Dontyne
Gears

Development and Testing of Gear Systems

Introduction

About Us

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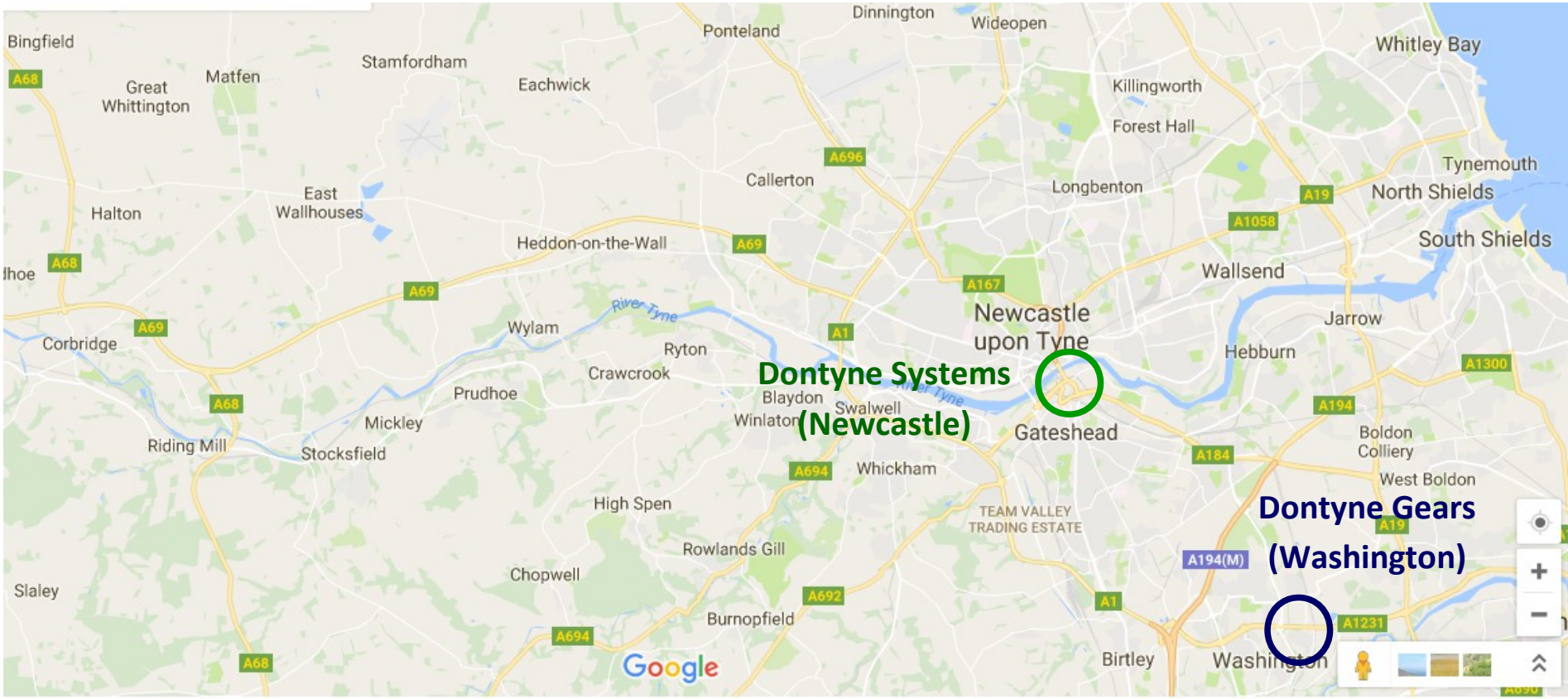


About Us

Products And Services For The Transmission Industry

Software Products and Bespoke Development

Engineering Consultancy

Product Training and Gear Theory Tutoring

Prototyping & Testing Programs

Sales of machines and equipment

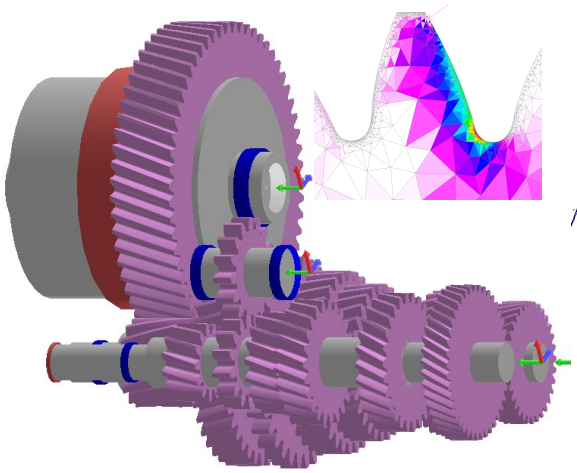
About Us

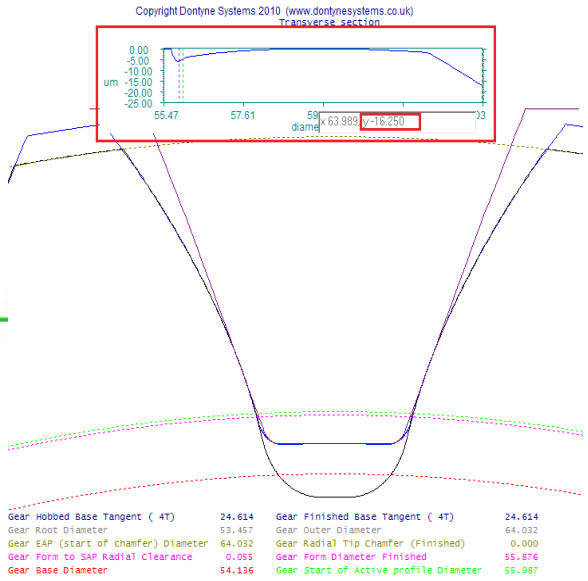
Facilities include:

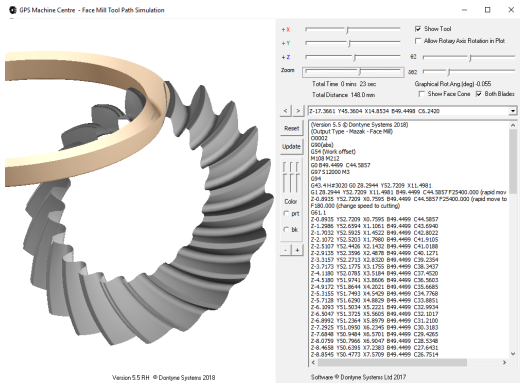
Design Office
5-axis CNC
Hobbing/Shaping
Profile Grinding
Inspection Centre
Test Rigs

