

Reducing Forming Defects with DYNAFORM

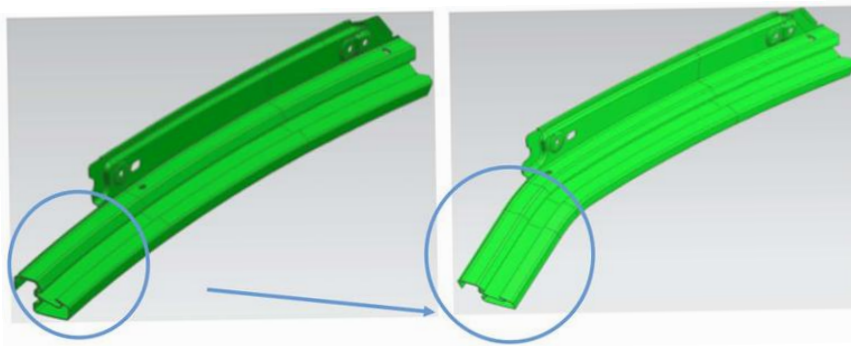
If today's automobile industry is a two-wheeler, cost savings and efficiency are the 2 critical wheels of it that keep it running. And, manufacturers have to find a balance between lowering production costs and lead times and maintaining high product quality to stay ahead and relevant—a challenge that modern simulation technologies are uniquely able to handle. Lingyun Industrial Corporation Limited, a leading Chinese manufacturer of automotive parts and plastic pipes, exemplifies this forward-thinking approach. By leveraging Dynaform, a cutting-edge formability simulation software from Engineering Technology Associates, Inc. (ETA), Lingyun significantly reduced costs by identifying and resolving forming defects virtually—before any physical tooling was carried out. This proactive method showcases the transformative impact of virtual tryouts, which were very similar to the physical testing, which we will discuss in detail in this case study.

About Lingyun: A Leader in Automotive Manufacturing

Lingyun Industrial Corporation is a global player that supplies a broad range of products, including body structures, sub-frames, and bumpers. Renowned for their quality and innovation, Lingyun continually invests in cutting-edge technologies to maintain their competitive edge. Virtual simulation plays a pivotal role in their design validation process, allowing them to identify potential forming issues before physical tooling is produced.

The Forming Challenge

Lingyun Industrial Corporation faced an exceptionally complex manufacturing challenge involving the production of a highly intricate part with varied cross-sections and multiple operations, including rolling, flanging, punching, trimming, and bending.



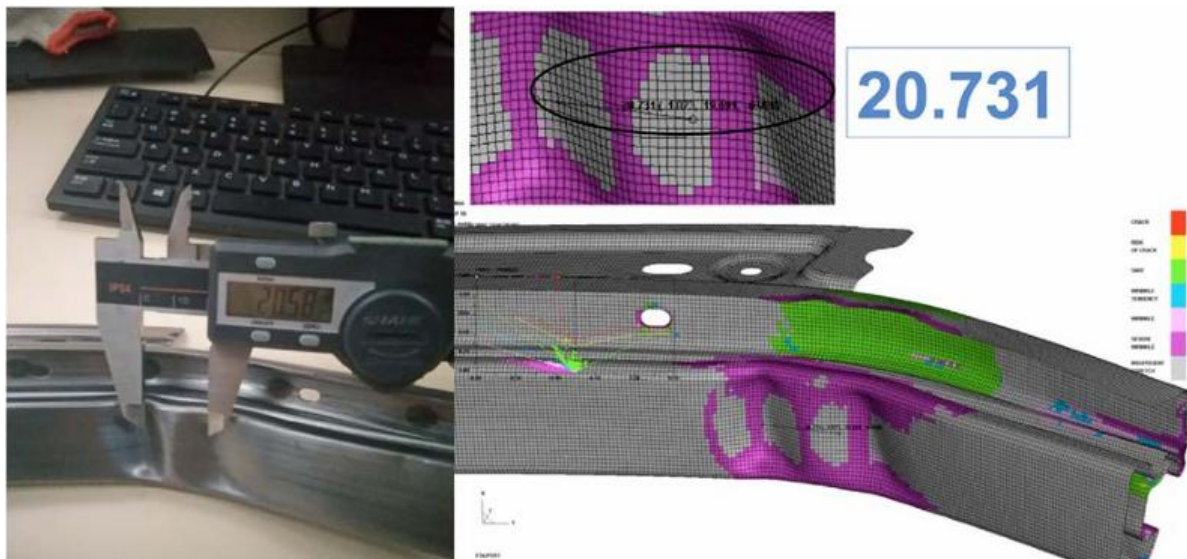
Despite trying various simulation solutions, the team struggled to achieve the precision required for the project. The tool design process demanded an accurate prediction of material behaviour to address issues such as deformation, springback, and potential defects. Lingyun's existing tools fell short of delivering the necessary insights, making it clear that a more advanced solution was required to overcome these technical hurdles.

