



2024 Truck & Bus Technology Subcommittee ACS60(5)

ESC Technology Overview & Impacts

01/08/24

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Agenda

- Introductions
- Stability Control Mandate and What's Happened
- Stability Control – Technical Primer
- Driver, Fleet, Maintenance – Experience & Responsibilities
- Foundation for the future - System Evolution



Important Baseline to Keep in Mind...

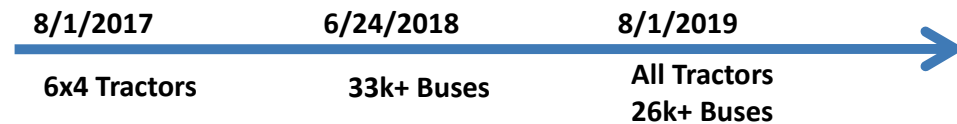
- The driver is responsible for the safe operation of the vehicle – AT ALL TIMES
- Driver Assistance, not driver replacement
- The fleet is responsible for training drivers and techs on the systems, Suppliers / OEMs can assist when asked



Stability Control Mandate - Overview

NHTSA: FMVSS 136 – The Stability Mandate

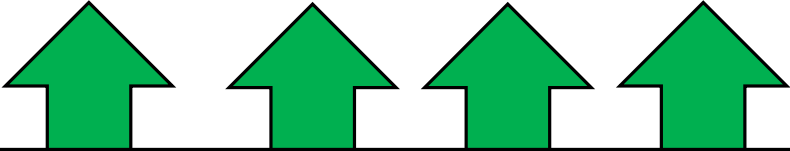
- **Final Rule issued June 2015**
 - 3 Phase implementation
 - Industry supports tech choice
- **Vehicles impacted:**
 - Class 7 & 8 air-braked truck tractors
 - Class 7&8 air-braked and hydraulically-braked (Class 7) motorcoaches
- **Vehicles not included:**
 - Single-unit Trucks
 - HD Severe Service - axle that has a gross axle weight rating of 29,000 lbs. or more.
 - **School Buses**
 - Perimeter seating buses
 - Transit buses
 - Specialty - Slow moving tractors or buses (33mph in 2 miles)



Stability Control Mandate – The Numbers

Comb Vehicles Registered	MM Traveled	Rollover Total	Jackknife Total	Rollover / 1000 Com	Jackknife / 1000 Com	Rollover / MMT	Jackknife / MMT
3,143,484	195,389	7,862	5,127	2.5	1.6	0.040	0.026
2,469,094	163,602	11,281	5,163	4.6	2.1	0.069	0.032
2,010,335	142,370	14,325	5,280	7.1	2.6	0.101	0.037

2021
2012
2004



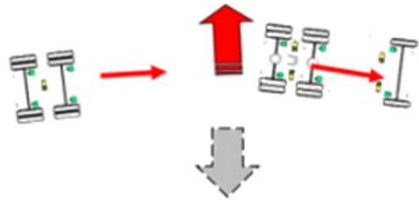
**Significant declines in rollovers and strong decline in jackknifes on per 1M comb vehicle; per MM basis...
Not just mandate, but increasing availability of stability control (standard position), driver training & feedback, awareness**

Sources: 2021 Large Truck & Bus Crash Facts - 11/23 - Vehicles Table 15 pg.75
 2021 Large Truck & Bus Crash Facts - 11/23 - Vehicles Table 17 pg.76
 2021 Large Truck & Bus Crash Facts - 11/23 - Trends Table 20 pg.31
 2012 Large Truck & Bus Crash Facts - 06/14 - Vehicles Table 7 pg.59
 2012 Large Truck & Bus Crash Facts - 06/14 - Vehicles Table 8 pg.60
 2004 Large Truck & Bus Crash Facts - 03/06 - Vehicles Table 43 pg.44
 2004 Large Truck & Bus Crash Facts - 03/06 - Vehicles Table 44 pg.44

Stability Control – Technical Primer

- What makes it works:
 - ABS Foundation
 - Engine torque limiting
 - Additional Sensors – SAS; LAS; YRS
 - Individual Wheel End Braking
- Vehicle Considerations
 - Tractor-Trailer vs. Single-Unit Trucks
 - Trailer Stability Control
- Situational Considerations

- Driving speed exceeds the threshold
- Surface friction sufficient to resist
- Vehicle prone to **roll over**

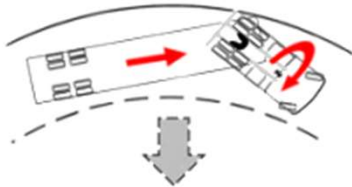


System applies all brakes to:

- Reduce speed
- Reducing tendency to roll over

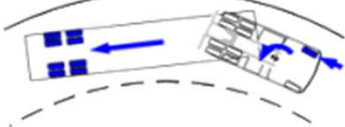


- Driving speed exceeds the threshold
- Lateral force exceeds surface friction
- Vehicle begins to slide/jackknife



System applies individual brakes to:

- Reduce speed / correct orientation
- Reducing tendency to jackknife/slide



Stability Control – Driver, Fleet, Maintenance Experience & Responsibilities

- Driver Responsibilities:
 - Normal Driving
 - Telltales
 - Review Available Info
- Fleet Responsibilities:
 - Driver Training
 - Technical Training
- Maintenance Responsibilities:
 - Hierarchy of Issues
 - Components
 - Other Systems – ABS; Wheel End; Tires



Stability Control – Foundation for the Future / System Evolution

- Vehicle Expansion
 - Single-Unit Trucks
- Collision Mitigation
 - Brake Strategy
 - Slick Surface Support
- Evolving Braking System
 - EBS is the Future
- Smart Trailer Technologies
 - Trailer EBS & Connectivity



Safe driving practices are still critical



WARNING

Improper use of Bendix Advanced Driver Assistance System technologies can result in a crash causing property damage, serious injuries or death.

The driver is always responsible for the control and safe operation of the vehicle at all times. Bendix Advanced Driver Assistance Systems do not replace the need for a skilled, alert, professional driver, reacting appropriately and in a timely manner, and using safe driving practices.

...Driver Assistance NOT Driver Replacement!

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Thank you!

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