

Ispezioni Visuali Digitali & Manutenzione Predittiva

SAIE | Arena Infrastrutture | 10 ottobre 2024

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VISION

SUPPORTING CIVIL ENGINEERS IN CIVIL ASSET MANAGEMENT

Thousands of bridges
to Inspect

Thousands of Images
Analyze

Maintenance priorities
to Define

Financial Plan
to Manage



KnowCE uses **(drone) images** and **A.I.** to implement concrete “symptom screening” to focus civil engineers’ attention on the most critical symptoms to speed up and optimize the treatment plan.

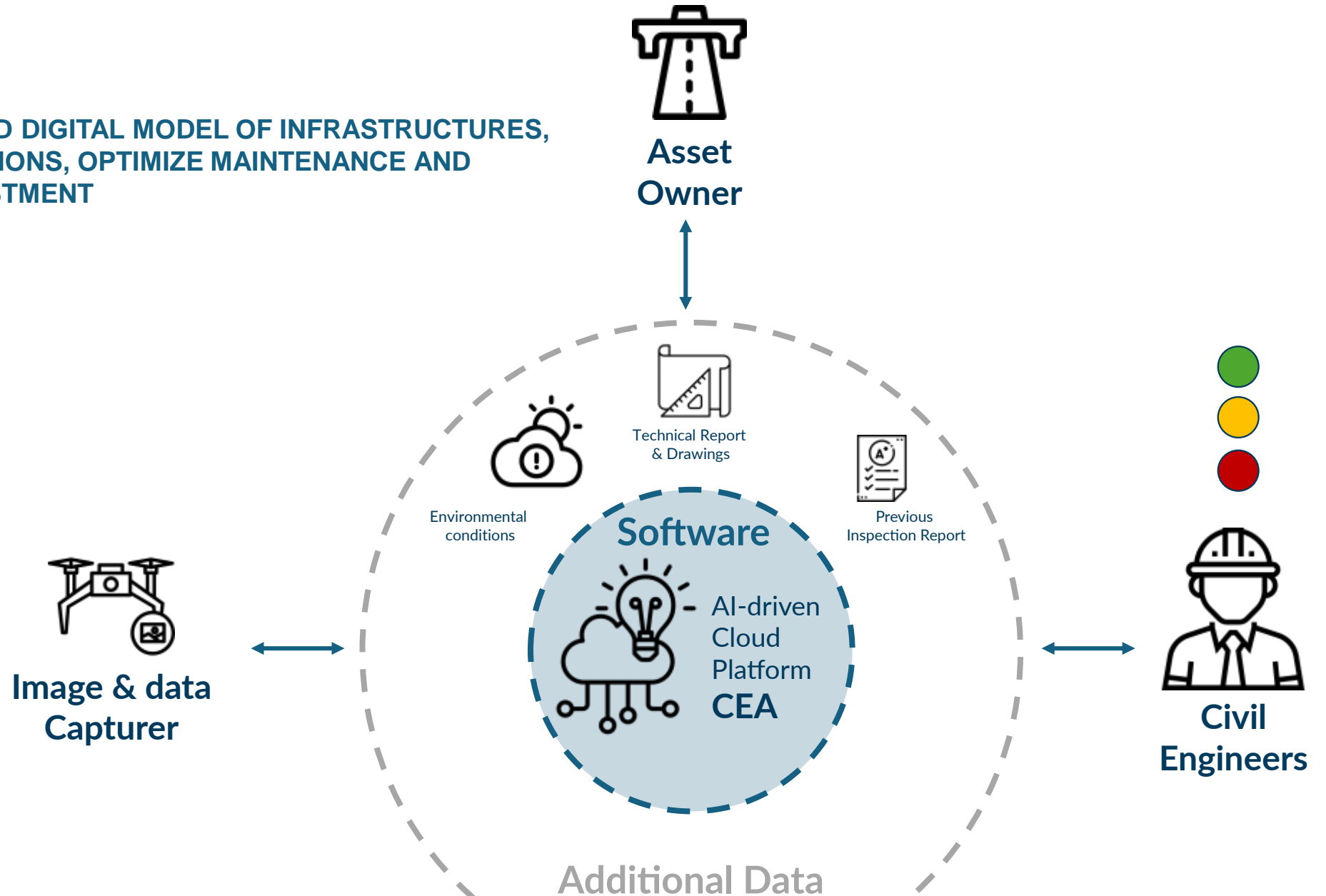
Software



AI-driven
Cloud
Platform
CEA

MISSION

DEVELOP DATA-ENHANCED DIGITAL MODEL OF INFRASTRUCTURES,
TO ASSESS THEIR CONDITIONS, OPTIMIZE MAINTENANCE AND
PRIORITIZE FUTURE INVESTMENT