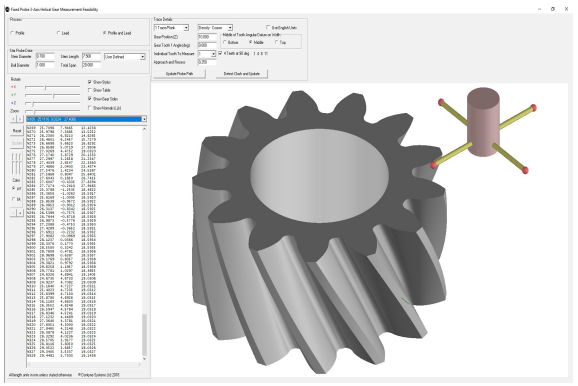
Design & Analysis

Range of CAD/CAM tools such as **Solid Works** for drawings and **ANSYS** for housing as well as Dontyne software









Gear Production Suite

- *Gearbox Model*
- *Gear Design & Rating*
- *LTCA*
- *Machine Centre*
- *Inspection Centre*

Manufacturing & Inspection

Design tooling and produce prototypes using in-house equipment or with collaboration partners in a range of processes

- *Hobbing*
- *Continuous Grinding (with Dressing)*
- *Shaving*
- *Profile Grinding*
- *Shaping*
- *Skiving*
- *Honing*
- *Forging*
- *Injection Moulding*
- *Sinter (Powder Metal)*

MEMBER OF

AFRC

ADVANCED FORMING RESEARCH CENTRE

UNIVERSITY OF STRATHCLYDE

DESIGN | UNIT

Gear Technology Centre

Höganäs

Dontyne Gears

Manufacturing & Inspection

Inspection service for various components on Zeiss CMM retrofitted with Modus™ from Renishaw plc, high accuracy gear inspection on OSK CLP-35DDS, or Equator™ (in-line monitor)

Testing Equipment

Dontyne Gears High Ratio Test Rig

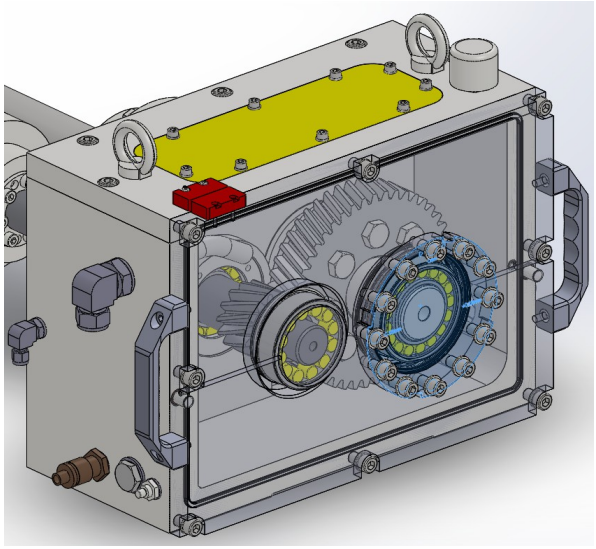
Features:

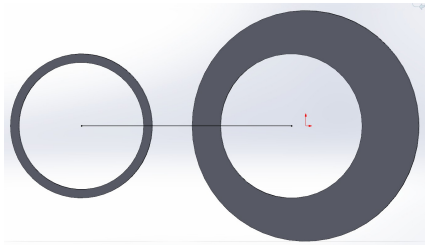
- Pinion Torque: 1500 Nm Max.
- Ratio Range: 2.5:1 – 3.3:1.
- RPM Range: 0-3000 RPM Pinion Shaft.
- Centre Distance: 125mm +/- 0.125mm.
- Hydraulic Torque Application.
- Live Vibration Monitoring.
- Designed using off the shelf components to reduce cost and lead times.
- Designed and Built in Newcastle Upon Tyne.

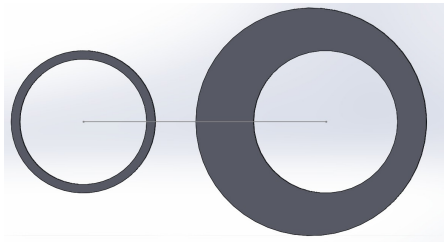
Testing Equipment

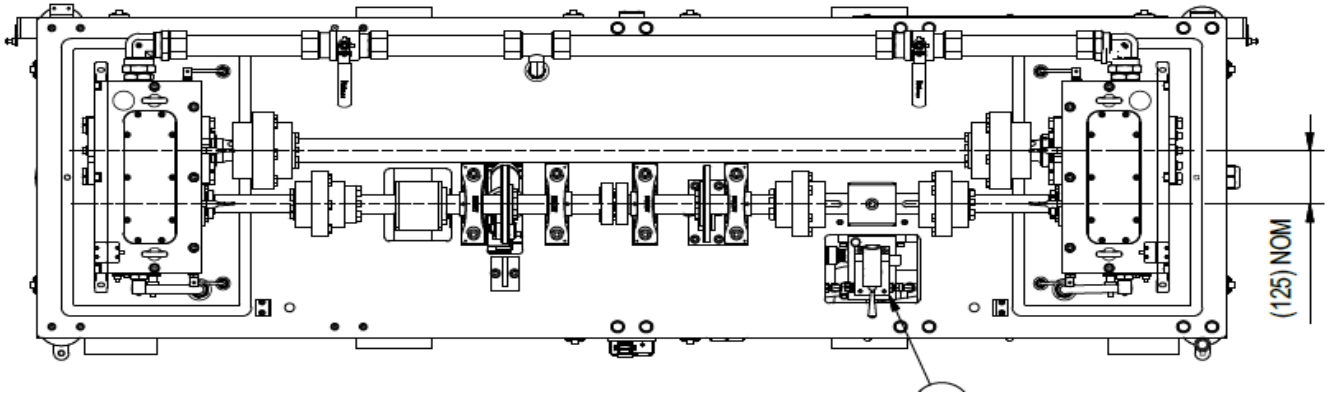
Variable Centres To Test Sensitivity Of Non-involute Designs.

- Ideal for testing the Sensitivity of Non-Involute Designs.
- Adjustment achieved using eccentrically machined, adjustable bearing housing.





