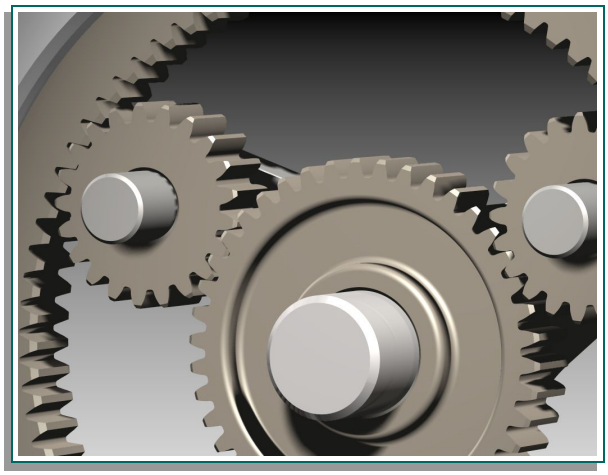
Theoretical Fundamentals, Dimensioning and Optimization of Cylindrical Gears

This seminar provides an understanding of the essential fundamentals of cylindrical gears. Starting with the basics of cylindrical gears through to the essentials of dimensioning and optimization, this seminar covers the key aspects that all engineers need to know about cylindrical gears.

This seminar is suitable for young professionals, experienced engineers, designers as well as technicians. eAssistant software is used to illustrate certain principles. The eAssistant software is the web-based calculation software to calculate and optimize of an extensive range of machine elements.



Main Topics of the Seminar

1. Basic of Cylindrical Gears

- Main geometry: Profile shift, module, pressure angle, helix angle, center distances, modification of tip diameter, contact ratio, backlash, tip clearance
- Types of tools and standard basic rack profiles
- Quality, allowances, test data
- Accurate gear tooth form
- Root and tip circle diameter: generated root diameter, form diameter, diameter of active flank
- Internal gears
- Calculation of load capacity: Geometrical influences, face coefficient, material, kind of material treatment, hardening depth, roughness, lubrication, mode of operation, minimum safeties, load capacity of tooth flank and tooth root, scuffing (flash and integral temperature), differences between DIN 3990 and ISO 6336
- Manufacturing data / creation of manufacturing drawing

2. Involute Splines According to DIN 5480 and Similar Standards

3. Dimensioning and Optimization of Cylindrical Gears

- Purpose and phases of development process
- Split of transmission ratio of multi-stage gearboxes
- Meshing interferences for internal and external gears, analysis and removal of meshing interferences
- Dimensioning of cylindrical gear: Requirements, module, facewidth, selection of sum of profile shift coefficents, split of profile shift, constructive guidance
- Special gearings: Special requirements
- Optimization options of load capacity for tooth root, tooth flank and scuffing
- Noise optimization: Procedure to reduce operating gear noise
- Calculation examples:

  - Calculation based on drawing data

  - Determination of profile shift, if profile shift is not indicated on manufacturing drawing

4. eAssistant CAD-PlugIns for Different CAD Systems

- Integration of CAD plugin into CAD system
- Connection of calculation and CAD, creation of 3-D models based on calculated values
- Manufacturing data for manufacturing drawing, configuration of manufacturing drawing

The full-day seminar includes practical excercises, individual questions are allowed and welcomed during the workshop.

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