PILOT PROJECTS and PARTNERS

AN ALREADY GROWN ECOSYSTEM OF IMAGES PROVIDERS, ENGINEERING FIRMS AND ASSET OWNERS



Bridges

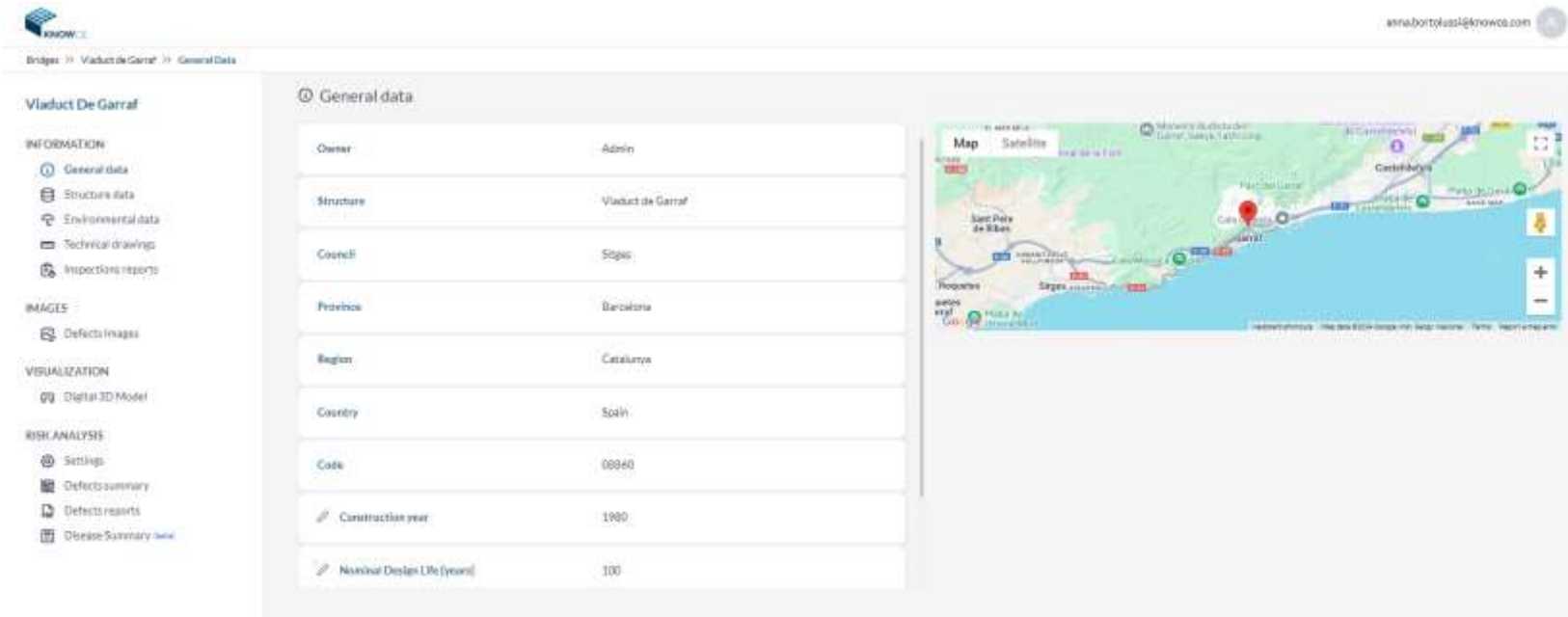


Structure Name	Description	Country	Last Inspection Date	Drone Operator	Next Inspection
Viaduct de Garraf	With Annotation	Spain	06/12/2016	Dronica	06/12/2018
Otto-Hirsch	With Annotation	Germany	15/06/2024	TS	15/06/2025
Viaduct de Rio Clivense - Derecha	With Annotation	Spain	22/03/2024	Dronica	22/03/2025
Viaduct de Valcarlos	With Annotation	Spain	22/07/2024	Dronica	22/07/2026
Mollano Bridge Sud	With Annotation	Italy	02/11/2023	Archetipo	26/09/2024

THE SERVICE

CEA is a service tool always available to immediately check which bridges are monitored with frequent visual inspections, to check their defects and relative root analysis.

