

WARD'S AUTOMOTIVE REPORTS®

Quality Hinges on Nuts and Bolts Execution

ORION, MI – David Archer has a fixation with fasteners. Nuts, bolts, rivets and screws – if it secures a joint, he is on it.

“They literally hold your product together,” Archer, president-Archetype Joint LLC, says at the company’s headquarters here.

Fasteners may seem small business, but can cause big quality headaches and drive warranty costs through the roof if mismanaged.

Archer insists the proliferation of less-than-robust joint design and inaccurate tooling is the leading cause of fastener foul-ups.

The National Highway Traffic Safety Admin. appears to support Archer’s theory. Of 66 safety-related recalls through June on ’05 models in the U.S., at least 34% are attributable to potentially defective fasteners, according to a *Ward’s* analysis. NHTSA’s number does not include customer-service action recalls issued by auto makers.

NHTSA’s data and Archer’s findings suggest the primary problem is with temporary fasteners that are meant to come apart. Permanent bonds, such as welds, tend to be more accurate and better planned, while threaded pieces are considered a lesser science.

Archer insists not enough attention is paid to the variables that determine a bond’s integrity, including the materials being fastened, such as polypropylene, which tends to rebound against a nut, loosening torque dramatically after tightening.

Other variables include coatings on bolts and screws; composition of fasteners, such as magnesium, which is lightweight but tears easily; and lubricants or other unintended substances that corrupt the tension in the tightening process, when even trace amounts sneak onto a washer.

Then there is the margin of error built into any human interface on the assembly line and the lightning-fast evolution of tooling technology and its high-cost maintenance.

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Even the most-advanced tooling and testing methods can fail.

There are 3,000-3,500 threaded fasteners that hold the typical vehicle together. Often these components – representing up to 75% of total parts – “are the last thing in the bill of materials,” Archer says.

“Engineers leave this thing until the end of the program,” he says. “Every new product of any size should have an interface design plan, with some testing either on the previous product or on the new one.

“If you can borrow stuff that you learned the last time and use it, more power to you; it’s cheaper down the road. But if you can’t, you really need to call the experts. And more and more, the experts are not going to be in-house.”

Al McCarty, an associate with Munro & Associates, a Troy, MI-based processes consulting firm, estimates 60% of assembly labor is using tools to fasten parts together. “Productivity, quality and human-health outcomes in assembly are all controlled by fastening.”

McCarty, a 40-year industry veteran with experience at General Motors Corp. and DaimlerChrysler AG, remembers when there were about a dozen fastener gurus at GM. Now, it takes less than one hand to count the on-site experts at major auto makers.

“I don’t think we’re doing that much better a job quality-wise with fastening than we did 20 years ago,” he says. “In these large companies, the individual expertise is going away.”

Archer recommends auto makers consider fasteners much earlier in the design process and integrate them into production methods from the get-go in order to reduce problems.

“When you assemble things, you not only have to worry about the components themselves, but about this process of how it goes together and the controllable variables of how it goes together,” he says.

However, the outsourcing of engineering to lower-tier suppliers and the reduction of workers who understand fastening on the OEM level have lessened the likelihood of solving fastener issues, resulting in additional production time.

– John D. Stoll



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Thinking outside the joint

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