

Renovation Heinenoord tunnel



Stephan van der Horst & Bart Ranke



Introduction

- Stephan van der Horst
 - Rijkswaterstaat
 - Civil engineering project leader
- Bart Ranke
 - Savera3 (Combination of Dura Vermeer, Swarco & Spie)
 - Technical manager

Heinenoord tunnel

- Part of the A29 highway
- Opened in 1969
- Crosses the Oude Maas River
- Connection from Rotterdam to Hoeksche Waard Island
- Average daily traffic load of 110.000 vehicles (= total for both directions)
- Immersed tunnel with 5 elements
- Length of closed part 615m
- Total length including access ramps 1065m
- 2 tubes with 3 lanes each



Renovation approach

- Civil renovation requires no major maintenance for 30 years
- Planning phase > Contract preparation > Tender > Design > Execution
- Investigations in the planning phase from coarse to fine (determining the scope in time):
 - Tension piles
 - Immersion joints
 - Shear force capacity
 - Hazardous substances (asbestos, PAHs, PCBs, Chromium VI, etc.)
 - Settlements & deformation

Renovation approach

Research in contract preparation:

- Inspections and investigations for the size of each activity
- Inspections and investigations to gain a clear picture of the existing situation
- Interviews with object experts and (former) tunnel managers
- Feasibility studies
- Translate scope to execution time for closing the tunnel

Renovation approach

Scope civil:

- Demolish existing objects
- Remediation asbestos
- Construction of central tunnel channel
- Replaced asphalt
- Replaced daylight screens
- Renovate immersion joints
- Improve and expand water drainage system → from category D to C hazardous materials transport
- Renovate service buildings
- Concrete repair
- Applying heat-resistant cladding and visual cladding



