AFDEX Top Use Cases

Manufacturing Software by MFRC, Inc.

Metal Flow Line & Scrap Optimization in Forging

Challenge
- Optimize metal flow lines
- Minimize the scrap volume
- Develop new automatized process with no failure

Solution
- AFDEX used to predict metal flow lines
- AFDEX provides higher accuracy to eliminate or minimize trial-and-error process.

Benefits
- AFDEX excludes failure at the early stage of process design especially in the conventional cold or hot forging processes.
- AFDEX allows process design engineers to achieve optimal metal flow lines with maximum yield and minimal scrap.

Before Metal Flow Line Optimization

After Metal Flow Line Optimization

Before: Large Amount of Waste

After: Minimal Waste
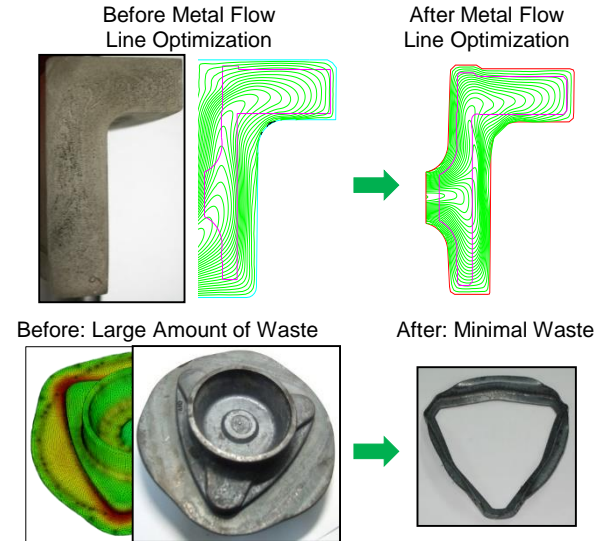
"*My long years of experience make me say that AFDEX is an application-oriented metal forming simulator on which you can rely in process optimization. It never fails to satisfy you.*"

Mr. Jae-Hyun Chung
Sen. Manager
Schaeffler Korea

△ Altair

Shorten Lead Time & Cost in Forging Process

Challenge
- Minimize the lead time and cost in developing difficult forging process
- Find an acceptable process design with no local material folding, which is almost unavoidable when depending on trial-and error approach.

Solution
- User-friendly functions in AFDEX help process design engineers become agile users through ways of simple operation.
- Automatic simulation capability for multi-stage forging processes enables users to analyze the whole simulation with the least intervention.

Benefits
- Minimizes development time and cost
- Makes it possible to turn very tough metal forming processes into economically competitive ones with no failures.
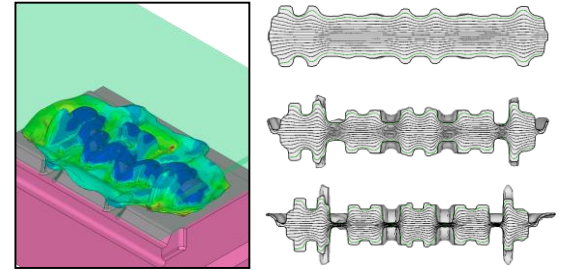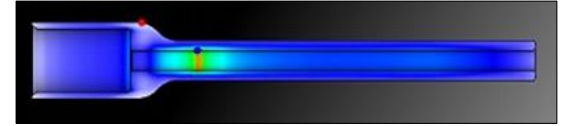
"AFDEX had been a true friend of mine for almost 17 years. With an easy communication power from the early days of beginner, it consistently has guided me to build my company's real competitiveness."

Mr. Young-Hyo Jun
Vice-President
Jinhap, a member of GFA

Altair

Plate, Sheet & Clad-Metal Forming

Challenge
- Solve sheet or plate forming processes of clad-metal with titanium skin and aluminum base
- Create layered mesh system
- Predict fracture phenomena and accurate product dimensions

Solution
- AFDEX offers a special routine for generating layered finite element models with tetrahedral elements, which can be effectively employed in revealing fracture at the corners or vicinities.

