



Fuel and Costs Savings at the Terminal

ZF-AS Tronic mid for Terminal Tractors

Cornelius Witte
IXSC

ZF Friedrichshafen AG



Do you know ZF?



DIVISION INDUSTRIETECHNIK · DIVISION INDUSTRIAL TECHNOLOGY

The image displays a comprehensive grid of technical drawings and photographs of industrial machinery parts. The grid is organized into rows and columns, with various colored headers (yellow, blue, green, orange) indicating different product lines or categories. The parts shown include:

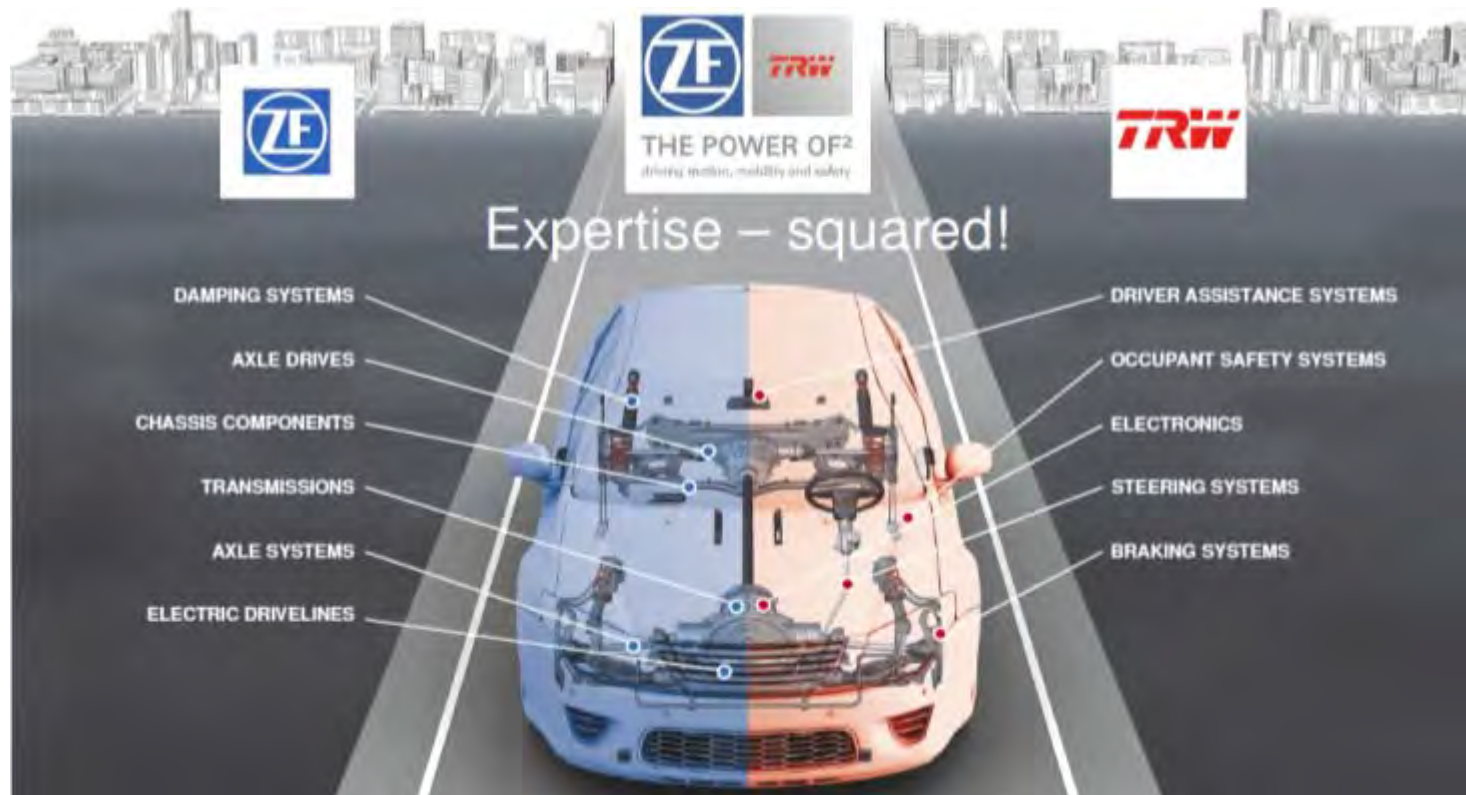
- Tractors:** Multiple views of tractor components such as gears, shafts, and bearings.
- Excavators:** Detailed drawings of hydraulic cylinders, pistons, and other heavy-duty components.
- Wind Turbines:** Components related to the drivetrain and power transmission of wind turbines.
- Ships:** Parts for marine engines and propulsion systems.
- Other Machinery:** A variety of other industrial components like pumps, valves, and structural parts.