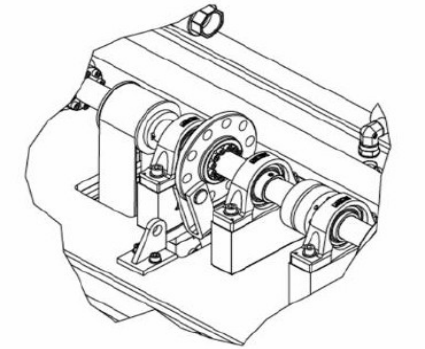




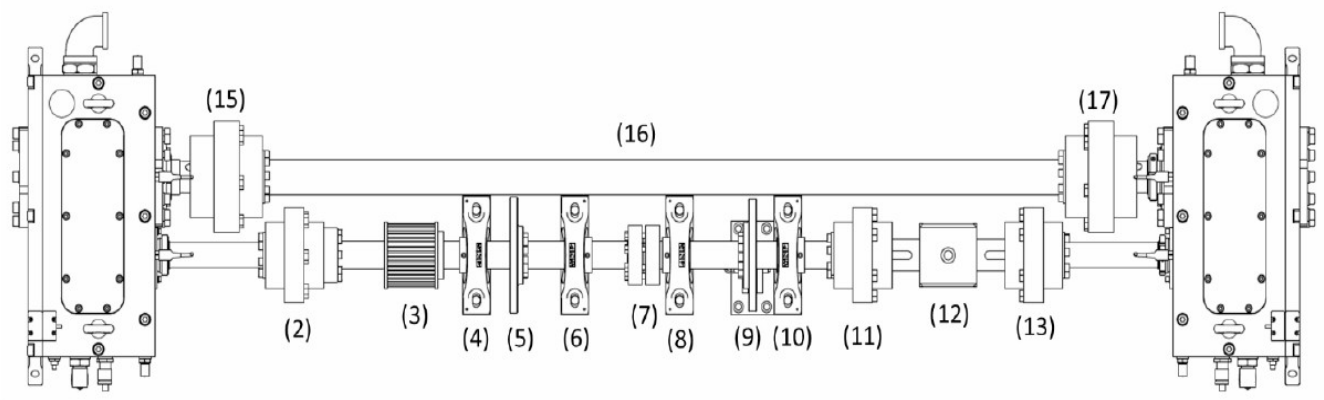
Testing Equipment

Torque Application:

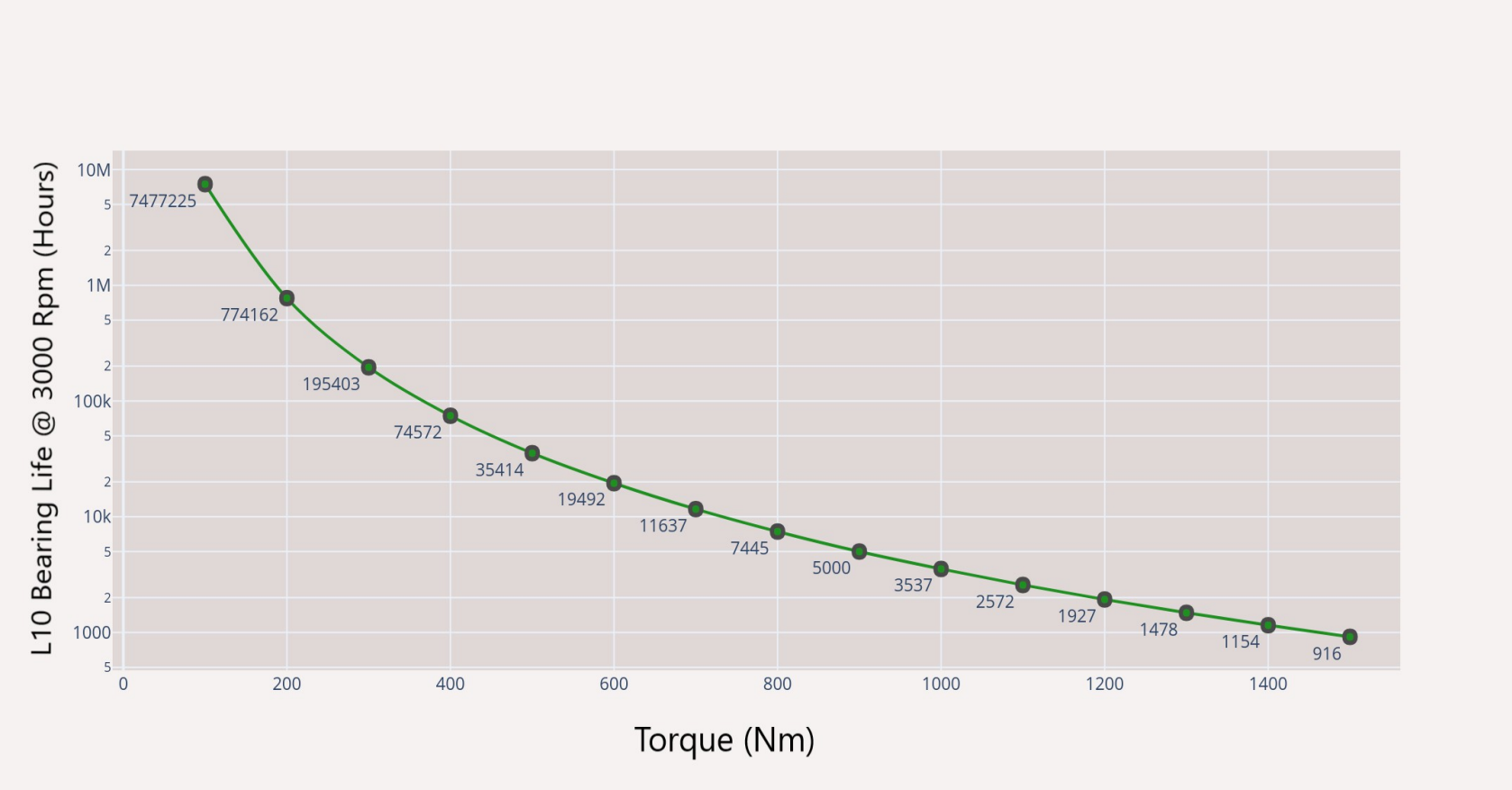
- Split Shaft at Coupling (Position 7).
- Hold Shaft With Brake Wheel (Position 9).
- Apply Torque using Hydraulic Cylinder (Position 5).
- Torque Transducer (Position 12) Collects and displays torque Value.



