Measuring Helical Pitch of a Spline Gear

Overview

Most dimensional measurement systems approach measuring an angle as a ‘two dimensional’ endeavor. Therefore, obtaining a helical pitch of a spline gear may pose a challenge for companies looking to inspect or reverse engineer a spline gear. This document describes a process that will allow a user of a portable cmm, such as a FaroArm® or Laser Tracker, to accurately measure the helical pitch of a spline gear.

Required

- FaroArm or Laser Tracker
- CAM2 Software
- CAD package capable of flattening curved surfaces into 2 dimension / planar surfaces
- CAD software must have unroll type function

Quick Steps

1. While nestling a hard probe between the teeth of the spline gear (pictured below right), collect a series of evenly spaced points. Repeat this between each set of teeth. The result will resemble the below left picture.

   Note: The probe must be large enough to nestle between the teeth.
2. Construct a cylinder by fitting it through the previously measured points.
3. Export the points and cylinder from CAM2 using the IGES format option.
4. Import the IGES file into the CAD package. You should see something on your screen similar to the picture below.
5. Unroll the cylinder and at least one group of points from to convert them from 3 Dimensional features to 2 Dimensional. The steps to do this in each CAD package will be different.

6. The unrolled points that represented a helical spline in 3D will create a straight line in two dimensions. Construct a line through the unrolled points and simply create a dimension from either or both baselines of the unrolled cylinder to the line. This is the helical pitch.