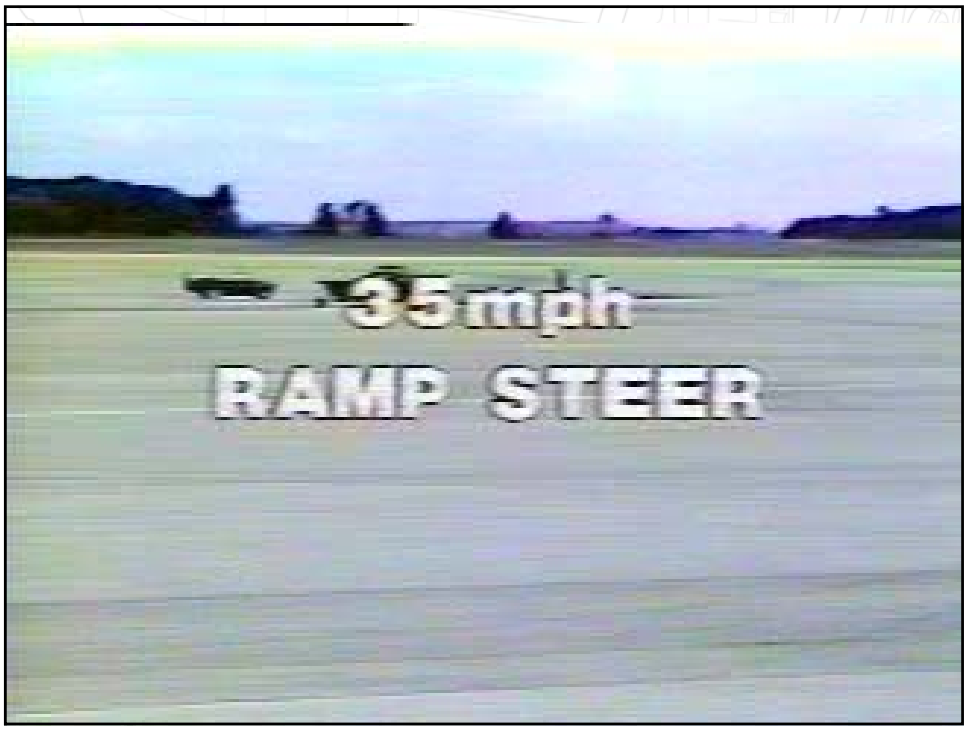
# TRS - Trailer Roll Stability

Todd Bourque
Canadian OEM Sales Manager
Braking Controls Division
Haldex Brake Products, Inc.





## Accident Statistics

In 1998, there were over 22,000 rollover crashes in the U.S.
- 680 Fatalities (12.7% of total)
- 7,858 Injuries (18.7% of total)
- $2.1 - $21 million in cost

In 2000, NHTSA reported for U.S. Large Trucks
- 453,000 Accidents
- 5,362 Fatalities
- 42,000 Injuries
- $24 billion in insurance losses

Trucks overturning at exit ramps caused 5% of fatalities

The National Transportation Safety Board in the U.S. considers that some 4,000 of the 15,000 large truck rollovers could be avoided with advanced warning. (27%)
- 27% of 680 fatalities or 183 lives saved
- 27% of 7,858 injuries or 2,121 avoided injuries
- 27% of $21 million cost or $5.7 million cost avoided

## Accident Statistics

In 1998, there were over 22,000 rollover crashes in the U.S.

- **680 Fatalities (12.7% of total)**
- **7,858 Injuries (18.7% of total)**
- **$2.1 - $21 million in cost**

In 2000, NHTSA reported for U.S. Large Trucks

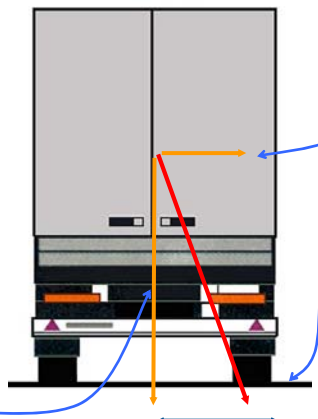
- **453,000 Accidents**
- **5,362 Fatalities**
- **42,000 Injuries**
- **$24 billion in insurance losses**

Trucks overturning at exit ramps caused 5% of fatalities



## Why a Rollover occurs

**Speed**
**Turning Radius**
**Height of Load**
**Track Width**



## Where does TRS come in?

TRS can not change the driving speed, turning radius, load position, tire profile, track width or road conditions.

TRS can brake the vehicle and ***Slow It Down*** using advanced braking technology called

# *TRS - Trailer Roll Stability*



## TRS – Trailer Roll Stability

- TRS is a Trailer ABS system with the added function of Roll Stability for trailers with constant power and air suspensions.
- It operates independently of the towing vehicle system.
- It does not require the driver to apply the brakes. The system automatically applies the brakes to slows the vehicle down when a roll event is detected.
- It will reduce the chance of a rollover. Any vehicle may overturn in certain situations with or without TRS.