CYLINDER ENGAGED ON LOAD WHEEL
DURING TORQUING OF SHAFT



Testing Equipment



Worst Case Bearing Life

Testing Equipment

Dontyne Gears Low Torque Test Rig

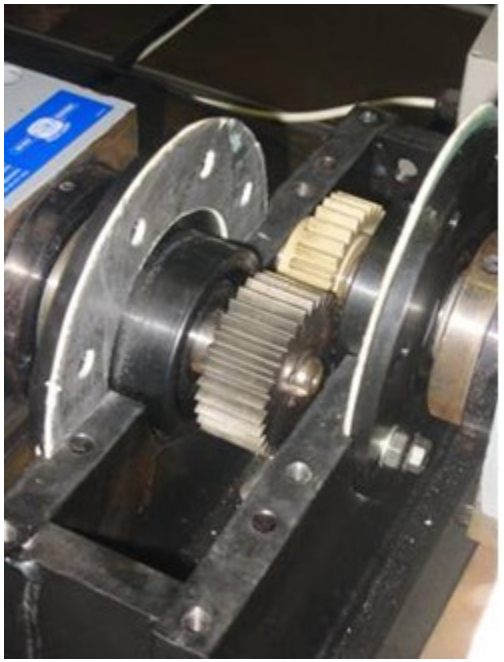
Features:

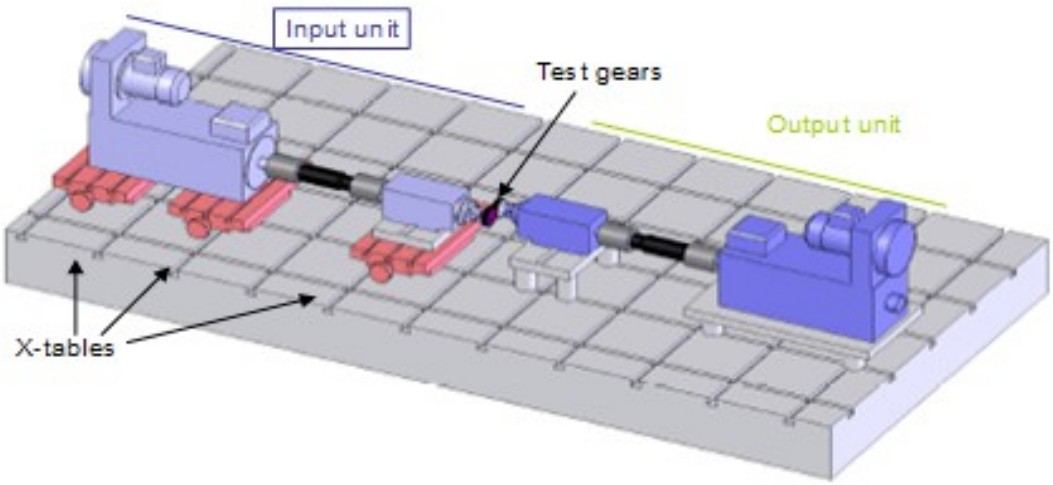
- 0-6000 RPM
- Up to 40 Nm
- Centre Distance: 50-150mm
- Flexible Configuration due to Bed plate (Spur, Helical, Worm)
- Dry and Lubricated Testing (Oil Temperatures Up to 150°C)
- Measurement of Lifetime with Data recorded every 0.02°

Testing Equipment

Dontyne Gears Low Torque Test Rig

- Compare different materials
- Compare profiles including asymmetric or non-involute
- Suitable for polymer gears
- 2 Test rigs available

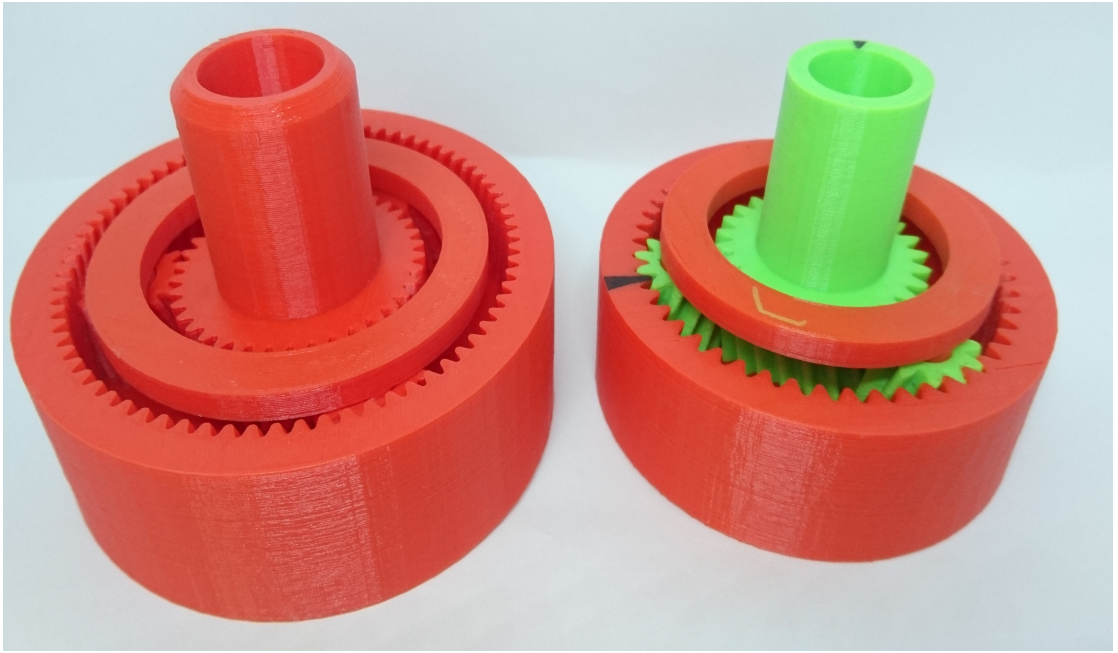




R&D Projects

Improve Design

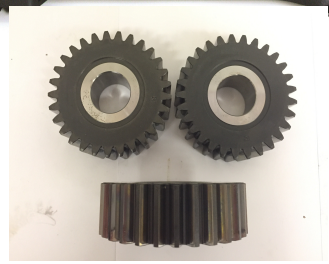
Original Gear System Removed from Current Production Car