Demolish daylight screens









Demolish escape doors



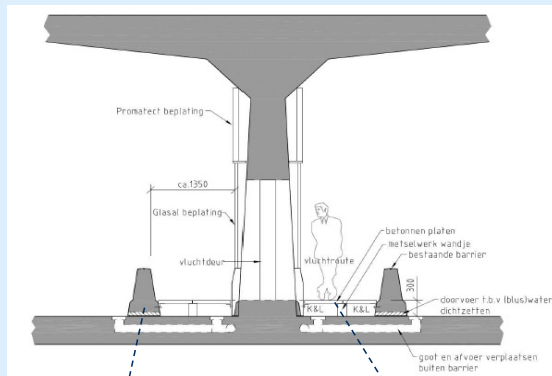
Remediation asbestos



Building midtube with escape en service corridor



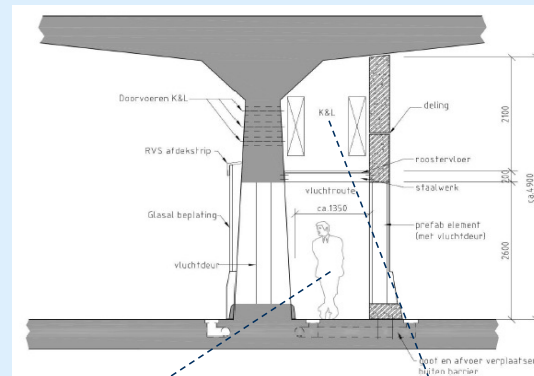
Old



Barrier

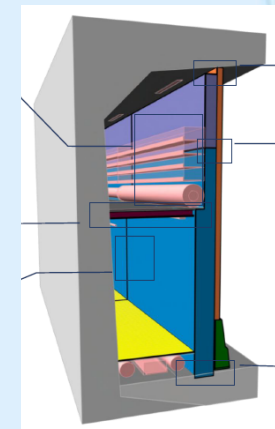
Escape path

New



Escape corridor

Service corridor





Building midtube









