HEX-FLX - Hub Clamping System

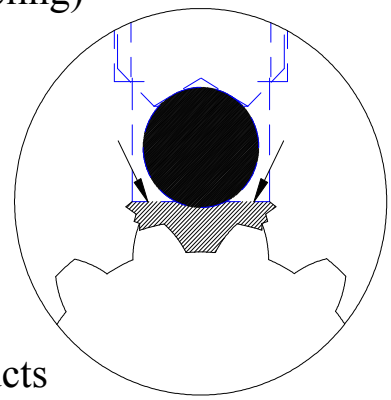
FMEA Overview

Design Objective:

Develop a one-time (single use) locking system to achieve superior clamping force between coupling hubs and splined pump shafts.

Design aspects and verification:

- Achieve superior spline clamping force
- Break away billet design (with spline configuration)
- Product design and development (2D and 3D Modeling)
- Sampling of product (to verify design and process)
- Design configuration (locations and depths)
- Testing – Push tests (clamping force)
- Testing – Comparison testing (clamping force)



Design Achievements:

- Superior clamping force compared to similar products
- Self-contained locking system
  - Flat bottom with break away billet
  - Ball bearing to push break away billet
  - Completely assembled by Hayes before shipping
- Maximum thread, set screw locations, for optimum torque capabilities
  - Thread depth
  - Fine thread set screws
- Engineered design for optimal repeatability & simplicity

Design Overview:

The design objective has been achieved. Applying torque to the setscrews (against the ball bearings) will start moving the break away billet in its intended fashion. As torque continues to be applied, the balls move the billet material, encompassing the spline (cracking occurs, releasing billet as intended) causing no shaft or spline damage while achieving superior clamping strength.

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