CEA provide a DIGITAL library updated-along-time.



THE PROPOSAL

Flexibility

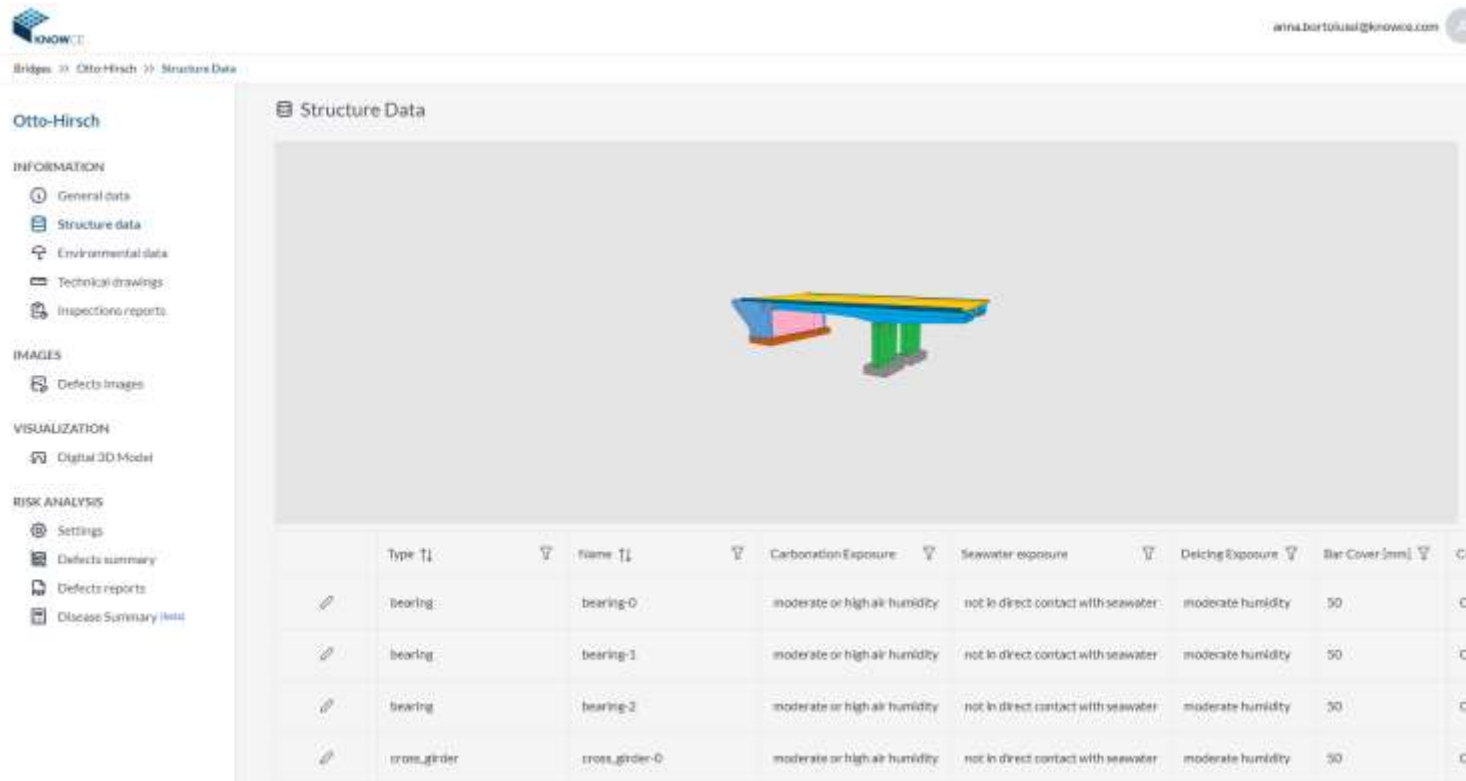
Innovation

Digitalization

Sustainability

DIGITAL TWIN

Digital library of the structure, including design report and drawings, the BIM simplified model, past and present inspection reports, weather conditions in the last 60 years, 3D photogrammetric model and set of images of the structure with 3D positioning