# Where used

Current Available Applications

- Single, Tandem, or Tri-Axle Semi Trailers, Full Trailers, and Canadian B-Trains
- Disc or Drum Foundation Brakes
- Air Suspension
- New Equipment (OEM Installed), or Used Equipment (Retrofitted)

Configurations

- 4S / 2M or 2S / 2M
- Side-by-Side



# Technology used

New Technology

- Added 1 lateral accelerometer
- Added 1 brake apply solenoid
- Added 1 port to connect the air bags
- Added 5 pressure transducers

Existing ABS Technology

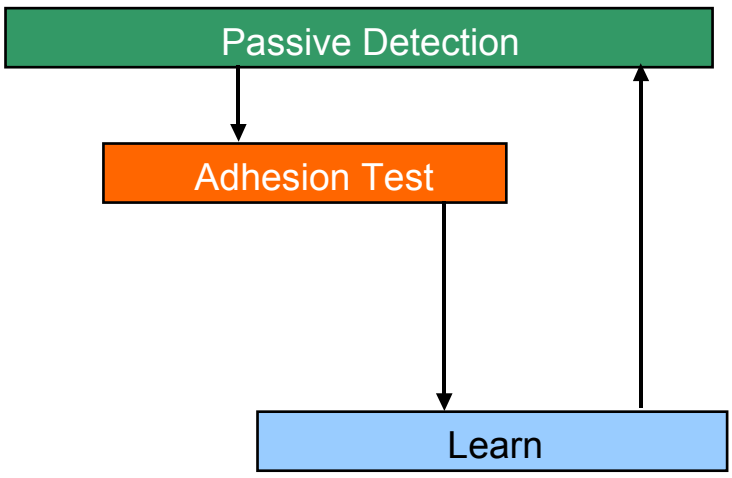
- Service brakes using standard relay pistons
- ABS using standard hold & dump solenoids
- Electronic Controller
- Electronic Odometer
- PLC

# TRS Operation

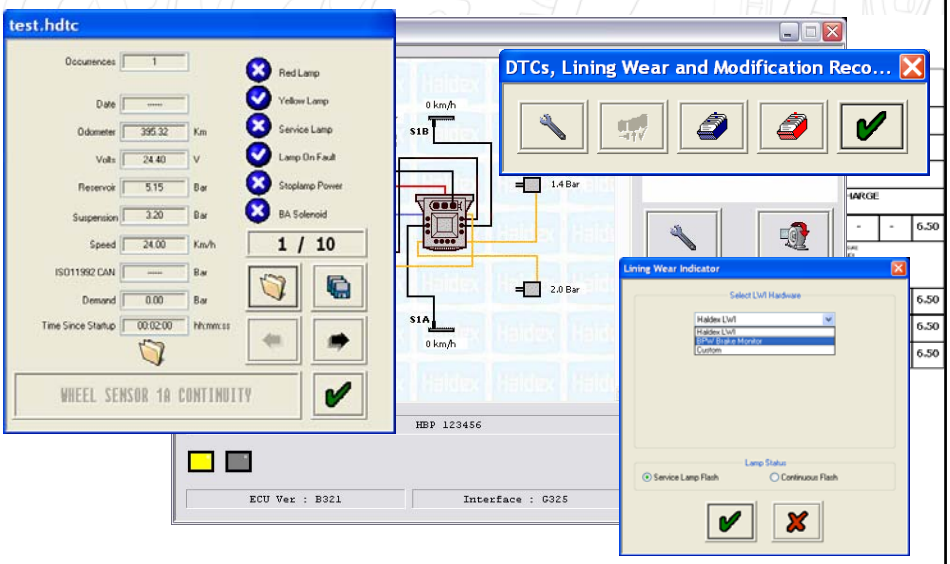
**Under TRS braking, the ECU receives input from the rollover stability accelerometer of an unstable vehicle condition. The ECU then looks at the trailer's wheel slip to determine if there is an impending roll event. Depending upon how the wheels are responding, the ECU will decide if the trailer's brakes need to be applied on the opposite side to Slow Down the vehicle combination.**



# TRS – no roll event

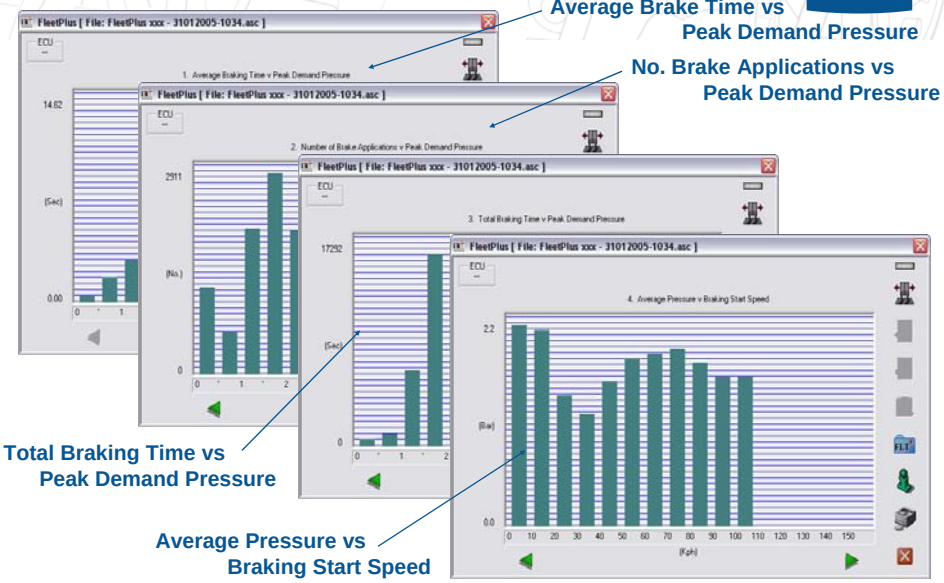


# DIAG+ Software

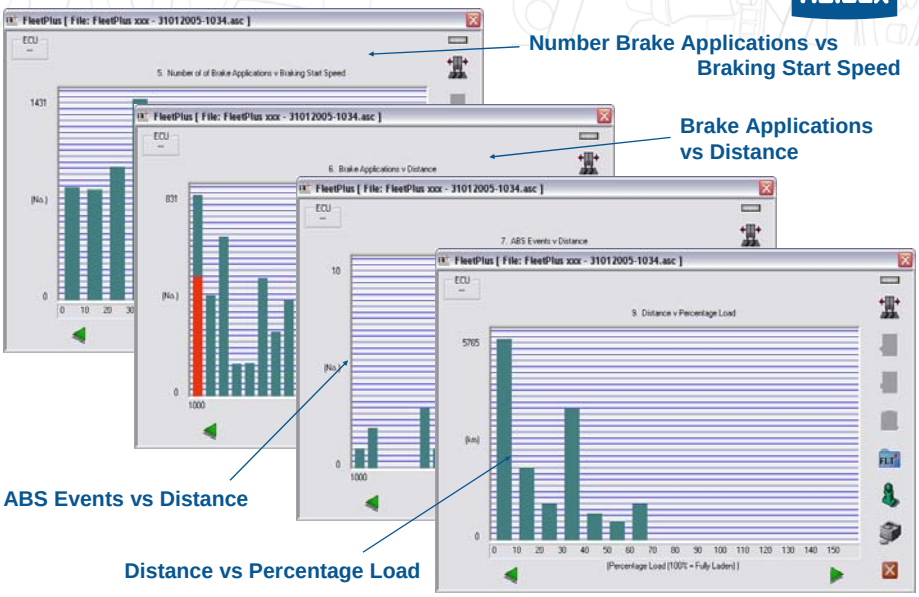





# Fleet+

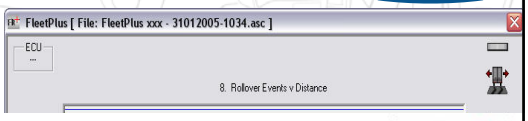


# Fleet+






# Fleet+




## Stability Snapshot

| Info | Filename | Vehicle Ident Number | ECU Data Saved At: |
|---|---|---|---|
| FleetPlus v1.5 | FleetPlus xxx - 31012005-1034.asc | xxx | 31/01/2005 - 10:34 |

The data shows the important parameters and settings that were present in the EBS when the Stability Event occured.

| | | | |
|---|---|---|---|
| Stability Snaphot | 2 of 27 | Date | Not Set |
| Stability Sensor Output | 0.33 g | Time Since Startup (HH:MM:SS) | 00:28:54 |
| SYSTEM PARAMETERS | | SYSTEM SETTINGS | |
| Odometer | 12059 km | Red Lamp Signal | OFF |
| Voltage | 27.6 V | Cab Lamp Signal | OFF |
| Reservoir Pressure | 7.80 Bar | Service Lamp Signal | OFF |
| Suspension Pressure | 2.75 Bar | Stop Light Power | OFF |
| Vehicle Speed | 72 kph | Brake Apply | ON |
| ISO Demand Pressure | 0.00 Bar | | |
| Control Line Pressure | 1.30 Bar | | |

THANK YOU!
Haldex
Innovative Vehicle Technology