

Spec'ing a Trailer For Roll Stability

NTTC 2011



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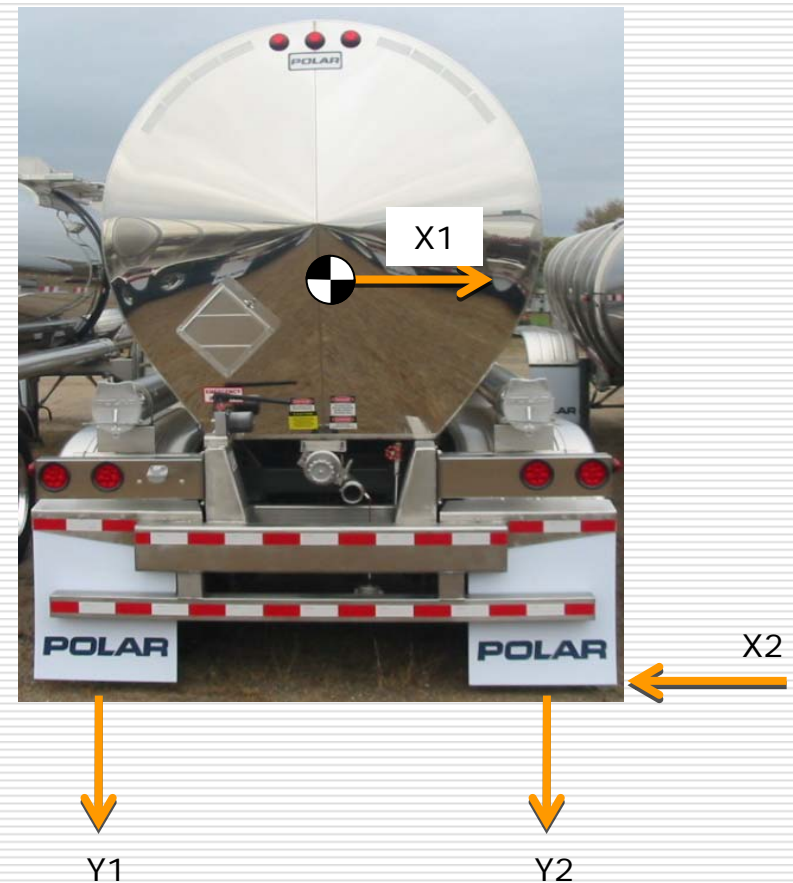
Today's Topics

- Physics of a Rollover
- Track Width
- Center of Gravity
- Sloshing and Surging
- Electronic Devices to Prevent Rollovers
- Q & A



Physics of a Rollover

- Side force creating couple between CG and outside wheel
 - Resulting from a point load like a guard rail
 - Resulting from an acceleration like a sharp turn
 - Uneven ground



Track Width of a Trailer

- ❑ Most Tank Trailers sold are still 96" for overall width
 - This is 71.5" track width
- ❑ Most states allow 102 wide
 - This is 77.5" track width
- ❑ Widening the track width to 77.5" can reduce the statistical likelihood of a rollover by 17% (Battelle Study reference)



Center of Gravity

- Trailer Configurations with a lower CG:
 - Double Conical vs. Straight Round
 - Double Taper vs. Straight Bore
 - Elliptical vs. Round
 - Tri axle vs. Tandem
- How CG is Calculated
 - 3D Software (many manufacturers have this capability)
 - Summation of Parts
- Lowering the center of Gravity by 3" can reduce the statistical likelihood of a rollover by 12% (Battelle Study reference)



Sloshing and Surging

- ❑ Can affect stability, depending on the magnitude
- ❑ Recommend hauling full, when possible, rather than partial loads

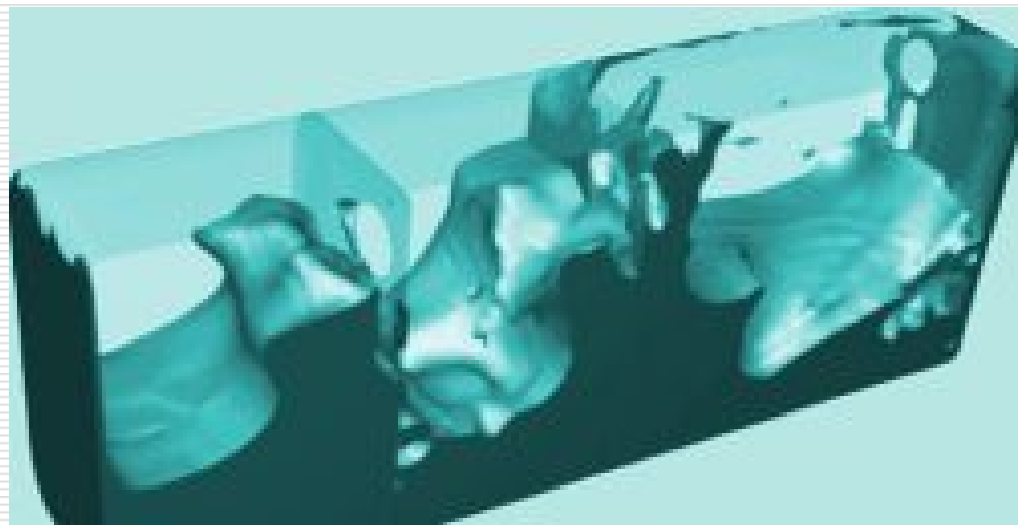


Image from CAE Simulation Solutions

Electronic Devices to Prevent Rollovers

- ❑ Electronic Roll Stability Devices (RSD)
 - Available on new trailers
 - Able to be Retrofitted on most older equipment, EVEN SPRING RIDE
 - Not available on Doubles (2 Pull trailers with a converter or turntable)
- ❑ Combining 3" lower center of gravity and the wider track width option could prevent the occurrence of 27% of rollovers! (NTSB safety recommendation 9/2/11)
- ❑ Couple this with a RSD and the tolerance for driver error (The ingredient most prevalent but also most difficult to control) grows!



References for More Information

- Bendix – www.bendix.com
 - Search “Roll Stability”
- Haldex – www.haldex.com
 - Search “Roll Stability”
- Wabco – www.wabco-auto.com
 - Search “Roll Stability”
- Cargo Tank Roll Stability Study
 - Prepared by Battelle
 - <http://www.fmcsa.dot.gov/safety-security/hazmat/cargo-tank-roll-stability-finalreport-april2007.pdf>
- NTSB Safety Recommendations – September 2, 2011



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QUESTIONS

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