



"Tunnels Reimagined: The Digital Path to Sustainable Renovation"

Introduction



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Agenda

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

Intro Digitalizationprogram COB



Actual COB projects related to the digitalization program

Serious gaming: open without any problems

Workshop 'Open zonder enkel'

The slide shows a workshop titled "Workshop 'Open zonder enkel'" with a photo of participants around a table. To the right is a complex project flowchart with multiple paths and decision points, illustrating the "serious gaming" process.

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.

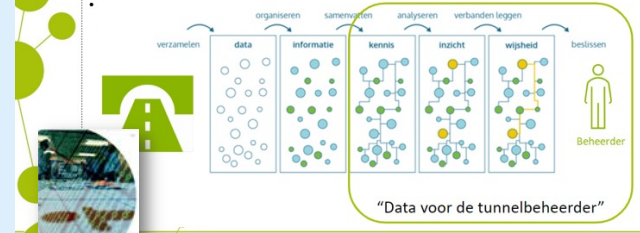
Businesscase digitalisering

The slide features a presentation slide titled "Businesscase digitalisering" showing a tunnel cross-section. Next to it is a screenshot of a software interface for business case analysis.



https://www.cob.nl/wp-content/uploads/2022/01/CCE_Businesscase-digitalisering_20220226.pdf

Information for tunnel manager



Dashboard for tunnel manager

Hoe ziet het ideale dashboard van de beheerder er uit?

The slide shows a conceptual diagram of an ideal dashboard for a tunnel manager, divided into three levels: "Bouwen en programmeren", "Beheren en uitvoeren", and "Bouwen en programmeren". It also includes a screenshot of a dashboard with various charts and data points.

Unlocking and sharing Tunnel Data

Diagram illustrating the process of unlocking and sharing tunnel data, showing the flow from 'Van bestaande data' to 'Wet' and 'Wijze'.

Van bestaande data ontgrendelen!

Wet: Digitaal toegankelijk
Wijze: Inzicht

Wijke datavormen zijn beschikbaar?

Er is nog geen idee of per systeemmanagement een andere data/informatiebeheer is. De informatiebeheer per net is uitgewerkt in een universeel contextdiagram (zie HANNAAR 1.3). In hoofdlijnen zijn de volgende datavormen ontgrendeld:

1. OPC server / I/O-databaseapplicatie
2. Metri-machine interface applicatie (MMI)
3. Technisch beheersysteem (TSS)
4. 3D-en stuurprogramma
5. Apparaat- en labelbeheer
6. Tunnelsoftware-architectuur (bv. Enterprise Architect, EA)
7. Project object type library (OTL)
8. Prestatiemetingstool (PMS)
9. Dataleerplatform informatielevenscyclus (ILS)
10. Onderhoudsmanagementstool (OMS)
11. Geografisch informatiesysteem (GIS)
12. Tool voor systeem engineering (SE-tool)
13. Documentmanagementsysteem (DMS)

Aanbevelingen:

- Kwaliteitsborging;
- Standaardisatie;
- Structureren (b.v. middels NEN 2660)
- Brug slaan tussen ontwerp en beheer
- Datasets delen en combineren
- Kennis overbrengen

Growth books

The slide shows a screenshot of a "Growth books" interface, displaying various icons and text related to growth and development.

COB products are available online



→ Maatregelencatalogus circulaire tunnels

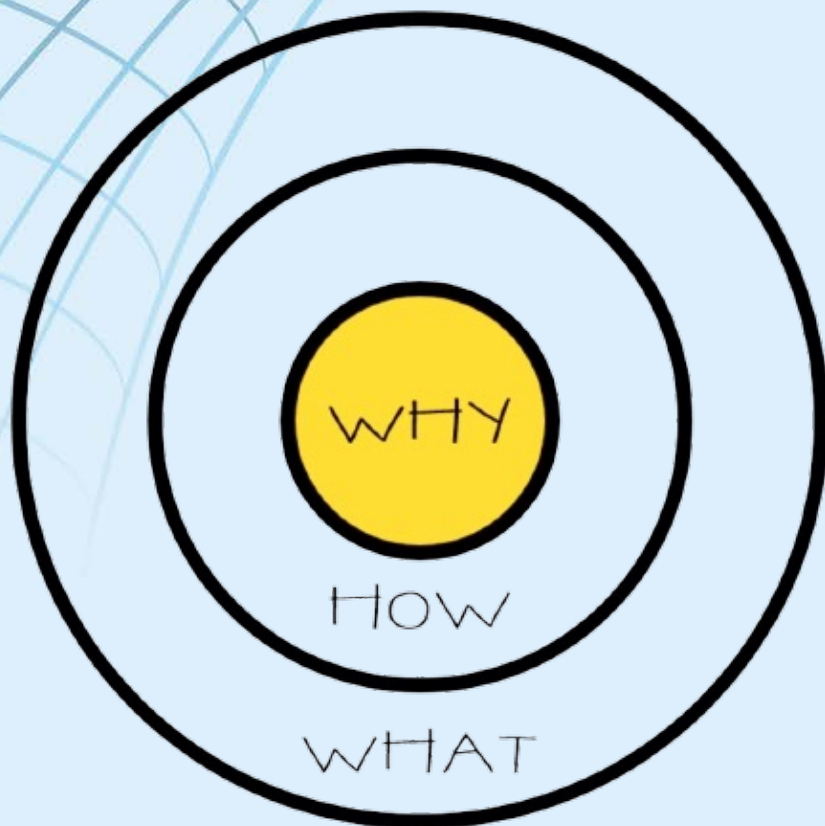
→ Circulariteitschallenge tunneltechnische installaties