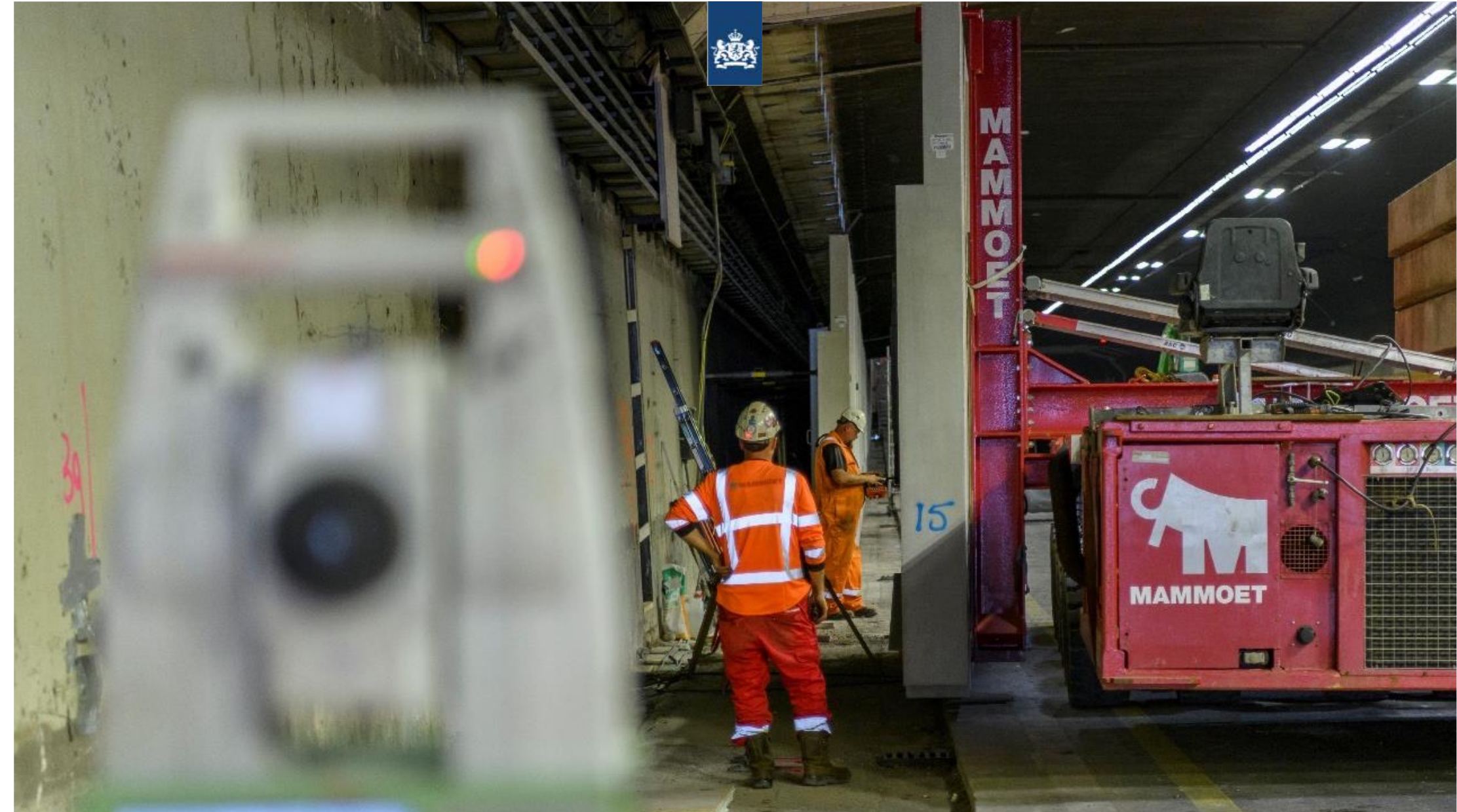


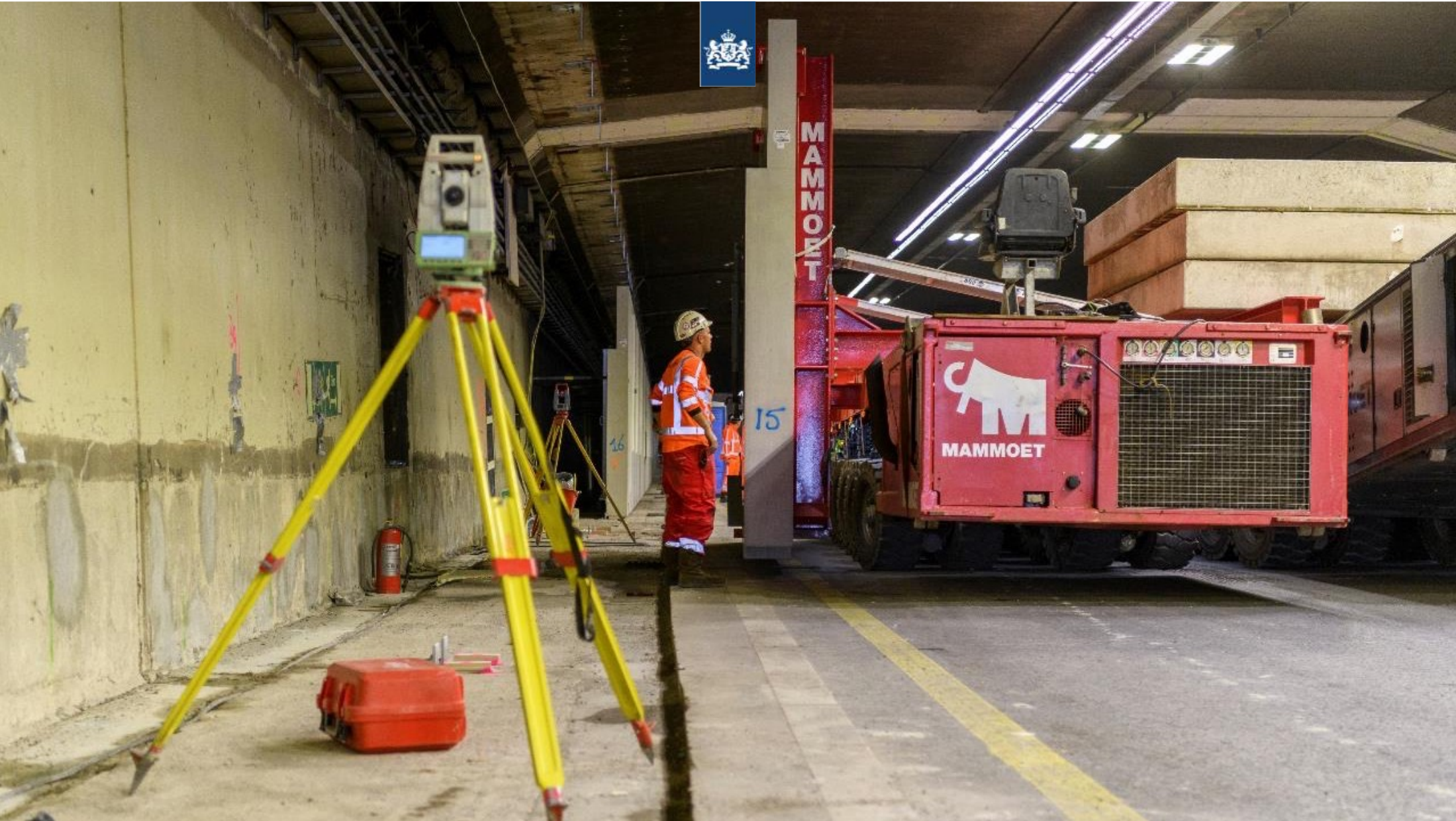
MAMMOET

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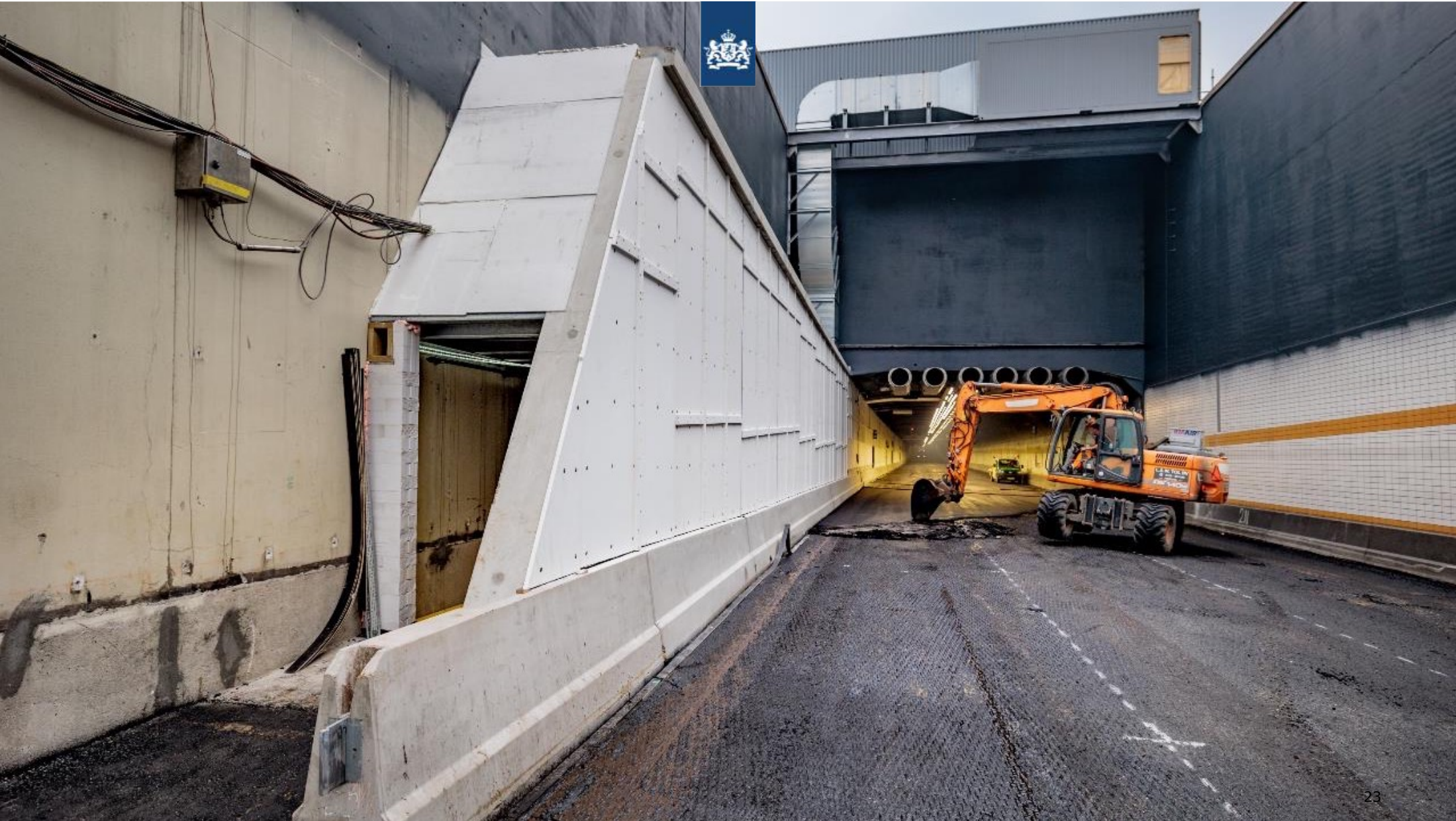














