

Off-Highway Europe Engineering

A brief presentation of



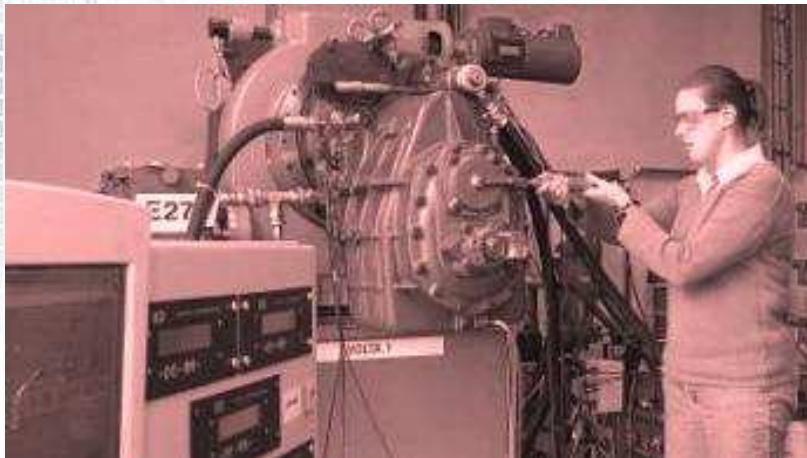
HEAVY VEHICLE TECHNOLOGIES AND SYSTEMS GROUP





People & Test Rigs

- 1 Manager
- 1 Workshop & Logistics Supervisor
- 6 Test Engineers
- 8 Test Technicians



- 1 Clutch test rig
- 2 Fatigue test rigs
- 2 Dynamometer test rigs
- 4 Functional transmission test rigs
- 5 Hydraulic test rigs
- 7 Engine (Endurance) test rigs



Classification of tests

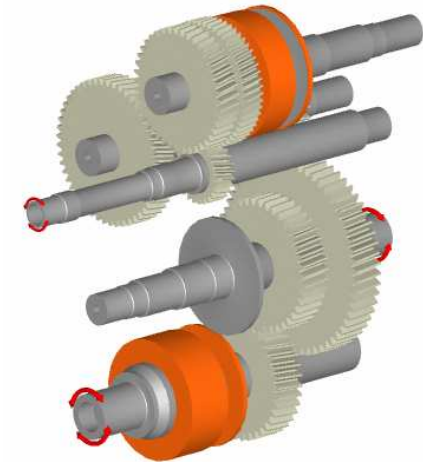
- **“Device Under Test”**
 - Component
 - Subassembly & assembly
 - Transmission
 - Vehicle
- **Duration**
 - Functional
 - Life time (Endurance)
- **Source**
 - New Product Development
 - Product Engineering
 - Production
 - Service & Warranty
 - Purchasing





Goals of tests

- Validating design models
- Defining accurate values for the parameters of the design models
- Checking functionality of prototypes
- Checking life time behavior of prototypes
- Checking supplier information
- Validating production methods
- Making testing obsolete ...



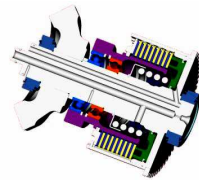


Types of tests ...

The standard component & (sub) assembly's tests are:

- **Clutch**

- Closing
- Inching
- Drag measurement
- Fatigue



- **Valve behaviour**

- **Shaft**

- Distribution of oil flows (static & dynamic)
- Fatigue (torque, bending, torque & bending)

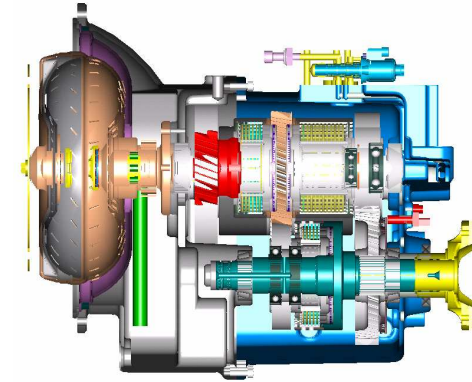




Types of tests (2)

The standard transmission tests are:

- **Functional**
- **Drag & efficiency** measurement
- **Noise** measurement
- **Gear & Bearing**, using a brake as static load
- **Forward-Reverse**, using a flywheel as dynamic load
- **Range**, using a brake as dynamic load
- **Inching**: continuous or intermittent, blocked or loaded
- **Power Take Off**: loaded by a hydraulic load





Hydraulic Test Rigs

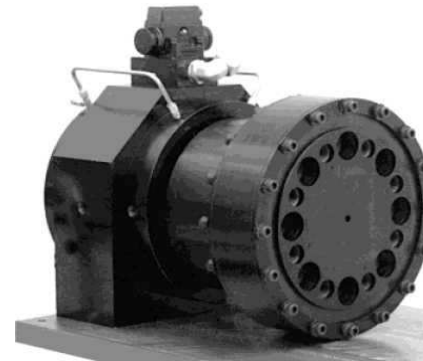
- Designed & built by TTC personnel
- Can operate in manual or automated mode
- Computer controlled
- Loads components with oil pressure & flow





Fatigue Test Rigs

- Torsion (25 kNm) & Bending
- Shafts & Clutch Drums
- Supplier of 1st: MTS (USA)





Dynamometer Test Rigs

- Electric drives:
 - 150 kW
 - 300 kW
- Electric brakes:
 - 215 kW
 - 350 kW
- Tests:
 - G&B
 - Efficiency
 - Noise





Engine Transmission Test Rigs

- Diesel engines from 75 to 320 kW
- Flywheels till 120 kg.m²
- Electric, low inertia brake of 260 kW
- Eddy current brakes till 1200 kW
- F/R, G&B, Range, PTO, Kick down & Inching tests





Test Track

- 140 m long
- 2 roundabouts
- 15% hill of 15 m





Measurement equipment

**LABVIEW
(NI)**



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