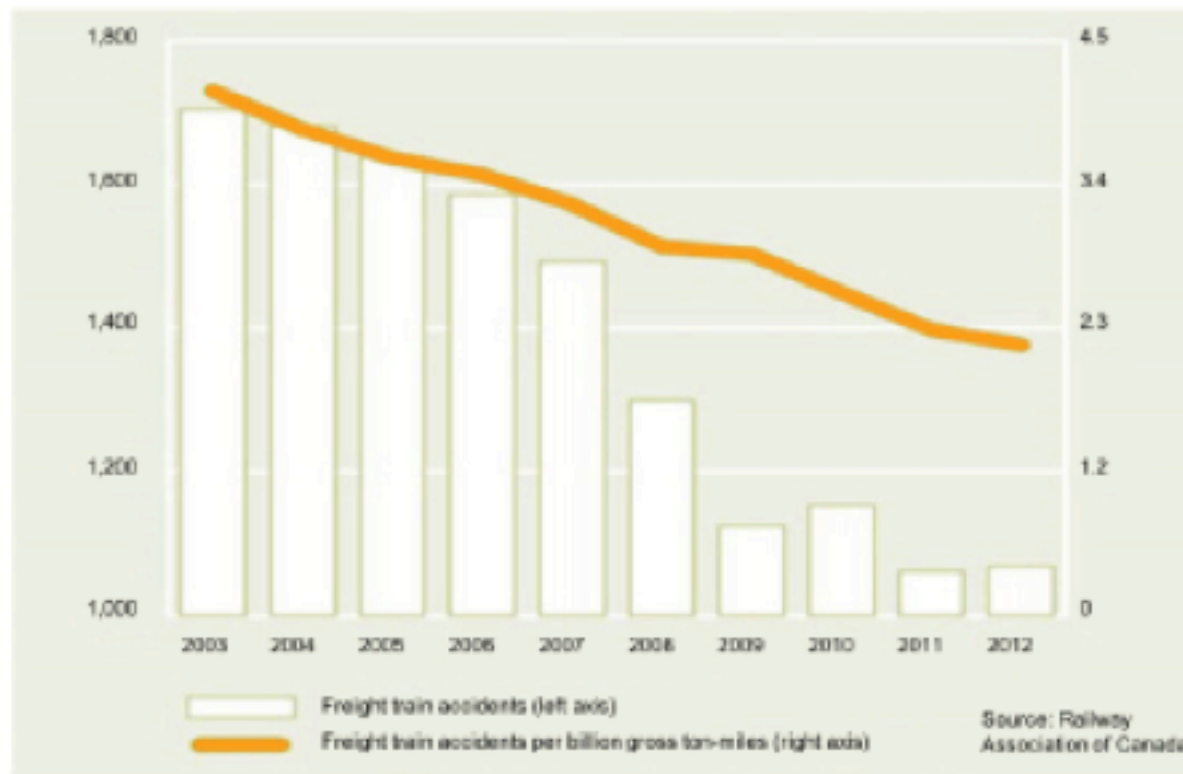


A photograph of a CSX freight train crossing a concrete bridge over a body of water. The lead locomotive is yellow and blue with the number 74329. The train is moving from left to right. The sky is clear blue, and the water is dark. The bridge is supported by concrete piers.

Emerging rail technologies

Bill Hjelholt, Director of Freight Rail,
Americas, AECOM

Freight accidents and accident rate



The performance of Canadian railways in terms of safety has steadily increased over the last decade. While the freight rail sector moved a record 503.9 billion gross ton-miles (BGTM) in 2012, it maintained a rate of 2.1 accidents per BGTM, the lowest rate to date.

Components of tank car safety design

HEAD SHIELDS
Full-height head shields to improve puncture resistance

PRESSURE RELIEF VALVES AND TOP FITTINGS PROTECTION

STEEL TANK
Increase thickness of steel tank

BOTTOM OUTLET HANDLES
Reconfigure to prevent handles from opening in the event of an accident

