



PSA

Case study: Foundry & Forging

Applications

- Forging

Products

- Cylinder crankcases
- Crankshafts
- Track rods



New process for new engines

A cooperation between PSA Peugeot Citroën and the BMW Group results in a new kind of car engine that will not only work more efficiently, but will be produced in a more efficient manner.

➤ In 2002, PSA Peugeot Citroën and the BMW Group made the unusual announcement that the two automotive giants would be cooperating on the development and production of a new family of small gasoline engines that would be used in the cars of both automakers.

There will be two types of engines produced. One will be an atmospheric engine, equipped with variable lifting distribution and with a capacity of 1.6 l and a power of 85 kW/115 hp. The other will be a direct injection engine, turbo compressed, with a capacity of 1.6 l and a power of 105 kW/143 hp.

From 2006, vehicles from the lower and middle of the Peugeot and Citroën ranges have been using the new engines. They will also equip future Mini models. Their power ranges from 55 kW/75 hp to 125 kW/170 hp and

sets new standards both regarding performance and driving pleasure, as well as in lower consumption and carbon dioxide emissions.

The Charleville foundry of PSA Peugeot Citroën completely modernized its Pôle Métallurgie in Mulhouse (PMM) production line to manufacture the engines – previously the PMM was dedicated to small parts. This line has been operational since November 2004. Two new lines are to be set up – one at the end of 2005 and the other one at the end of 2007. It will produce some 1,150 cylinder heads a day once the lines are complete.

The PMM process is proving to be interesting from an economic point of view, with a 15 percent increase in production compared to a traditional shell process. The investment itself is 30 percent less than the replaced



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process and the ground area taken up by this process is 15 percent less than that necessary for the shell process.

The PMM has made many innovations in a number of areas, including in the production of cylinder crankcases, crankshafts and track rods for the new engines. For example, the crankcases are made with a new patented solution and the track rods are forged in duplicate, giving a 10 percent gain on the price per piece. Steel was chosen over cast iron for producing the crankshafts, for reasons of both bulk and cost. This choice has enabled first-rate feature and performance to be achieved for a price barely above that of a traditional gasoline engine crankshaft.

>FACTS

Benefits

The PMM process provides a number of benefits:

- a 15 percent increase in production compared to a traditional shell process, and total production of cylinder heads that is 25 percent higher than the highest previous rate
- the investment itself is 30 percent less than the replaced process
- the ground area taken up by this process is 15 percent less than that necessary for the shell process.



A new range of engines are being produced jointly by PSA Peugeot Citroën and BMW.

In total, this new workshop will bring cylinder head production to a level of over 25 percent compared to the highest ever in the factory's history, allowing the skills of the Charleville factory to be perpetuated and developed. In concrete terms, within the framework of the cooperation, 86 metric tons of metal will be cast every day, allowing one cylinder head to be produced every minute. Some 116 staff at the PMM workshop in Charleville will receive 6,300 hours of training in total.

Ambitious objectives

In the cooperation project, quality management is paramount for both partners. Quality management is therefore carried out based on common criteria in the BMW Group and PSA Peugeot Citroën, both for manufactured and bought parts.

The ambitious quality objectives of the project also benefited from past experience acquired in the development of other engine projects and particularly with the renewal of the "Carton Rouge" [red box] policy, which consists of only accepting retouches on the assembly line for a very small number of processes; anything more and the engine is systematically scrapped and none of the parts recovered.

The choice of this method resulted from the report that in the majority of cases of incidents with customers, the offending engine had been retouched in the factory. This radical method has been tested successfully on DV engines, which is also confirmed by results among customers since it was launched in 2001. ☉