

Case Study: **Omni-Lite Industries**

Simufact Reduces Development Costs and Time in Cold Forming Tool Design

Overview

Omni-Lite Industries is an advanced materials company. They recently designed a new part that was exhibiting a unique material flow. The part was cold formed out of 1100 aluminum material. The manufacturing process for this new part utilized a three-die progression, and was produced on a Nakashimada TH3-6A cold forming machine.

The initial tool design was completed and reviewed using the Simufact.forming simulation from MSC Software. Upon initial review, everything seemed to be acceptable, with the exception of the volume of material in the flange of the part. The second station trap extrusion die radius was then reduced in order to accommodate the reduced material volume requirement.



Use of Simufact.forming resulted in reduced development costs and time to market by providing simulation results that were very close to physical test results, which reduced the need for repetitive and costly physical testing

“Simulation is a very necessary tool used for cold forming tool design to reduce development cost and product development lead time”

Mike Walker, VP Research and Development, Omni-Lite Industries

Challenge

The updated die geometry was not re-evaluated with Simufact.forming simulation software, because it was expected that this small change in extrusion die radius would not have a major impact.

The tooling was produced to this revision, which produced a “rejected” sequence. There

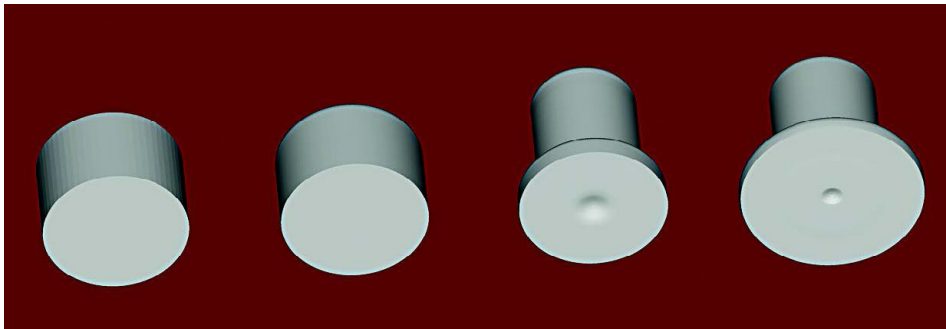
was a material flow issue that resulted in a void on the top of the flange which was not acceptable to the customer.

At this time, the simulation was re-run with the reduced second station radius, and the simulation duplicated the physical results from the cold forming process, as shown in the images of the simulated rejected sequence in Figure 1.

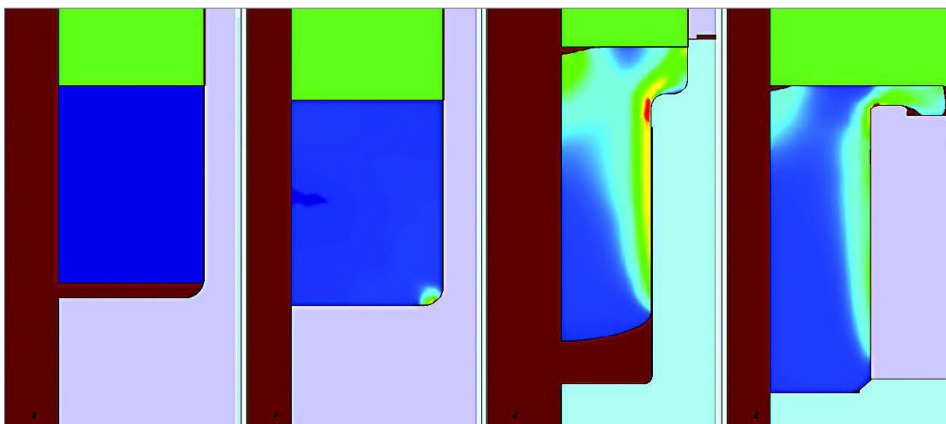
Figure 1: Progression sequence and simulation photos of the rejected sequence.