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 **Circulariteitschallenge 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



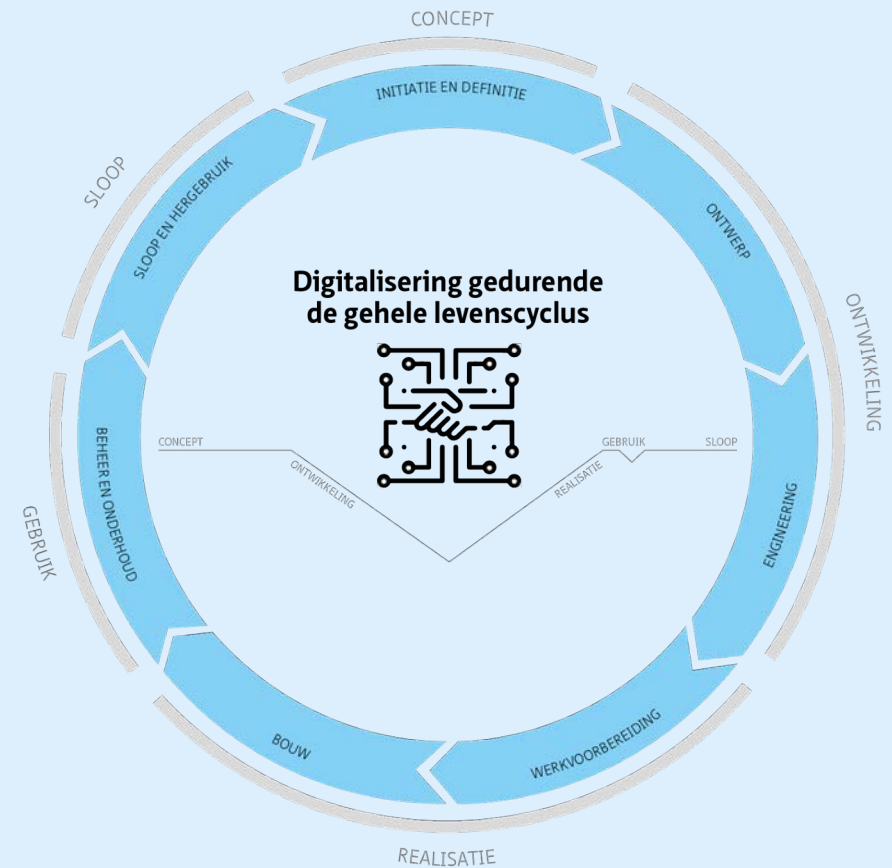
WHAT?

- 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

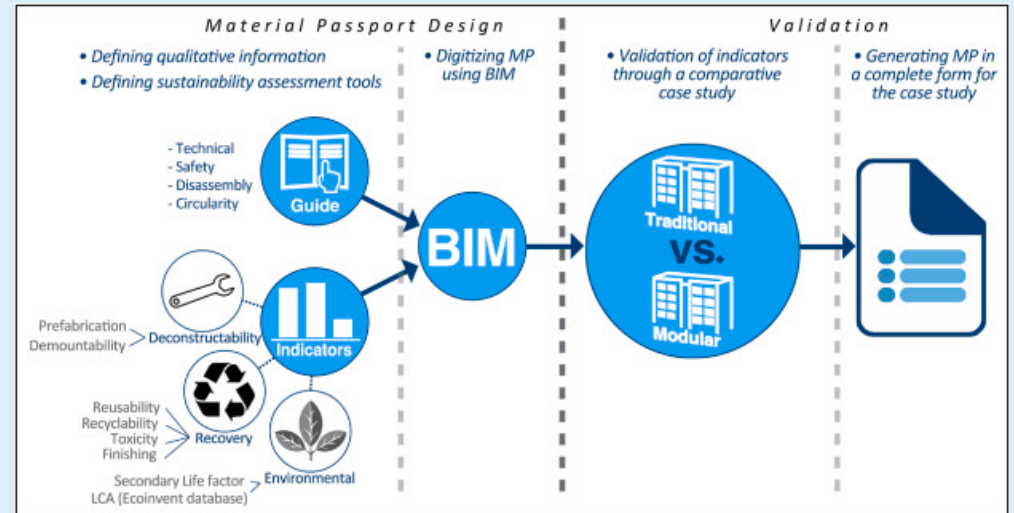
Growth Book Digitalization (COB)