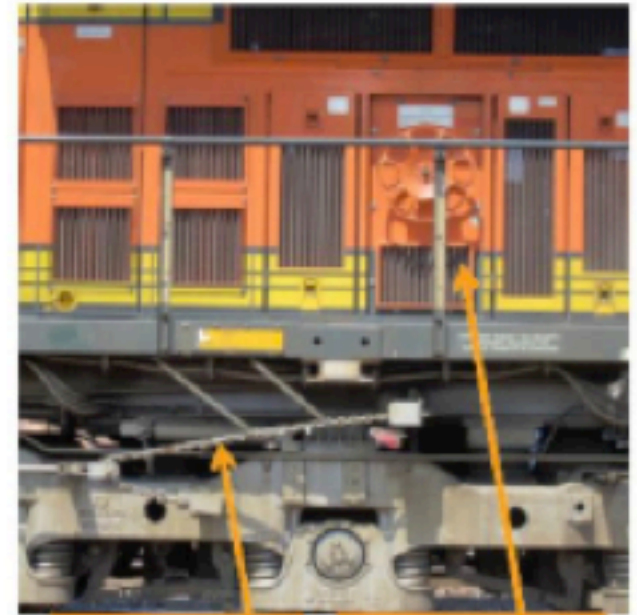
JACKET AND THERMAL PROTECTION
Outer steel jacket around the tank car and thermal protection

Car braking systems



Locomotive handbrake chain

Locomotive handbrake wheel



Handbrake chain

Handbrake wheel



Tank car handbrake chain and wheel



Flat car handbrake, loose chain, lever

Advancing tank car design

- DOT-111 tank car
 - Legacy design from the 1970s
 - General purpose tank car
 - Transport Canada's phase out or refit by 2017
- CPC-1232 tank car
 - "Good Faith Car"
 - Voluntary adopted by the industry in 2011
 - Offers improvements to DOT-111s
- HM-251 tank car
 - "Proposed Car of the Future"
 - Positioned as central to \$3 billion phase out of DOT-111s
 - Suppliers report 3,500 HM-251 ordered so far in 2014

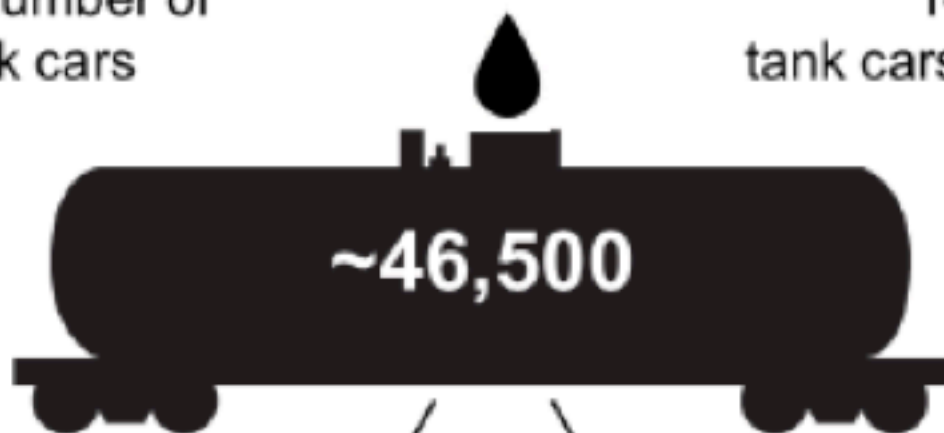
North America's current rolling stock for tanks cars



