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Try hard with a vigilance

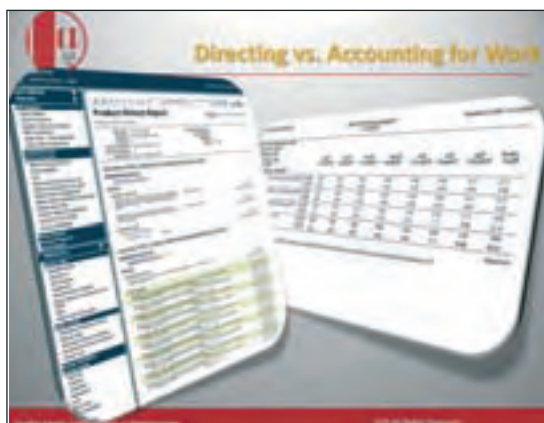
Achieving zero defects on the JSF-35 engine mountings for a perfect fit at Lockheed Martin delivers dramatic results. By Michael Young, QCR Group.

Most peoples' introduction to the world's most advanced aircraft ever built came in viewing *Die Hard with a Vengeance*, the third installment in the "Die Hard" adventures of New York Police Detective John McClane, still the most famous and popular character that Bruce Willis has played. However getting the JSF35 to market is a difficult chore especially with a supply chain that requires manufacturing all over the world. The major manufacturers include Lockheed Martin, Northrop Grumman, Pratt and Whitney and BEA Systems. Their concerted efforts meet in Fort Worth, Texas, where final assembly

of the aircraft takes place. This is the point at which vision becomes reality.

Early in production one such reality came to light when it was determined that the engine was a little too large, using up all the available variation when attaching the fuselage. This reality required the thrust mounts, which are the attachment points for the engine, to be perfectly placed. To accomplish this feat, the assembly of those thrust mounts went from hours to days. The ultimate solution would be to re-engineer the attach-

The results were dramatic. The previous installations, which were averaging 3 errors and one omission, went to zero.



ment. However, that would take months given the supply chain and reaction times. The short term solution was to rely on craftsmanship.

Craftsmanship has its drawbacks. Even with a highly experienced workforce, some of the most advanced CAD-CAM and work instruction systems installed, the effort still comes down to perfectly executing over 300 individual process steps.



Ed Linhart the vice president of Manufacturing and instrumental in organizing the startup operation of the F35 program, agreed to a pilot program with QCR Corporation to mistake-proof the thrust mount installation. While observing two installations of thrust mount assemblies, which took days to complete, QCR went about configuring their SMART solution (System Monitoring Automated Reasoning Technology). The results were dramatic. The previous installations, which were averaging 3 errors and one omission, went to zero. The elapsed time required to install went from days to 9 hours. Point-of-Activity verification of requirements associated with all tools, materials, activities and associates was accomplished in real-time. By-products of this effort included real-time where-used information on tools, equipment and materials. The reliance on the craftsman and his variability was diminished due to standardizing the work process and real-time delivery of multimedia guidance and training on hand-held devices. This approach essentially allowed one certified assembler's experience to guide future assemblers and lessen their dependence upon on-the-job training.

The QCR solution is actually guiding the associate through the work process in real-time, essentially directing instead of accounting for his/her efforts. The published procedure for assuring quality in manufacturing at Lockheed is:

- Ensure the tool is in good working condition
- Ensure the calibration sticker is stamped (QA) current
- Check planning for measurement requirements
- Conduct measurements using the tool correctly

As can be seen, this requires trying harder to be attentive and vigilant on the part of the associate. SMART on the other hand, systematically reminds the associate to address each of these items at the point-of-activity and time of use then provides for verification of the work thereby preventing any omissions and errors. If issues are encountered SMART invokes a collaborative knowledge base of business rules to automatically handle the situation and maintain compliance. ●

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