Optimizing Forming with Dynaform's Virtual Simulation

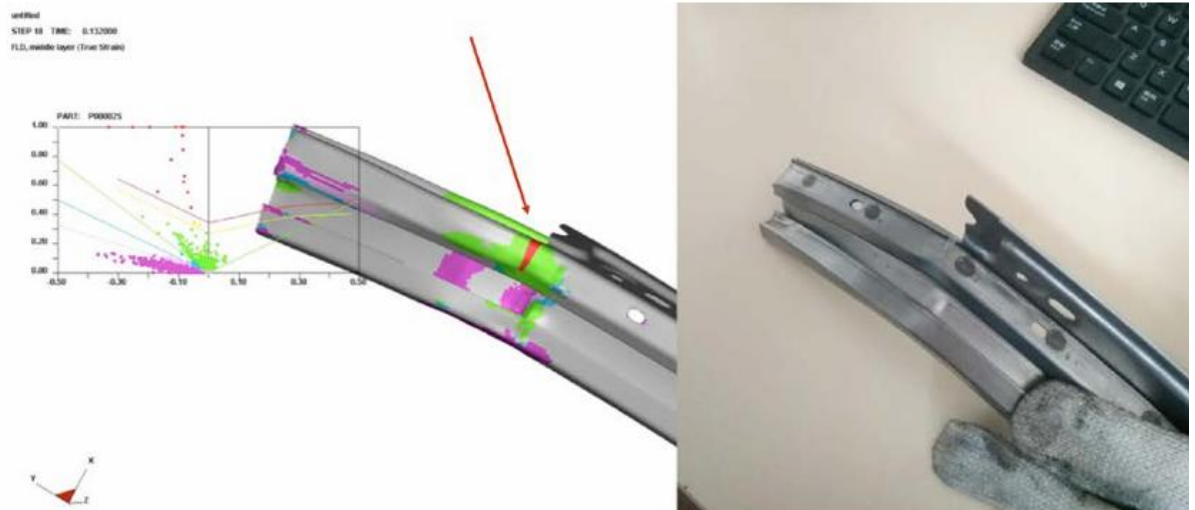
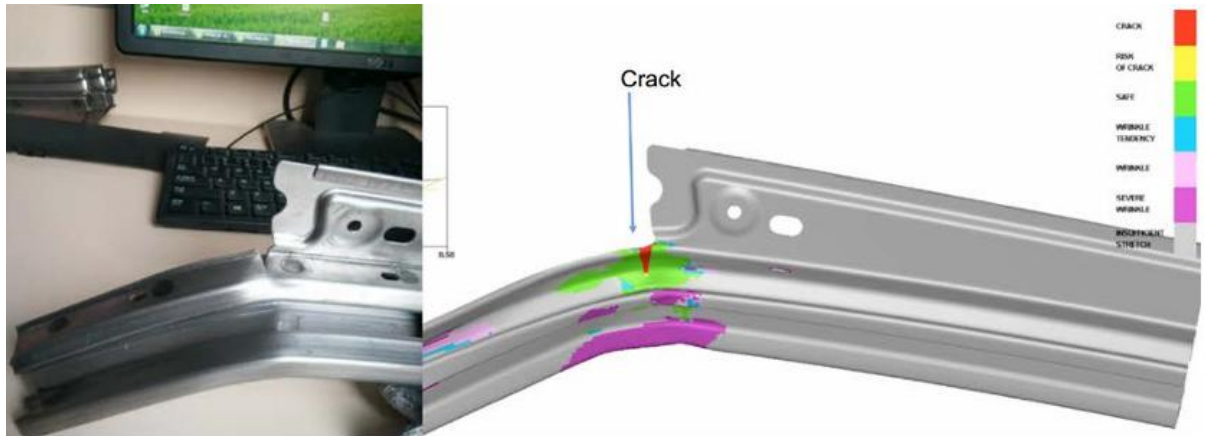
Recognising the need for a more advanced and precise virtual simulation solution, Mr. Houqing Sun from Lingyun Industrial Corporation turned to Dynaform for assistance. Developed by Engineering Technology Associates, Inc. (ETA) with over 30 years of expertise, Dynaform offered the comprehensive virtual tryout capabilities required to address this challenge. Its Formability Simulation module is specifically designed to predict critical forming defects such as cracking, wrinkling, thinning, and springback, allowing engineers to optimize designs and processes early in the development cycle, which was critical for the frame (part to be manufactured). This approach was much more appreciated and accepted by Lingyun Industrial Corporation and promised them significant cost savings by eliminating the need for multiple physical trials and reducing production risks.

Exceptional Simulation Results

The collaboration between ETA and Lingyun resulted in the successful implementation of a Dynaform simulation for the complex frame design. The results demonstrated remarkable accuracy, with the simulated wrinkle band calculated at **20.731mm**, closely aligning with the actual physical measurement of **20.58mm**.



- Correlation within 1% of the actual manufactured part was achieved, demonstrating an extraordinary level of accuracy.
- Details such as crack, wrinkling and safe zones were captured precisely, validating the software's predictive capability.



Real-World Benefits

By utilizing Dynaform, Lingyun significantly reduced the time and cost associated with trial-and-error tooling adjustments. The accurate virtual predictions allowed the team to refine their process parameters and tooling designs early in the development phase. Mr. Sun expressed his satisfaction with the software's capabilities, reinforcing Dynaform's position as a trusted leader in formability simulation.

Conclusion

The case of Lingyun Industrial Corporation highlights the effectiveness of advanced simulation tools such as Dynaform in modern manufacturing. Manufacturers can accurately forecast material behaviour during complicated sheet metal forming operations such as forming, drawing, and springback by using high-fidelity virtual simulations rather than physical trials

solely. With Dynaform's proven accuracy and comprehensive feature set, manufacturers can achieve better outcomes, reduce costs, and stay ahead in a dynamic market.

This case study demonstrates how virtual simulations can replace costly physical iterations, resulting in improved process accuracy and efficiency across industries other than automotive engineering. As the automotive industry continues to evolve, embracing innovative solutions remains key to sustainable growth. Lingyun's success story serves as a compelling example of how technology-driven strategies can revolutionize manufacturing processes and deliver measurable performance improvements.