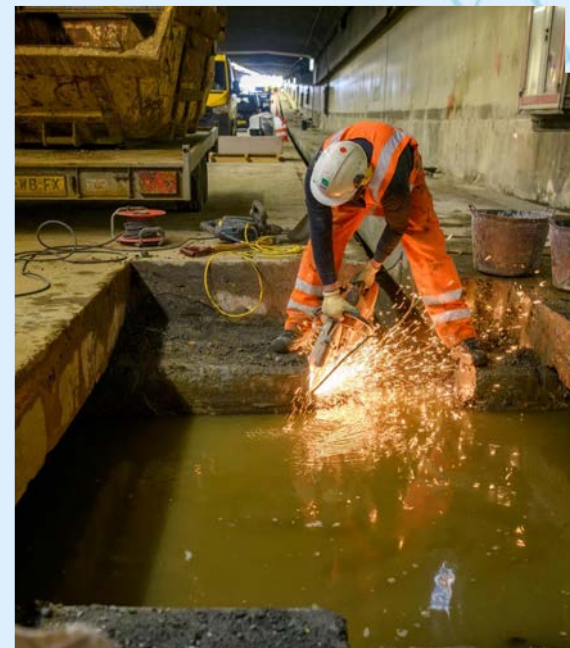
Escape corridor



Service corridor



Improve and expand water drainage system



Renovate service buildings



Renovate service buildings



Renovate service buildings



Execution time

Werkkalender A29 2023

Op de kalender staat wanneer er in 2023 afsluitingen zijn voor de renovatie van de Haringvlietbrug en de Heineoordtunnel, beide in de A29.

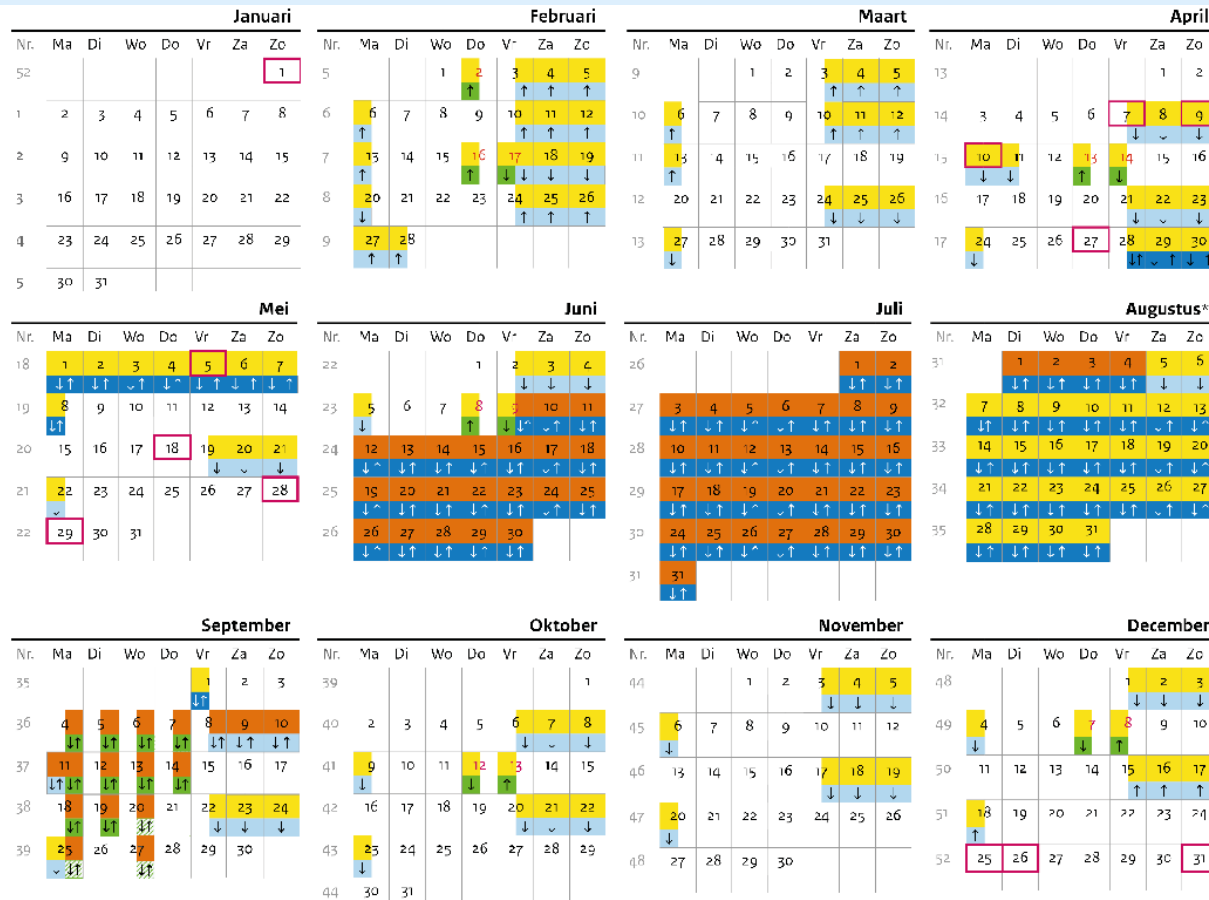
Kijk voor de actuele planning en tijden op www.rijkswaterstaat.nl/haringvlietbrug of www.rijkswaterstaat.nl/heineoordtunnel

