"Tunnels Reimagined: The Digital Path to Sustainable Renovation"

Introduction

Name:	Sander van Ruijven
COB role:	PL Growth Book Digitalization
	PL Instrumentation
Employer:	Vialis - VolkerWessels
Education:	Electrical Engineering,
	Mechanical Engineering, Maintenance
Contact:	sander.van.ruijven@vialis.nl / 0625446883

Name:	Bram ten Klei
COB role:	Coordinator of the Digitization Program
Employer:	Maasstad Engineers
Education:	Electrical Engineering,
	Maintenance and Asset Management
Contact:	bram.tenklei@cob.nl / 06-27379191

Agenda

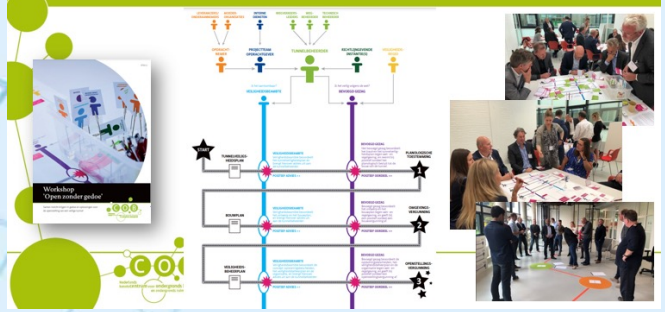
- Introduction COB (Building centre for underground construction)
- Sustainability by Digitalization
- Growth Book Digitalization
- Statements

Intro Digitalizationprogram COB

Goal 1:
Digitalization makes tunnels demonstrably safer in constantly changing conditions.

Actual COB projects related to the digitalizationprogram

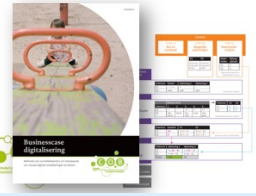
Serious gaming: open without any problems



Business Case Digitalization

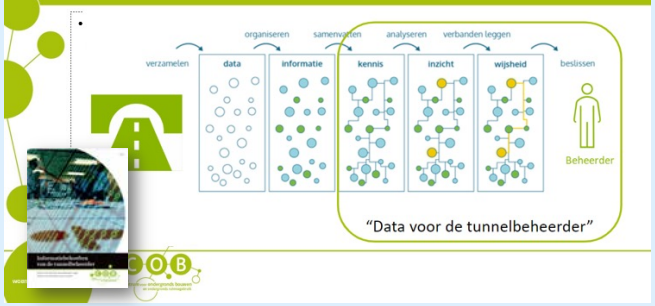
- Doelstelling:

Een generiek toepasbaar besluitondersteunende methode, waarmee een businesscase kan worden opgesteld, om de meerwaarde van nieuwe digitale ontwikkelingen voor tunnelbeheerders te kunnen toetsen.



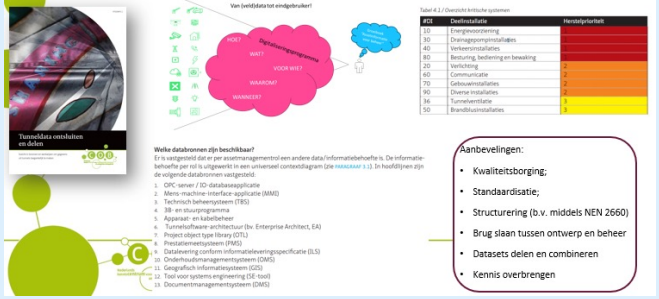
https://www.cob.nl/wp-content/uploads/2022/01/COB_Businesscase-digitalisering_20220126.pdf

