H2K brandweeropleidingen • trainingen • consultancy

KAPPETIJN SAFETY SPECIALISTS

KENBRI FIRE FIGHTING

The Waalhaven Zuid firefighting train

Fire engine XXL on rails in Rotterdam

Content

- Introduction
  - What is a rail yard?
  - Possible incident scenarios
  - Dillemas for firefighting
  - Port of Rotterdam railway
  - Rail yard Waalhaven Zuid
- Development
  - Timeline
  - Design framework
  - Functional requirements
  - Design of the train
  - The firefighting train
  - Collaboration
- Operationalization
  - Departure location
  - Crew of the train
  - Procedures, training and practice
  - Inspection and maintenance
  - ProRail Incidentresponse

KAPPETIJN SAFETY SPECIALISTS

H2K brandweeropleidingen • trainingen • consultancy

KENBRI FIRE FIGHTING

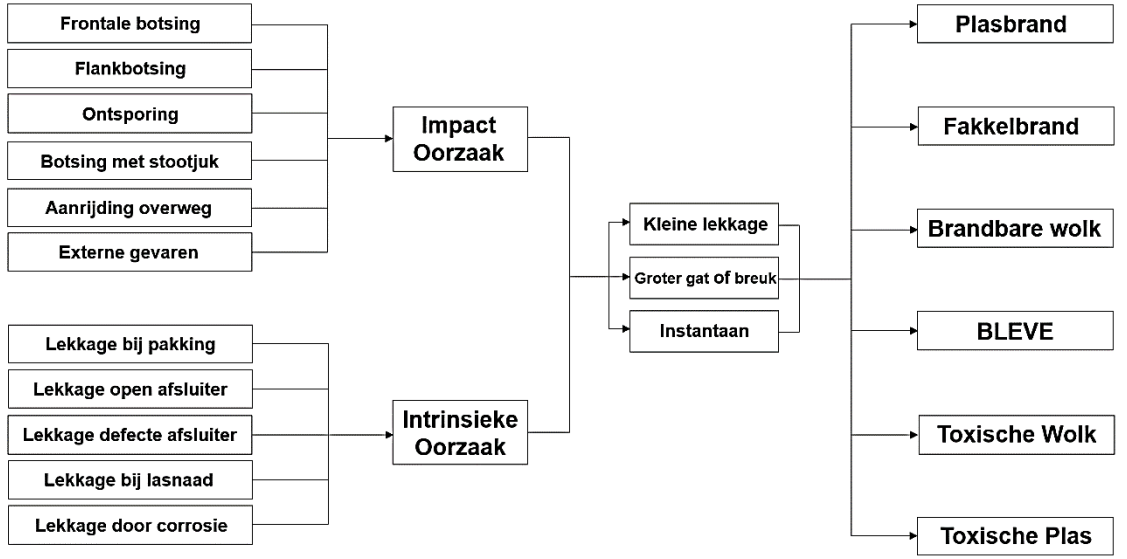
INTRODUCTION

What is a rail yard?

- Split and assemble trains from separate wagons
- Lots of tracks and trains close together
- Moving trains / wagons pulled by locomotives or through hills
- Low speeds (up to 40 km / h)
- Hazardous materials in tank wagons (up to 55 tons)
- Potentially present hazardous materials:
  - Flammable gases (e.g. propane)
  - Toxic gases (e.g. ammonia)
  - Highly flammable liquids (e.g. pentane)
  - Toxic liquids (e.g. acrylonitrile)
  - Highly toxic liquids (e.g. acrolein)

Possible incidentscenario's

- Tank wagons failure due to collision, derailment and collision
  - Risk mainly present around railroad switches
- Tank truck failure due to intrinsic failure of welds, gaskets or tank truck valves
  - Risk especially present when wagons standing still (for more than 4 hours)
- Credible incidentscenarios
  - Pool fire
  - (Very) Toxic pool
  - Jet fire
- Size of the scenarios
  - 100 m2 pool with continuous outflow
  - 160 m2 pool in case of instantaneous failure



Dillemas for firefighting

Past incidents show different dilemmas in firefighting at railway yards:

1. Long distances to bridge at an intervention
2. Difficult access and limited room for maneuver
3. Limited availability of immediately usable fire extinguishing water
4. Danger for emergency services, partly due to poor sight lines
5. Limited availability of information about the containment of the wagons
6. Need for (fluorine-containing) foaming agent
7. Education and training is complex
8. Knowledge of railway processes i.r.t. incidents by operational managers of the fire brigade