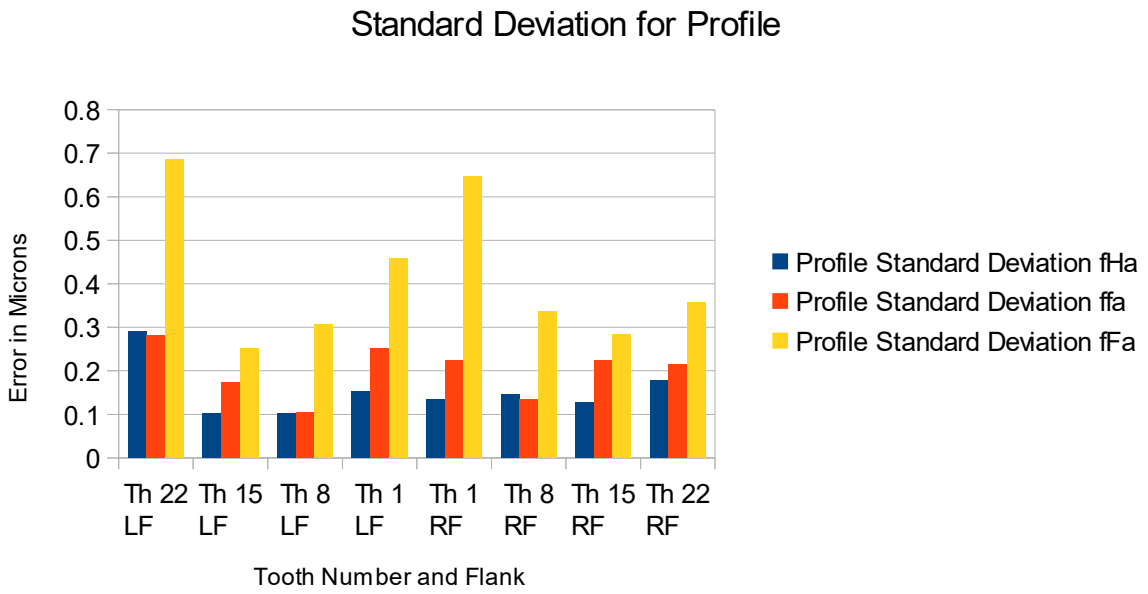


Original (Involute) and New Design (Convoloid) Printed in 3D
Demonstrate 20% Reduction in Diameter and 36% in Weight.
Result : Reduced carbon emmisions by lower steel consumption and transport costs on several million units

R&D Projects

Repeatability studies

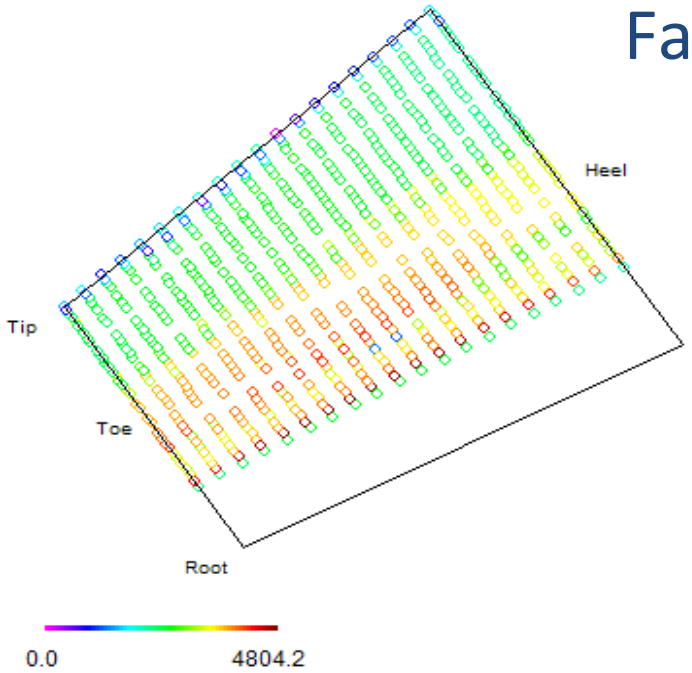




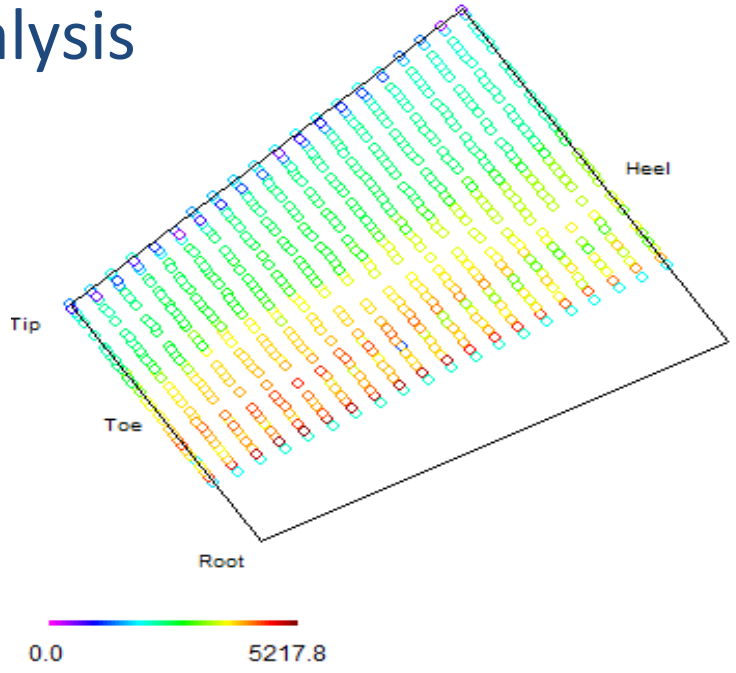
Studies of repeatibility use 3 samples and 30 measurements to determine variation of error for static and then with part replacement show less than 1micron variation