Each drawing is accompanied by technical specifications, part numbers, and descriptive text. The overall layout is clean and professional, typical of a technical catalog or product manual.

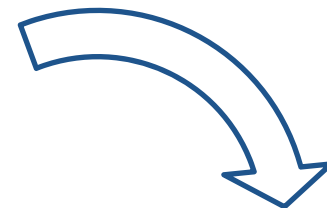
ZF 1915 – today



ZF & TRW – THE POWER OF²



The Idea: Transportation At The Port



The Product: Terminal Tractors



- 24 hours/7 days operation
- stop and go
- Unskilled drivers
- Low emission
- Low fuel consumption
- Low service cost

The Challenge



Automatic system: easy Operation



Just two pedals & a range selector

Low fuel consumption: 12-Speed transmission



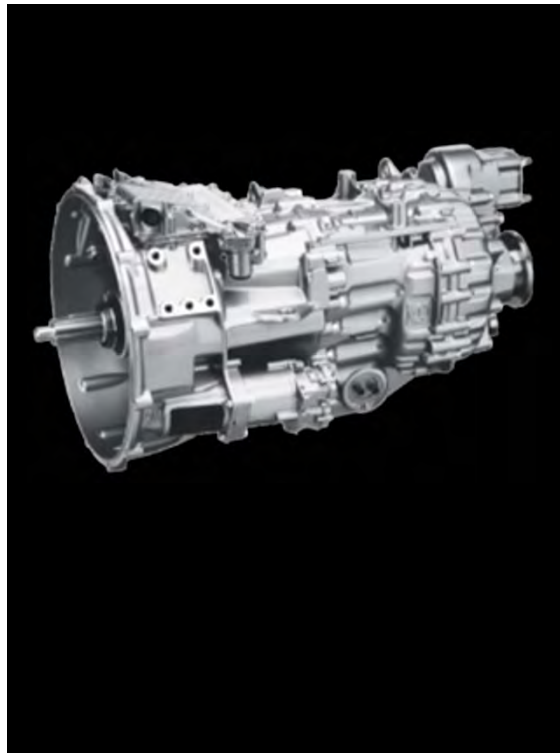
- picking the right gear out of 12
- Skip gears
- run the most economic engine speed
- Make high acceleration available
- Get maximum productivity

