integradde

CORDA Orodjarna d.o.o.

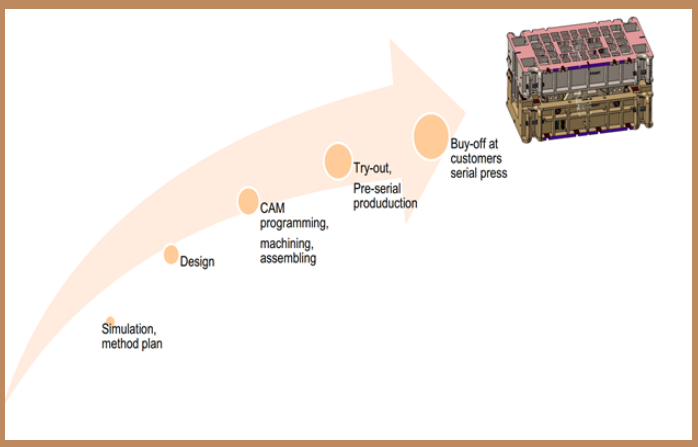
# Production of Automative Tools

Factsheet

## CORDA: A leader in laser technology

CORDA is a company specialized in Development of extremely configured tools for the transformation of high-strength sheets for the needs of the automotive industry. Company cooperates mostly with German manufacturers in the higher price range, such as BMW, Audi, Porsche, WV….

**Company:** CORDA
**Founded:** 1992
**Location:** Celje, Slovenia
**Technology:** Powder Additive Manufacturing
**Industry:** Automotive, Tooling, Space, Manufacturing




*Steps from start to finish*

## Manufacturing process

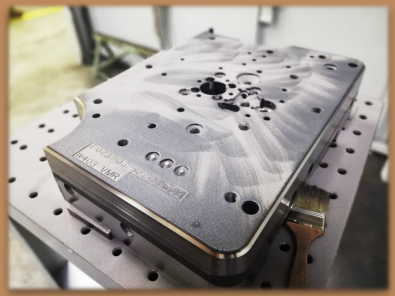
Production consists of small kits or individual components. The manufacturing process begins with the casting. These casts are then machined on CNC milling machines, which brings us to a tolerance range of somewhere around + -0.02 mm. After processing, each part must be processed by hand sanding with grinding stones and sandpaper to achieve the required fine surface quality. After that, the tool continues its way to the final work by testing on a hydraulic press. This process is done by painting a piece of sheet metal with ink paint and squeezing it between the matrix and the groove.

When the press compresses the sheet metal, it takes the shape of a tool and hardens at the same time. In doing so, the ink paint is transferred to the surfaces of the sheet metal working tool in those places where the sheet metal has come into contact. If the surface on the tool is stained, it means that the sheet metal has been touched, and vice versa if the surface on the tool is unpainted.

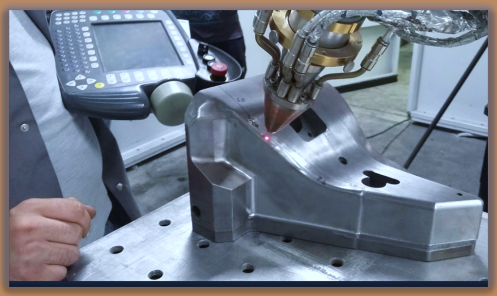
The final tool needs to fit perfectly, ie about 80% of all surfaces are painted. This percentage is increased by grinding, re-painting and compressing the painted surfaces, ie where the tool touches the sheet metal, and repeat this process until the required surface coloring is achieved - a satisfactory match.

Sometimes this cannot be achieved because too much material has been removed by previous procedures. In this case, there is a lack of material in the areas where it needs to be replaced, namely by welding in our case direct energy deposition with powder is used.

*Production hall*



*Programming of the robot path*



*Deposited part*

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 820776.

integradde

CORDA Orodjarna d.o.o.