R&D Projects

Failure analysis



Contact Stress of Successful Gear using measurement data

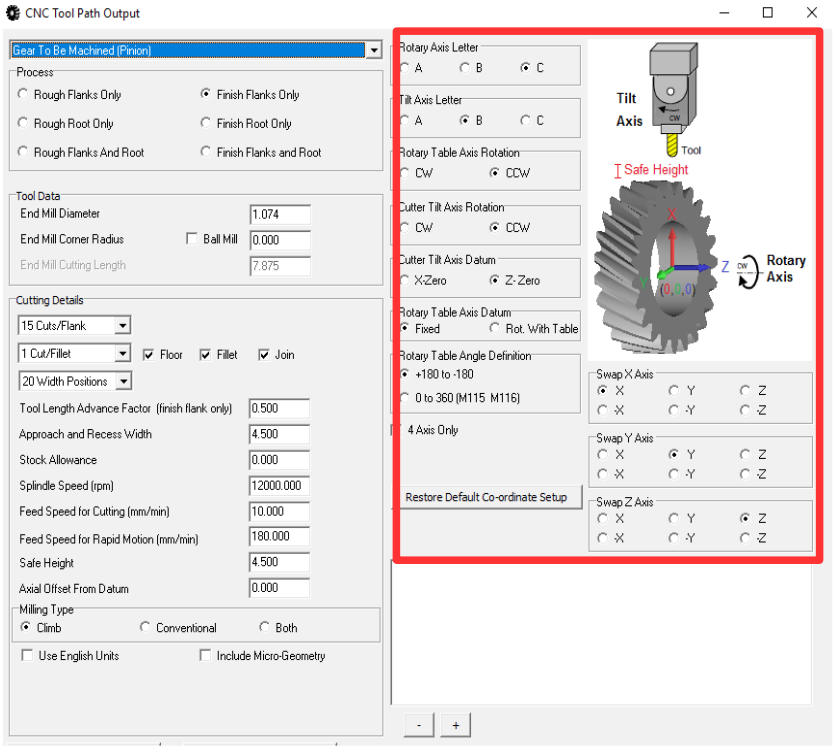


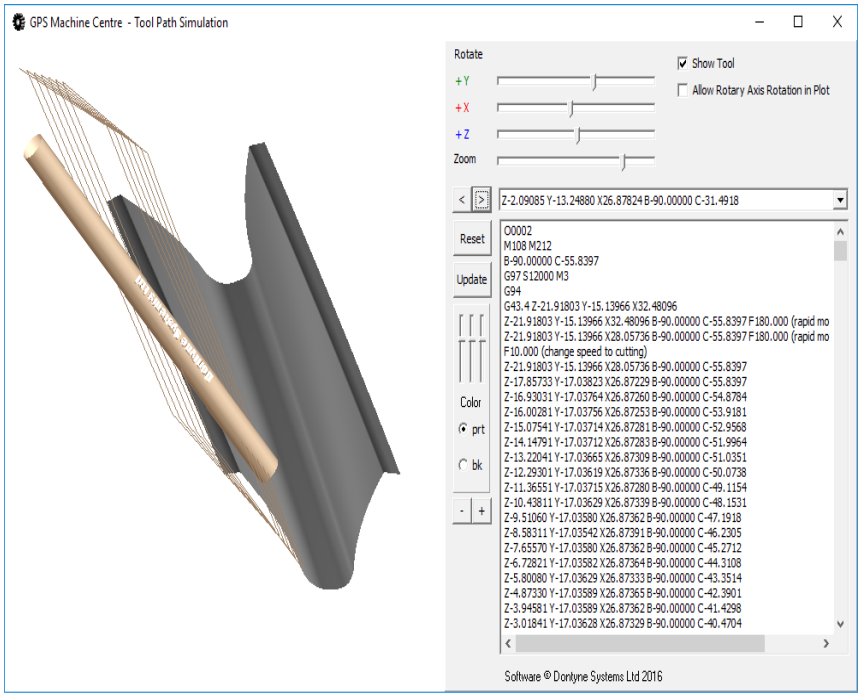
Contact Stress of Failed Gear using measurement data

Using measured data in Contact Stress calculation shows 10% increase in failed gear compared to successful gear

R&D Projects

Machine Simulations – Multi Axis CNC





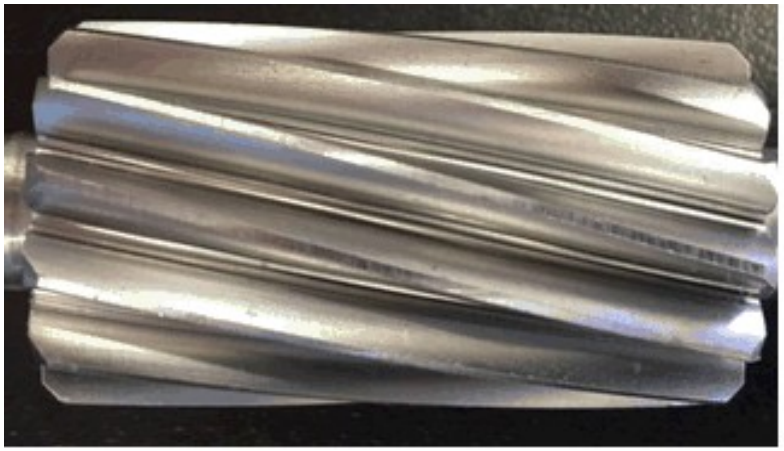
Virtual CNC Machine Construction

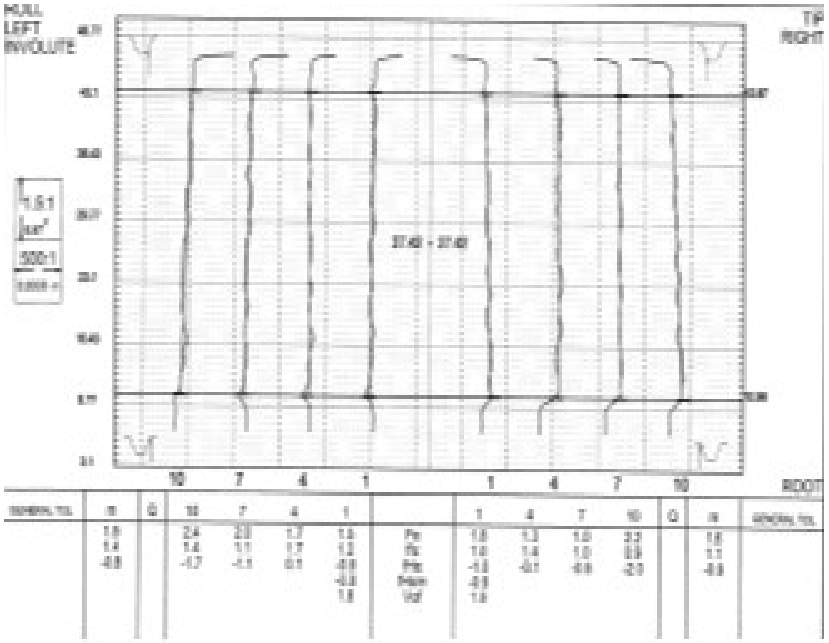
Simulation shows generation and creates G-Code

Export data (G-Code) for Cylindrical or Bevel directly from GPS to machine removes risk of operator error or differing surface model in machine software

