

Hydroforming from AP&T to China

FAW invests in advanced process for new automobile model

The Chinese vehicle manufacturer FAW Car Co. Ltd. has decided to invest in hydroforming in order to produce the engine cradle for a new automobile model. Thanks to its high level of cutting-edge technology and successful past collaborations, AP&T was chosen to supply the production equipment.

FAW is not only China's first vehicle manufacturer, but also one of the largest – with a product range that includes trucks, buses and automobiles. As the plan to produce a new automobile model was finalized, the company decided to invest in advanced technology in order to be able to shape more complex components. The structure that the entire engine is mounted on in the automobile – the engine cradle – can be produced in a variety of different methods, for example by welding together several pressed sheet metal components. However, FAW opted for hydroforming since it offered the following advantages:

Tight tolerance in few operations

“With hydroforming, it is possible to transform a bent and pre-shaped tube into the engine cradle's final shape in one operation. The material experiences no springback and it is possible to maintain extremely tight tolerances, otherwise known as the ‘net shape’,” says Björn Kinnby who is AP&T's Asian Market Director. “In addition, it is much lighter and there is considerably less scrap compared to conventional manufacturing



Tight Tolerances from Day 1. The new hydroforming facility on site at FAW produced approved components on the first attempt following installation.

– which means both a lower manufacturing cost and a higher quality.”

Complex shapes

Hydroforming involves filling a tube or profile material with fluid, most often an aqueous emulsion. With the increase of the fluid pressure, the material expands and is shaped to match the tool's mold. Since the fluid's pressure works perpendicular against the mold's surface, it is possible to shape components with complex geometries, often in one or two operations. The opportunities

to optimize the structure of the components based on their functions thus increase dramatically.

No thinning

Typical forming pressures are 14,500-29,000 PSI. In order to minimize the thinning of the material during expansion, fluid is injected from both ends of the tube with the help of the mold's axial cylinders. During the hydroforming process, the mold is held together by a hydraulic press, with press forces of 3,370-5,620 US tons. The press that AP&T

delivered to FAW has a press force of 3,930 US tons. The press is of the 'short stroke' type – an energy-efficient press with a short cycle time.

Level of technology and previous experiences were decisive

FAW evaluated a number of suppliers before it chose AP&T. The combination of a high level of technology and positive previous experiences with AP&T proved to be decisive. "AP&T was the only supplier that offered a NC-based system for the control of both the hydroforming tool and the press as a joint forming process, and that means a lot for the level of quality of our products," says Mr. Liu Qiang, Project Manager at FAW.

Correct from the start

FFAW has a 2,810 US tons hydraulic press previously supplied by AP&T, which has been used for several years for the testing of conventional press tools for major vehicle components. This press impressed many with its high reliability and low service requirements – and the combination of this with AP&T's level of technology proved to be decisive. The following nine months consisted of close project cooperation between the parties as AP&T designed, built and tested the hydroforming press according to the time schedule. FAW ordered the hydroforming tool from another supplier, and the first time the mold and the



Jack Wang, AP&T's Area Sales manager in China and Liu Qiang, Project Manager at FAW.

press were tested together was on site at FAW. The result exceeded expectations to say the least.

"The very first piece of material we shaped was close to perfect and was within the applicable tolerances. The reliability of the form is one of the advantages of hydroforming and the tolerance reliability is the result of our servo hydraulics together with the NC control system," says Jack Wang, AP&T's Area Sales Manager in China, who is responsible for customer contact with FAW.