime of infrastructural assets and investigating what is required to improve the public awareness.

Quick Facts

Project title	Innovative health monitoring for circular steel infrastructure
Social theme	Climate and Circular Economy
Project partners	Eindhoven University of Technology - Department of the Built Environment; Aluminium Structures Dutch Drone Company Materials innovation institute (M2i) TNO - Buildings, Infrastructure & Maritime

HiTMaT

The HiTMaT Call (Connecting High Tech pps in Maatschappelijke Thema's) is an incentive programme of Top Sector HTSM to stimulate high tech innovation, highlight the importance of innovation in addressing social themes and mission, and inspire consortia to develop promising high tech solutions in pps research programmes.