Total number of
tank cars



Total number of
tank cars carrying flammables



Total number of
tank cars
carrying crude

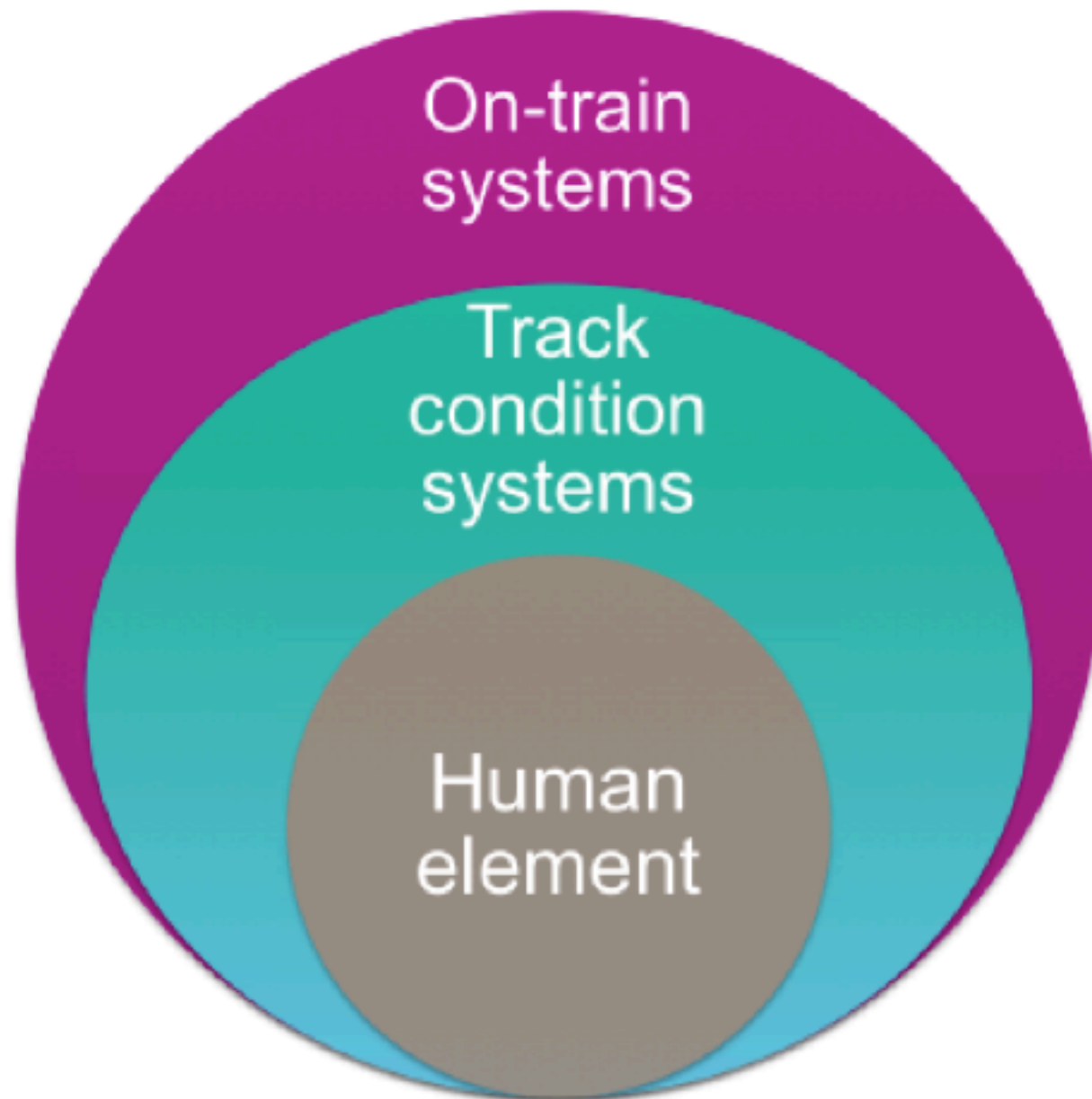


DOT-111s



CPC-1232s

Areas of emerging safety technologies / improvements



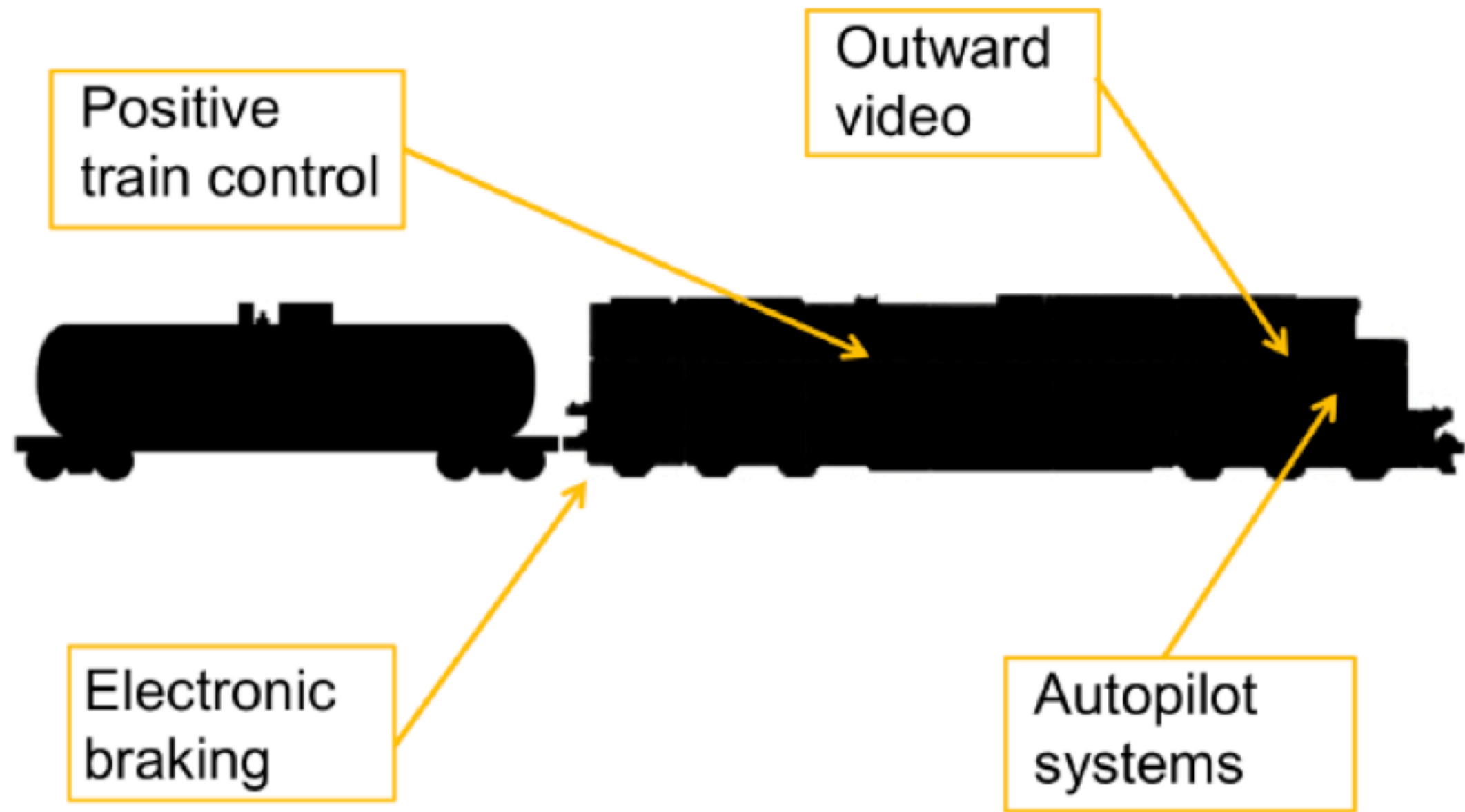
On-train system improvements

