

## Cost, Time, and Failure Reduction Due to Casting Process Simulation



U-Shin is a global automotive parts manufacturer, specializing in automotive system appliances and mechatronics. Its main product line includes lock sets, electronic steering column locks, climate control panels, door latches, keyless entry, door handles, switches, power closure systems, and rear access modules. U-Shin's expertise ranges from mechanical machinery design to electronic engineering and software, offering full support from development and design of various parts and systems to manufacturing.

Many of the automotive parts and accessories U-Shin produces are manufactured with zamak, an alloy with a base metal of zinc. "Approximately 10 tons of zamak per day are produced from U-Shin's zamak foundry which is one of the largest foundry locations in Europe," states Ahmed EL ABIDI, CAE Manager and Senior Expert of U-Shin. U-Shin takes pride in being a worldwide leader in performing high pressure die-casting with zamak. With the challenge of outputting more than 100 tools per year, U-Shin recognizes that optimizing these tools as well as the design and manufacturing process not only reduces time and cost, but is also a key factor in providing its customers with the reliable solutions they expect and demand in the automotive industry.

**"We have seen significant time and cost savings while using Altair Inspire Cast: €5,000-10,000 and 3 weeks for actual trials vs. €500-600 and 1 day of simulations in Inspire Cast."**

Ahmed EL ABIDI  
CAE Manager & Senior Expert, U-Shin

### Inspire Cast in the Casting Simulation Process

Understanding the flow and material characteristics of zamak is crucial in producing a quality and reliable part. Being able to simulate, observe and have better insight of this material is one



#### Industry

Automotive

#### Challenge

Die-casting simulation, result analysis and design optimization for automotive dead lock pin.

#### Altair Solution

Employing Inspire Cast to perform testing and optimization in order to create a sound, redesigned part.

#### Benefits

- Optimization of injection speed to remove turbulence due to air entrapment.
- Prediction of the critical zone (porosity location) accurately in the part to assist in the proper design modification.
- Reduction in porosity from 0.45mm<sup>3</sup> to 0.03 mm<sup>3</sup>.

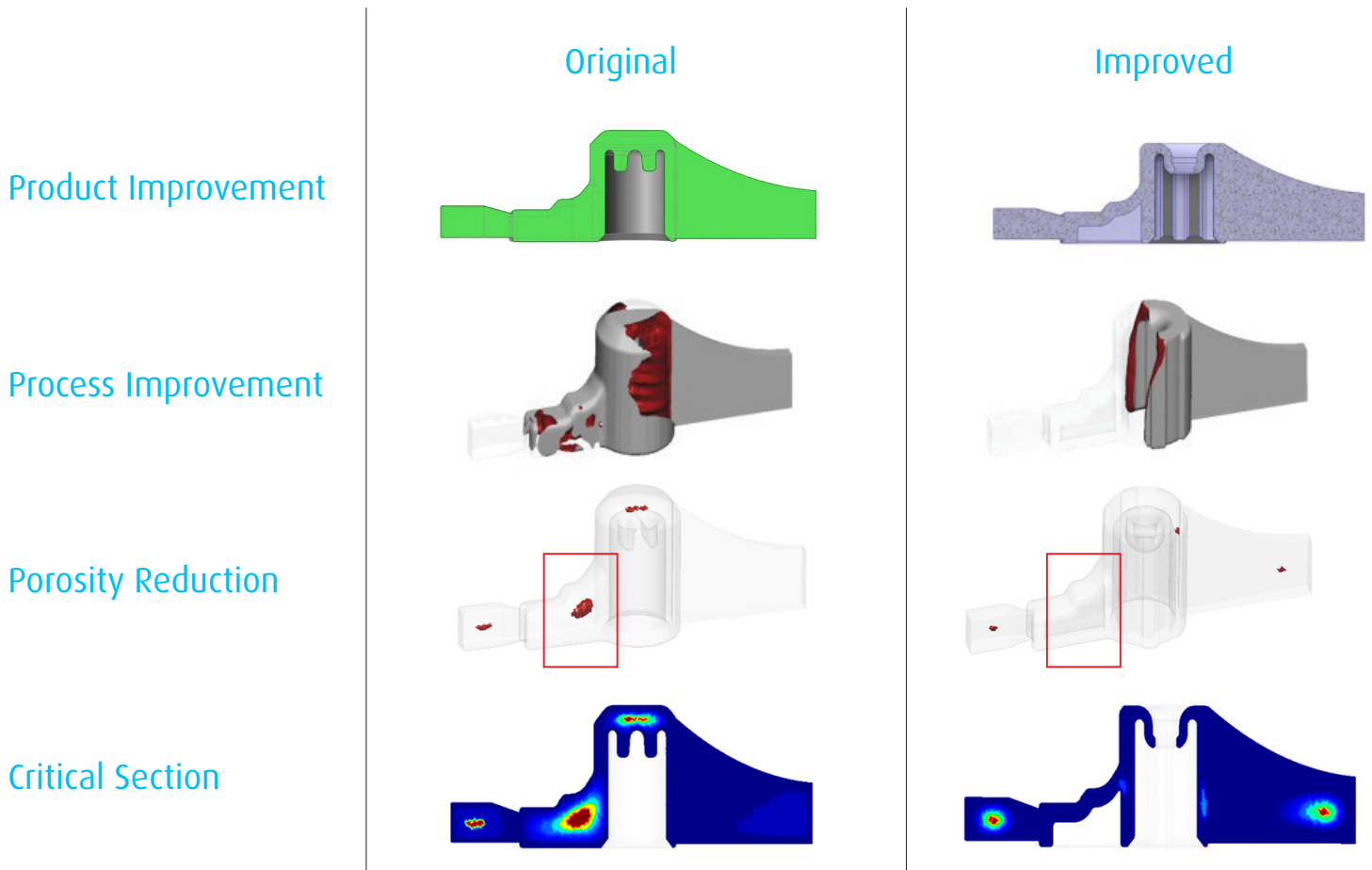
of the many benefits U-Shin has seen by implementing Inspire Cast casting simulation software. "By using Inspire Cast, we are able to better understand the flow of zamak and identify the causes and location of porosity," notes Ahmed. With the extensive material database that Inspire Cast offers, companies like U-Shin can simulate the casting process for various parts under a variety of stresses. One of U-Shin's most recent projects involved analyzing the failure of an automotive dead lock pin and redesigning the part based on the simulation results in Inspire Cast. The point of failure in the dead lock pin occurred during the vibration test.

### What's Next?

U-Shin continues to employ Inspire Cast on several automotive projects. By utilizing Inspire Cast, U-Shin can better anticipate, modify and improve a design which allows the company to supply the quality and robustness that its customers demand in their parts. Ahmed states, "In regards to future projects, U-Shin plans to work with the Inspire Cast team to further explore and develop other functionalities of the tool such as adaptive mesh, stress calculation and thermal optimization."

### About U-Shin Ltd.

U-Shin Ltd. founded in 1926, is an automotive part supplier providing reliable and innovative solutions to meet the expectations of the most demanding customers around the world. U-Shin Ltd. specializes in the product development, design, manufacturing and selling of mechanical and electrical systems and components and various system devices and control machines.



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