Benefits
- AFDEX can be a powerful solution provider in solving plate or sheet metal forming processes, especially for clad-metals using solid elements.
- AFDEX has special functions for processes such as blank holding force-exerting die, spring attached die, layered mesh generation scheme, etc.
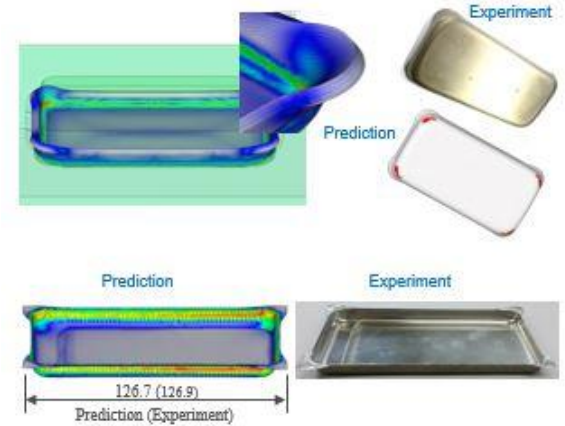
"AFDEX team provided us solutions of clad-metal forming processes faster than expected, whose level of simulation was unattainable by other software we tried before. It has a beautiful mesh."

Dr. Hong-chul Hyun
Senior researcher
Global Technology Center
Samsung Electronics

Forging Process Renewal / Optimization for Automation

Challenge
- Renew the conventional process designs
- Optimize the process design in terms of robustness
- Minimize the cost with enhanced quality

Solution
- Improve conventional process designs in consideration of automation by simulating them in a fully automatized way
- Minimize the scrap generation and conduct the design for stable scrap gripping

Benefits
- AFDEX minimizes the burden of development cost which replaces manual products with automatized ones with no additional cost.
- AFDEX helps improving the stability of process and quality of forgings, leading to the world-class competitiveness in hot forging of hubs, bearings and etc.

"Forging competitiveness heavily depends on its elaborate simulation techniques. AFDEX is well prepared especially for intelligent forging process."

Mr. Deukyong Yoo
Executive Director
Dongeun Forging

△ Altair

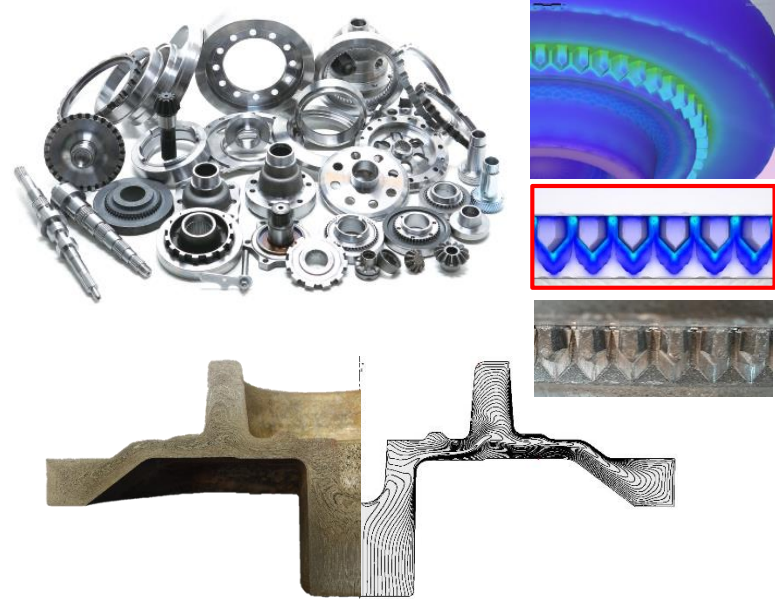# Precision Forging of Large Automotive Parts

Challenge
- High value-added forging parts for automotive industry
- Net-shape forging of large gear-like parts with no empirical knowledge available

Solution
- Engineering together with process optimization might be accomplished by counting on AFDEX of high accuracy predictions.
- The cost for product development and its tooling as well can be minimized.

Benefits
- Much earlier than expected the new business of net-shape forging turned out to be soon stable for large gear products.
- The company of Hanho has successfully equipped their engineers with state-of-the-art technology and creative research capability in the field of high-precision auto-transmission parts.

"Hanho has quickly risen to the world-class company in the field of precision forging of larger automotive parts. We firmly believe the secret lies in its unshaken simulation capacity in using AFDEX"

Dr. Hokeun
Executive Director
Hanho Automotive Co.