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 paspoort



Material passport at VolkerWessels Energy



From building new to renovation

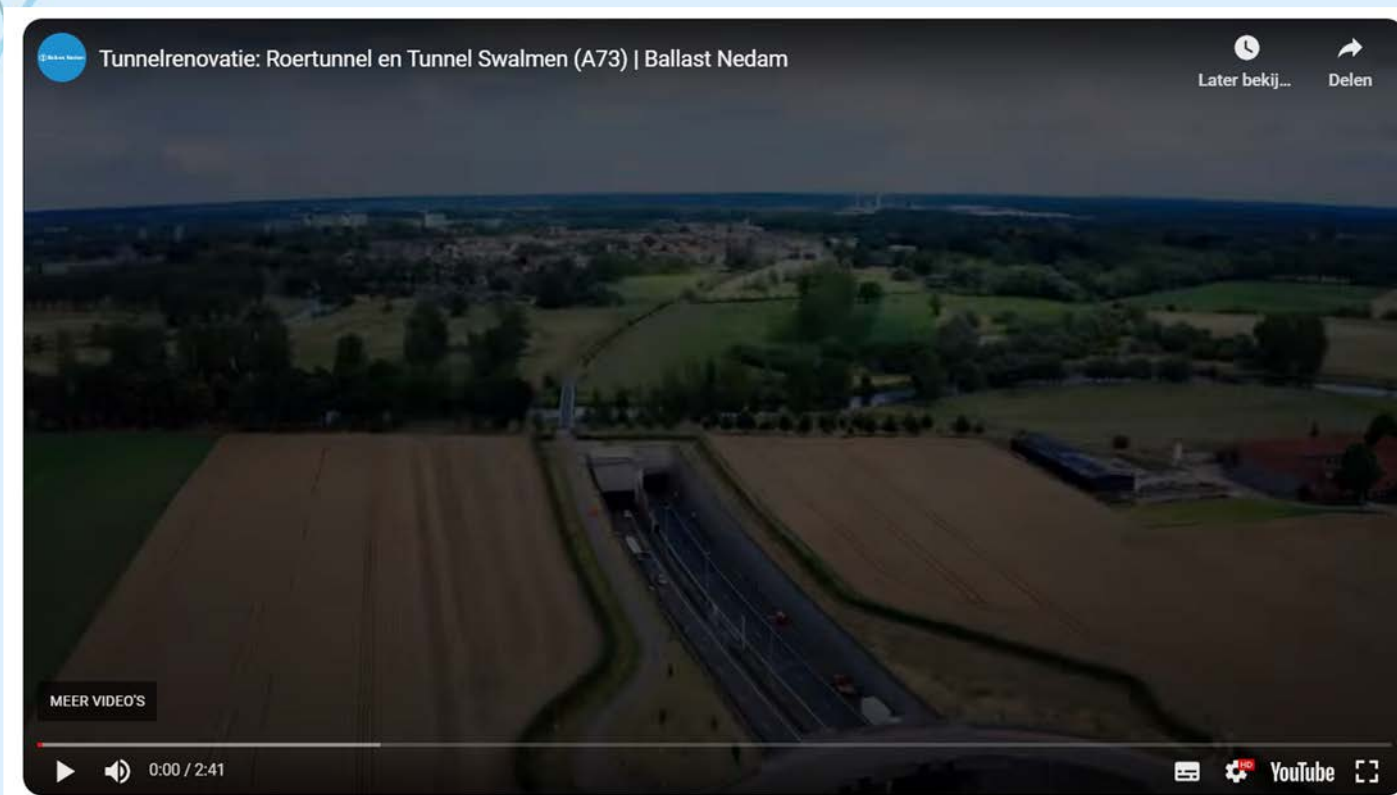


Rijkswaterstaat
Ministerie van Infrastructuur en Waterstaat

- 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."

A decorative graphic in the top-left corner consisting of a grid of curved lines that recede into the distance, creating a sense of depth and perspective. The lines are light blue and white.

Statement 2:

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

A decorative graphic in the top-left corner consisting of a grid of thin, light blue lines that curve and fade out towards the right.

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 use 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."

A decorative graphic in the top-left corner consisting of a grid of thin, light blue lines that curve and converge towards the top-right, creating a sense of depth and perspective.

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."

A decorative graphic on the left side of the slide, consisting of a grid of curved lines that create a sense of depth and perspective, resembling a wireframe sphere or a tunnel. The lines are light blue and fade out towards the right.

Great information for reference

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