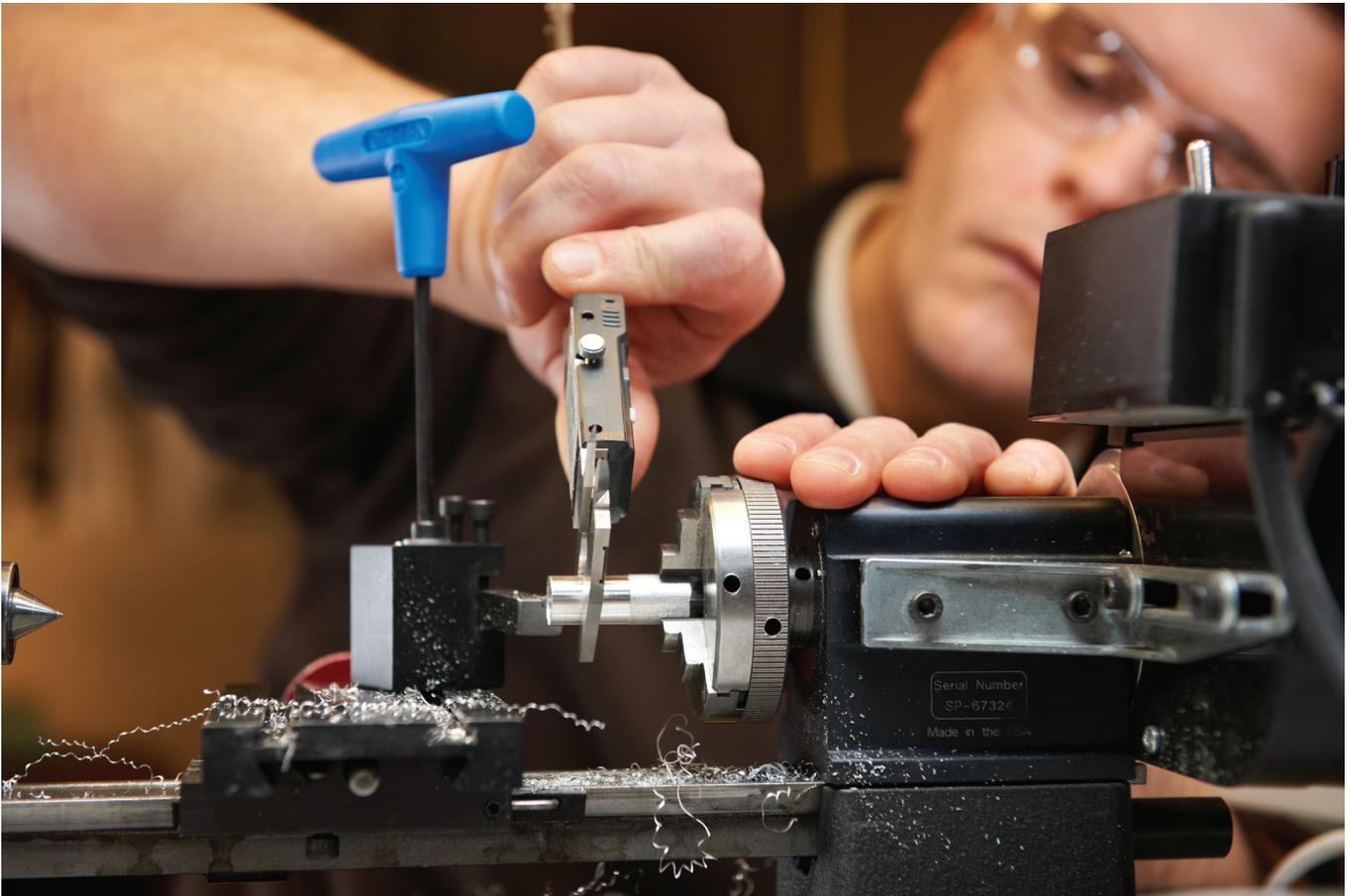# OPTIMIZE YOUR INSPECTION PROCESS TO REDUCE COSTS AND GET TO MARKET FASTER


As a manufacturer, you are committed to quality. Quality can mean different things to different groups within an organization. From a customer perspective, quality means that the product they purchase is reliable and performs to their satisfaction. From a manufacturing perspective, quality means conformance with manufacturability specifications. While delivering high-quality products usually translates to happy customers and increased profitability, the internal benefits of reduced scrap, rework, and defects in the manufacturing process mean lower costs and faster time to market.

Many companies today subscribe to internal quality management programs, both for external and internal gains. However, in this world of increasing competition, manufacturers must seek ways to optimize their bottom line while managing the cost/ quality trade-offs. The inspection process within the supply chain plays a critical role in managing conformance of manufacturability and is a process ripe for optimization.

QUALITY IS ESSENTIAL

Maintaining the highest quality possible is a critical business objective. When products are defective or fail prematurely, companies incur higher waste and re-work costs and lose revenue,

market share, and customer loyalty. Many companies implement quality management programs to rectify these challenges and deliver superior quality products to their customers. While most quality management programs are implemented company-wide, driving quality from a manufacturing perspective involves building processes that ensure products conform to and are consistently produced according to design specifications. This is typically done through the Quality Assurance and Quality Control functions within manufacturing.
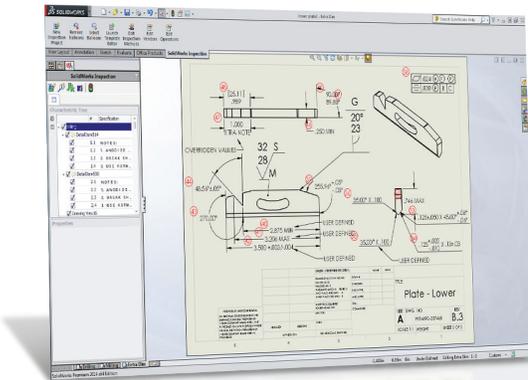
INSPECTION AND TESTING PLAY A KEY ROLE IN DRIVING QUALITY

Inspection is a common step of Quality Assurance and Quality Control processes within the overall manufacturing process. Quality Inspections provide data and manufacturing intelligence that indicate how production processes are performing and provide insights into how a better design might yield higher quality and less waste. Statistical Process Control (SPC) analyses can be performed on Quality Control data to gain insights for process improvement along the entire production lifecycle.

Inspection can happen prior to, during, or after production. Pre-production inspection generally occurs when parts assembly is required. If parts are defective prior to assembly and not checked, the assembly itself becomes defective. Part of the reason for the inspection process is to create documentation that both identifies key attributes of a product to inspect and serves as proof of inspection. Quality technicians, who perform critical inspection tasks both in-process and post-production, are key players in a quality system. Their job entails not only performing physical inspections, but also generating the required documentation, such as balloon drawings, inspection checklists and reporting results.

EXAMPLE: FIRST ARTICLE INSPECTION PROCESS

The First Article Inspection process is another inspection application within product development. First Article Inspection Reports (FAIR) are often subject to industry standard requirements, such as AS9102 for the aerospace industry, or PPAP in the automotive industry. Traditional first article inspection packages were printed or handwritten. Today many companies use software to generate First Article forms that can be stored on servers for easier retrieval as needed. Manufacturers use first articles in two ways:

- A manufacturer produces the first item of a run to validate the manufacturing process that meets the design criteria. This item is tested to ensure it meets all specifications, dimensions, and tolerances. If the item fails inspection, then further analyses must be done to adjust either the production machines or the design, or both.

- A manufacturer receives parts from an outside supplier within its supply chain. The manufacturer uses a First Article to validate the supplier's parts conform to specification. The supplier provides an item, or test batch, which the manufacturer inspects. A successful acceptance of the First Article means the supplier may ship the balance of the order to the manufacturer for integration into the final product.

SUCCESSFUL INSPECTION REQUIRES THOROUGH DOCUMENTATION

The inspection process has two requirements: the physical testing and inspection of a part of finished assembly as well as its associated documentation. Documentation is used for internal inspection activities (such as checklists or balloon drawings), external use (such as deliverables that ship with a product), to maintain industry certifications, or to support audits.

The need for inspection documentation has been driven by a number of forces, including industry and regulatory requirements, particularly when human safety is concerned. For example, manufacturers who supply parts and products to the automotive and aerospace industries must adhere to industry-standard quality requirements (such as SAE AS9100 for aerospace industry suppliers) that mandate inspection documentation meet certain criteria. If your company manufactures parts and products for the U.S. Federal Government, you must demonstrate proof of quality through documentation, including inspection reports.[1]

SPREADSHEETS AND MANUALLY BALLOONED DRAWINGS

In many instances, current inspection documents are created manually. The QA team creates balloon drawings from the design engineer's original drawings. Balloon drawings make it easier for inspectors to see the details of joints and other areas of concern. Inspectors typically create the inspection checklists manually, quite often in a spreadsheet. They manually enter values from the drawings to a spreadsheet. In turn, as measurements are taken, inspectors write or type in the results. After the inspection is completed, inspectors complete reports on their findings. Often these reports are created manually and must follow industry-standard formats. Quality professionals traditionally use resources from the American Society for Quality (ASQ) to assist them with implementing best practices for inspection and documentation processes.[2]

As you can imagine, the manual creation of documentation is a long and tedious process. Inspection engineers can spend a whole day creating balloon drawing of a complex product or assembly. The inordinate time spent on creating documentation manually is expensive which can create product release delays and risks the possibility of incorrect data being included in multiple documents. There is a great opportunity to improve this costly and potentially error-prone process.

