



Reverse Engineering Informational Report

January, 2020

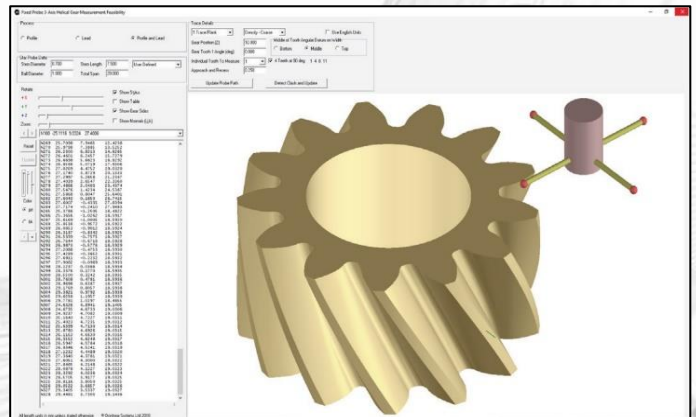
MEASURE & IDENTIFY EXISTING GEAR GEOMETRY



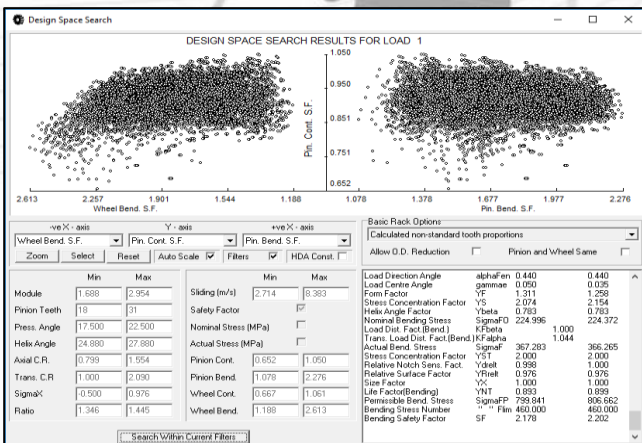
Using available CMM or equivalent equipment the gear of interest is measured to fully identify the geometry of the gear. In most cases the inspection data interface is already included as part of the Dontyne product suite allowing for quick and easy import into the Gear Design Pro (GDP) software module. In the event an unrecognized CMM or file format is obtained, Dontyne support can typically quickly develop the proper interface to enable the import.

IMPORT MEASURED DATA INTO DONTYNE GEAR DESIGN PRO

The measured data is imported in to the GDP module where the gear can be fully evaluated with the corresponding mating gear to determine conjugation and expected performance. The information obtained includes all the typical gear performance, safety and marking pattern details.



