FUEL EFFICIENCY FOR TRAILERS

California Air Resource Board Symposium
Phase 2 Greenhouse Gas Emissions Standards for On-Road Heavy Duty Vehicles

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Gus Sumcad
Director Engineering
1. Introduction to Wabash National
2. Current State of Trailer Technologies
3. Next Generation of Trailer Fuel Efficient Technologies
INTRODUCTION TO WABASH NATIONAL
About Wabash National Corporation

- Founded in 1985
- NYSE (WNC)
- 2014 Revenue: $1.9B
- 6,000 Associates (full time & contract)
- 12 Manufacturing locations in 3 countries
- 18 Company-owned Retail Locations
- 2014 New Trailer shipments: 57,350

- #1 in Total Trailer production for 19 of past 25 years
- #1 in Dry Van Trailer production
- #1 Manufacturer of Liquid Tank Trailers
- #3 in Refrigerated Van Trailer production
- Top 3 in Platform Trailer production

Source: Trailer Body Builders Magazine
Wabash National Aerodynamics Program

- **Expertise:** Dedicated team that designs and supports aero products
- **Extensive Testing:** Computer Simulation Modeling, Wind Tunnel Testing, Track Testing, Test Lab Durability Testing, and Road Testing
- **Outreach:** EPA, NHTSA, CARB, and other stakeholders
### Trailer Technology and Technology Drivers

#### Trucking Fleet Initiatives
- Increased payload capacity
- Reduce weight
- Improve fuel efficiency
- Low total cost of ownership
- Safety
- Extend lifecycle

#### Technology Initiatives
- Improvements in Aerodynamics/Fuel Efficiency
- Development of High Strength and Lightweight Materials and Components
- Improvements in Product Safety
- Corrosion-resistant Technologies

*fuel efficiency related*
CURRENT FUEL EFFICIENCY TECHNOLOGY EXAMPLES

- **Trailer Mounted Gap Reducers**
  Saves 1-2%

- **Trailer Boat Tails**
  Saves 1-6%

- **Trailer Side Skirts**
  Saves 4-8%

- **Low Rolling Resistance Tires**
  Saves 2-4%
  (Duals and Wide Base)

- **Tire Inflation**
  Saves 1-2%

- **Trailer Under Tray Systems**
  Saves 1-3%

Source: Performance Innovation Transport, Cascade Sierra Solutions, Device Manufacturers Data
NEXT GENERATION OF TRAILER FUEL EFFICIENCY TECHNOLOGY
TRAILER AERODYNAMICS TECHNOLOGY CONSIDERATIONS

- Real World, Quantifiable Fuel Efficiency Benefits
- Cost Effective/ROI
- Safety and Durability
- No Interference with Normal Operations
- Effect on Freight Capacity (Freight Efficiency)
Wabash National’s Newest Products Offerings

SmartWay Elite Aerodynamic Technology Combination

Duraplate® Aeroskirt™

- 4-6% Improvement

VENTIS® DRS™

WABASH AEROFIN™

- >9% Improvement

US EPA Certified SmartWay

Multiple Fuel Savings options. Typical payback is 12-18 months.
TMC Show February 16-19, 2015 @ Music City Center, Nashville, Tennessee
Customers adopting technology to reduce fuel consumption & manage costs
Most Tanker Trailer applications are highly customized.
Applications largely local and regional transportation.
Local and regional hauls average less than 65mph.
Aerodynamics improvement benefits in local and regional speed likely limited.
Standardized *skirt* designs limited by undercarriage custom plumbing, piping, and accessibility requirements.
Possible *wake convergence device* opportunities – could reduce wake in Trailer Rear Area.

Tankers will not likely see benefits of aerodynamics devices because of duty cycle.
Navistar SuperTruck Projected Freight Fuel Efficiency – 70% improvement

- 30% aerodynamics improvement
- 25% engine efficiency improvement
- 10% weight reduction
- 5% reduction in parasitic loads

Wabash National & Navistar Aerodynamics Collaboration

- Rear
- Nose
- Underbody
- Side Skirts – Ventix DRS @ 8.5% FS

Initial Wind Tunnel testing results indicate goal is achievable

- 0.300 Cd
- 30% system reduction in Cd
- 15% FS

1 December 2014, Truckinginfo.com, “Navistar Outlines SuperTruck Progress”
TRAILER AERODYNAMICS — FUTURE OPPORTUNITIES

- **Trailer shape** → requires changes in length, weight, and height regulations (State and Federal)
- **Matching tractor and trailer** → requires greater collaboration between truck and trailer manufacturers
- **Variable Ride Height Suspensions** → new technology in development
- **Lighter Weight Components** → costs Vs weight savings benefits

SOURCE: Navistar SuperTruck DOE Merit Review, May 2014

Technology and design will continue to evolve – fuel savings $ are the driver