AUTOMATIC CREATION OF INSPECTION-RELATED DOCUMENTATION

There is a better way. What if the inspection engineer could automatically generate balloon drawings, inspection checklists, and reports that include the 3D CAD data from the approved design? SOLIDWORKS® Inspection is First Article Inspection (FAI) and in-process inspection software that streamlines and automates the creation of ballooned inspection drawings and inspection reports (AS9102, PPAP, and more). It can be used standalone or as an add-in that enables SOLIDWORKS users to leverage their legacy data, such as SOLIDWORKS files, PDFs, and TIFFs.

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1 Government Contractors Must Meet Quality Assurance Standards, Biz Filings by CT, http://www.bizfilings.com/toolkit/sbg/run-a-business/govt-contracts/govt-contractors-quality-assurance-standards.aspx, May 24, 2012

2 American Society for Quality, http://asq.org/index.aspx

SOLIDWORKS Inspection software virtually eliminates the need for manually creating balloon drawings, which is a huge timesaver. Inspection checklists are pre-populated with values for dimensions, hole sizes, and tolerances. In addition, SOLIDWORKS Inspection enables you to digitally capture measurement information (such as USB calipers or a Coordinate Measuring Machine (CMM), into your inspection process. SOLIDWORKS Inspection also can automatically import measured test data into industry-standard packages (such as AS9102, PPAP, APQP, and more) as well.

SOLIDWORKS Inspection delivers significant benefits to the inspection process. Because balloon drawings can be created in minutes instead of hours, users experience a 90% time savings over manual methods. Automatic generation of inspection checklists and reports significantly reduces data translation errors and inconsistencies. Industry-standard reporting simplifies the exchange of documentation between business partners, and satisfies governing industry bodies and regulators. These time savings shave time off the product development process and reduce time-to-market, which enables engineers to focus their time on design and innovation.

CONCLUSION

The commitment to quality in manufacturing is an on-going process. Companies today are always seeking ways to increase efficiencies and lower costs without sacrificing quality. A significant number of organizations still use manual translation of engineering data to create their test and inspection documentation, which leads to errors, inconsistent quality data, lost productivity due to manual document creation, and time-to-market delays. SOLIDWORKS Inspection software enables quality assurance, quality control, and manufacturing personnel to produce higher-quality products and easily create accurate inspection documentation, industry-standard reports, and First-Article inspection packages. Completing these tasks in less time helps companies realize significant cost savings, accelerate time-to-market, and improve product quality.
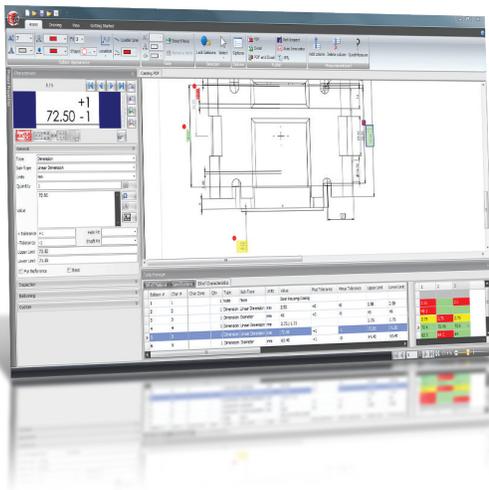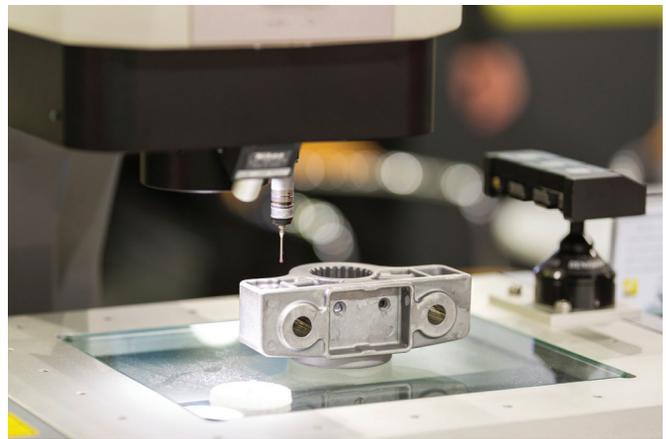
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