



Fuel and Costs Savings at the Terminal

ZF-AS Tronic mid for Terminal Tractors

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IXSC

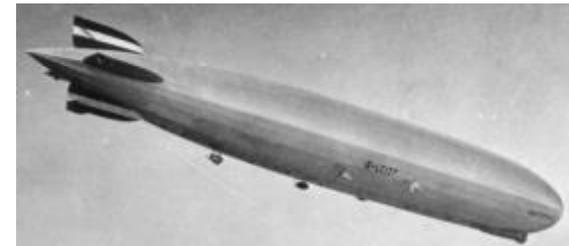
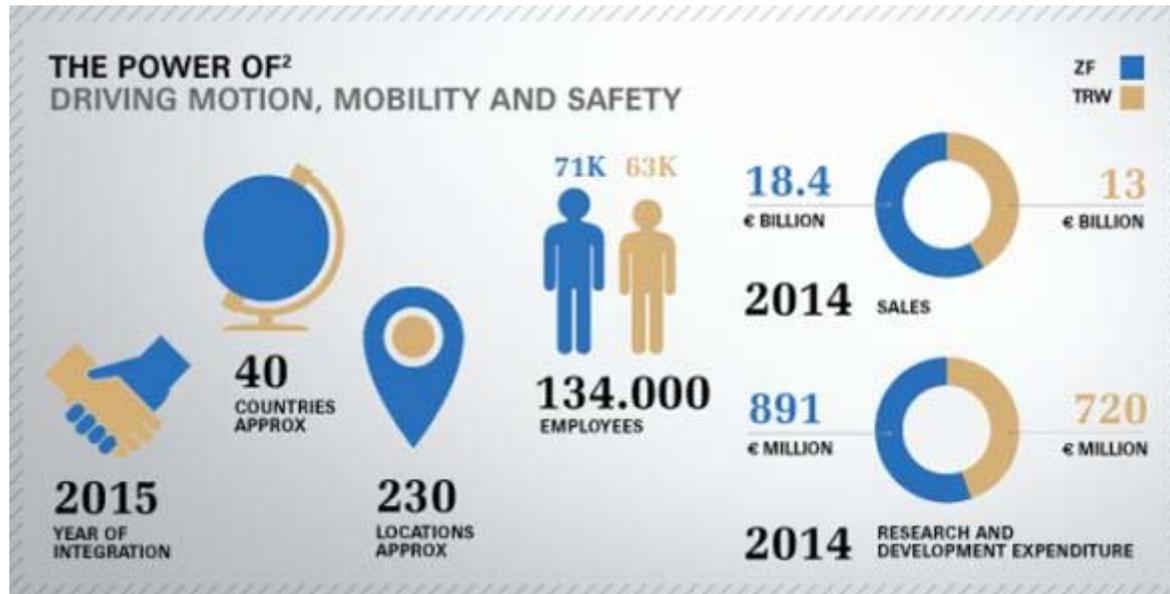
ZF Friedrichshafen AG