- Afsluiting Heineoordtunnel
- Afsluiting Haringvlietbrug
- Weekendaafsluiting
Vrijdag vóór 22.00 uur tot maandag of dinsdag 05.00 uur
- Avond- en nachtafsluiting
Haringvlietbrug vanaf 22.00 uur tot 05.00 uur
'Bijna'-doel dinsdag 12 september: 22.00 uur tot woensdag 13 september 05.00 uur

* Heineoordtunnel vanaf 00.00 uur tot 05.00 uur

- Reserve nachtafsluiting
- ↑ Regulier onderhoud
- ~ Noordelijke rijrichting dicht
(voedschuifrichting Rotterdam)
- ∨ Zuidelijke rijrichting dicht
(voedschuifrichting Bergen op Zoom)
- ↑∨ Beide rijrichtingen dicht
- * N59 afgesloten 7 augustus t/m 28 augustus
(resp. Heiligesplein - Den Bommel)
- Feestdagen

Aan deze planning kunnen geen rechten worden ontleend.



Execution time

Werkkalender A29 2024

Op de kalender staan de geplande afsluitingen van 2024 voor de renovatie van de Heine Noordtunnel, in de A29. Kijk voor de actuele planning en tijden op www.rws.nl/renovatieheinoordtunnel of scan de QR-code

- Afsluiting Heine Noordtunnel
- Meerdaagse afsluiting
Van vrijdag 26 juli 22.00 uur tot vrijdag 9 augustus 05.00 uur
- Weekendaafsluiting
Vanaf vrijdag 22.00 uur tot maandag 05.00 uur
- Avond- en nachtafsluiting
Vanaf 00.00 uur tot 05.00 uur
- ↑ Noordelijke rijrichting dicht
(oostbus richting Rotterdam)
- ↓ Zuidelijke rijrichting dicht
(westbus richting Bergen op Zoom)
- ↑ ↓ Beide rijrichtingen dicht
- * Rijrichtingen worden nog nader bepaald
- Feestdagen

