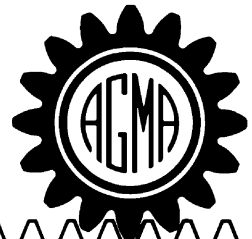


Gear RollScan for High Speed Gear Measurement

by: A. Pommer, FRENCO GmbH

American Gear Manufacturers Association



TECHNICAL PAPER

Gear RollScan for High Speed Gear Measurement A Revolutionary New Method for a Complete Topographical Inspection of Gears

A. Pommer, FRESCO GmbH

[The statements and opinions contained herein are those of the author and should not be construed as an official action or opinion of the American Gear Manufacturers Association.]

In modern gear production, simple inspection systems for quick and close by measurements help to produce high quality. The Gear RollScan method inspects all flanks of helical gears within about 1 minute.

The gear RollScan system is similar to the one-flank gear rolling inspection. The master gear, however, has measuring tracks on selected flanks. All other areas of the master gear are clear to create a contact ratio below 1. Thus, a clear allocation between the angle of rotation and the contact point can be made. A suitable number of teeth ratio between the work piece and the master wheel is chosen. Every measuring track on the master wheel is chosen. Every measuring track on the master wheel will contact every flank of the specimen after a specified number of rotations. Two master gears are in roll contact with the specimen simultaneously. One master gear inspects all left hand flanks, the other all right hand flanks.

The topographical measurement of all teeth requires the deployment of statistical methods for evaluating the deviations. New parameters have to be derived, describing features of the gear which are critical for function, such as the noise excitation, as function of the topography.

With regard to the tolerances, this measuring method has wide-ranging consequences. Whereas a standard evaluation considers 4 teeth, with the effect that a gear's worst tooth is measured more or less by coincidence, the RollScan measuring device always will find the worst tooth

Copyright © 2002

American Gear Manufacturers Association
1500 King Street, Suite 201
Alexandria, Virginia, 22314

October, 2002

ISBN: 1-55589-809-2

Gear RollScan for high speed gear measurement.

A revolutionary new method for a complete topographical inspection of gears

Andreas Pommer , FRENCO GmbH



Rolltester with component between two master gears

1. History Of Development:

The idea for a new gear testing procedure was born in Cologne. Dr. Guido Hopf from Ford made the first contact with FRENCO about the development of such a gear tester in 1995. In the following years FRENCO built the first fixtures and suitable electronics for fast capturing of measuring points. The software was written in Cologne. In 1999 the first gauges were installed on the shop floor. The process is protected by two patents [1]. The Ford team was honored with the 'Henry Ford technical achievement award 1999'.

Since 2001 FRENCO is holding the license to bring this technique to the market. FRENCO is now responsible for development, design and production of the complete system. The large potential of this system still creates demand for new ideas and solutions.

2. Existing Gear Testing Processes

This article is about a new gear testing process, called RollScanning. It is useful to consider common methods first. Existing gear testers could be divided into two groups: