

CHALLENGE:

During manufacturing, a fold occurred in a forging part and had to be rejected

SOLUTION:

Process simulation & redesign of forging stages

PRODUCTS USED:

Simufact.forming

CUSTOMER:

Demshe Forge Inc.



Blocker part with flash and the trimmed finish part



The simulated deformation during finisher using the corrected shape from blocker was formed without lap

Simufact.forming Helps Demshe Forge Inc. to get Forging Process Design Right at the First Try

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Overview

Demshe Forge is using Simufact.forming, the forming simulation environment of Simufact Engineering, to design dies & process parameter for hot-forging of large parts, made on hammers and presses. All the simulations are mainly carried out to understand how the edger & preform configuration helps filling up of the Blocker & finisher cavities & to get uniform flash around the parting line. The designs require careful considerations to guarantee a complete die-fill, to avoid folds, laps and cracks in the part, and to control an advanced temperature which ensures that the part can be forged. If the piece cools down too much during the many required blows, a re-heating is needed to continue the material deformation, without breaking the metal.

Business Profile

Demshe Forge Inc., located in Port Robinson, Ontario, Canada was founded in May 2008 and is based on the former forging supplier to the automotive industry DemShe Products Inc. Demshe Forge Inc. today is a one-stop shop for die sinking, forging, heat treating, and production machining. While DemShe Products Inc. was mainly a supplier for the automotive industry, offering components from a few ounces to 25lbs, the new Demshe Forge Inc. supplies many different industries, among them oil and gas, railway equipment, safety harness and shackle forgings, as well as truck and trailer component industries, with forging components in the range of 30 to 450 lbs. This change of portfolio is supported through the acquisition of new equipment and the construction of a new building. Demshe Forge Inc. is ISO 9000 certified. For more information please visit: <http://www.demsheforge.ca/>



The fold occurred in a critical area and the part had to be rejected

Challenge

In one of their latest projects, the forging of a large clamp with a length of 18" (45 cm) and a weight of 220 pounds (100kg), Demshe Forge experienced a fold occurring in a critical area of the clamp. The fold was 1/4" deep, and the part had to be rejected and re-designed. The original component was forged using a three stage process: An Edger, Blocker, and Finisher operation. During the Blocker stage, the material is distributed to ensure a proper fill of the finisher dies.

Solution

The process was re-designed and optimized using the simulation environment Simufact.forming. Ramachandran, Engineering Manager at Demshe Forge, is an expert in performing design, and using simulation, he was able to set up a forming process, in which no folds occurred in critical areas and

the part had finally the perfect shape. The key to eliminate the lap was to use a different design for the blocker, which could be defined through simulation. The initial design forged the u-shaped feature during the blocker stage. The new Blocker design did not do that, and the u-shaped feature is forged completely during the Finisher operation. The simulation showed that the new, re-designed process correctly forms the clamp, without any defects. The modified process is now used in production.

Benefits

Thanks to simulation, the forging process could be re-designed and the before existing fold could be eliminated. This helped Demshe Forge Inc. to successfully forge parts during the first physical try out, leading to cost and time savings. The procedure will be in place for future projects in order to avoid a time consuming trial and error process. Thanks to the use of Simufact.forming the company could realize:

- Time savings
- Cost reductions
- Safe on prototypes
- Get a design right the first time

"Demshe Forge has fully integrated simulation into their design process", said Patrick Demers, plant manager Demshe Forge Inc. "This helps us to successfully forge parts during first physical try-out, which was not possible without simulation."

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