

Revolutionary Product Development with DEFORM-3D®

STANLEY Engineered Fastening has built its success through the constant pursuit of innovation, particularly in the ongoing development and implementation of new fastening and assembly technologies. The many benefits obtained from using DEFORM-3D product installation and metal forming simulation software ensure that STANLEY Engineered Fastening stays at the forefront of its industry in terms of cutting-edge but cost-effective product design.

Company

STANLEY Engineered Fastening produces fastening and assembly technologies for a wide variety of industries. For more than 40 years, it has worked continuously to advance the use of today's newest technologies to solve fastening and assembly issues.

A Stanley Black & Decker Inc. Company, STANLEY Engineered Fastening has a number of locations close to its clients worldwide. As there is virtually no industry in which a STANLEY Engineered Fastening product, installation tool or system is not used, the company has a broad client base. Industries served include aerospace and defence, agriculture/heavy equipment, appliances, industrial assembly equipment, automotive, construction, electronics, energy, medical, telecommunications and transportation.

Challenge

The foundation of STANLEY Engineered Fastening's continuing success is its relentless pursuit of innovation, in particular the ongoing development and implementation of new fastening and assembly technologies. In support of its clients' environmental considerations, much of the company's focus is on the development of lightweight, high-strength fastening technologies. The increased use of plastics and composites also presents unique challenges in the design and manufacturing of fastening components that were traditionally designed for metal joints. To remain at the forefront of its industry, therefore, STANLEY Engineered Fastening requires the most advanced technology available for product design & analysis.



Fig. 1: POP Avdel NeoSpeed® range (Courtesy: STANLEY Engineered Fastening)

Solution

Wilde Analysis has supplied DEFORM-3D, the world's most widely-used analysis software for optimising bulk metal, forming, heat treatment and machining processes. DEFORM helps to improve product quality and reduce manufacturing costs and lead time for a range of processes including forging, extrusion, rolling, fastener installation and mechanical joining, turning or drilling.

“We are now in the position of being able to develop the cold-heading progressions of complex 3-D forms, simulate the installation of the fastener assembly, and then apply loads to the joint to predict strength. This has completely changed the way we develop products for STANLEY Engineered Fastening. Wilde Analysis has been there over the years to help us make those key steps forward in our FEA capability.”

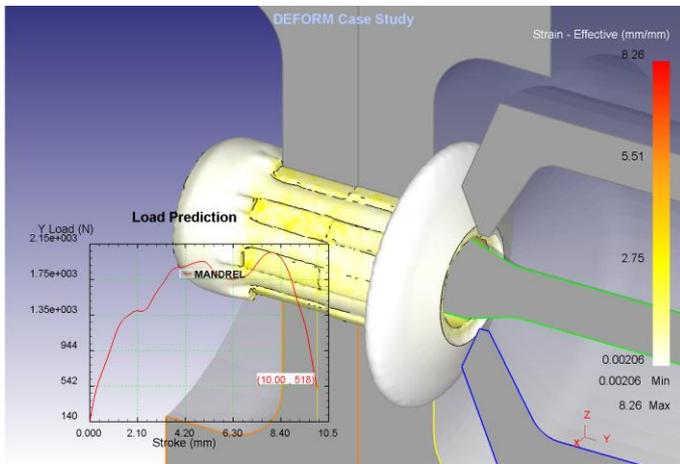


Fig. 2: Strain field on the Workpiece and load profile of the mandrel from DEFORM Post Processor (Courtesy: STANLEY Engineered Fastening)

Wilde Analysis' relationship with STANLEY Engineered Fastening and previous generations of the company stretches over a period of 18 years. During this period, the return on investment in DEFORM software has been maximised through detailed training run by dedicated manufacturing simulation and metals plasticity specialists at Wilde. On-going technical support and advice is also provided by Wilde to ensure that STANLEY Engineered Fastening's engineers can accurately and efficiently exploit the capabilities of DEFORM.

Business Benefits

Engineers from STANLEY Engineered Fastening provided the following direct feedback on the benefits they have realised through their investment in DEFORM, supported by Wilde:

"Through the years, STANLEY Engineered Fastening's engineers have experienced many benefits in using DEFORM within product and manufacturing design, rather than simply relying on conventional methods involving trial and error. One recent example of this is a newly-developed fastening system called NeoSpeed® (<http://www.stanleyengineeredfastening.com/brands/avdel/products/speed-fasteners/neospeed>) with a unique, patent protected splined rivet design. Use of DEFORM-3D software was integral to the development & optimisation of the product, providing clear indications of how it would perform and where changes were required. This included the calculation of stresses during the heading manufacturing process that helped determine the appropriate Carbide and tool steel grades to use."

"The design of a new revolutionary rivet could only be done using DEFORM-3D, as the software clearly shows exactly where any problems are to be found. This enabled the design to be perfected at a fraction of the cost of doing it by more conventional, physical prototype-and test methods. The latter option would have involved development work with a production heading machine lasting around 6 to 8 months. This testing process would also have needed to include all diameter sizes and 3 to 4 lengths of the rivet using 3 different heading wire materials."

"We developed the Grade A4 stainless steel NeoSpeed® rivet series which was 100% designed by using DEFORM-3D in conjunction with our SolidWorks CAD system. Our Heading Engineer tested it all and it was a complete success first time – amazing!"

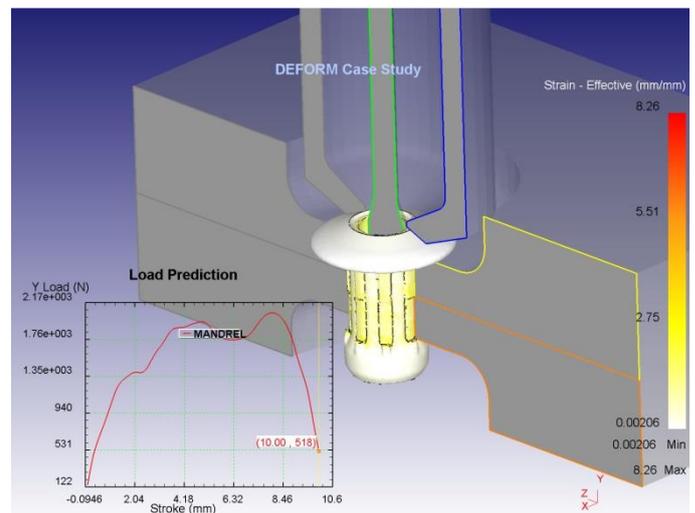


Fig. 3: Vertical semi cross section view of the assembly using DEFORM Post Processor (Courtesy: STANLEY Engineered Fastening)

““ Back in the 1990s, Engineering management at Avdel was quick to pick up on the potential of DEFORM FEA to save time and cost in developing new cold-headed component designs. Since then, our Design Engineers have all been trained by, and worked with, Wilde Analysis to exploit DEFORM more and more.