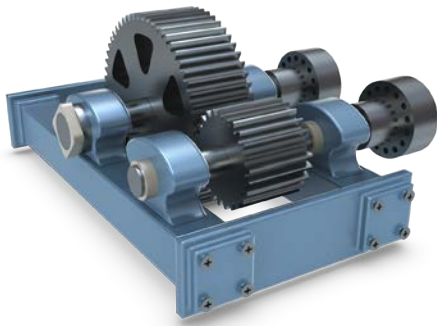


SPUR AND HELICAL GEAR DESIGN FUNDAMENTALS

eLearning courses designed to increase productivity and profits



Learning made Simple, Visual, and Interactive

Gear design simplified! The THORS course, Spur and Helical Gear Design Fundamentals provides strategies for designing gears that meet given application requirements. This course, complemented with real-life examples, delves into the principles of selection and optimization of primary and secondary design variables.

Prerequisite Knowledge:

Learners taking this course must be familiar with gear terminology and working principles of gears and gearboxes.

Credit Hours **3**

Learning Objectives

- 💡 To understand the application and gear design input parameters.
- 💡 To estimate the gear design basic variables based on design inputs.
- 💡 To design a gear pair that satisfies the specifications of the intended application.
- 💡 To design a gear pair that meets or exceeds target design life and safety factor ratings.
- 💡 To improve safety factor ratings through optimization of gear geometry, material selection, and heat treatment.

Table of Contents

I. Gear Design Inputs

- **Shaft Orientation**
 - o Inline Orientation
 - o Parallel Orientation
 - o Right Angle Orientation
- **Target Safety Factor**
- **Target Design Life**
- **Gearbox Requirements**
 - o Size Limits
 - Envelope Size
 - Weight
 - Center Distance
 - o Applied Load
 - Speed, Torque, Power
 - Internal Combustion Engine
 - Electric Motor
 - Gas Turbine
 - o Gear Ratio

II. Primary Design Variables

- **Basic Design Variables**
 - o Normal Diametral Pitch
 - o Normal Pressure Angle
 - o Normal Base Pitch
 - o Helix Angle
 - o Face Width
 - o Number of Teeth
- **Transverse and Calculated Variables**
 - o Transverse Variables
 - o Calculated Safety Factors
 - Tooth Flank Contact Stress
 - Tooth Root Bending Stress

III. Secondary Design Variables

- **Material and Heat Treatment**
- **Accuracy Level**
- **Profile Shift**
- **Design for Manufacturability**

IV. Case Study

- **Case Study 1**
 - o Step 1: Identify Design Inputs
 - o Step 2: First Iteration
 - Select Basic Design Variables
 - Select Secondary Design Variables
 - Calculate Rating
 - o Step 3: Second Iteration
 - o Step 4: Optimize Rating
 - o Step 5: Deliverables
- **Case Study 2**
 - o Step 1: Identify Design Inputs
 - o Step 2: First Iteration
 - Select Basic Design Variables
 - Select Secondary Design Variables
 - Calculate Rating
 - o Step 3: Second Iteration
 - o Step 4: Optimize Rating
 - o Step 5: Deliverables