Engine off – no fuel is burned



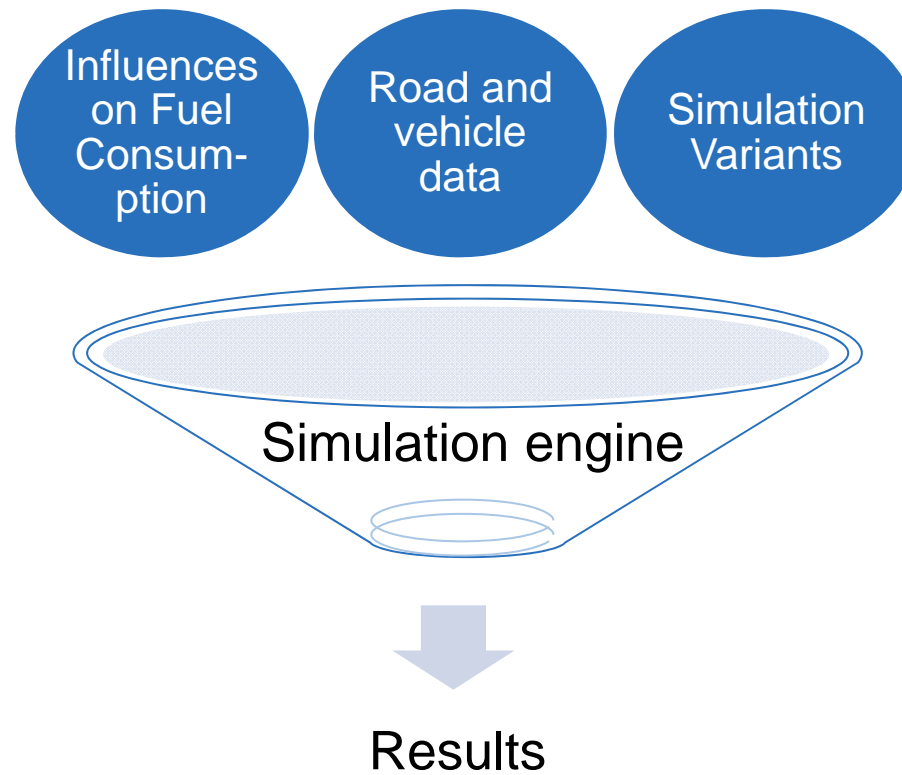
- Don't burn your money!
- Turns engine off while waiting with start stop systems!
- Yes, WE can!
ZF AS Tronic is start-stop – ready to save YOUR money!