R&D Projects

Improved Machining Capability

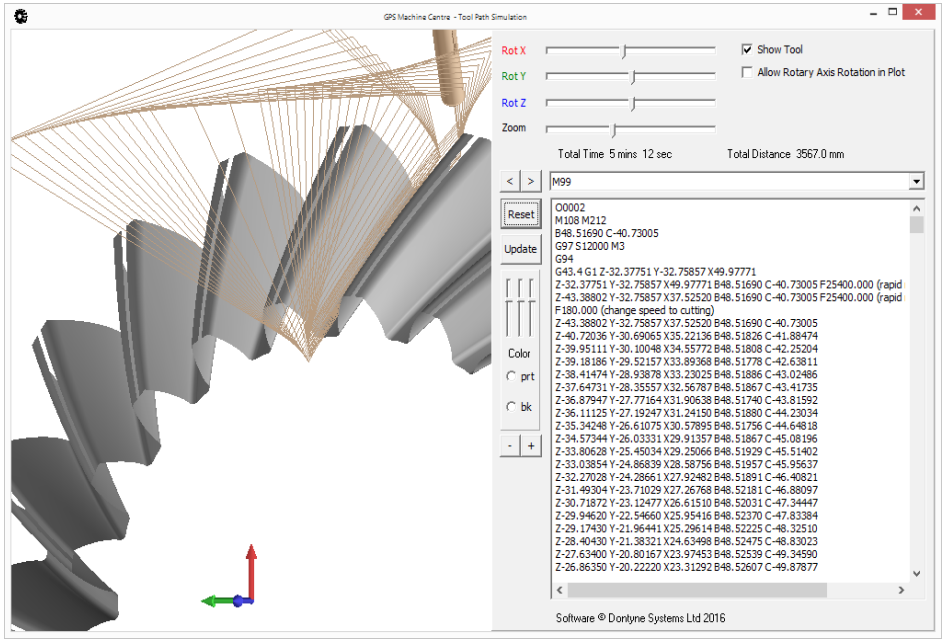


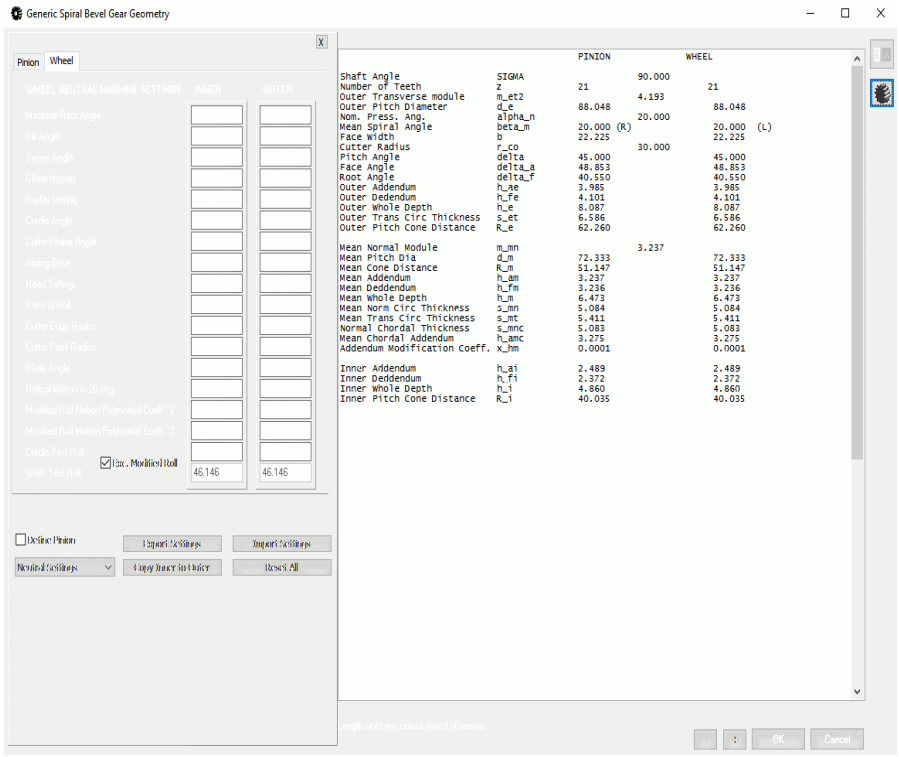


Sample helical made using G-Code exported from to 5-axis machines to confirm the accuracy for given cycle time

R&D Projects

Machine Simulations – Multi Axis CNC





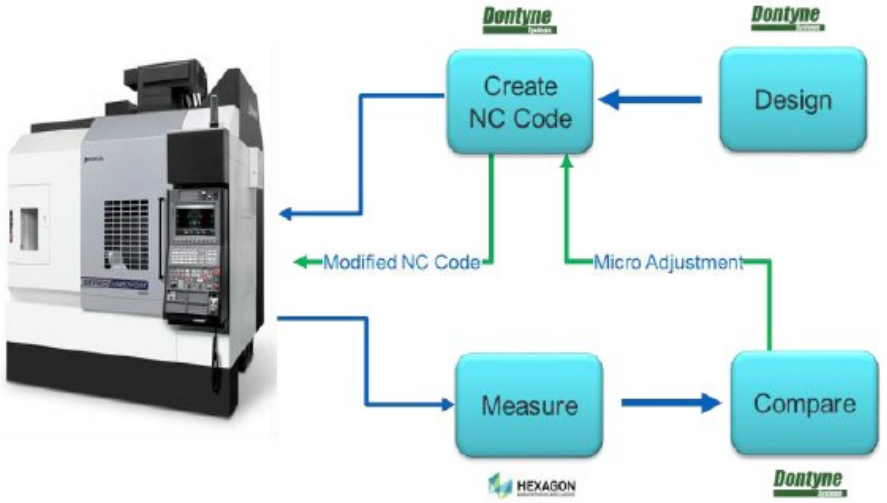
Spiral bevel simulation checks generation time and wear as well as creates G-Code for production by end mill or face mill methods