△ Altair

# Innovative Non-Standard Automatic Multi-Stage Cold Forging

Challenge
- Develop highly value-added auto-parts, i.e., non-standard parts including yoke parts
- Develop micro-forming parts for ABS parts

Solution
- Increase die life-span with minimized die stresses
- Encourage process design engineers to challenge creative and innovative process designs

Benefits
- AFDEX paves such a way for process design engineers as to make them more active in developing new process for new products.
- Customer companies has a big confidence in crediting forging companies as product quality guarantors.
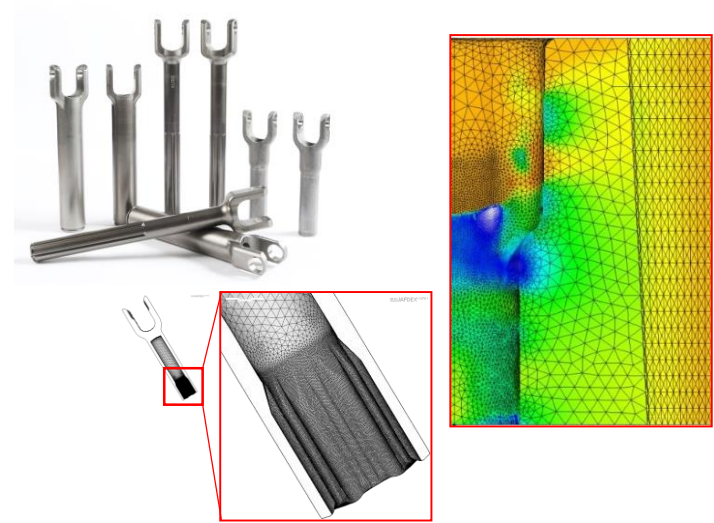
"I am asking all forging process developing engineers to optimize their processes and guarantee them by elaborate simulator just like AFDEX."

Mr. Taemin Hwang
Executive Manager
Sungjin FO-MA

△ Altair

Innovation in Die Making for Customers

Challenge
- The more technological advances in forging companies, the more user-friendly process design software is in need.
- Global business is more attractive especially in forging industry when process designs can be easily optimized.

Solution
- More opportunities can be secured when the most user-friendly forging simulator such as AFDEX is hired.
- Approaches are to be made through optimizing many chronic problems by close collaborations with AFDEX developers

Benefits
- International standards and requirements are fruitfully met in forging process design as well as the die making.
- Collaborations with AFDEX technicians greatly enhances the company's level of understanding global technological trends and applicative caliber towards customers.
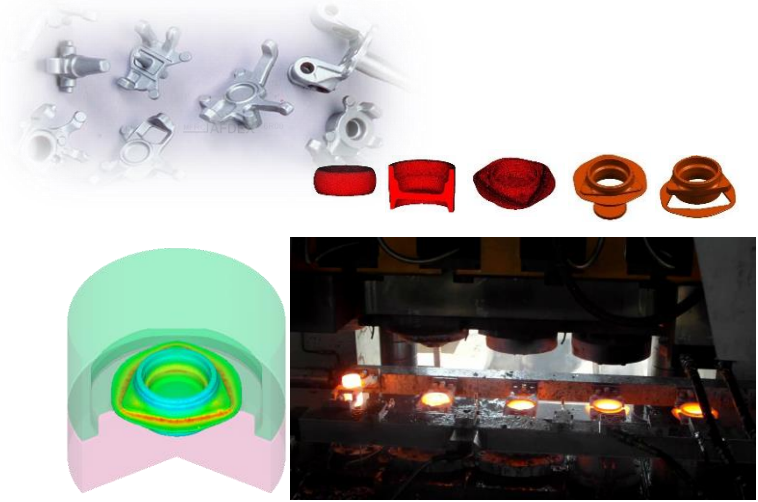
"When customers visit my company, they are firstly to encounter selected CAE predictions showing our creative forging process philosophy and open-minded designs for our beloved customers."

Mr. Younggil Choi
President
Samwoo

△ Altair

Innovative material development and identification

Challenges

- Develop new materials by processes with reduced energy consumption (environment friendly)
- Reveal their mechanical and deformation behavior for different applications
- Obtain the accurate flow stress at large strains of over 1.0 for metal forming simulation
- Support customers with technology and value

Solution

- Pre-heat treated steels, ESW series, were developed and their applications have drastically increased.
- With AFDEX-MAT, the material identification module of AFDEX, the unique characteristics of true stress-strain curves of various ESWs are being revealed just in time and supplied for customers.
- Enables us to give valuable advice for customers to develop their application processes with reduced effort.

"AFDEX-MAT ensures that the best material properties are used leading to the highest quality of our products."

S. T Ahn
CEO
SAMHWA Steel

Benefits

- Develop best quality steels and quickly commercialize them with highly accurate material identification for process design engineers
- Usage of new materials can lead to removal of existing heat treatment process thereby saving manufacturing costs
- Wide variety of applications, i.e. the newly developed materials are being used in 25% of the passenger cars