



TRAILER SAFETY OVERVIEW

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Topics

- Review the Basics
- Braking Performance
- Wrap Up



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Why we are here.....



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Review Some Basics



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Four Rights of Towing

- **Built Right**
- **Maintained Right**
- **Hooked Up Right**
- **Loaded Right**



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Built Right

- Axles – Capacity and Location
- Brakes – 3,000 lbs. GVWR +
 - Electric Brakes
 - Safety Breakaway
 - Hydraulic Brakes
 - Sufficient Size
- Wheels & Tires – Adequate Size
- Alignment – Spindle to Coupler
- Coupler – Capacity and Size
- Safety Chains – Each = GVWR



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Built Right (con't)

- Lighting – DOT Compliant
 - Chart provided in your handouts
- Labels & Warnings
- LOOK FOR THE NATM COMPLIANCE DECAL



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Maintained Right

- Coupler
- Safety Chains
- Hubs
- Wheels & Tires
- Frame and Undercarriage
- Lights and Wiring



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Maintained Right

- Trailer Brakes
 - Electric
 - Hydraulic
- Surge Brake Couplers
 - Master Cylinder Fluid
 - Rollers
 - Dampers



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Hooked Up Right

- Hitch
- Ball Size & Class
- Weight Distribution & Sway Control
- Light Hookup
- Safety Chains
- Level Towing
- Inspection



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Hooked Up Right

- Wiring
 - Correct Plug and Wiring
 - 4-Way
 - No Brakes
 - 6-Way
 - Brake wired correctly – S-pole not Center Pole
 - 7-Way
 - Two conventions – SAE J2863 & RV/Light Truck
 - Standards SAE J560, J1239, J1292, J2863



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Loaded Right

- Adequate Tow Vehicle
- Proper Weight Distribution
 - 10 – 15% Tongue Weight (Bumper Pull)
 - 20 – 25% Tongue Weight (Goosenecks)
 - Balanced side to side
- Proper Load Securement
- All Affects Braking Performance



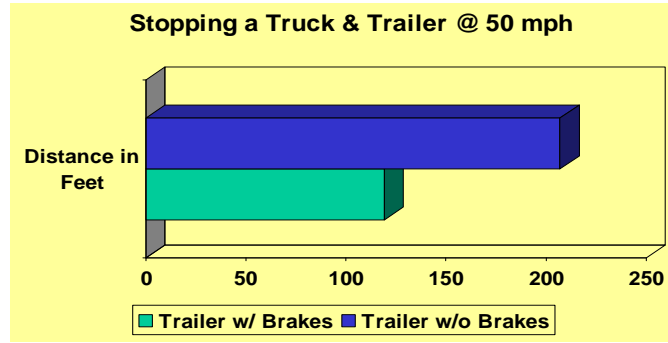
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Brakes & Braking Performance

Sample braking distance for Combination Vehicles



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Brakes & Braking Performance

Control System –Electric Brakes

- Synchronize Trailer & Tow Vehicle
 - Make several hard stops
 - If trailer skids decrease “Gain” on the Controller
 - If trailer does not skid increase slightly
- If Adjusting Synchronization During Transport
 - Slow Down below 30 MPH
- Remember to Adjust when Trailer Payload Changes



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Brakes & Braking Performance

Surge Coupler – Hydraulic Brakes

- Self contained on the trailer
- Mechanical to mechanical operation
- Important that the fluid be kept full and the reservoir is checked often



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Tip-over Performance

Refers to the amount of g's (centrifugal force) the trailer can sustain when going around a turn before losing its load, either from poor securement or rolling over.



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Tip-over Performance



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How to Avoid

- Track of tires need to be greater than 2 x's the height of the center of gravity (cg).
- Divide the track width (t) by 2 times the cg height (h) referred to as " $t/2h$ "
 - Keep $t/2h > 1.0$ for reduced roll-over potential
 - $t/2h < 1.0$ has a greater propensity to roll over
- Tractors typically run around a $t/2h$ of 0.5 but they go slow and use dually wheels
- So let's see how it applies to us.....

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Example

- Skid steer has cg of 3 ft
- Trailer is 1.5 ft height deck
- Center of gravity is 4.5 ft
- Trailer track width is 6 ft (e.g., centerline width between tires on an axle)
- $6 \text{ ft} / 9 \text{ ft} = .67$ which is less than one



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Remember!!

Doubling your speed around a corner increases the centrifugal force by 4 times.



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Wrap-up

- Be Smart – Understand Trailers
- First Step – Buy NATM compliant trailers
- Next – Ensure an Owner’s Manual is available
- Finally – Educate your customers or Employees



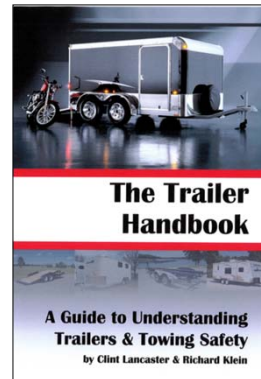
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The Trailer Handbook

- Find more information on the topics in the presentation in The Trailer Handbook.
- Order at www.natm.com
\$19.95 – Retail
- Quantity Pricing is available



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Thank You



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