THE PROPOSAL

Flexibility

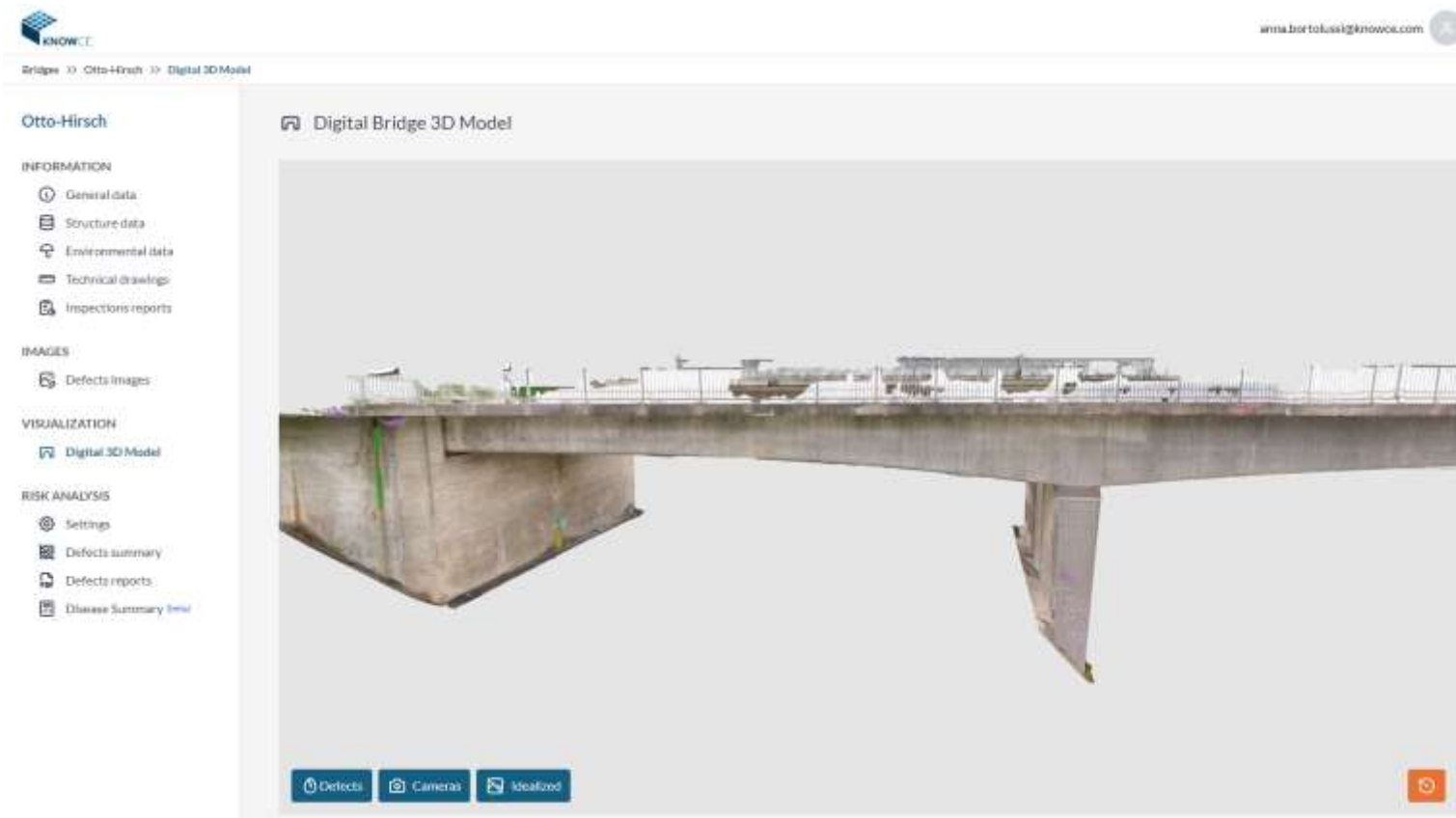
Innovation

Digitalization

Sustainability

DIGITAL INSPECTION

Defects identification and positioning within the 3D model through proprietary AI algorithm and collection of pictures used for the defects analysis and with the final defect report.