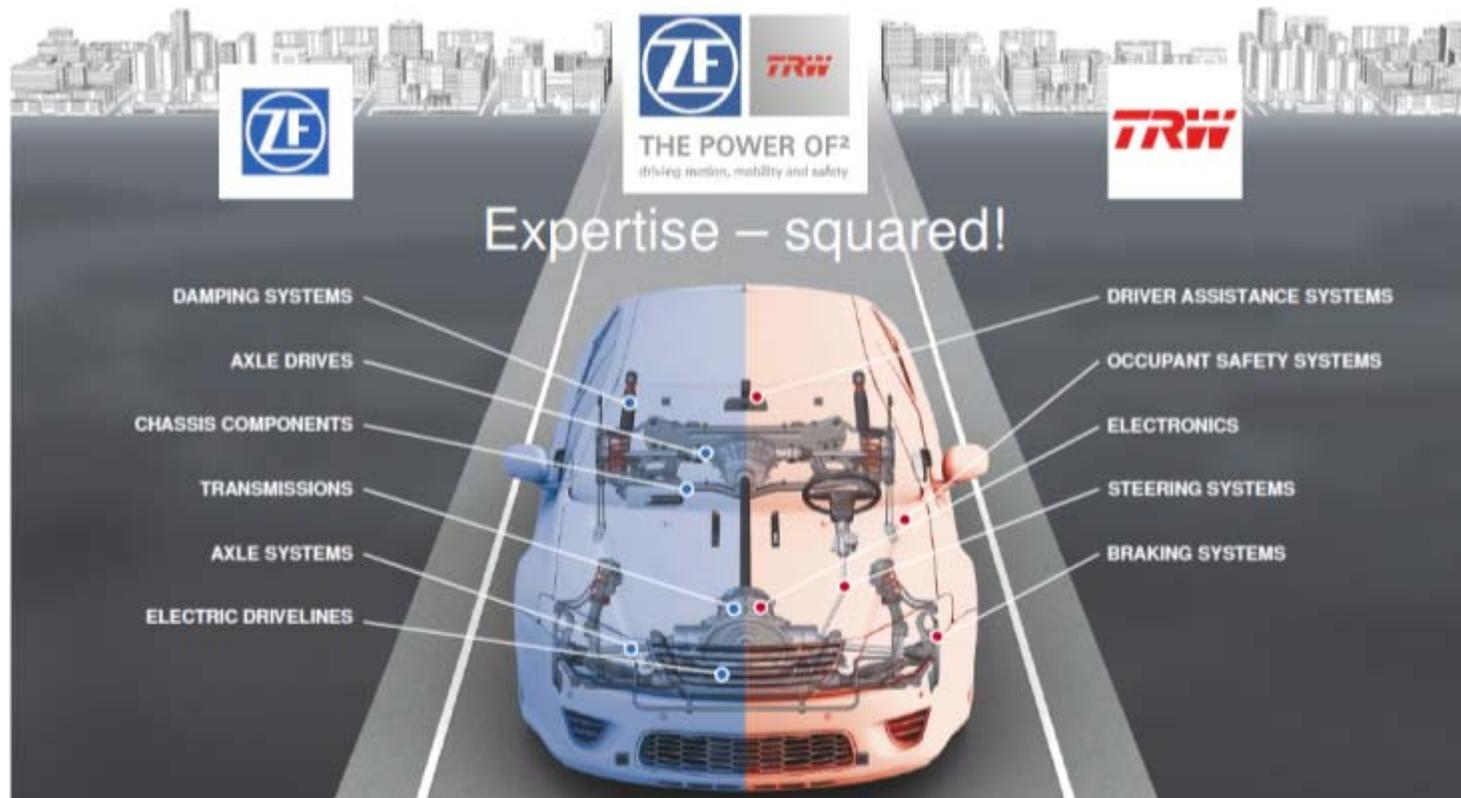
Do you know ZF?



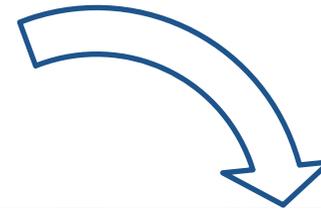
ZF 1915 – today



ZF & TRW – THE POWER OF²



ZF transportation at the port



High Demands on Terminal Logistic

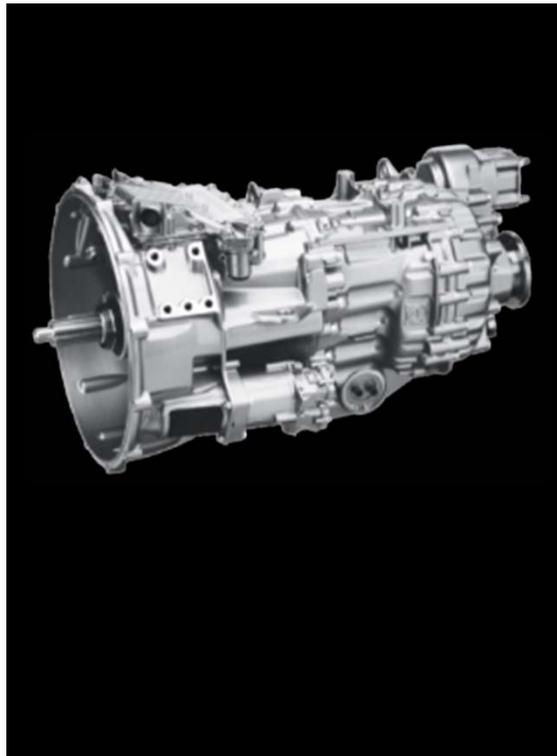


- Up to 24 hours/7 days operation time
- Constant stop and go
- Different, unskilled drivers (shift worker)
- Higher demands on emission/fuel reduction



ZF Transmission system with reduced fuel consumption, longer oil change and service intervals

We have your solution! – ZF-AS Tronic mid



- Innovative, automatic transmission system
- Significant reduced fuel consumption
- Emission reduction
- Reduced life cycle cost thanks to up to 4 years oil change interval

12-Speed – Always the Right Speed



Quite natural, when have to be fast skip unnecessary steps

- picking the right gear out of 12
- if possible in 4 steps to maximum vehicle speed
- maximum acceleration for maximum productivity
- all the time in the most economic engine speed

Engine off – no fuel is burned



Save the max

- Don't burn your money!
- Turns engine off while waiting with start stop systems!
- Yes, WE can!
ZF AS Tronic is start-stop – ready to save YOUR money!

