



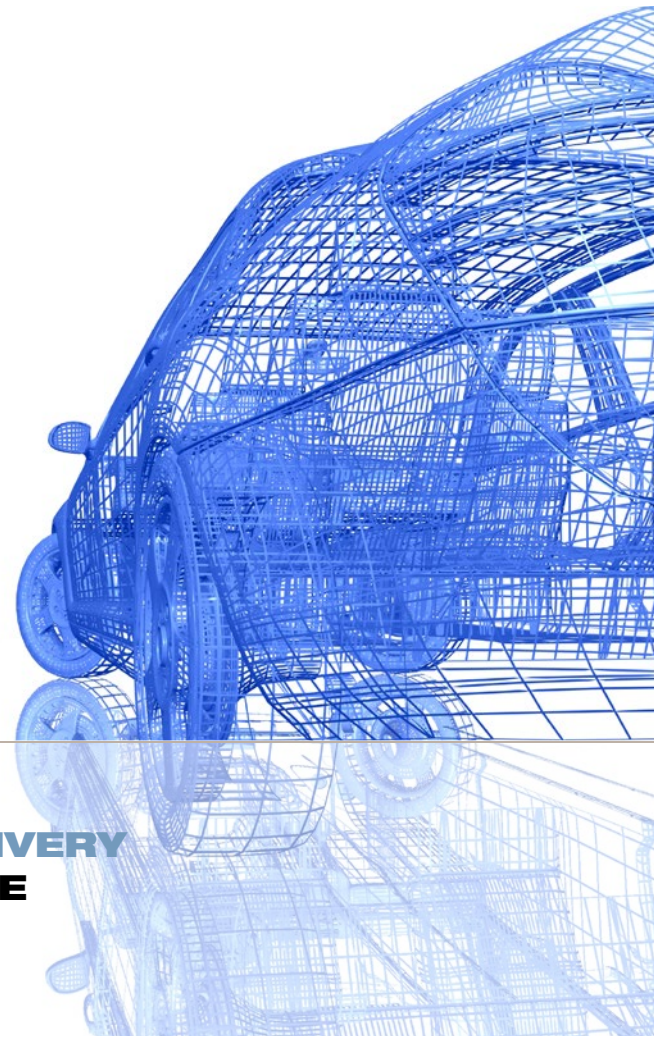
KEEPING PACE WITH
**SHORTER
PRODUCT DESIGN
& MANUFACTURING
CYCLES**

EWI[®]
We Manufacture Innovation

STAYING AHEAD OF THE MANUFACTURING REVOLUTION

THE PRESSURE OF RAPID INNOVATION

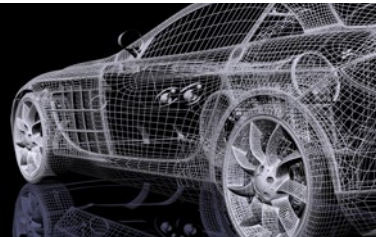
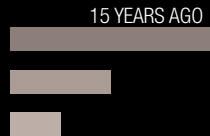
Manufacturers across all industries are under increasing pressure to reduce product design cycle times while simultaneously improving product performance. Expectations for design-to-deliver times can be up to half of what they were just ten to fifteen years ago. As a result, manufacturers are forced to compress their design and development processes. This has accelerated the pace at which technology must advance to allow manufacturers to streamline their processes and meet these challenging expectations. Further, to meet consumer demand for ongoing and rapid innovation, companies are exploring alternative design processes, new development models, and advanced manufacturing techniques.



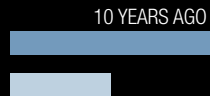
**EXPECTATIONS FOR DESIGN-TO-DELIVERY
TIMES ARE HALF OF WHAT THEY WERE
JUST TEN TO FIFTEEN YEARS AGO.**

PACE IS ACCELERATING

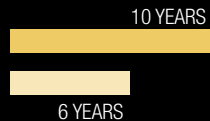
Auto design cycles are 25% to 50% shorter than they were 15 years ago.



Consumer product design cycles are roughly half of what they were a decade ago.



Oil & gas fabricators have reduced the time required to design, build, and commission offshore platforms from 10 years to just 6 years.



According to a recent survey of more than 2,100 engineers and technical professionals:¹

- The majority agreed that designs are more complex but design cycles are shrinking due to pressure to get products to market faster
- 46% are working on more projects concurrently than they were two years ago
- 44% said the pressure to meet deadlines is putting product quality at risk
- 45% said they can't consistently meet launch dates and product quality standards

¹<http://press.ihc.com/press-release/design-supply-chain/pulse-engineering-study-reinforces-idea-pace-engineering-accelerat>

BENEFITS OF A SHORTER DESIGN CYCLE

Although shorter design cycles place more pressure on manufacturers, these compressed schedules yield significant benefits. Getting products to market faster helps lower development costs and allows manufacturers to generate revenue more quickly. This is particularly important in industries where being first to launch a new product allows a company to capture the lion's share of the market.