Work calendar A29 2024

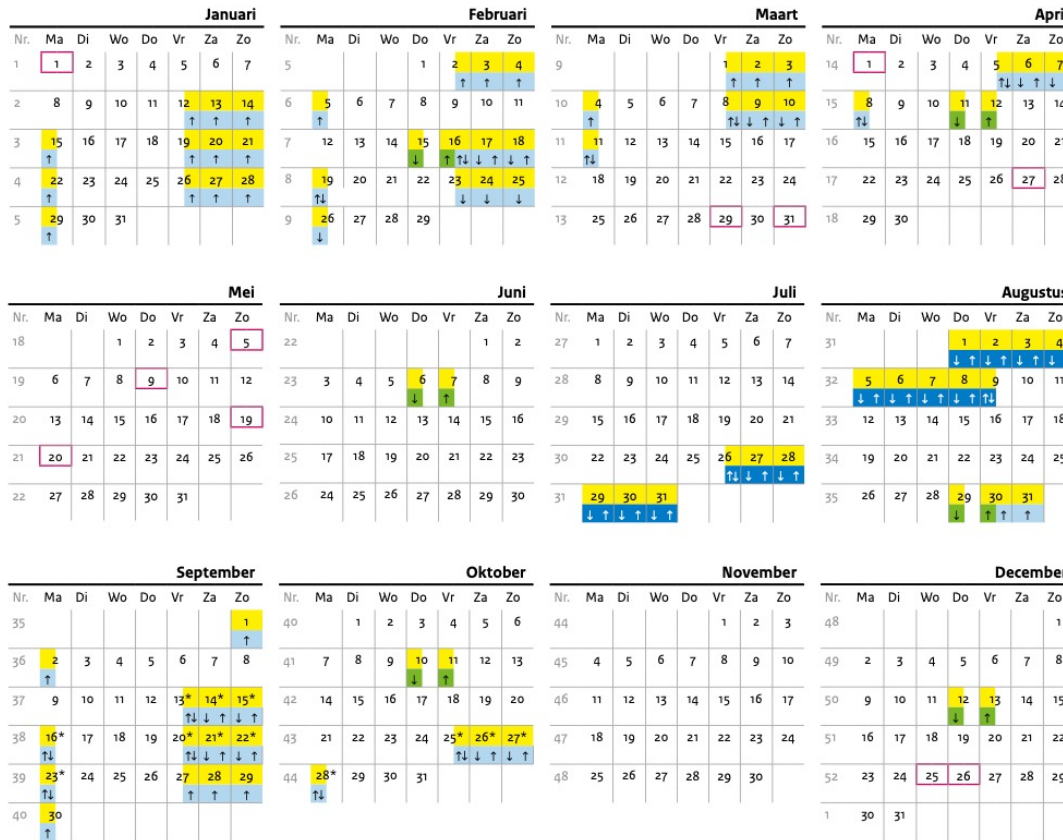
The calendar shows the dates and times of closures due to the renovation of the the Heine Noord Tunnel on the A29. For the current schedule and times, please visit www.A29roadworks.nl. Or scan the QR code.

- Heine Noord Tunnel Closure
- Multi-day closure
From Friday 26 July 10.00 pm to Friday 9 August 5.00 am
- Weekend Closure
From Friday 10.00 pm to Monday 5.00 pm
- Evening and overnight closures
From midnight to 5.00 am
- ↑ Northbound lane closed
(east tunnel towards Rotterdam)
- ↓ Southbound lane closed
(west tunnel towards Bergen op Zoom)
- ↑ ↓ Closed in both directions
- * Direction to be determined
- Public holidays



Aan deze werkalender kunnen geen rechten worden ontleend.
No rights can be derived from this schedule.

2024



Dealing with execution time

Work can only be carried out during weekends and holiday periods

Work divided into the following stages:

Phase 1: Preparations for MTK & Tunnel construction. Getting to know the Tunnel

- 13 weekend closures one-way during Spring 2023
- One 9-day closure two-way during May holiday 2023

Phase 2: Construction MTK

- 4-week closure two-way during Summer holidays 2023

Phase 3: Construction of new installations (parallel)

- 16 Weekend closures one-way during autumn and winter 2023/2024

Phase 4: Testing new installations

- 2-week closure two-way during Summer holidays 2024

Phase 5: Removal of old installations

- 5 Weekend closures one-way during autumn 2024

Dealing with execution time

Planning often had no buffer during the closures

- Working with go no go moments
- Probabilistic planning does not work with such closures