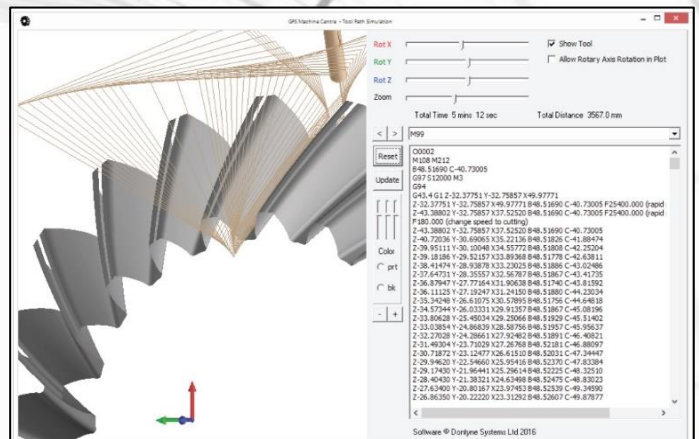
EVALUATE GEAR PERFORMANCE IN GDP AND IMPROVE AS DESIRED



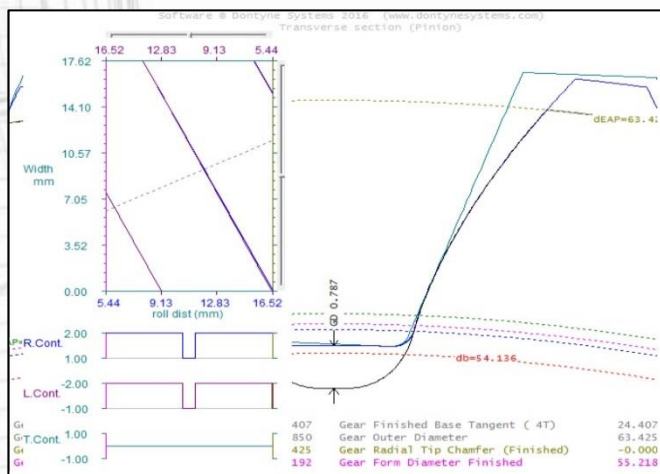
Armed with the generated performance details, the engineer can determine if the existing pair is performed as needed. The engineer can also manipulate the gear geometry and micro geometry to improve performance in targeted areas in order to improve the overall gear performance and/or specify gear performance best suited for the actual application.

CREATE TOOLING OR 5-AXIS G-CODE FOR GEAR MANUFACTURE

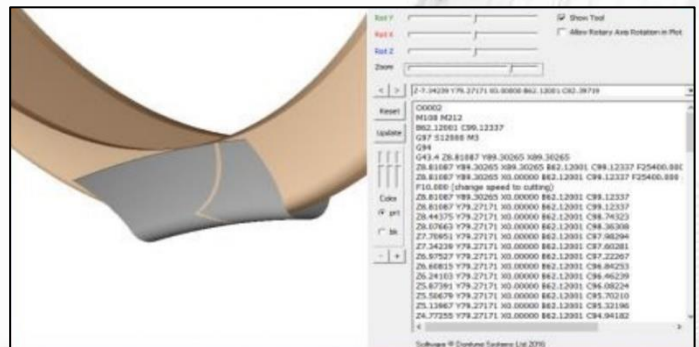
Upon definition of the geometry in GDP the manufacturing process can be simulated, tooling can be defined and 5-axis g-code generated by Dontyne manufacturing modules. To utilize the full strength and advantage of the closed loop gear machining (CLGM) process, the manufacture of gears on a 5-axis machine is recommended. In this case the software generates the required g-code for cutting the gear teeth which can then be called the overall part machining routine.



MANUFACTURE GEAR

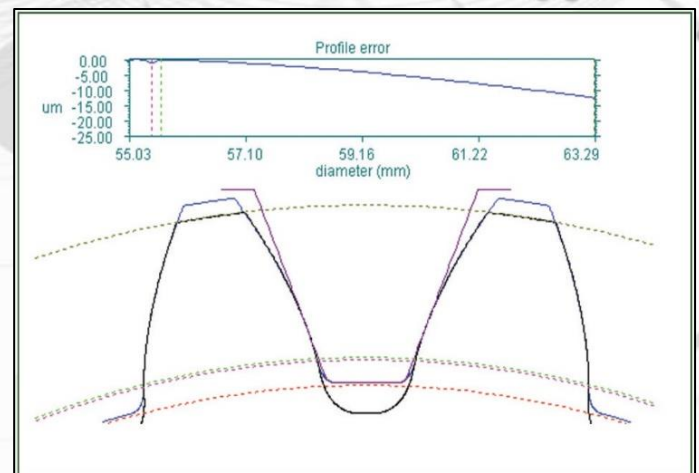


Upon completion of the manufacture simulation and tool or g-code generation, the part is ready to be manufactured on the preferred equipment.