Information for tunnel manager

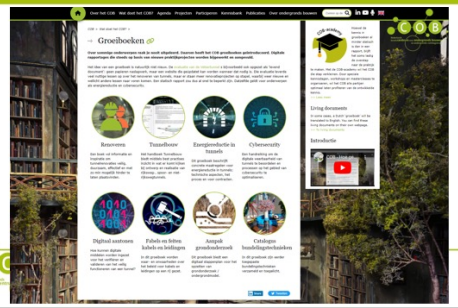


Dashboard for tunnel manager

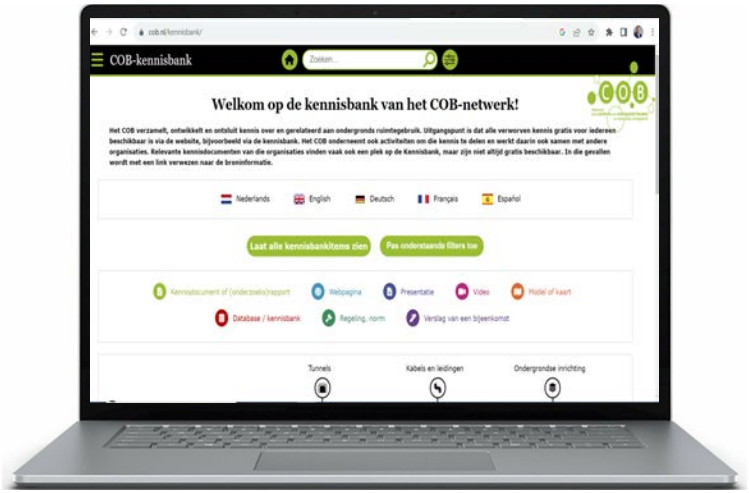
Unlocking and sharing Tunnel Data



Growth books



COB products are available online



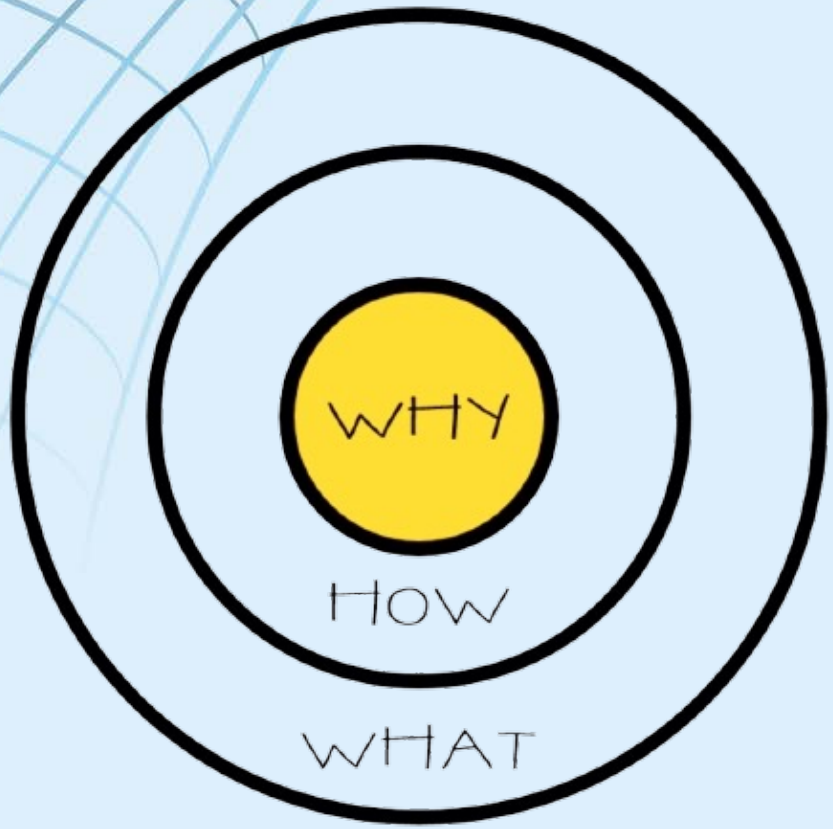
Maatregelencatalogus circulaire tunnels

Circulariteitschallenge tunneltechnische installaties

Voor de (door)ontwikkeling van maatregelen voor in de Maatregelencatalogus circulaire tunnels is het COB-netwerk op zoek naar input vanuit de markt. Om tot een inventarisatie van circulariteitsmaatregelen te komen is de Circulariteitchallenge tunneltechnische installaties bedacht. Marktpartijen worden hierin uitgedaagd om maatregelen in te sturen.

Hoe werk je circulair in de aanleg en renovatie van tunnels? Met name over hoe installaties circulair benaderd moeten worden is nog weinig inzichtelijk. In het werkpakket Circulariteit werkt het COB-netwerk aan een Maatregelencatalogus circulaire tunnels. Hierin staan maatregelen die behulpzaam zijn bij hergebruik.

The Why, How and What behind Enabling Sustainability by Digitalization



WHY?

- Increased complexity (renovation) projects
- Increased amount of data (incoming and outgoing)
- Aging population knowledge carriers
- Shortage on Qualified technical people
- V&R-challenge, Energy Transition, Sustainability, CO2 / Nitrogen, Building Quality Assurance Act (WkB)
- Rapidly changing technology
- Increasing (and changing) expectations

HOW?