Port of Rotterdam railway

- Supply and removal of (raw) materials for the largest port in Europe
- 35,550 freight trains in 2019 in the Port of Rotterdam
  - Gross tonnage: 55.3 million
- 6 railway yards, of which 5 deploy activities involving hazardous materials
- In 2005 the railway yards in the Port of Rotterdam were obligated to have its own industrial fire service
  - A unit of 6 FTEs with an attendance time of 6 minutes must be available for each yard
- ProRail participates in the Joint Fire Service Rotterdam for a first deployment
- Emplacement Kijfhoek (designated 2010) lies just outside the harbor railway

Rail yard Waalhaven Zuid

- One of the largest yards in the Port of Rotterdam
- Insufficient extinguishing water and accessibility at the south side of the yard
- Additional investments and infrastructure adjustments will take years
- Temporary solution needed to bridge this period
- Solution after brainstorming and international benchmark: the firefighting train

KAPPETIJN
SAFETY SPECIALISTS

H2K
brandweeropleidingen • trainingen • consultancy

KENBRI
FIRE FIGHTING

DEVELOPMENT

Timeline

November 2020

Brainstorm for possible solutions to resume shunting with hazardous materials.

December 2020

Drawing up functional requirements and operational and management frameworks for the firefighting train and acceptance of the train as a solution by ProRail.

January 2021

Converting functional requirements and operational frameworks into a preliminary design for the firefighting train.

February 2021

Physical construction of the firefighting train at Kenbri (Numansdorp) and Shunter (Rotterdam). Drafting a test program and company fire service report.

March 2021

Testing of the firefighting train and completion of the permit process. Education and training of the train drivers, firefighters and the Joint Fire Service Rotterdam.

April 1st, 2021

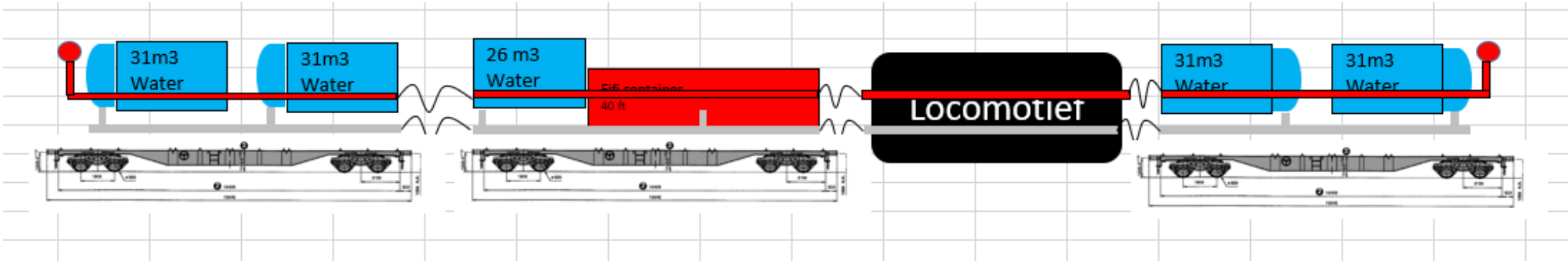
Firefighting train is operational and shunting with hazardous materials is resumed.

Design framework

- Reliable, suitable, inspectable
- Modular with existing rail and fire fighting techniques
- No additional inspections and certification required
- No addition to basic training firefighters and train drivers
- Remote deployment: Occupational safety
- Current governmental requirements
  - Fire service deployment within 20 minutes
  - Dutch Policy for industrial fire services