Easy Operation



Just two pedals & a range selector

ZF-AS Tronic mid – Conclusion of your Advantages



Economic efficiency



- Fuel savings up to 10% plus
- Emission reduction

Comfort



- Automatic gear changing
- Easy handling

Safety



- Driver can focus on traffic and cargo

Service and Life Cycle cost



- Longer oil change intervals (up to 4 years)
- No oil filter change necessary
- Transmission overhaul after 4 years



Results from Port of Singapore in 2007



- 8% lower FUEL consumption than 6-speed power shift transmission
- 1 OIL change in 4 years
- no OIL filter change
- 1 OVERHAUL in 8 years vehicle life time

Tested on 750 vehicles

Results from Ports of Malaysia and Europe in 2010

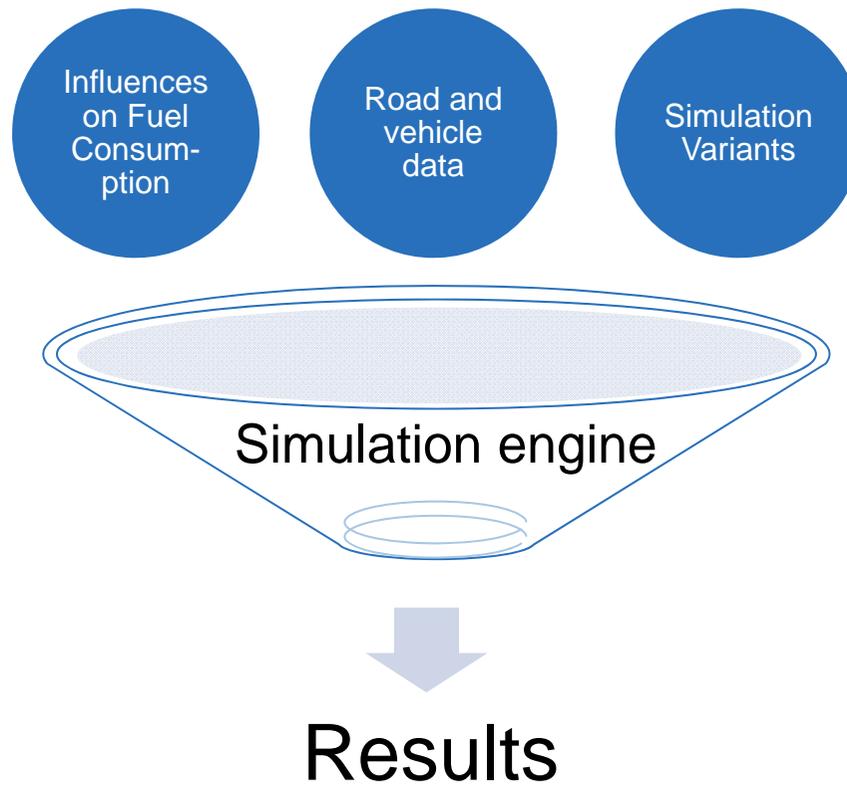


- Up to 20% lower FUEL consumption than a 4-speed power shift transmission
- 1 OIL change in 4 years
- no OIL filter change
- 1 OVERHAUL in 8 years vehicle life time

