

Challenge

A manufacturer of steering linkages required a method to measure and improve the quality and effectiveness of their idler arm assembly process, specifically the nut crimping operation. The idler arm is a key component of the steering linkage system and the quality of its assembly is vital. If manufactured incorrectly the steering system will feel floppy or can even result in complete steering failure.

The crimping process deforms the nut by impacting its sides thus preventing the nut from loosening. An operator then uses a tool to run the crimp nut down to full position. The nut is now crimped, ensuring no future displacement occurrences. As part of their existing quality check, the operator would attempt to back the nut off by reversing the direction of the torque gun. The problem was that there was no way to determine the effectiveness of the operation as common problems such as cross-threading, missing crimp and “soft” crimping often occurred.

Solution

The Sciometric system analyzes the entire torque waveform as the nut is run down and as the reversing torque is applied. Multiple signature checks determine the peak torque during run down and the amount of reverse torque applied as the operator attempts to remove the nut. By analyzing more than one portion of the signature, the Sciometric system accurately detects each defect and rejects the part when necessary. As can be seen in the waveform below, each defect introduces a unique and dramatic change to the torque waveform. Signature analysis provides a consistent measurement standard for evaluating the quality of the operation.

CRIMP NUT MONITORING KEY FEATURES

- Catches defects that were previously missed such as no crimp, soft and cross threading
- Can be used for multiple model types, i.e., nut sizes
- Reduces manufacturing repair costs by finding defects early in production
- Uses signature analysis for most accurate verification
- Improves quality of idler arm assembly process

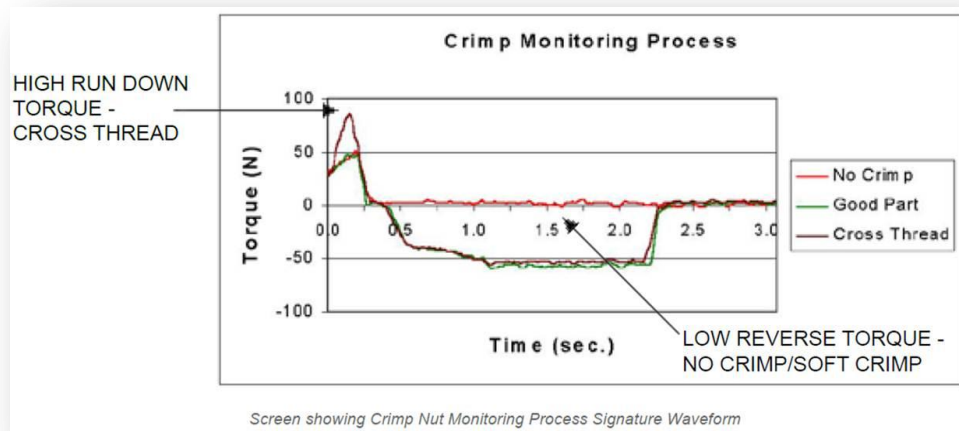


the science
of quality

The dynamic functionality of the Sciometric system also made it possible to test various nut sizes with a single configuration file. Due to the system's capability of changing limits on-the-fly, it was no longer necessary to download a new configuration every time the part changes, making the process more efficient, while increasing quality.

Results

Through the implementation of Sciometric's signature analysis technology into the idler arm assembly process, the manufacturer is able to effectively and efficiently monitor the effectiveness of the crimp nut portion and find common defects that otherwise would not be caught until the vehicle was assembled and possibly in the field.



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