

# Eliminating Errors – For Good

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This, coupled with lower on-site inventory levels, has automotive suppliers searching for IT solutions to help eliminate errors before they occur.

**By Steve Warnke**

In recent years, the old saying, “Good enough isn’t good enough anymore” has taken on a whole new meaning. Today, automotive OEMs require zero defects from their suppliers. This mandate is forcing first-tier suppliers to prevent non-conforming product from ever leaving their docks, or risk being assessed back charges, or worse, losing business.

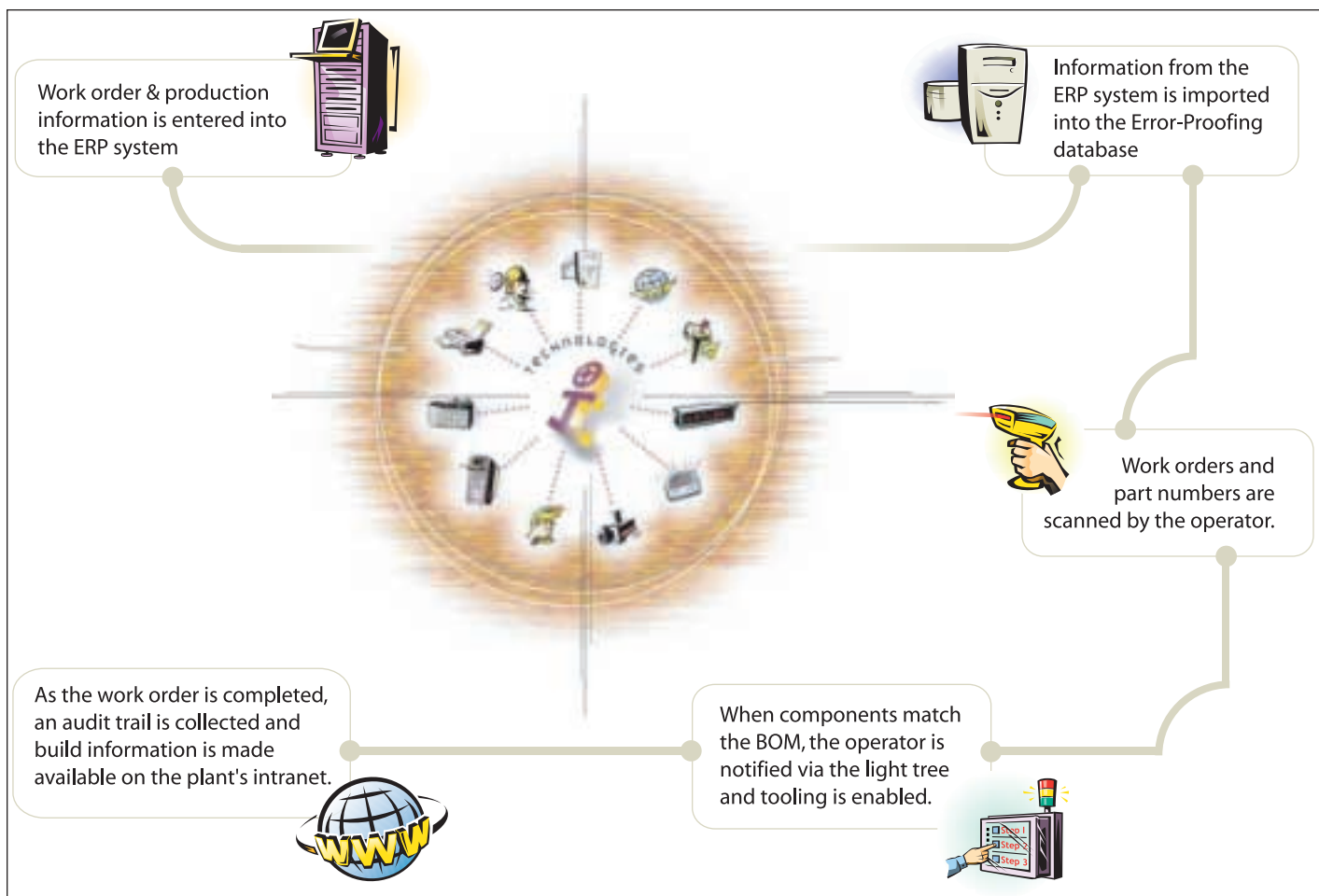
OEMs' quality standards are higher than ever and continue to rise. This, coupled with lower on-site inventory levels, has automotive suppliers striving to eliminate errors or mistakes before they occur. Exceedingly high OEM quality expectations and preventing mistakes is especially challenging for the first-tier supplier today given:

- Increasing variety of products and components;
- Made-to-order requirements;
- Transient workforce and employee retention; and

■ The need for employees to master complex equipment and processes.