THE PROPOSAL

Flexibility

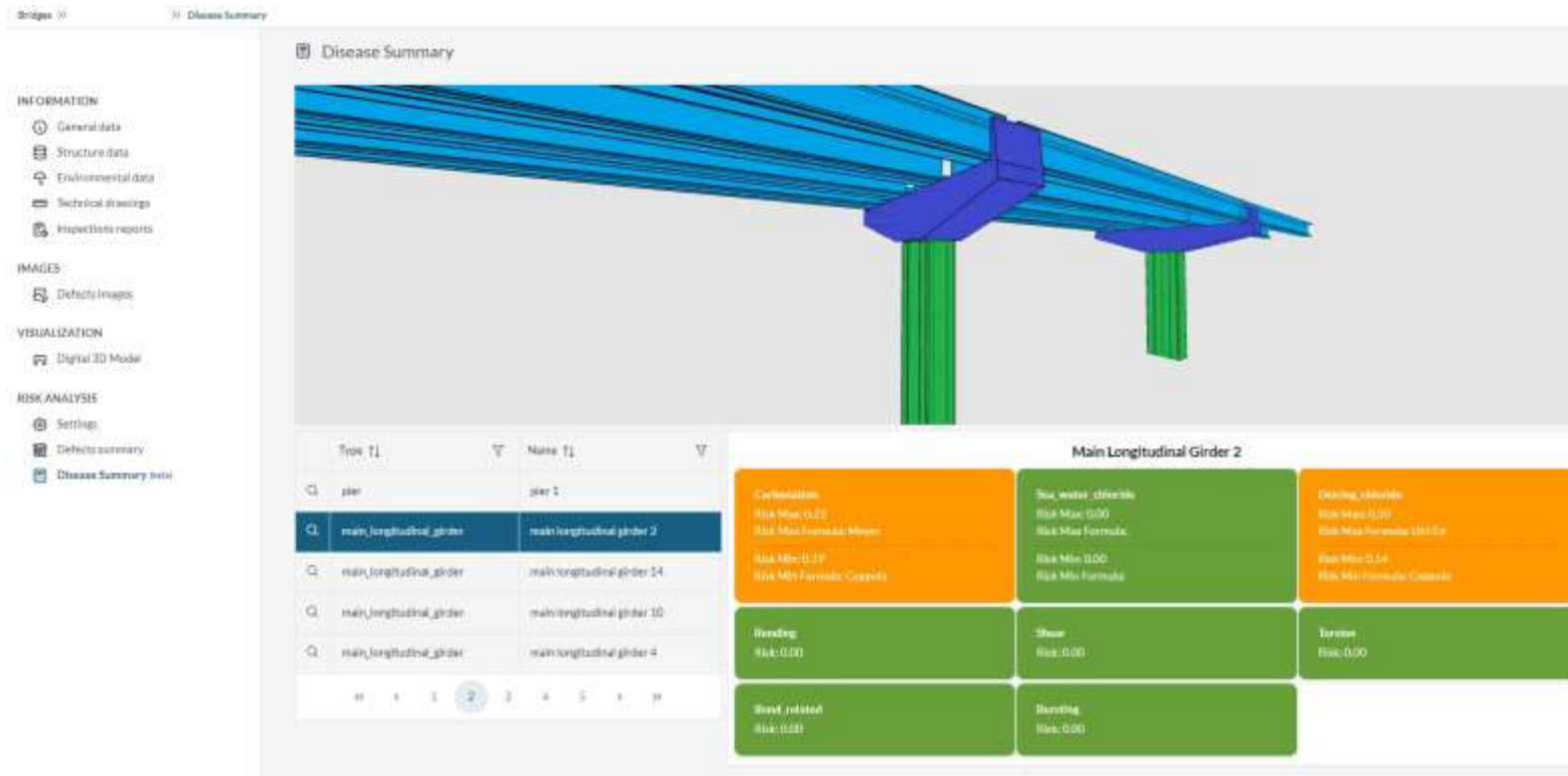
Innovation

Digitalization

Sustainability

DIGITAL ASSESSMENT

Structural assessment of each defect, with risk classification for engineering review, developed using the most known and agreed international standards and formulas about concrete ageing, damaging and danger/risk.



The screenshot displays a software interface for 'Disease Summary'. On the left, there is a navigation menu with categories: INFORMATION (General data, Structure data, Environmental data, Technical drawings, Inspection reports), IMAGES (Defects images), VISUALIZATION (Digital 3D Model), and RISK ANALYSIS (Settings, Defects summary, Disease Summary level). The main area shows a 3D model of a bridge structure with blue girders and green piers. Below the model is a table with columns for 'Type', 'Name', and a grid of risk analysis data for 'Main Longitudinal Girder 2'.