Huge burden on staff

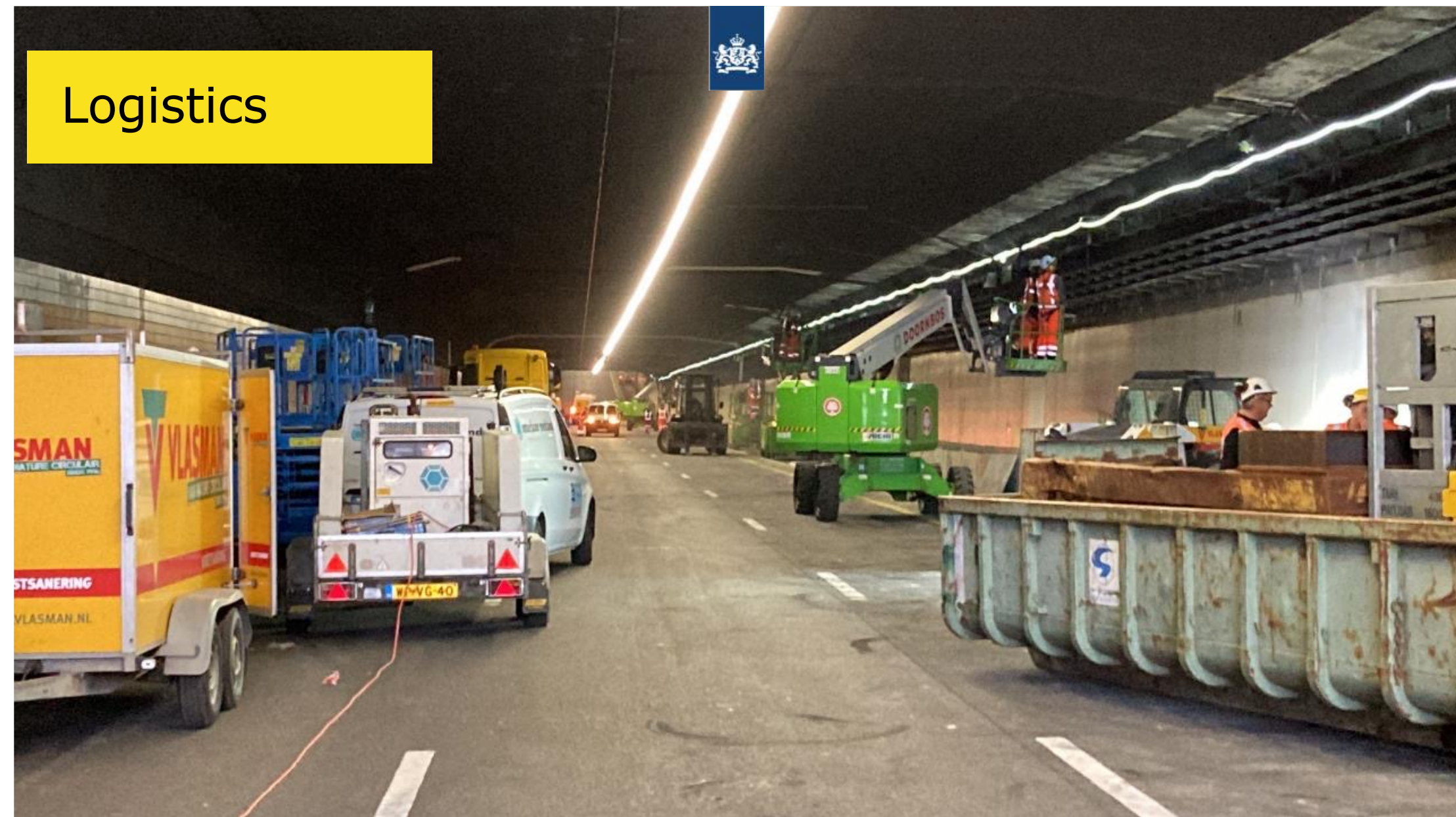
- Weekends were extra compared to the preparation work during the week
- Working during both May and summer holidays
- Continuous pressure due to not having buffers
- Continuously adjust the activities to achieve the planning (coordinate, replan, evaluate)

Dealing with execution time

Success factors:

- **People -> outside, office, staff, client and stakeholders -> full team performance!**
- Good design -> coordination between disciplines and their specialists
- Detailed preparation -> coordination between disciplines and their subcontractors
- Time to gain knowledge of the object (Phase 1 before Phase 2)
- 3D modelling
- Tunnel experience
- No major setbacks -> Happy Flow
- Willingness to adapt and make concessions

Logistics





Logistics and safety

Passage during work for both buses and emergency services

Dealing with execution time

Do you want to do a renovation like this again?

- Difficult to find or deploy staff
- No time for recovery and/or preparation
- Long period without relaxation
- Bus traffic and emergency services through work zone
- A lot of inefficiency due to having to open to traffic again and again
- Logistics in a tunnel pose limitations to doing a lot in a short time (weekend).



Questions?