The Transmission: ZF-AS Tronic mid

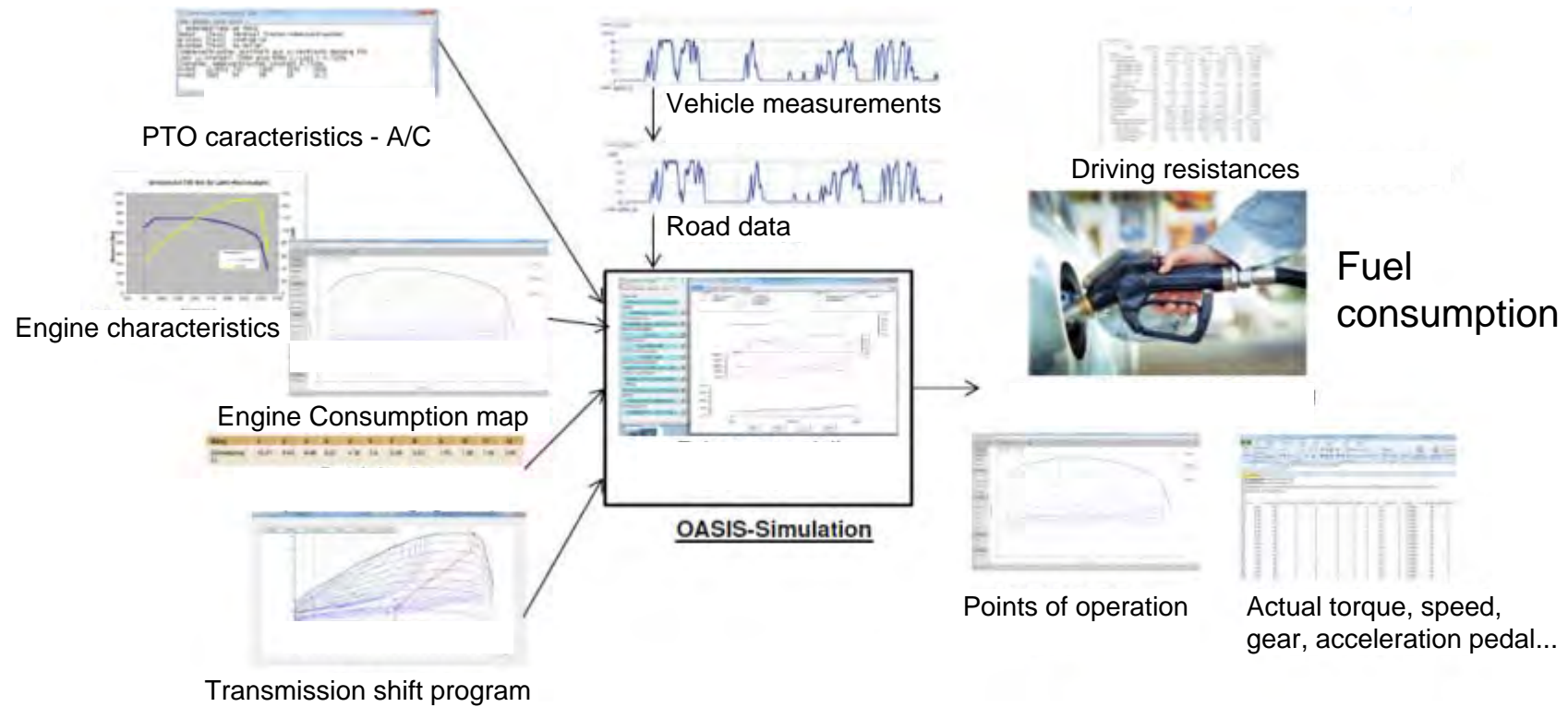


- 12 gear automatic transmission system
- 10% reduced fuel consumption
- 4 years oil change interval
- Reduced life cycle cost

The Simulation



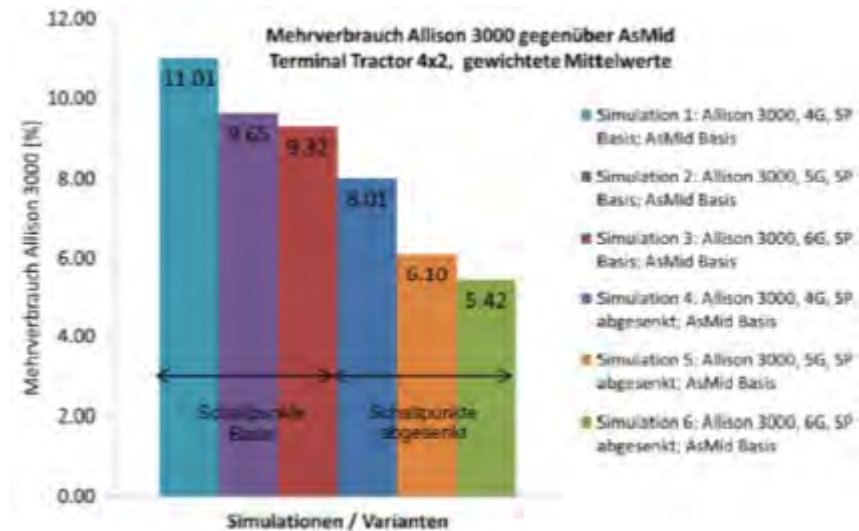
How we REALLY did the Simulation



The Simulation Results



- The fuel consumption with the AS Tronic transmission is **6% – 11% lower** than the power shift transmission
- The 5th speed on the power shift transmission reduces the fuel consumption only by 2%
- The 6th speed on the power shift transmission gives NO extra benefit.



The Test: Results from Port of Singapore



- 8% lower FUEL consumption than a 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

The Test: Ports of Malaysia and Europe in 2010



- 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

And what it REALLY means for the Operator



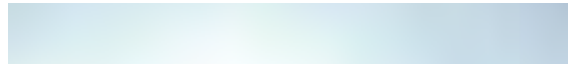
© poldy / PIXELIO

Save
1700 liters to 3300 liters
of FUEL
per YEAR and
per VEHICLE

ZF-AS Tronic mid – Conclusion of your Advantages



Economic efficiency



Comfort



Safety



Service and Life Cycle cost



- 10 % Fuel savings and emission reduction
- Automatic gear changing and easy handling
- Safe driving
- 4 years oil change intervals
- No oil filter change
- Transmission overhaul after 8 years

Check it out, visit us at our booth
or get in contact at www.ZF.com



ZF Friedrichshafen AG behält sich sämtliche Rechte an den gezeigten technischen Informationen einschließlich der Rechte zur Hinterlegung von Schutzrechtsanmeldungen und an daraus entstehenden Schutzrechten im In- und Ausland vor.