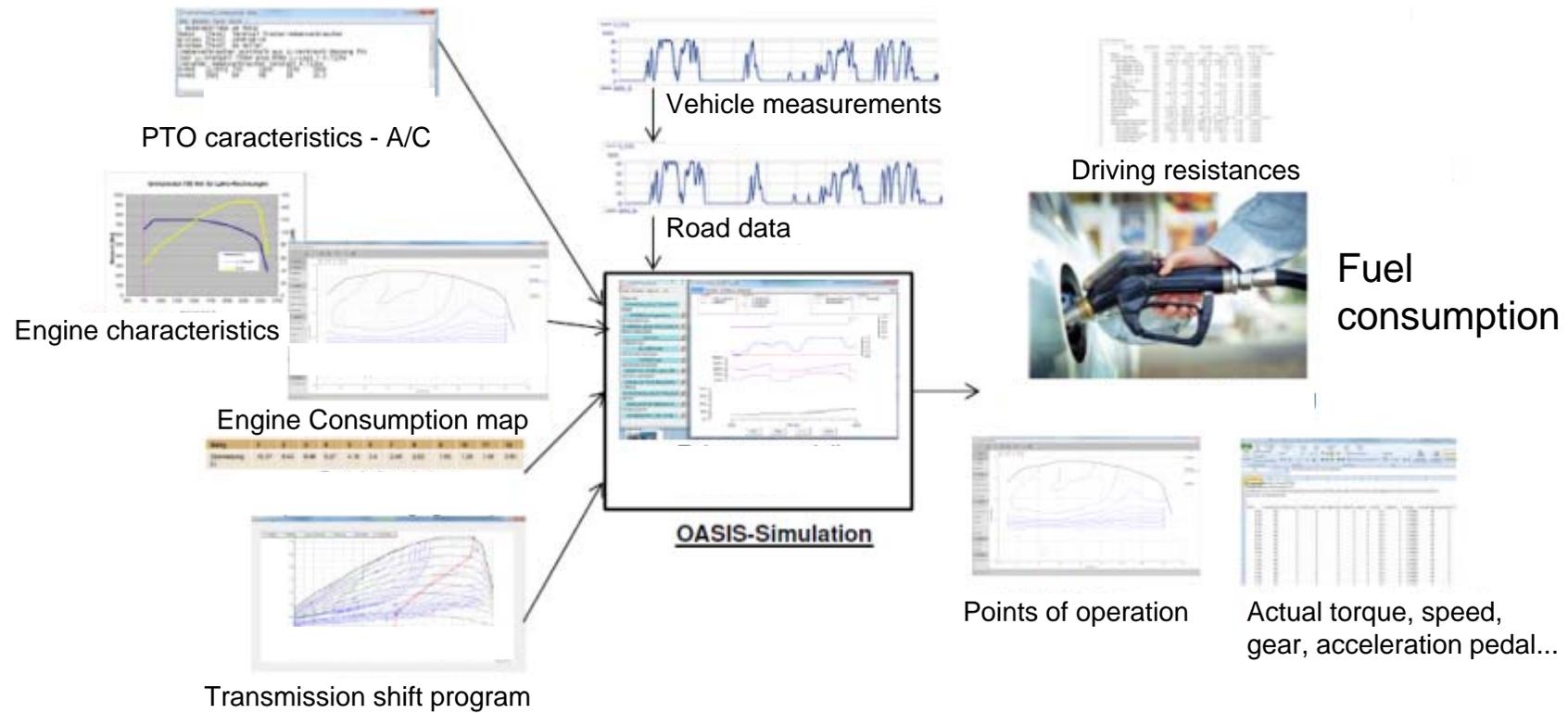
Fuel Consumption Simulation Study (2015)



How we did the Simulation



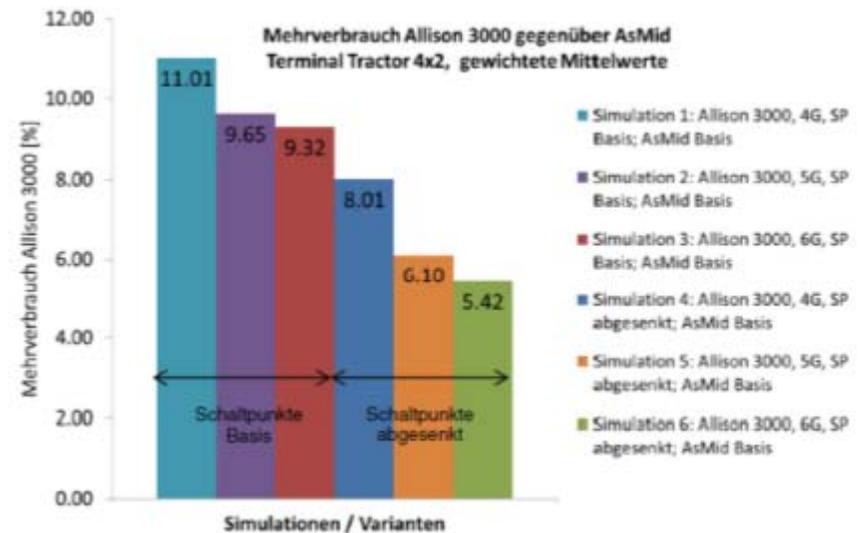
How we REALLY did the Simulation



And our Simulation Results



- In spite of the optimization on the power shift transmission the fuel consumption will be **6% – 11%** higher than the AS Tronic transmission
- The 5th speed on the power shift transmission reduces the fuel consumption by only 2% compared to the 4 speed tm.
- The 6th speed on the power shift transmission gives almost NO extra benefit.



And what it REALLY means for the Operator



AS Tronic transmission saves between 1700 liters and up to 3300 liters of FUEL per YEAR and per VEHICLE

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ZF Innovation Truck



ZF future-proof

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