

Spill Prevention and Response Day
California Maritime Academy
Vallejo, CA 5/14/2014

New Regulations for Tank Car Construction

Where Are We Today

- Canada – Emergency Directive
 - Ban unmodified pre CPC-1232 tank cars from rails by May 1, 2017
 - Remove all AAR tank cars from service by May 24, 2014
- USA
 - April 18, 2014 - PHMSA/DOT has submitted proposal to Office of Management & Budget (OMB). There is something in writing!
 - July 31, 2014 - OMB Review and back to PHMSA
 - September 1, 2014 - PHMSA Notice of Proposed Rulemaking Issued – 60 Day Comment Period?
 - PHMSA review of comments – 60 to 90 days (est.)
 - Final Rule most likely 1Q15

New Tank Car Proposal

All Other

| | Pre CPC 1232 | CPC 1232 | CPC 1232 | AAR/Railroads | BNSF |
|-----------------------------|-----------------|-----------------|-----------------|--------------------------|-----------------|
| | All Legacy | Non-Jacketed | Jacketed | Jacketed Non-Jacketed | Jacketed |
| Tank Shell Thickness | 7/16" | 1/2" | 7/16" | 9/16" | 9/16" |
| Head Shields | None | Half Height | Half Height | Full Height | Full Height |
| Pressure Relief Valve | Per AFFTAC | 27,000 SCFM | 27,000 SCFM | Dual Range | Dual Range |
| Protective Dome | None | Yes | Yes | Yes | Yes |
| Jacket & Thermal Protection | None | None | None | Yes | Yes |
| BOV Handle | Yes | Yes | Yes | No | No |
| Manway | Hinged & Bolted | Hinged & Bolted | Hinged & Bolted | Hinged & Bolted | Kelso Klincher® |

Legacy Tank Car Retrofit Proposal

Rail Supply Institute (RSI)

| | | Pre CPC 1232 | | CPC 1232 |
|-----------------------------|-----------------|-------------------------|------------|-------------------------|
| | Non-Jacketed | Non-Jacketed | Jacketed | Jacketed & Non-Jacketed |
| | Crude & Ethanol | Other Class 3 PG I & II | All Legacy | All Legacy |
| Tank Shell Thickness | 7/16" | 7/16" | 7/16" | 7/16" or 1/2" |
| Head Shields | Full Height | Half Height | None | Half Height |
| Pressure Relief Valve | Dual Range | Dual Range | Dual Range | Dual Range |
| Protective Dome | Yes | Yes | No | Yes |
| Jacket & Thermal Protection | Yes | No | No | Yes |
| BOV Handle | Remove | Remove | Remove | Remove |

New Tank Car Construction Proposals - Rail Supply Institute (RSI)

| | New Cars | New Cars | Cars on Order | Cars On Order |
|-----------------------------|-------------------|-----------------|-------------------|-------------------|
| | Class 3 PG I & II | Class 3 PG III | Class 3 PG I & II | Class 3 PG I & II |
| | Non-Jacketed | Jacketed | Non-Jacketed | Jacketed |
| Tank Shell Thickness | 1/2" | 7/16" | 1/2" | 7/16" |
| Head Shields | Full Height | None | Half Height | Half Height |
| Pressure Relief Valve | Dual Range | Dual Range | Dual Range | Dual Range |
| Protective Dome | Yes | Yes | Yes | Yes |
| Jacket & Thermal Protection | Yes | No | No | Yes |
| BOV Handle | Remove | Remove | Remove | Remove |
| Manway | Hinged & Bolted | Hinged & Bolted | Hinged & Bolted | Hinged & Bolted |

EVOLUTION OF RAIL INDUSTRY TANK CAR STANDARDS FOR CRUDE OIL

The railroad industry is proposing to increase the federal tank car design and construction standards for new tank cars used to transport crude oil. This proposal comes after a previous upgrade proposal which the industry voluntarily adopted and has been observing since October 2011. This graphic shows the additional tank car components included in the latest rail industry proposal.

HIGH CAPACITY PRESSURE RELIEF VALVE

Current Standard:
No requirement

Latest Rail Industry Proposal:
Requires a high capacity pressure relief device to protect against a rise in internal pressure resulting from fire. Provides for faster release of product.

TOP FITTINGS PROTECTION

Current Standard:

Requires top fittings protection to protect the integrity of valves and fittings used to load product in the event of an accident.

Latest Rail Industry Proposal:

Contains the same requirement.