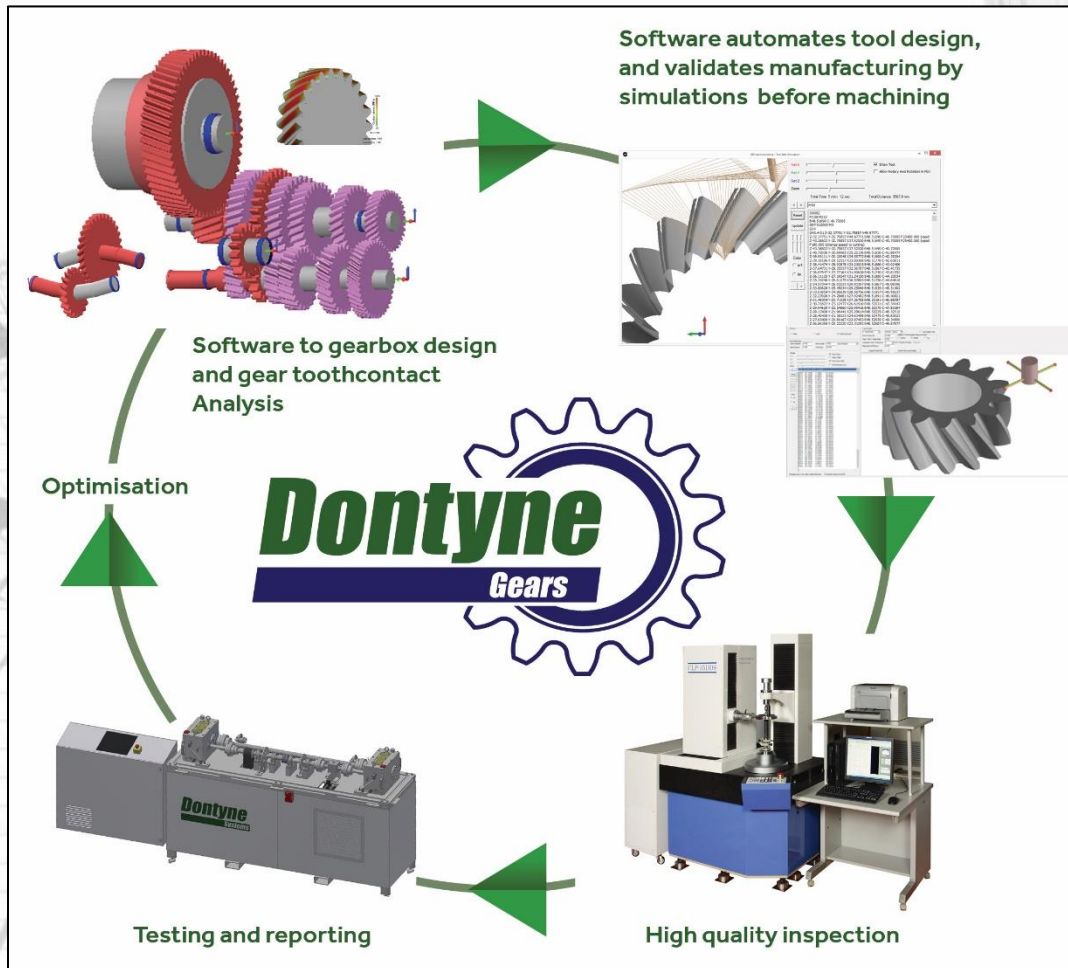
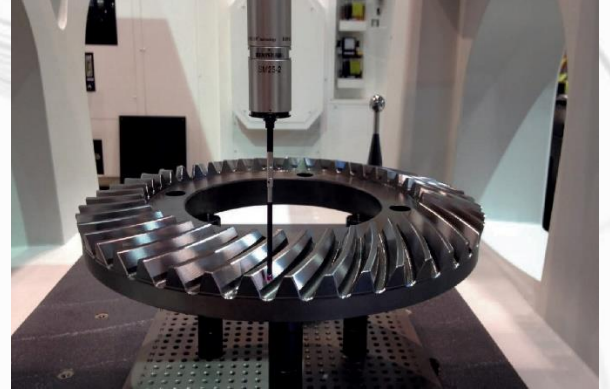
INSPECT NEW GEAR AND COMPARE TO DESIGN

The part is now measured again on the CMM or equivalent equipment, preferably the same equipment used to measure the original part. This inspection data is then again imported into the GDP software and compared against the final master design. This comparison will result in an error matrix showing any deviances between the design and actual manufacture. The actual manufactured part performance can then be simulated and evaluated to determine if the actual performance is acceptable for the planned application.



CORRECT MANUFACTURE ERRORS AND REMAKE IF NECESSARY

Upon completion of the manufactured part performance evaluation, if the manufacture errors are deemed too severe for part operation in the application, the errors can be "corrected" in the software by modifying the tooling g-code in order to compensate for the manufacturing process variation. These corrections can then be implemented into the manufacture process and new parts manufactured, inspected and evaluated. This process should typically only require one correction iteration, but can be utilized as many times as deemed necessary by the design, manufacture and evaluation team.



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