



## Virtual Engineering ... ... Engineering Services for Drivetrains

### Computer Simulation of Complete Drive Systems dedicated to Mechanical / Plant Engineering & Construction, Automotive Engineering, Shipbuilding

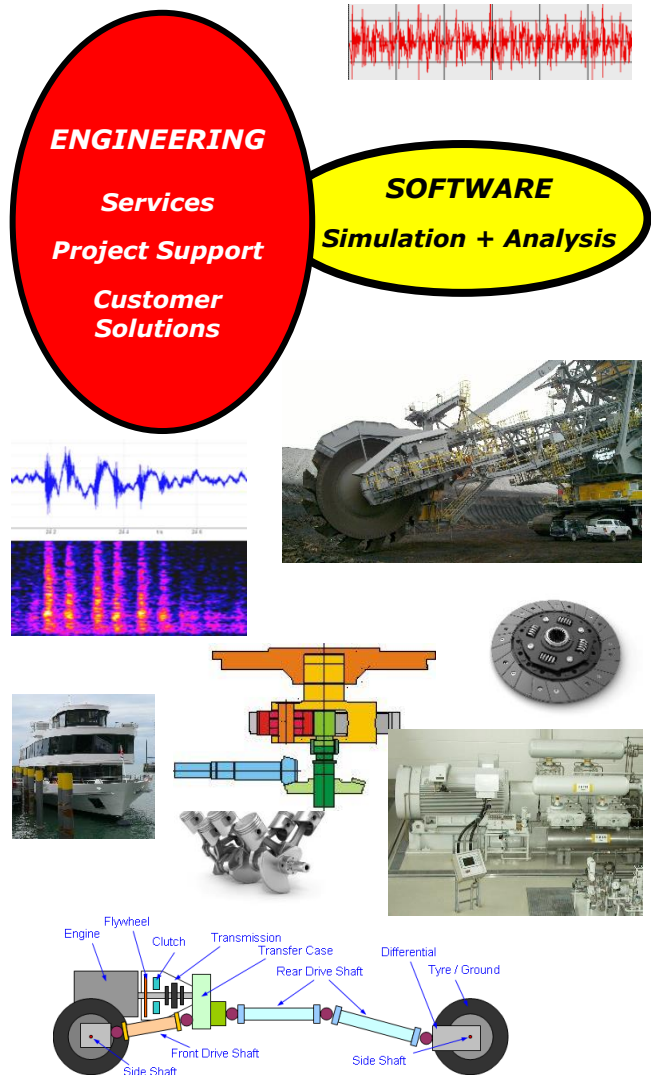
*Customer-Dedicated Engineering Services to Optimize Torsional & Lateral Vibrations in Drivelines & Powertrains (Drive Systems)*

**Laschet Consulting** is specialist in computer simulation technology. Due to longterm experiences in the simulation of complete drive systems, we offer a professional customer-dedicated **CAE Service for Engineers** worldwide. *Dr. Laschet's* personal wide expertise is based on more than 30 years professional experiences. Our customers are well-known OEMs and numerous suppliers from various sectors in the mechanical and plant engineering world. Furthermore there are excellent contacts and references in the domains of automotive, vehicle, aircraft engineering, and also shipbuilding. In particular we have special experiences in the simulation of dynamic effects within test rigs and test stands including the comparison with test results and CAE model matching.

All our **engineering services and project works** contain a practice-oriented technical consulting at the time of research and development (R & D) which is part of the "**Virtual Engineering**" process. In addition to that we help in case of real problems optionally with an appraisal of damages within a short time ("**Trouble Shooting**"). This includes the elaboration of a suitable machine diagnosis concept which may be part of an effective "**Predictive Maintenance**" strategy.

Our engineering services are industry and field proven to illustrate solutions in order to **optimize complete drive systems** with respect to the dynamic behavior.

One of the key targets of our engineering support is the minimization of torsional vibrations and also the study of further dynamic effects like lateral vibrations (or any other rotordynamic effects in high-speed machinery), or the special analysis and prevention of so-called NVH effects in automotive drivelines. The analysis may also incorporate the tuning and matching of CAE models considering corresponding test results.



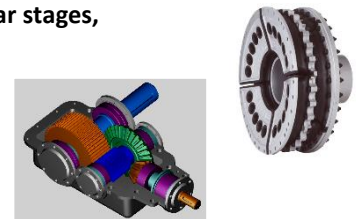


# Virtual Engineering for the Analysis of Drivetrains ...

To realize these ambitious jobs successfully we count on powerful **simulation tools** (like ITI-SIM, SimulationX, ARMD, own simulation software), but also on our own **long-term experiences**. What we can confirm as learnt from the past: **Engineer's brain is the most important „tool“**. Even powerful software cannot replace the engineer.

## Applications of our CAE Engineering Services for "Drive Engineering" ...

- turbomachinery, extrusion machines, crushing machines, cement mills, machine tools, etc.
- compressors (reciprocating compressors, screw compressors) in connection with electric motors, gas engines
- pumps, ventilators (fans, blowers)
- vehicle or ship drivelines with reciprocating engines, electric motors, hybrid drive technologies
- drive systems in the aircraft and aerospace industry
- drivelines as complete systems with couplings, dampers, absorbers, clutches, gear stages, universal (cardan) shafts, etc.
- configuration of test stands (test rigs) incorporating measurement results
- fine tuning of prototypes to optimize the dynamic behavior



These are the typical subjects which we cover with our CAE analyses:

- "Torsional Vibration Analysis" (TVA)
- "Lateral Vibration Analysis" (LVA) optionally with additional studies (in particular of fluid-film bearings) as part of a comprehensive "Rotordynamic Analysis"
- simulation of NVH effects in vehicle drivelines (optionally with studies of sensitivity and target conflicts)
- application of various simulation methods (including CAE model matching):
  - a) steady-state simulation (in the frequency domain)
  - b) non-steady-state (transient) simulation in the time domain; study of nonlinear effects

You may also request our list of publications (technical papers, books) and customer references.

Note: Measurements are offered and performed by our external partners.



### Advanced Rotating Machinery Dynamics

Dynamic Analysis	Fluid Film Bearings	Viewer Utilities
<input type="checkbox"/> Rotor Dynamics	<input type="checkbox"/> Journal	<input type="checkbox"/> Text
<input type="checkbox"/> Torsional Vibration	<input type="checkbox"/> Conical	<input type="checkbox"/> Plots
	<input type="checkbox"/> Thrust	<input type="checkbox"/> Bearing
	<input type="checkbox"/> Tilting Pad	<input type="checkbox"/> 3D Shaft
		<input type="checkbox"/> Wear-ring
Lubricant Properties	Rolling Element Bearings	<input type="checkbox"/> AeroCC
<input type="checkbox"/> Viscosity	<input type="checkbox"/> COBRA	

