

Ingénierie@Lyon helps introduce a new set of tools to improve brake pad manufacturing quality

A piece of clamp jaw manufactured using direct metal additive processing increases existing machining productivity.

Supporting Innovation

The clamp jaw placed over the chuck must be as light as possible to avoid strong clamping centrifugal forces during machining operations. Indeed, a heavier clamp would exacerbate tightening of the workpiece with induced deformations. IPC*, as part of Ingénierie@Lyon Carnot Institute, worked to make the holding clamp, manufactured by chuck specialist SMW AUTOBLOCK, lighter. The combined topological optimisation/metal additive processing has reduced the clamp weight by 50%, allowing for a reduced tightening. Therefore eliminating the risk of distorted brake discs during the machining process. Renault thus managed to improve process capability while ensuring quality of the brake pads

*IPC = Innovation, Plastic Technology, Composites

3D image of the optimised chuck/clamp piece (shaded areas represent cut-outs only possible using metal additive processing)



The client needs

Renault and SMW Autoblock have been faced with many obstacles in reducing the piece of clamp jaw, while maintaining its mechanical properties for a firm holding of the machined brakes. They subsequently turned to the IPC Technological Centre as part of the Ingénierie@Lyon Carnot institute. Using the OptiStruct structural analysis solver from Altair Hyperworks, the teams first re-examined design topological optimisation, so as to respond to the main requirements of improving mass and resistance constraints. The geometrically complex series part was subsequently produced using metal additive processing. The lighter clamp jaw is enabling to hold the machined part with better gripping conditions and a lower torque in comparable quality. As a result, Renault could increase productivity and reduce reject rates in production making allowance for improved ecological and economic balance.

Le partenariat

The Ingénierie@Lyon Carnot institute brings together both the IPC and 13 other research laboratories. The objective of its R&D spectrum is to develop new materials and technologies for applications in the field of transport, energy and health devices. In addition to multidisciplinary the Institute's research partnerships support innovation of very small companies and large international groups alike, .

The IPC Technological Centre, could dramatically contribute to Renault's and chuck maker SMW Autoblock's venture by combining two of its competences, i.e. topological optimisation and laser metal fusion. Such valuable work has been acknowledged and revered by the professionals. The project has been awarded the 3DPrint trophy for best applications for metal additive manufacturing in June 2017.