Cycle Challenges

Aerospace—

There is an increased need to get new products to market quickly. Aerospace manufacturers who can compress design cycle times while reducing weight, operating costs, and environmental impact can prevail in a highly competitive market with limited demand.

Automotive—

Auto design cycle times are much shorter than in the past, and product designs are often modified after just a few years on the market. Companies are using a variety of powerful simulation tools to model their products and improve designs more quickly than ever.



ACHIEVING FASTER DESIGN CYCLES

Faster design cycles aren't the result of any one change; rather, they're the sum of multiple process improvements, including:

- Accurate, streamlined procurement operations
- More efficient process development and qualification
- More streamlined post-manufacturing quality assurance (QA) and quality control (QC)
- Reduction in "non-value-added" operations

Speed-to-Market Strategies

EWI's world-renowned engineers and technicians team up with companies to find solutions to their most difficult design challenges and get their products to market faster. Our capabilities include:

- Material selection and characterization
- Computational modeling
- Design for welding
- Manufacturing process evaluation
- Advanced technologies for production
- Welding process selection and optimization
- Equipment specifications



FEASIBILITY TESTING

Feasibility testing allows companies to determine whether proposed designs and manufacturing processes are possible. More advanced approaches are needed to increase efficiency and reduce the time and resources required to bring new products to market. These challenges are becoming more significant as new advanced materials and manufacturing processes find increasing application in industry.

EWI tests the feasibility of joining aluminum to steel using friction stir welding

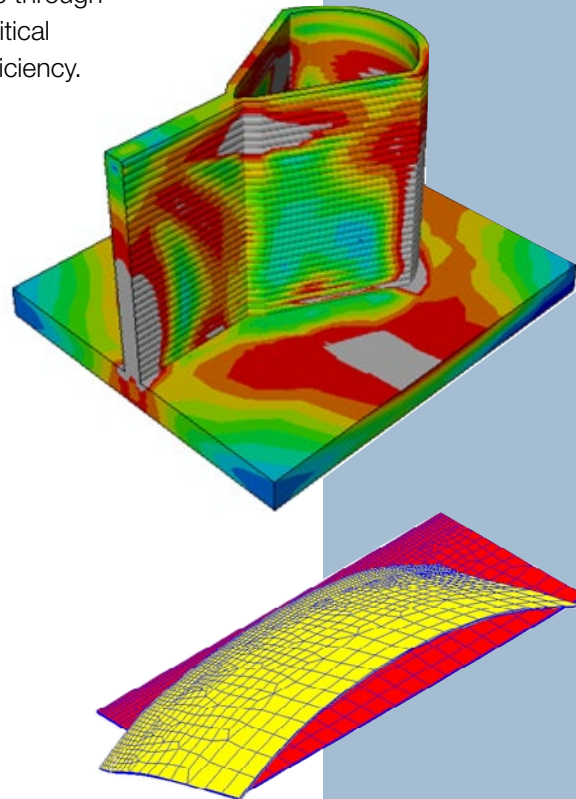
- EWI designed a new tool and successfully welded multiple aluminum alloys to low-carbon steel.
- The degree to which joint tensile strengths were reduced compared to aluminum-only welds was determined by the amount of intermetallic compounds which formed at the weld interface.



MODELING AND SIMULATION

Modeling of materials and processes can accelerate development and significantly improve the quality of final products. Validating manufacturing processes and predicting product performance through advanced computer modeling enables companies to make critical decisions more quickly, positively impacting manufacturing efficiency.

- Integrated computational materials engineering (ICME) reduces the time and testing required to validate new processes and material performance.
- EWI's innovative computational modeling techniques can decrease the number and duration of physical welding trials required, reducing design and prototyping costs and allowing companies to bring new products to market faster.
- EWI's weld-distortion-prediction modeling tools (Q-Weld and WeldFEA) help customers quickly refine welding processes, saving significant time during implementation.
- The development of parts libraries increases the efficiency of modeling and simulation, positively impacting design cycle times.



MULTIDISCIPLINARY DESIGN OPTIMIZATION

Incorporating multiple disciplines can simultaneously solve a number of design challenges by allowing concurrent assessment of multiple, interdependent, variables. While this approach is complex, it allows for more efficient analysis of the proposed product design and can significantly reduce the product design cycle time.



ABOUT EWI

EWI's high-level expertise and wide range of industry experience help companies set priorities and make the strategic decisions that enable them to move quickly through the product and process design phases.

Through innovative technology development, we help manufacturers to reduce design cycles, develop better products more cost effectively, and stay ahead of the manufacturing revolution.



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