R&D Projects

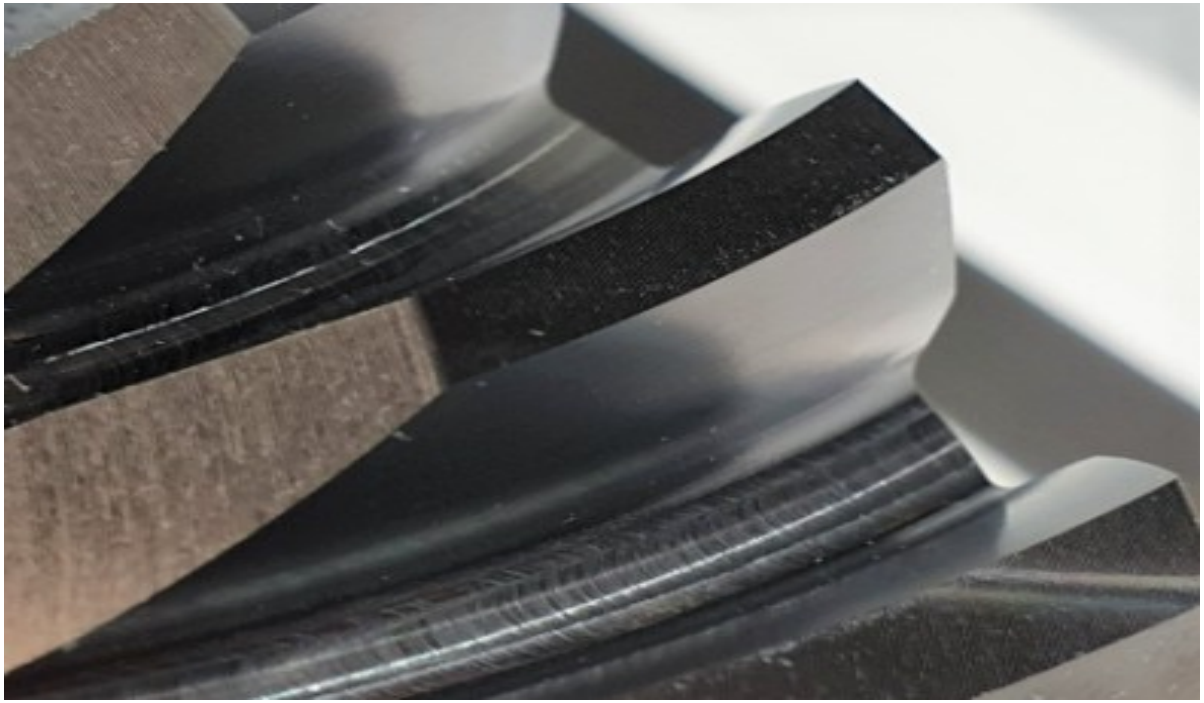
Logarithmic Spiral Bevel Gear Production using OKUMA 5 axis

- Further Testing of Closed Loop System, using Dontyne Systems Software, OKUMA 5 axis and Hexagon CMM Measurement.

- Logarithmic Spiral Bevel Pair Designed In Dontyne Gear Production Suite.
- Machined Using Dontyne G-code Export.
- Measured Using Hexagon CMM.



R&D Projects



QDS QUINDOS

SPIRAL BEVEL GEAR

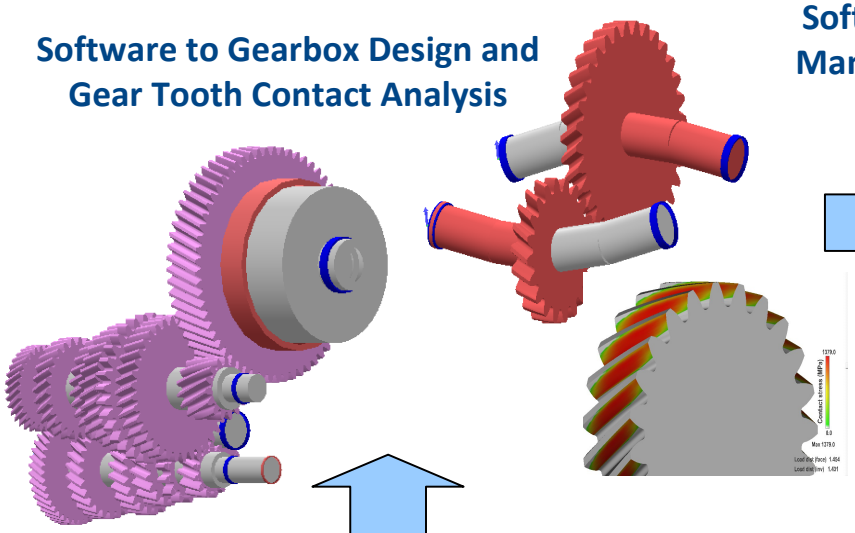
Notation	:	NCMT Gear Open Day
Drawing No.	:	DTG_DTG_001
Inspector	:	RT
Date	:	09-JUL-2019
Remarks	:	
Dimension	:	metric / mm
Article No.	:	1

Mes.	Tol.	Sym.	Tol.	Mes.
9.0	0	Pri	0	2.6
8.0	0	Pro	0	3.4
1.1	0	Lit	0	2.2
0.0	0	Lir	0	3.1
9.2	0	Tot	0	6.4

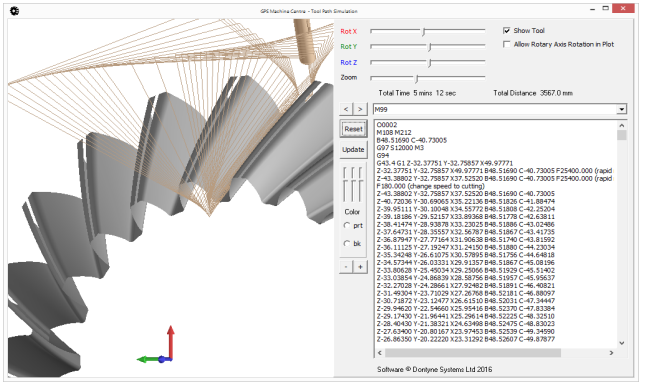
Surface deviations within 5-10 microns first attempt by end mill
(face mill method shown in movie)

Summary

Software to Gearbox Design and Gear Tooth Contact Analysis

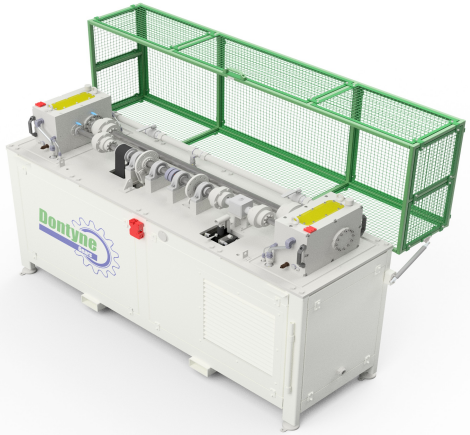


Software Automates Tool Design, and Validates Manufacturing By Simulations Before Machining



High Quality Inspection

Testing and Reporting



Optimisation

Thank You!