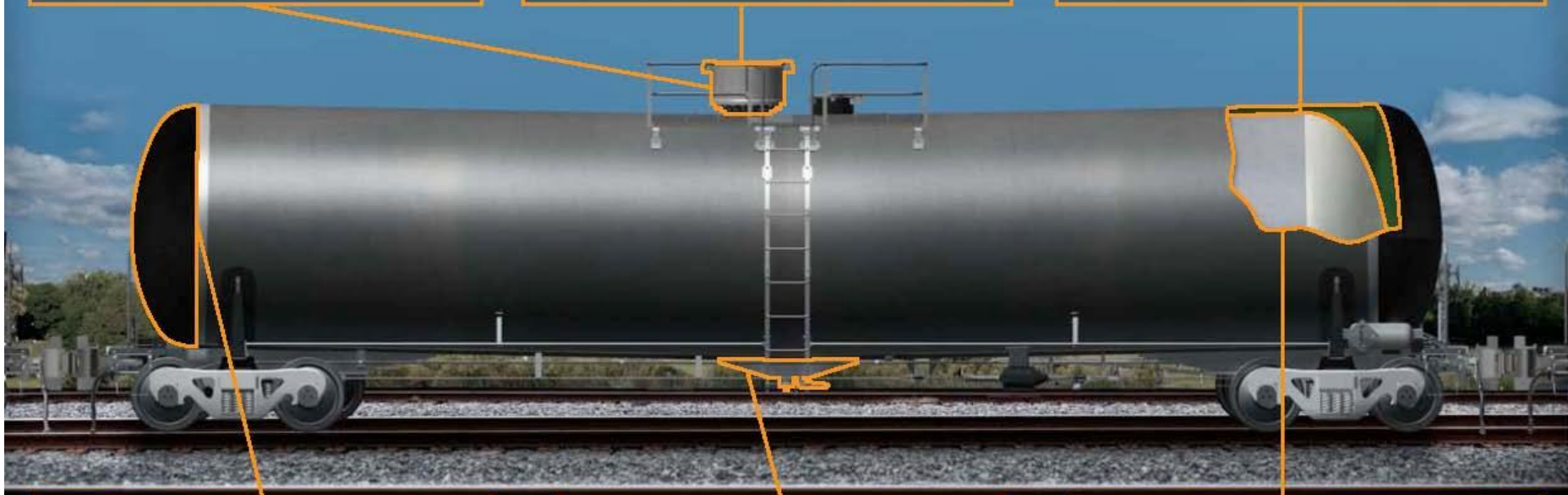
STEEL TANK

Current Standard:

Requires a minimum 1/2 inch thick steel tank for unjacketed cars and a minimum 3/8 inch thick steel tank for jacketed cars.

Latest Rail Industry Proposal:

Requires a minimum 3/8 inch thick steel tank.



HEAD SHIELDS

Current Standard:

Requires minimum 1/2 inch thick half height head shields at both ends of the tank car to improve puncture resistance.

Latest Rail Industry Proposal:

Requires 1/2 inch thick full-height head shields at both ends of the tank car.

BOTTOM OUTLET HANDLES

Current Standard:

No requirement

Latest Rail Industry Proposal:

Requires bottom outlet handle reconfiguration to prevent the handle from inadvertently opening the bottom outlets in the event of an accident.

JACKET AND THERMAL PROTECTION

Current Standard:

Requires a minimum 1/2 inch thick steel tank OR a 3/8 inch thick steel jacket.

Latest Rail Industry Proposal:

Requires the addition of both a 3/8 inch thick steel jacket around the tank car and thermal protection.

