Reverse Engineering with 3D scanning

BEYOND

An integrated solution oriented company for your precision machining needs.

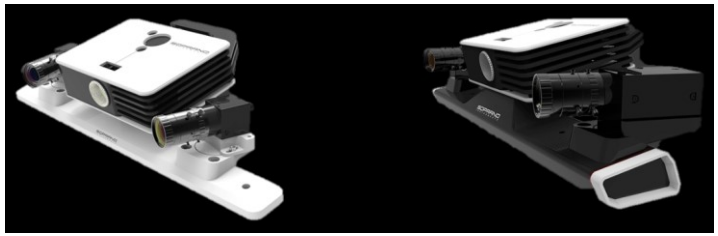
Approach matters

How to conduct reverse engineering effectively

- Accuracy is essential.
- Speed is the key.
- Integrated solution with structured interfaces to link digitally with other equipment and devices.
- Cost-effective methodology for repeating success.
- Validation of developed parts against modeled object.
- 2D and 3D file interface with in-house expertise (tolerances and know-how) for later machining, tooling development, and parts comparison (development samples and production parts).

Leveraging new technology

A 3D scanning example



Our approach

Process flow

1. OEM samples
2. Basic analysis of parts
3. 3D scanning
4. Gear profile compilation
5. Analysis of the gear profile
6. Verification of the gear parameters
7. Gear parameters on AutoCad plotting
8. Reverse the data to 3D or 2D files
9. Existing cutting tool availability checking
10. Gear sample making with customized cutting tool
11. 3D scanning of sampled parts for comparison
12. Functional testing of the gear

Process 1
OEM samples

Key task : Pristine (unused, if possible) OEM parts without wear for reverse engineer base.

Remark :
Two (2) samples are preferred for key parts and one matching parts for reference.

Process 2
Basic analysis of parts

Description :
Basic analysis of parts for material、hardness、and finishing requirements.

Key task :
1. Use tool to find out the material used via Spectrometer, for example.
2. Perform hardness analysis for hardness related information and heat treatment requirements.
3. Determine the finishing required.

Remark : Two (2) samples are preferred for key p arts and one matching parts for reference.

Process 3
3D scanning

Description :
Scanning sample for dimensional data.

Key task :
Getting basic information for a gear Profile.

Remark : Sample should be the brand new one and without any damaged .

Process 4
Gear profile compilation

Description :
Gear profile compilation from 3D scanned data.

Key task :
Initial data for a gear profile identified.

Remark :
Involvement of 3D scanning shop and BYG in-house engineer for data complication.

Process 5
Analysis of the gear profile

Description :
Analysis of the gear profile to determine the gear type.

Key task :
Identify type of gear and find relevant formulae for the identified g ear

Process 6
Verification of the gear parameters

Description :
Verification of the gear parameters.

Key task :
Measure, if applicable, key specs to check the proximity of the gear profile and parameters.

Process 7
Gear parameters on AutoCad plotting

Description :
Gear parameters on AutoCad plotting.

Key task :
Compare plotted CAD file details to 3D scanning file for validation..

Process 8
Reverse the data to 3D or 2D files

Description :
Reverse the data to 3D or 2D files for gear making purpose.

Key task :
Adjust and correct profile parameters to approximate the original sample with up to 98% of similarity.

Process 9
Existing cutting tool availability checking

Description :
Existing cutting tool availability check ing by gear maker/tool maker. Order a new tool if needed..

Key task :
Have gear maker work with tool maker to determine if existing tool is available.

Process 10
Gear sample making with customized cutting tool

Description :
Existing cutting tool availability checking by gear maker/tool maker. Order a new tool if needed..

Key task :
Identify cutting tool required and sub sequent action for tool.

Process 11
3D scanning of sampled gear for comparison

Description :
3D scanning of sampled gear for com parison with the OEM (original) gear.

Key task :
Find any deviations from the OEM (original sample) and fine tune the tool.

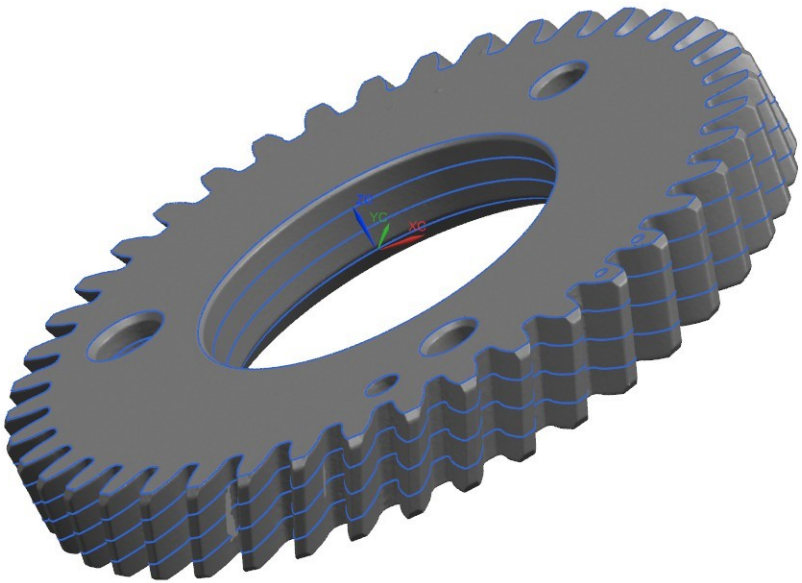
Process 12
Functional testing of the gear

Description :
Functional testing of the gear with matching piece.

Key task :
To ensure the functionality of the gear and fitting to iron out any remaining issue for gear tuning.

Gear Reverse Engineering

Polaris Sportsman 570 gear plate



Gear Reverse Engineering

Skidoo 800R drive gear