Type	Name	Main Longitudinal Girder 2		
Q	girder	girder 1		
Q	main_longitudinal_girder	main_longitudinal_girder 2	Corrosion Risk Max: 0.22 Risk Min Formula: Mean	Risk Max: 0.00 Risk Min Formula:
Q	main_longitudinal_girder	main_longitudinal_girder 14	Risk Max: 0.17 Risk Min Formula: Concrete	Risk Max Formula: 0.01 2x Risk Min: 0.14 Risk Min Formula: Concrete
Q	main_longitudinal_girder	main_longitudinal_girder 10	Bonding Risk: 0.00	Shear Risk: 0.00
Q	main_longitudinal_girder	main_longitudinal_girder 4		Torsion Risk: 0.00
			Steel related Risk: 0.00	Bursting Risk: 0.00

THE PROPOSAL

Flexibility

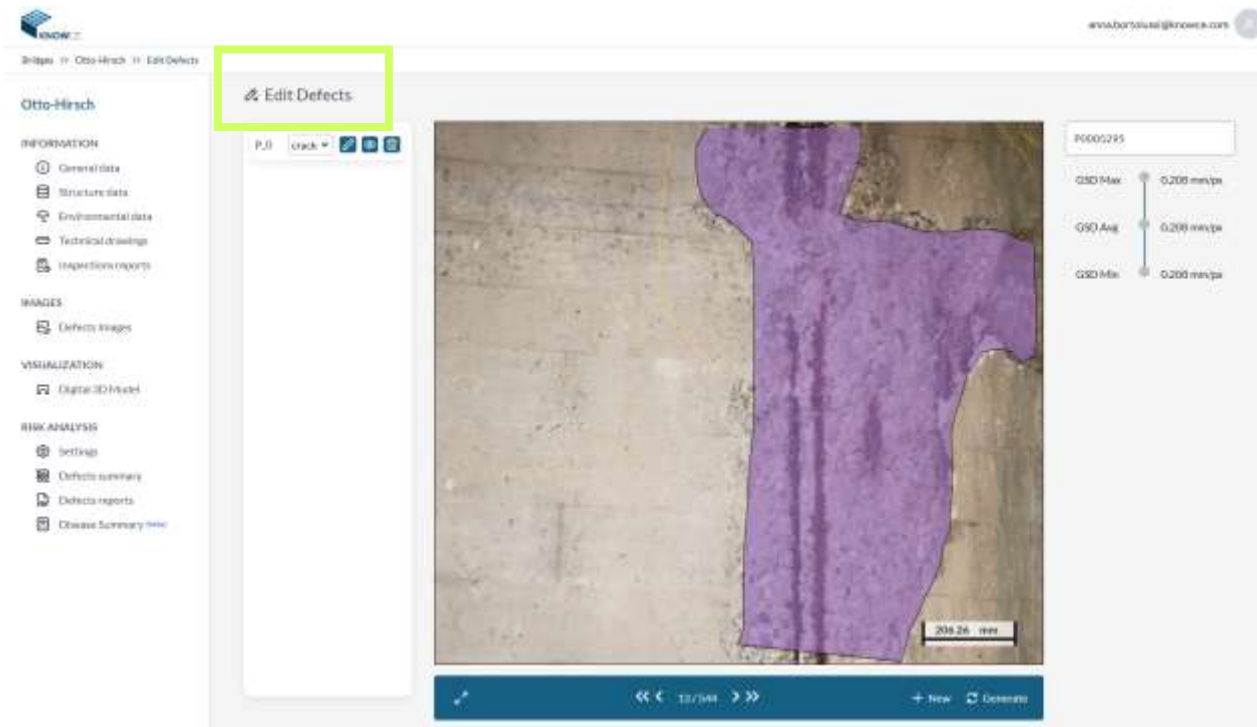
Innovation

Digitalization

Sustainability

THE TOOL

The tool to view structures' data and defects annotation, or (in the "editor mode") to modify and update them.



The proprietary algorithms help users to build the digital history of the structures and to develop a strategic monitoring and maintenance planning.

THE SOFTWARE

Flexibility

Innovation

Digitalization

Sustainability

THE ADVANTAGES

A LONG –VISION WIN WIN PARTNERSHIP



Dashboard for an Immediate Visualization of Infrastructures Risk Status



Defects and Diseases always remotely available for analysis and design check



Summary of risk analysis recommendations for the identified diseases.



Speeding Up of Priority List's editing of Maintenance Operations and related costs



Typological drawing about diseases resolution with suggested technical prescription for materials, operations timing and related costs



Increased Maintenance Operation - [ESG]: increased efficiency of priorities and planning



Increased Maintenance Operation - [ESG]: innovative and durable materials and technologies

Don't make Future waiting

Thank you for your time and attention



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