- Digitization / Digitalization / Digital Transformation
- Move from project thinking to Lifecycle thinking
- Semantic technology
- Achieving Interoperability
- Data Integration
- Training and Skill Development (people)
- Data-optimization / Data Appreciation / Data-cleaning

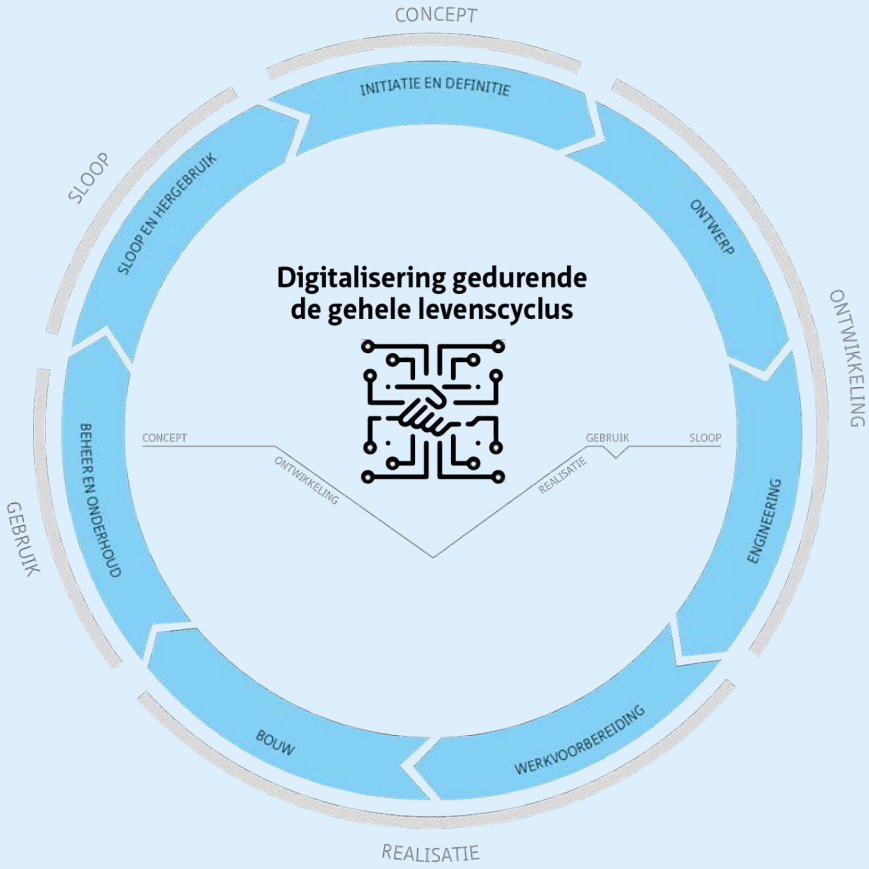
WHAT?

- Digital Twin Technology
- Advanced Sensor Technology
- Use of BIM (Building Information Modeling)
- Automation and Robotics
- AI and Machine Learning
- Training and Education
- Adopting and implementing of open information modelling standards like the NEN2660

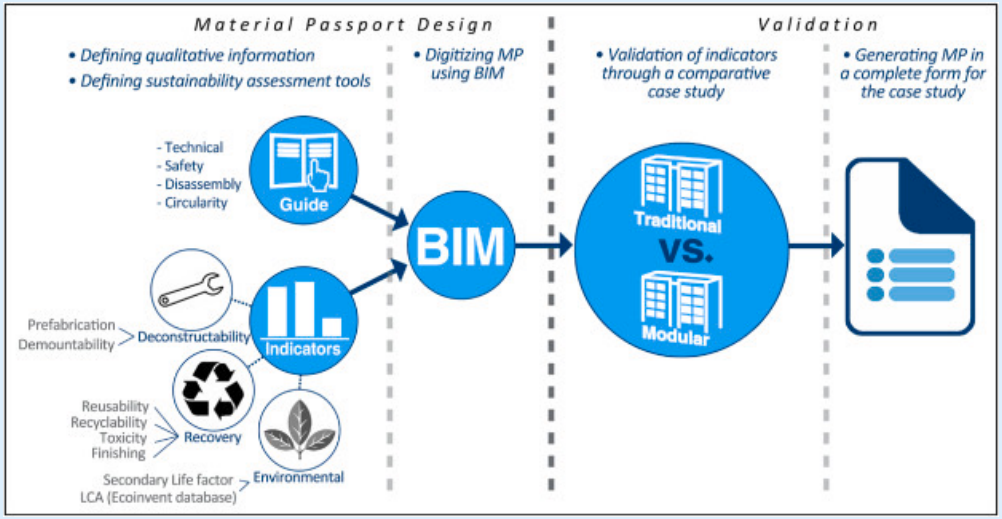
Growth Book Digitalization (COB)

Nederlands kenniscentrum voor ondergronds bouwen en ondergronds ruimtegebruik

The Digitalization Growth Book is designed to offer guidance on digital solutions throughout the different phases of a tunnel's lifecycle, catering to the COB network and beyond. It emphasizes the importance of interoperability and circular construction principles, aiming to enhance understanding and structure around the digitalization of project lifecycles.



