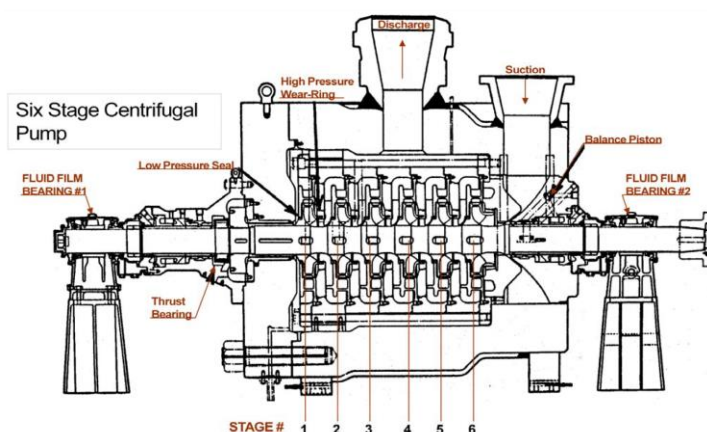


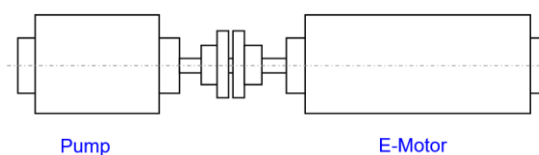
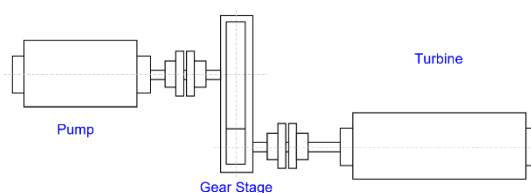
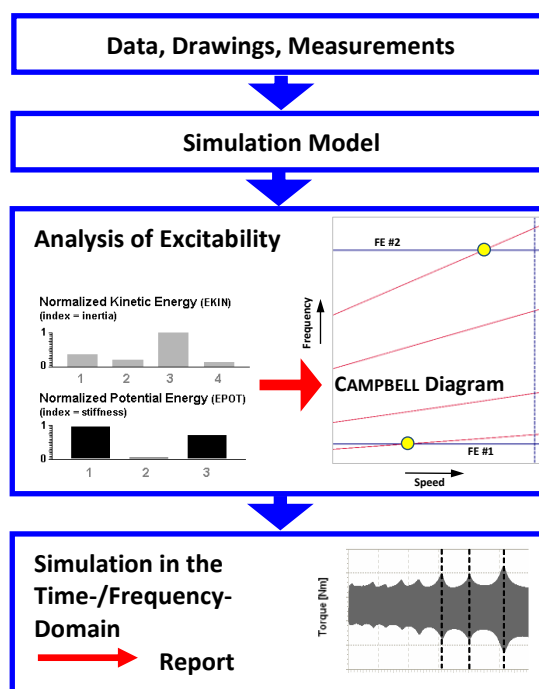
Virtual Engineering Engineering Services for Pump Drivelines



As part of the computer assisted dynamic analysis of **PUMP SYSTEMS**, Dr.-Ing. Andreas Laschet provides a calculation service, which combines the computer-based **analysis of vibrations** (**TORSIONAL VIBRATIONS** as well as **LATERAL VIBRATIONS**) of the complete driveline. The analysis corresponds to **API 610** and also includes numerous extended features. According to these calculations possible critical resonances can already be detected in advance during the development and design phase. In case of machine diagnosis or the calculation of an existing installation respectively (e.g. in case of any reconstructions/revamps), the computer simulation can successfully be applied in order to determine disturbances, vibrations, oscillations, acoustic effects based on vibrations as well as reasonable measurement locations. A realistic model validation is important for the optimal correlation between measurements and the calculations.