Positive
train control

Outward
video

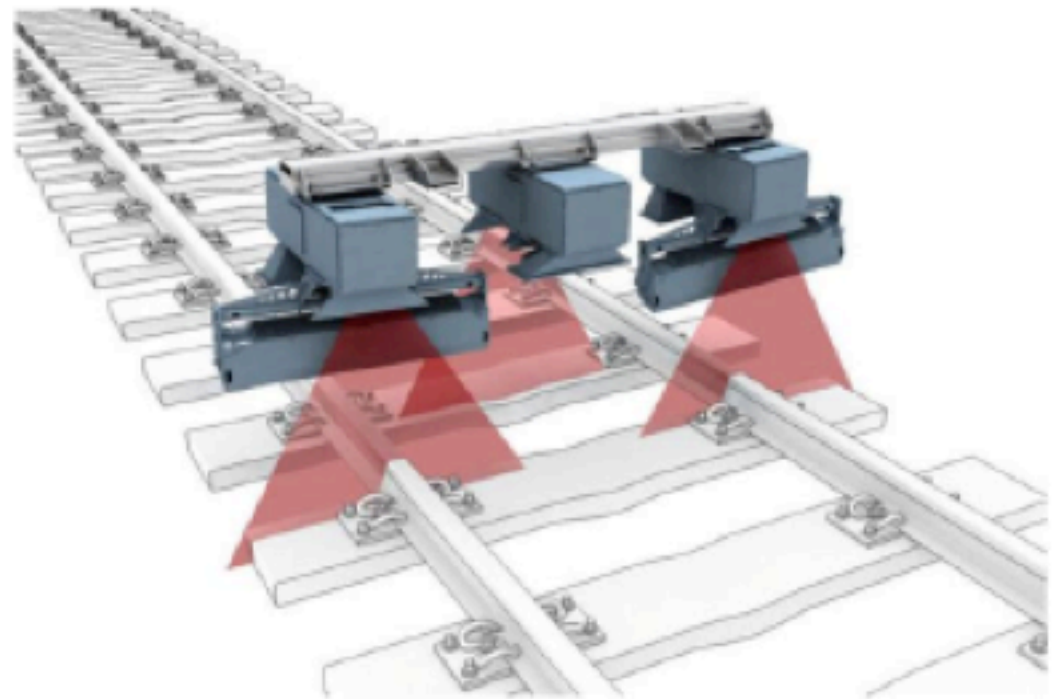
Electronic
braking

Autopilot
systems



Track condition systems

Railways conduct high-tech track geometry and rail flaw inspections on routes over which trains carrying crude oil run.



Questions



July 2, 2014

AECOM