Direct Gear Design for Symmetric and Asymmetric Gears

Agenda

Presenter –
Dr. Alex Kapelevich
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1. Introduction
- Alex Kapelevich Background
- AKGears Introduction

2. Historical Overview
- Direct Gear Design Origin
- Gear Design Based on Rack Generating Technology
- Definition of Direct Gear Design
- Brief History of Asymmetric Tooth

3. Macrogeometry of Involute Gears
- Involute Tooth Parameters
- Gear Mesh Characteristics
- Direct Gear Design for Different Types of Involute Gears

4. Area of Existence of Involute Gears
- Area of Existence of Symmetric Tooth Gears
- Area of Existence of Asymmetric Tooth Gears
- Application of Area of Existence

5. Involute Gearing Limits
- Number of Teeth
- Pressure Angle
- Contact Ratio
- Practical range of involute gear parameters

6. Tooth Geometry Optimization
- Involute Profile Optimization
- Asymmetry Factor Optimization
- Tooth Modeling and Bending Stress Calculation
- Root Fillet Optimization Technique
- Conversion of Root Bending Stress Reduction to other Performance Benefits
- Tooth flank modification optimization
- Contact ratio optimization

7. Direct Gear Design Software Demonstration
- Gear Pair Geometry Definition
- Gear Mesh Animation
- FEA Stress Calculation
- Root Fillet Optimization Demonstration
- Tooth Flexibility and Hertz Contact Stress Calculation
- Tooth Flexibility and Bending Stress Calculation
- Tooth Micro Geometry Optimization – Transmission Error Minimization
- CAD Gear Tooth Profile Modeling

8. Special Direct Gear Design applications
- High Gear Ratio Planetary Drives
- Self-locking Gears
- Plastic Gear Design Specifics

9. Gear Fabrication Technologies and Tooling
- Gear Machining and Tooling
- Gear Forming and Tooling

10. Measurement Asymmetric Tooth Gears

11. Analytical and Experimental Comparison of Symmetric and Asymmetric Tooth Gears

12. Implementation of Asymmetric Tooth Gears

13. AKGears' Software
- Tooth Root Fillet Optimization
- Spline Interpolation and Tangent Arc Approximation
- Pin / Ball & Span Gear Measurement

Questions and Answers