KISSsys Training

Modeling Gearboxes (2 days)
System Calculations (1 day)
Planetary Stage Gearboxes (1 day)

Basic and Advanced KISSsys Training

KISSsys is a powerful tool to model and analyze entire transmission systems. With the help of KISSsys your design process will increase in speed and reliability. There is no more manual data exchange needed between the single calculation modules or different programs. The results of all gearbox calculations will be available in an overview, even for different operating conditions. Modeling with KISSsys allows you to produce 3D models of the new design at the very early stage of the process.

The training is divided in three parts. The first part "Modeling gearboxes" allows you to get started with KISSsys. During the two days you will get to know the interface of KISSsys and learn about modeling points and designing your first simple gearboxes. Thereafter, being the second part, you will be introduced to "System Calculations" with KISSsys and KISSsoft by using various templates and analysis possibilities. The third part offers for a day the handling of a special advanced application field "Planetary Stage Gearboxes". The 1-day training focuses on how to design, analyze and optimize epicyclics in accordance with different requirements taking into account specialized applications, example projects and calculations.

The training course is aimed for engineers working in the field of gearbox calculation. The goal is to give users the knowledge on how to get started with KISSsys, learning about its scope and possibilities, so that participants can use the software for their specific applications in a more efficient way after the training.

Part 1: Modeling Gearboxes

Introduction to KISSsys

- Key benefits
- Important settings
- User and administrator mode
- User Interface and functionalities
- Terminology
- Using existing models
- Communication with KISSsoft modules for strength analysis
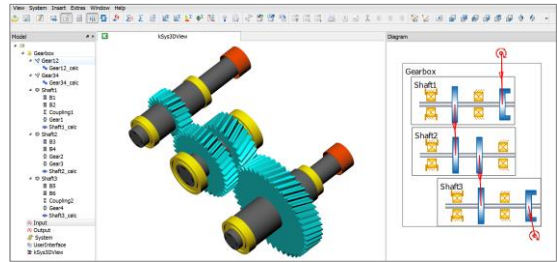
Introduction to Modeling

- Plan the model
- Calculation of kinematics / power flow
- System based calculations regarding safeties, lifetime, weight and cost
- Generate user defined tables

Modeling with Single Shafts

Examples of modeling a two-stage industrial gearbox and a bevel gear stage gearbox

- Creating a proper sketch
- Building the model with different methods
- Calculating and defining the kinematics
- Geometry definition of machine elements in KISSsoft Interfaces
- Sizing of gears, positioning of shafts and bearings according to the requirements
- Generating a User Interface table with variables for system information (operating data, safeties, lifetimes)

Exercise to build a simple industrial gearbox and use the sizing functionalities

Special Kinematic Conditions

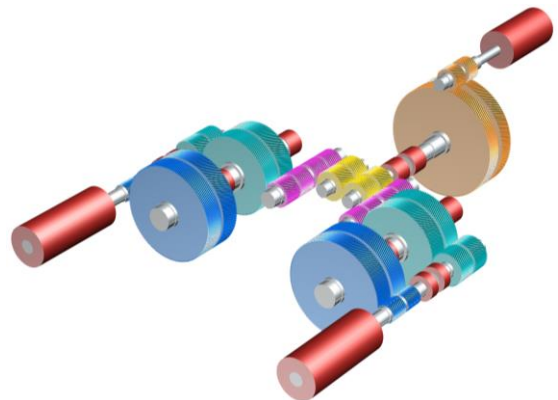### Models with One Input Two Outputs

- Definition of boundary conditions
- Controlling power distribution

Gear Chain with Three Gears

- Handling of KISSsoft calculations
- Setting alternating bending factors

Overdefined Kinematics

- Model with powersplits
- Using of gear activation method

Coaxial Shaft Modeling

Planetary Stage

- Important notes on the sketch
- Generation of the model, kinematics calculation
- Definition of the geometry in KISSsoft
- Modifying the positions of the groups
- Implementing of simple functions into a table
- Realization of multiple stages with spline connections
- Combination of single and coaxial shafts in one model

Summary of the first two days with a complete gearbox as an exercise.

Part 2: System Calculations

Data Handling in the System

Table of Variants

- Defining correct settings
- Varying gear and shaft calculation files

Using the Translation Table

- Creation of new variables
- Communication of KISSsoft variables to KISSsys

System Based Calculations

Efficiency and Thermal Analysis

- Calculation of gear, bearing and churning losses
- Calculation of dissipation through housing and rotating parts
- Oil temperature over time

Load Spectrum Template

- Definition of a spectrum in KISSsys
- Calculation with different options
- Checking the result data

Housing Stiffness

- Theory
- Characteristics of a reduced stiffness matrix
- Reading in and calculating in KISSsys
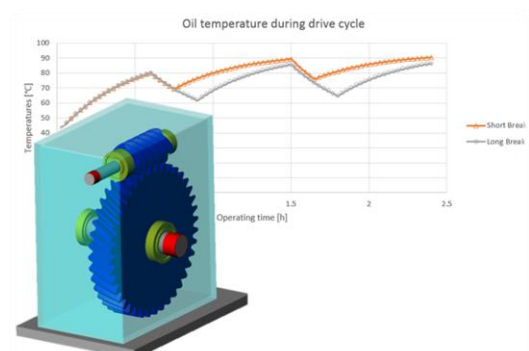
Modal Analysis

- Calculation of system eigenfrequencies
- Generation and evaluation of Campbell Diagram

Programming in KISSsys

- Export result data
- Create a readable output file

Part 3: Planetary Stage Gearboxes

Different Kinematics

- Presentation of different epicyclic applications
- Gearboxes in combination with cylindrical gear pairs
  - Ravigneaux stage
  - Wolfrom stage
  - Simpson gearset

Modeling a Compound Planetary Stage

- Building kinematic structures
- Switching through different operating modes
  - Output carrier
  - Output ring
  - No reduction condition

Calculations of Planetary Stage Gearbox

- Calculation of shafts and rolling bearing elements
- Tooth contact analysis considering shaft deflections with KHb calculation
- Basic tooth modifications to improve contact pattern and reduce shocks
- Practice of theory with basic exercises