

Physical testing guarantees joint safety

WORDS: ISABELLE KLIGER | PHOTO: ERIC SMITH

TESTING “DEVELOPMENT TESTING can disprove many of the common misconceptions surrounding joint failure,” says Dave Archer, President of Archetype Joint.

What is Archetype Joint?

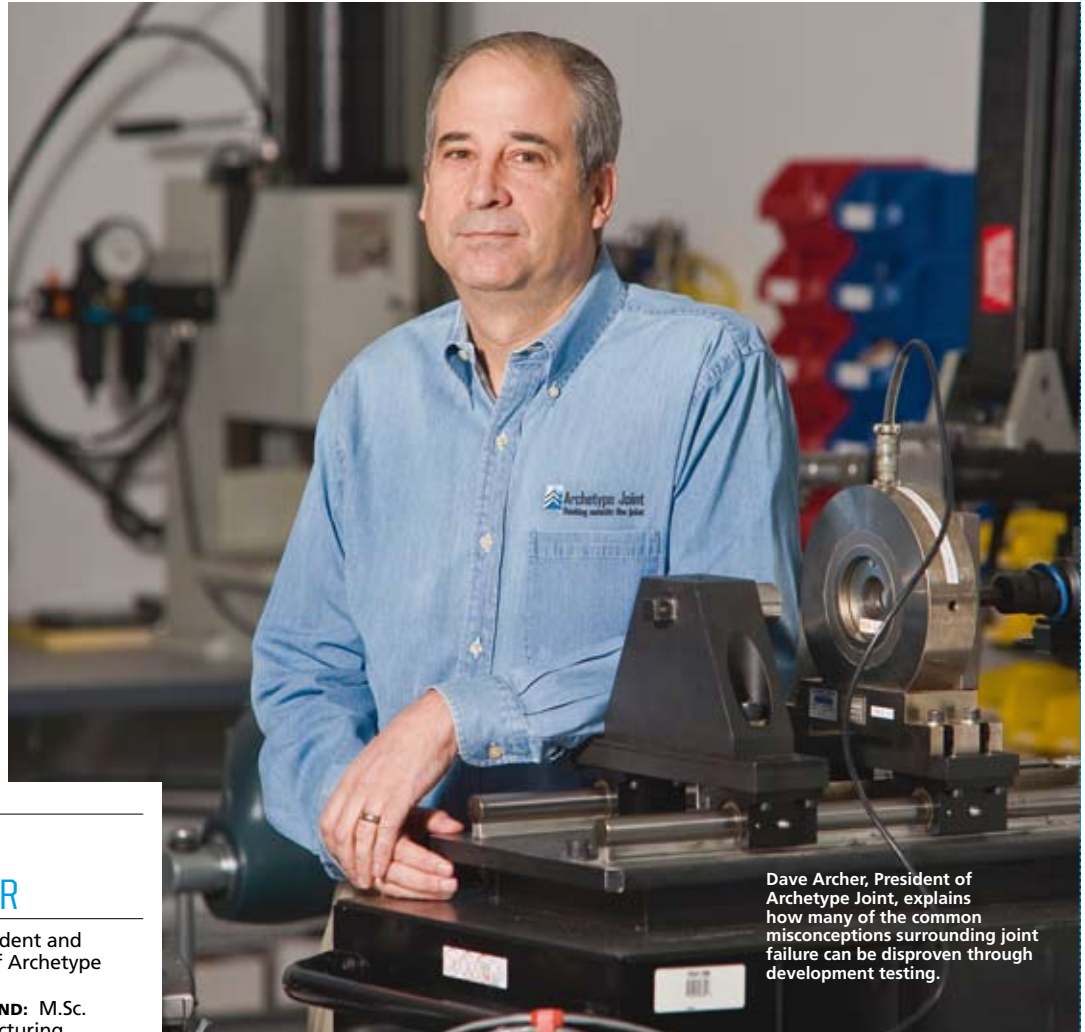
“We provide our clients with independent design, testing and validation services focused exclusively on joints; primarily bolted joints. Approximately half our work involves performing specific design validation tests – primarily for automotive and aerospace companies. The other half is to solve joint problems and provide independent competitive comparisons of fasteners, tools and assembly techniques.”

Why is testing so crucial?

“The performance of assemblies such as bolted joints cannot simply be analyzed in theory, as the results are not accurate. When several pieces are used together, the effect of variable interaction explodes exponentially. As a specific example, there is no way to accurately calculate the amount of bolt tension generated for a given torque input. Instead, physical testing is required. As the vast majority of bolted joints never undergo development tests focusing specifically on joint integrity, most engineers are unaware of the level of knowledge that can in fact be gained from tests of this kind.”

How do you hope to help improve the quality and safety of bolted joints?

“It’s crucial to educate anyone involved in designing, assembling or maintaining critical joints to eliminate once and for all the misconception that joint failure can be prevented through luck rather than engineering. In many cases, this belief may appear to be sufficient – especially as a manufacturer may not suffer significant failure for some time. But the day their luck runs out, the consequences



Dave Archer, President of Archetype Joint, explains how many of the common misconceptions surrounding joint failure can be disproven through development testing.

FACTS:
DAVE ARCHER

ROLE: President and founder of Archetype Joint.

BACKGROUND: M.Sc. in Manufacturing Engineering from the University of Rhode Island. Previously held senior design and manufacturing engineering positions within the industrial equipment and defence industries.

LIVES: In Lake Orion, Michigan with his wife Nancy and son Troy.

can be devastating. I have been an expert witness in cases where bolted joint failure led to profound injury or death – and nobody wants to be the person with ‘misconception’

being deposited on that day.”
How can customers improve the quality and safety of their bolted joints?

“Many people believe that bolted joints are a ‘pre-engineered’ solution, requiring no more effort than picking an element from a CAD library, along with a torque from a table in a book. We must therefore seek to elevate the status of bolted joints to ensure that users understand their complexity. As bolted joints

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are usually a part of all product sub-systems, we need to consider the best ways in which to manage joint design, fastener selection and assembly parameters from a global perspective. In many cases, this also requires us to re-consider the way we calculate cost, by adopting a more long-term perspective.”

How would you advise customers to approach product cost?

“The question is an easy one to answer: life-cycle costs should drive

product development decisions. Unfortunately, implementing the obvious is sometimes difficult. People tend to be slaves to unit cost – largely because life-cycle costs are so much more difficult to quantify. The cost of a more expensive washer, such as a Nord-Lock, must be justified, often through indirect savings and cost avoidance. Nord-Lock should therefore be compared for its ability to ensure joint integrity rather than on unit cost alone.” □