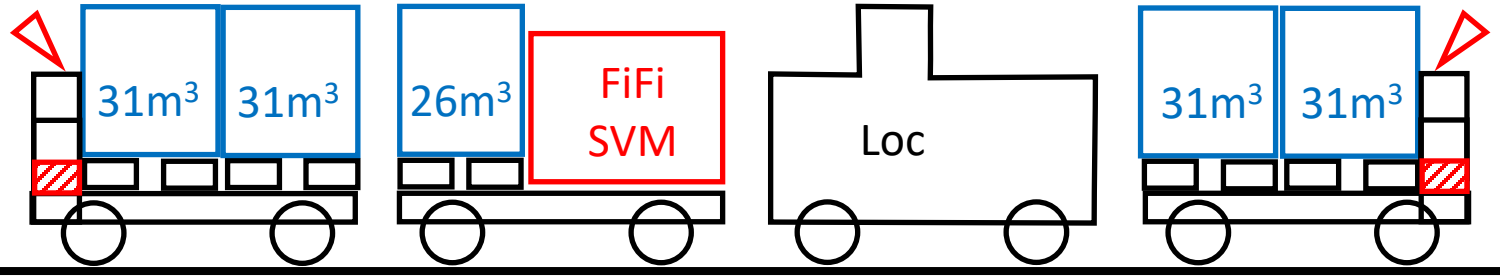
Functional requirements

- Monitor capacity 4.000 l/min
- Pump capacity 4.000 l/min
- 120 m³ for 30 minutes
- Foam percentage of 3% (with margin to 3,9%)
- 4.680 litre foam suitable for 30 minutes of firefighting
- Minimum throw length of 45 metres (with headwind/most unfavourable circumstances)