Deep dive: Material pasport



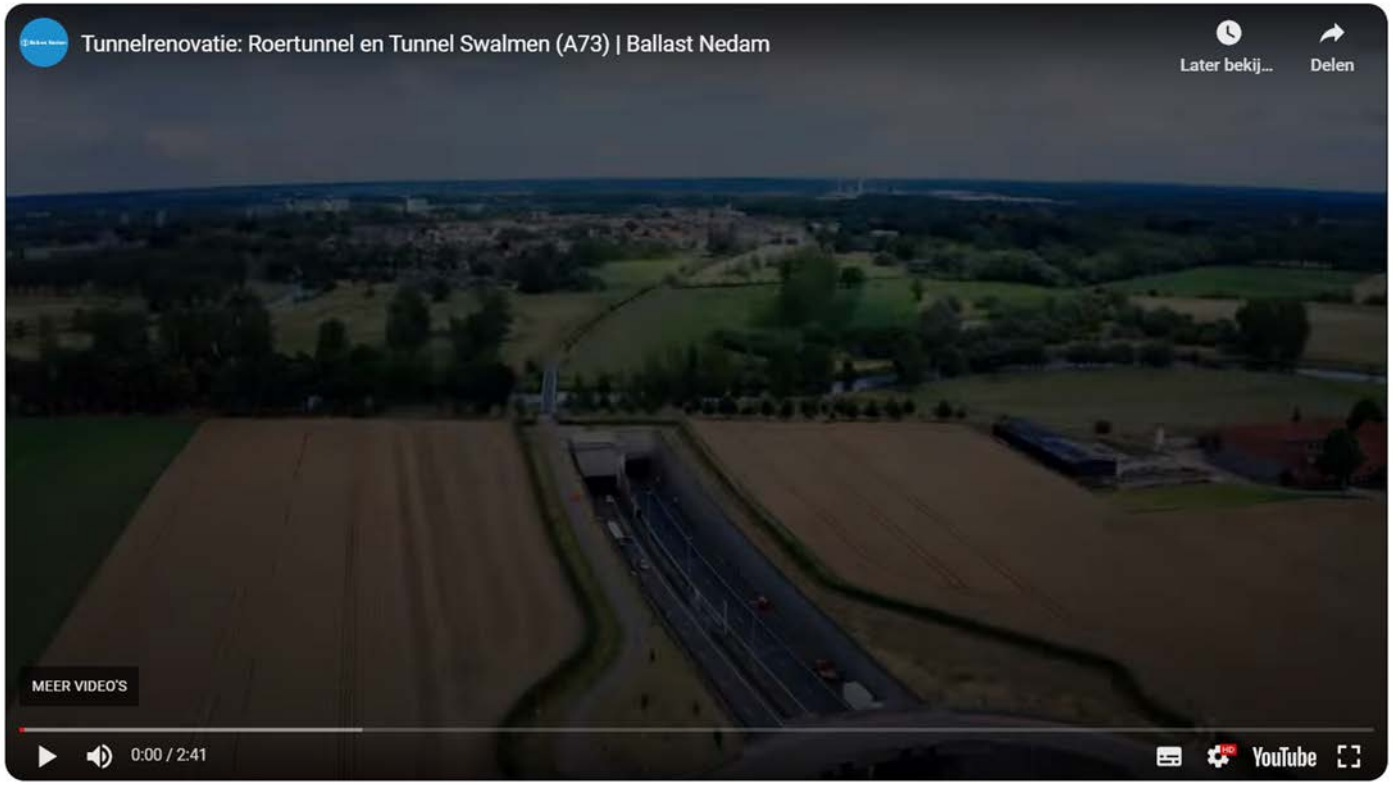
Material pasport at VolkerWessels Energy

From building new to renovation

Rijkswaterstaat
Ministerie van Infrastructuur en Waterstaat

- Comprehensive plan for national infrastructure refurbishment
- Includes roads, bridges, tunnels, and waterways
- Ensures safety, sustainability, and future adaptability
- Integrates advanced digitalization
- Applies circular economy principles
- Aims to prolong lifespan and efficiency of vital assets

Renovation A73 Swalmen tunnel (Filmpje)



Statement 1:

"Digitalization increases the initial costs of tunnel renovation projects, but reduces long-term expenses through more efficient maintenance and management."

Statement 2:

"Digitalization in tunnel renovation will significantly enhances the efficiency and accuracy of the design process, by utilizing 3D modeling and simulations."

Statement 3:

"Artificial intelligence (AI) will be very important for the big renovation project because it will help overcome the lack of data quality and will help the project uses resources in the most efficient way."

Statement 4:

"Accurately maintaining data within the civil sector forms the backbone for realizing sustainable developments (such as creating materials passports), which are essential for circular economy initiatives."

Statement 5:

"Sustainability is more than just a concept or a department within an organization; it's an integral part of the corporate culture and way of life. To consistently stay two steps ahead, the belief of every individual in the organization is essential."

Great information for reference

- https://youtu.be/CzzLfBsD_3Q?si=szjAopWinxiqMtrV