As front-line employees are asked to get more done with less while having to deal with a wider variation in products, it is important they are assured their job was correctly done the first time. This is accomplished by providing operators real-time guidance. Operational QS-9000 work sheets and screens provide graphical work instructions, quality control procedures and specific parts required for each product. Best practices are documented and shared in efforts to improve overall product quality.

Beyond improving the effectiveness of employees, manufacturers are streamlining manufacturing processes to optimize their equipment and inventory resources. The basic goal of lean manufacturing is to get more done with less — by minimizing inventory at all stages of production, shortening product cycle times from raw materials to finished goods and eliminating waste. Integrated



**Figure 1. Successful error-proofing system at work**

automated systems ensure products are built to customer specifications in lot sizes of one and prevent mistakes from ever occurring in the first place.

A quality concept that is referred to by various names — like error-proofing, fail-safing and poka-yoke — but essentially pertains to the same idea of producing a defect-free product, is becoming a standard in most automotive production operations. Error-proofing solutions provide clear, concise operator instructions on the correct components to use and how to assemble the product, verify and record the correct parts that were used, and test the product to ensure design specifications are achieved (see Figure 1).

### Case Study Background

Dana Corporation is one of the world's largest suppliers to vehicle manufacturers and their related aftermarkets. Founded in

1904 and based in Toledo, Ohio, the company operates 300 major facilities in 35 countries and employs more than 75,000 people. The company reported sales of \$12.3 billion in 2000. The Dana Commercial Vehicle Systems Group is a leading supplier of axle products for the heavy truck market, providing single-source, customized innovation — from design to assembly.

In Henderson, KY, Dana has zero tolerance for defects. Dana's customers measure them by ZMPDs (Zero Miles Product Defects) and PPM (parts per million). ZMPD is defined as a defect that will not allow an OEM's vehicle to be driven off the final assembly line. These are important measures of quality, and meeting these performance indicators is critical to customer satisfaction and future business.

In efforts to exceed customer expectations and maintain its competitive edge, Dana realized the need to put into place a

system that would error-proof critical operations. An area of focus was in the assembly of the yoke with the axle. Even though an incorrect matching of the yoke and axle occurred infrequently, that was not acceptable to Dana. Due to sequential scheduling of product, a mismatch could result in shutting down the customers' production line and expensive rework costs.

Dana recognized employee training would only take it so far in its mission for zero defects. With a growing number of products and assembly variations, it wanted to take additional steps to prevent mistakes. As a result Dana deployed an error-proofing system.

### The Solution

A leading provider of information technology solutions for the automotive industry worked with Dana to develop and deploy an error-proofing solution that addressed

specific needs and achieved the desired results. The solution was tailored to Dana's need to ensure the correct components are used in each and every product assembly and to record the components that makeup the finished product for historical reference.

The production sequence and the bill of material for each product are downloaded to a SQL Server database from an ERP system, via an information-transfer software package. This software package provides a standard means to move information between dissimilar technologies. As the axle assembly arrives at the assembly station, the operator scans the barcode on the work order manifest and then the barcode on the yoke. The barcode scans are compared to the product bill of material in the SQL Server database. If both the yoke and axle assembly selected are a correct match, a green light on a status light tree is illuminated, and the production tooling is activated. If there is an incorrect match, a red light on the status light tree is illuminated, and the production tooling is not activated. Interlocking the production tool-


ing eliminates the possibility of using the wrong part in the product assembly. After all parts have been properly identified and matched, the information is sent to the SQL database and stored. If any part problem should ever occur in the field, the product makeup can be easily traced back to the original parts used in the assembly.

The architecture of the solution is easily expanded and modified to meet changing needs. With the success of the system, plans are to incorporate additional stations to error proof more component parts. Furthermore, this system has the potential for the operator to quickly see approaching and previous work orders on a monitor, to allow for planning ahead and checking of completed work orders.

### **The Benefits**

With Dana and the provider of information technology solutions working together, the solution has proven to be a success. Part defects associated with wrong components have been eliminated and customer satisfaction has increased.

Operators on the production line find the system easy to use and a necessity in building quality product. Since repair costs have been greatly reduced, both in-house and at the customer's site, Dana anticipates a fairly quick return on investment. With improvements in quality and gains in employee productivity, more business contracts are actively and successfully sought.

Error-proofing systems have proven to be of great benefit in ensuring the customer receives the correct order produced with the correct components. It is a simple concept, yet companies have struggled with shipping totally defect free products. Recently this has become a high priority in securing future business. As the quality expectations of the customer continue to increase, it is essential that automotive companies deliver the highest quality product to survive and grow in a very competitive global marketplace. 

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