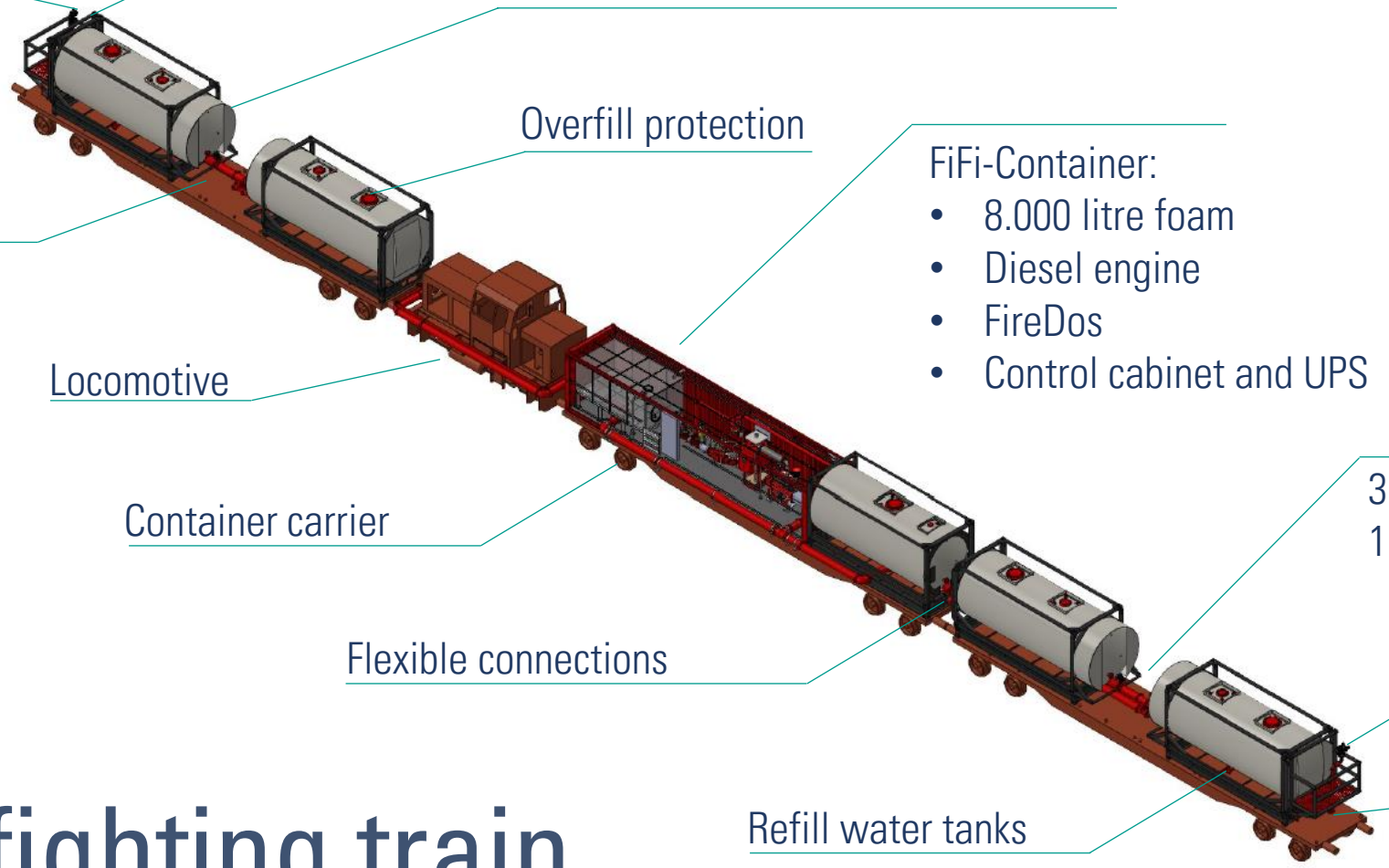


Design of the train

- Locomotive: remote controlled (in the middle of the train because of heat radiation)
- 3 container carriers
- 5 water tanks (raised)
- 2 fire monitors: remote controlled
- Water pipes along, under and through the train



The firefighting train



Additional:
- 1 x 4” mobiele monitor
- 2 x 2,5” handlines

Monitor 4.000 l/min

5 water tanks with 150.000 litre water

300 metre 4” hoses
100 metre 2,5” hoses

Overfill protection

FiFi-Container:
- 8.000 litre foam
- Diesel engine
- FireDos
- Control cabinet and UPS

Locomotive

Container carrier

300 metre 4” hoses
100 metre 2,5” hoses

Flexible connections

Monitor 4.000 l/min

Refill water tanks

Additional:
- 1 x 4” mobile monitor
- 2 x 2,5” handlines

Collaboration

Kappetijn Safety Specialists

Expertise, Autorities &
Project management

H2K

Expertise, Testing
& Education

Kenbri Fire Fighting

Calculate, Draw
& Build

Shunter Tractie

Rail technology
& Railtraction

ProRail

Client & Exploitation

KENBRI FIRE FIGHTING

H2K brandweeropleidingen • trainingen • consultancy

KAPPETIJN SAFETY SPECIALISTS

"... a worldwide first has been achieved in a world record time."

– Kenbri Fire Fighting

KAPPETIJN SAFETY SPECIALISTS

H2K brandweeropleidingen • trainingen • consultancy

KENBRI FIRE FIGHTING

OPERATIONALIZATION

Departure location

- On the Shunter site next to the yard
- Equipped with a connection to shore power for the locomotive and FiFi container
- Hydrant available for (re)filling the water tanks
- Near the accommodation of the fire train crew

Crew of the train

- Train driver supplied by Shunter
  - Positioning train from a distance
  - 3 shift system, 24/7 on site
- 2 fire fighters provided by Falck
  - Operate pump and monitor of the train from a distance
  - 3 shift system, 24/7 on site
- Joint Fire Department Rotterdam
  - Commander: management and determining deployment location
  - Firefighters: scout between the tracks + extra tasks

Procedures, training and exercise

- Procedures
  - Fire service drive up
  - Stopping rail traffic: firefighting train can continue to operate
- Training program
  - Basic skills
  - Site orientation / team exercise
  - Art. 31 exercise / integral intervention test
- Training program
  - In accordance with the Practice Guidelines 2013
  - Industry standard Permanent Professional Competence

Blustrein Waalhaven-Zuid
Vakbekwaamheid

ProRail
Verbindt. Verbetert. Verduurzaamt.

Inspection and maintanance

- The starting point is demonstrable operational reliability of the train
  - Protected against weather influences: frost-free and heated
  - Winterize button
- Inspection, testing and maintenance program
  - Starting point: Model Regulations Designation Policy
  - Principle: NFPA and Supplier
  - Without consumption testing of water and foam following NFPA25
- Redundancy / Certification
  - Diesel engine fire pump: Double starting device with monitoring

ProRail Incident Response

- ProRail Incident Response
  - Handling of incidents on the Dutch railways
  - Arranges everything related to the industrial fire service at the yards
- Position in the firefighting train
  - Implementing / outsourcing Inspection and maintenance
  - Outsourcing firefighters
  - Ensure that the train operates within the framework of the permits
  - Maintain contacts with the Joint Fire Department Rotterdam
  - Training, education and practice firefighting train crew

More information?

Watch the mini-docu on:

www.kappetijn.eu
www.h2k.nl
www.kenbri.nl