Rejected sequence



Simulated 3D view



Simulated 2D view with plastic strain

Key Highlights:

Product: Simufact

Industry: Machinery

Benefits:

- Reduce product development costs
- Reduce time to market by eliminating need for repetitive physical testing
- Very close correlation between physical test results and Simufact simulation results

Solution

A revision was then made to the diameter of the raw material in order to change the reduction of cross section area in the second station trap form die where the round material is trap extruded into the hex geometry. Simulation validated this design revision and new tooling was produced.

The parts that were produced with this process did not exhibit the void in material. See the progression sequence photo and simulation images of the accepted sequence in Figure 2 (page 3).

The parts that were produced with the reduced material diameter were then approved by the customer for full production.

Results/Benefits

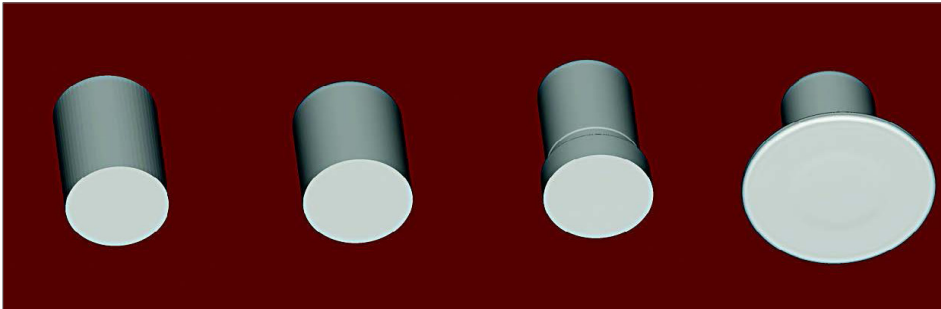
Omni-Lite found that there is a very accurate correlation between the software prediction of material flow and the real-world results from the heading tooling. The results prove that simulation is a very necessary tool to use for cold forming tool design in order to reduce development cost and product development lead time.

Simufact.forming provides Omni-Lite Industries with the capability to proceed from “paper-to-part” faster and with reduced cost.

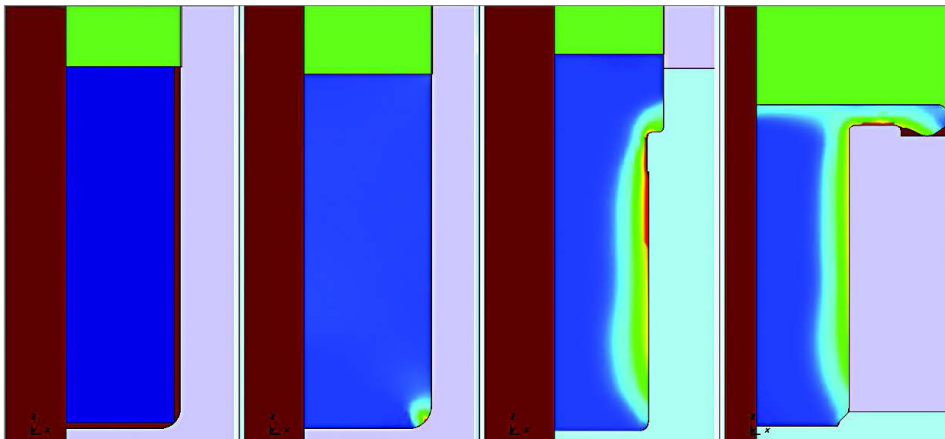
Figure 2: Progression sequence and simulation photos of the accepted sequence.



Accepted sequence



Simulated 3D view



Simulated 2D view with plastic strain

About Omni-Lite Industries

Founded in September 1992, Omni-Lite has quickly grown to become one of the world's leading developers of precision components utilizing advanced composite materials and computer-controlled cold forging techniques. Omni-Lite's early success came from the sports and recreation industry where its ultra light-weight ceramic composite track spikes quickly became the industry standard used by most of the world's elite athletes. The company has since broadened its product offerings to include products for the automotive, commercial, aerospace, and military markets. Omni-Lite develops and manufactures precision components utilized by several Fortune 500 Companies including Boeing, Airbus, Alcoa, Ford, Caterpillar, Borg Warner, Chrysler, the U.S. Military, Nike and Adidas.

For more information on Simufact and for additional Case Studies, please visit www.mscsoftware.com/product/simufact

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