BNSF Tank Car

1. Reinforced hull
Thicker steel plates make them more puncture-resistant

2. Breakaway handles
Valve handles on the bottom of the car snap off in a crash, keeping them from opening

3. Protective cap
Reinforced fittings prevent oil from spilling in a rollover

4. Pressure relief valve
Gas can escape, rather than build up, if the car heats up in a fire

5. Protective shields
Steel plates stop the car from crumpling in a collision

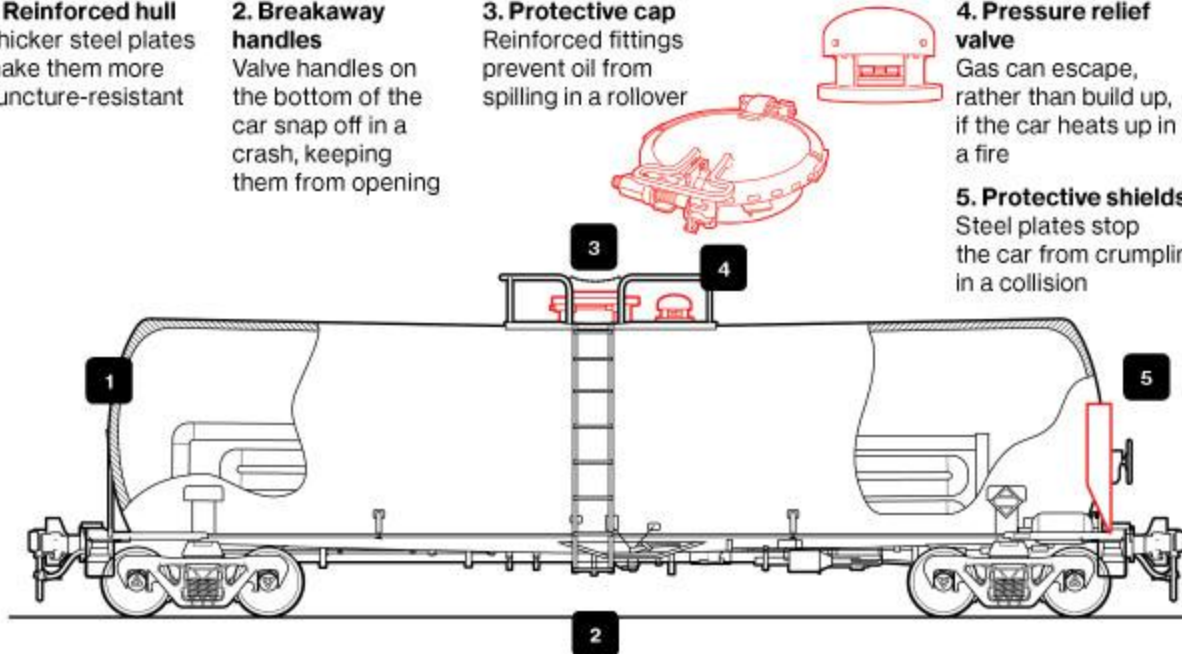


ILLUSTRATION BY CHRIS PHILPOT; GRAPHIC BY BLOOMBERG BUSINESSWEEK

Another Consideration

Flash Point of Crude Oil

- Up until 1989, flash point testing was required to determine the need to ship commodity in pressure tank car
- Requirement dropped in 1989, no one remembers why this was dropped
- Being considered for classifying crude oil and need to use pressure car design – DOT 112 with Bottom Outlet Valve?

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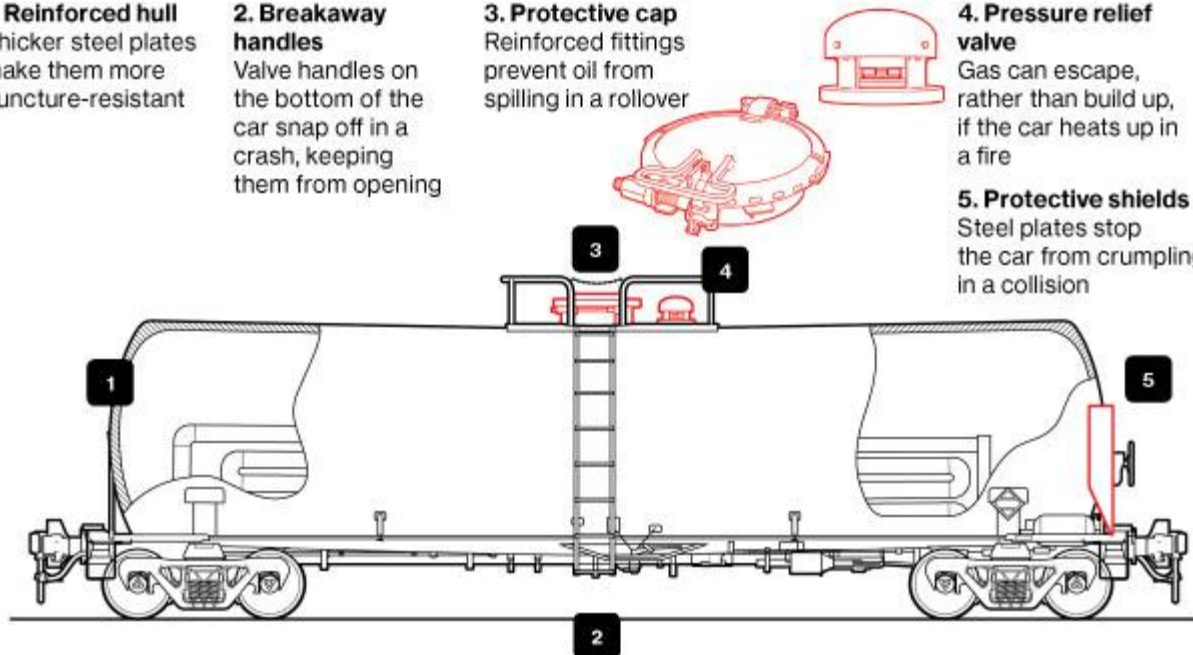


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