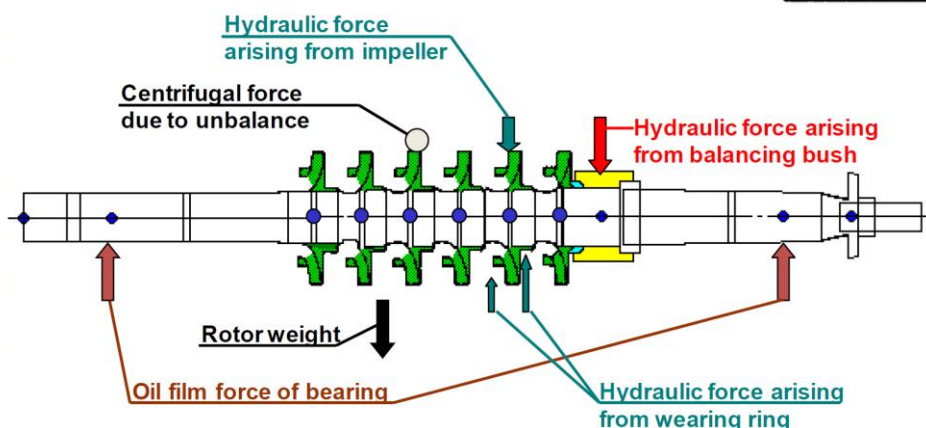
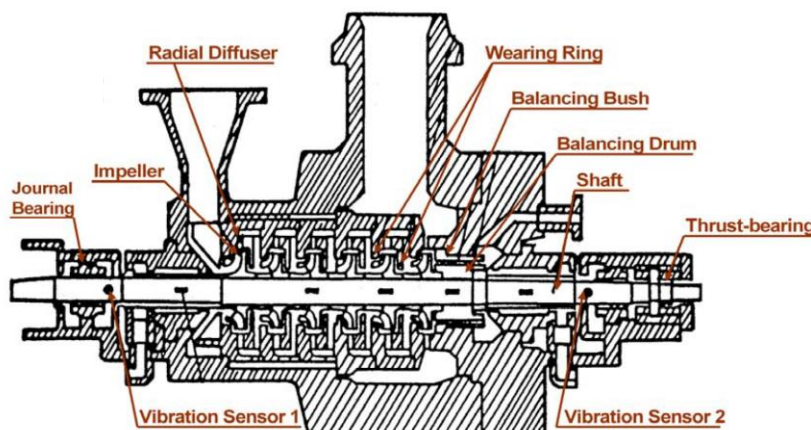
On the one hand the analysis of the natural behavior is performed (i.e. calculation of **natural frequencies** and **vibration modes** including the **CAMPBELL diagram** containing all relevant excitation orders). On the other hand the dynamic behavior is calculated and rated including the **visualization and analysis of all relevant torques**. Alternative driveline configurations (i.e. concerning electric motor, engine, turbine, coupling, gearbox) are considered in order to find an optimized dynamic behavior of the complete driveline.

On the basis of long and extensive experiences in torsional & lateral vibration simulations my professional **CAE engineering services** can be used by the customer quickly and practice-oriented. This analysis service in particular is qualified for the associated support of measurements.

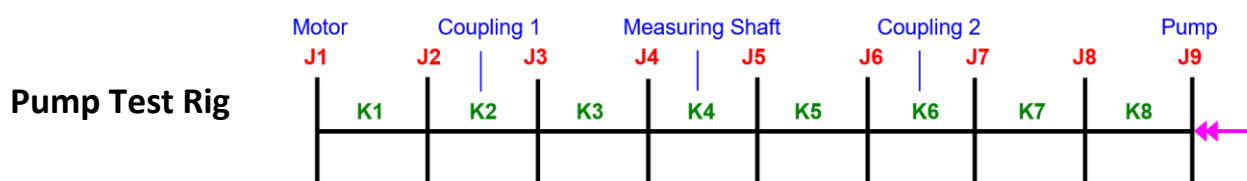


Typical Applications

Feed Water Pump



Representative Rotating Assembly Illustrating Various Applied Radial Forces



Dr.-Ing. Andreas Laschet is an experienced specialist and provides support to understand and minimize vibrations in **all types of pump systems** concerning both **TORSIONAL** and **optionally LATERAL VIBRATIONS** of the drive systems. This kind of engineering analysis may be also integrated in a more complex complete **ROTOR-DYNAMIC ANALYSIS** which also includes a more detailed fluid-film bearing analysis.

My **Engineering Services** are always performed in close and confident cooperation with well-known pump manufacturers, and plant manufacturers/operators.

I have a lot of expertise in the evaluation of torsional and lateral vibrations in complete drive systems worldwide. Concerning these engineering services I also cooperate very closely with external partners (measurement and engineering service providers) even in case of urgent **troubleshooting**. Further information: <https://www.laschet.com/>

Concepts NREC

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