Q-DAS Incorporated | Thomas Stewart | October 2015

Quality in Manufacturing: Two Industries - Same Problem

Considering that the prevailing quality standards (means, methods and traditional statistics) are oriented towards the automotive industry and its traditional manufacturing systems, it is surprising that even within the automotive industry there is significant disagreement and in some cases outright confusion about the definition of the major quality metrics. This has led many companies to author their own company guidelines in order to clarify the statistical assessment of measurement systems, manufacturing tools and process capabilities. These company guidelines mainly deal with the blind alleys left open to interpretation in the prevailing guidelines, bringing definition and acknowledging the need for engineering judgment based on pragmatic analysis.

Lost in the discussion are several key points that are industry specific.

As it relates to the aircraft industry, the fact that these machining production systems will produce fewer parts with more frequent pauses in production means that the traditional automotive quality metrics, especially those that assess process stability, may not be sufficient to accurately describe the process or provide the information necessary to improve a process. Also unique to aircraft production are the exotic materials and the extensive use of general purpose tooling and machines, such as flexible milling, turning, boring and drilling machines, which lend themselves to the manufacturing of multiple part characteristics by a single tool, where not every characteristic has the same level of criticality. Advances in carbon fiber manufacturing materials and processes still continue at a fast pace and these processes are unique enough to warrant special attention on their own as it pertains to descriptive statistics.

As it relates to the automotive industry, governmental environmental regulation and standards have driven powertrain manufacturing away from steel and iron towards the successful development of exotic materials for manufacturing lighter and more fuel efficient powertrains. For automotive body and assembly the now extensive use of polymers, Die cast and thin wall stamped body parts means that they too have made significant advances in manufacturing technology.

Ironically, automotive now has more in common with the aircraft industry than at any point in history and both still have the same significant gap when it comes to dealing with data collection and analysis (quality metrics) for purchased components.

Regardless of the industry, the communication of quality standards and requirements to part component suppliers are generally the responsibility of a large companies purchasing supplier quality team and not the direct responsibility of manufacturing or quality engineering groups. There is a tendency to rely upon the traditional SPC methods, quality metrics and techniques that have most generally been taught and used for years. Since the predominant SPC training leans towards bending (transforming) the data until it fits the kind of analysis methods that can be calculated using simple spreadsheet and typical SPC tabulation software, the resulting quality metrics are frequently misleading at best. At its worst, these are the same SPC methods, quality metrics and techniques that are so frequently misunderstood even within the same company. The communication of requirements to external parts component suppliers therefore becomes a new challenge with every independent supplier.

Most companies will still simply rely on the traditional SPC methods for part component suppliers because they are in fact widely accepted as the best practice, even though the OEM companies own internal manufacturing and quality engineering teams have already discovered the issues and developed the internal company guidelines that support an advanced statistical analysis software capabilities. This results in an unspoken phenomenon... where some companies might have different quality standards applied for internal production systems and external purchased components, while believing that everyone works to the same standards.

The solution to this dilemma is the universal deployment of Q-DAS products across OEM's and their suppliers, effectively merging the independent quality systems into one common system that still allows the organizations to function independently.

Q-DAS has developed and implemented systems meeting the global quality and individual company standards as a "standard off the shelf" product that is both cost effective and value added back to the process. The Q-DAS methodology is a systematic approach to the assessment of measurement, test, manufacturing and assembly systems while providing the real-time production monitoring with exceptions reporting capability that enables a true vision into the process. The Q-DAS Statistical Engine can automatically evaluate non-normal data, assessing process stability according to preset business rules that understand the difference between similar features that have a different relative importance (characteristic class), natural bounded and positional tolerance characteristics (GD&T Features) and relational features for example; in a best-fit move. This powerful and flexible data analysis engine is coupled with a modular products design that together support every phase of production quality:

- **C**ollection and Recording
- **A**nalysis
- **M**anagement
- **E**valuation
- **R**eporting
- **A**rchiving

... collectively known as the CAMERA Concept.

Q-DAS data analysis capability is unique in the world today and provides sound rational methods for analysis of normal and non-normal data at the same time. The built in capability to adapt the method for analysis (evaluation strategy) to suit the reason for test makes it possible for the product to fulfill the individual needs of every OEM plant and supplier, while also making it possible to have a true global system at the same time.

These same software tools are flexible enough to support both high and low production rates, traditional and exotic materials and traditional or agile manufacturing technologies.

Currently there are more than 85 suppliers of measurement, test and assembly systems that are certified to support the Q-DAS ASCII transfer format and that means customers can purchase the best suitable equipment and expect that it will be compliant with a Q-DAS CAMERA system.

Q-DAS & TEQ Training & Consulting insure that the confusion surrounding the quality metric, methods and techniques is eliminated and promote common understanding of pragmatic methods. These teams also support the preparation of company guidelines that can virtually eliminate miscommunication of requirements and the attainment of quality objectives for both OEM and supplier alike.

In summary, regardless of your production system technology, Q-DAS has the right products and the right experience to provide both local and global solutions that can link OEM's together with their suppliers for a common and effective quality system. Contact your local Q-DAS team to find out more about how we can take the mystery out of your data recording and analysis.

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