## DEMONSTRATOR: DED technology deployed within INTEGRADDE project

During the INTEGRADDE project, CORDA is working on integration of DED technologies in the process which will replace the manual repairing of tools.
The process of robotic laser powder surfacing is definitely more appropriate compared to the conventional, manual mode. Due to the more controlled, focused, and lower heat input compared to the conventional method, the occurrence of cracks is significantly reduced. It is with robotic laser powder surfacing that the required hardness is obtained immediately after the surfacing process, without the need for additional heat treatment, which is unavoidable with other methods (inductive hardening, laser hardening, ...)

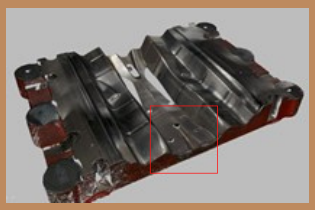
Also, the accuracy of processing is much higher - from the final shape of the welded surface differs by somewhere 1 mm to 2 mm, while in conventional mode, this figure rotates somewhere in the range of 5 mm. This also leads to a significant reduction in the time required for machining after the repair process - with a difference between 3mm and 4mm, this means between 10 and 15 strokes of the tool, which means up to 300% longer machining time, where the machine clock is even the most expensive.

## ADVANTAGES

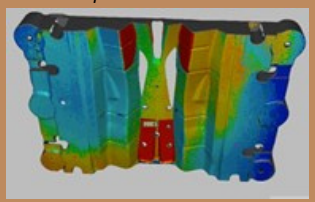
By using robotic laser powder surfacing, we gain in at least five areas; in the field of improved accuracy, reduction of cracks, lower porosity, higher hardness, and at the same time we reduce the time of additional machining, which means less waste, as well as lower energy consumption, refrigerants, thus contributing to a cleaner environment for all of us.

## CONTROL

3D scanner will be used for positioning of the base part and also control-correction of cladded part. The main steps in this manufacturing workflows are: scanning of target component to get point cloud and therefore position of the part in space; laser cladding; second scanning to get disparity map by comparing two scans; finishing milling after the control shows that the clad is within expected tolerances.

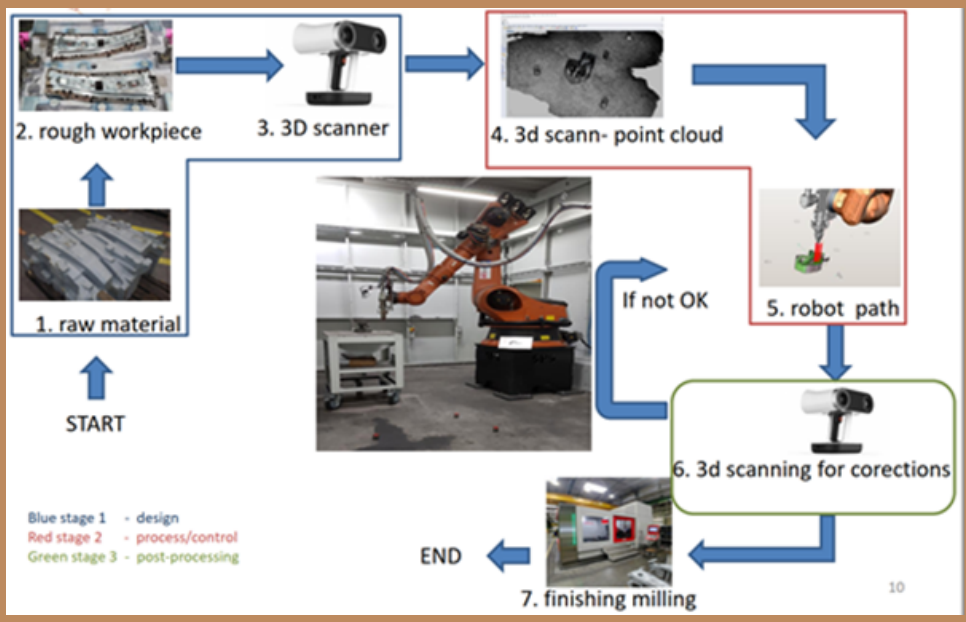


*Scanned part*



*Disparity map after welding*

## WORKFLOW DESIGNED DURING THE INTEGRADDE PROJECT





CORDA Orodjarna d.o.o.

**Corda - Orodjarna d.o.o Bežigrajska cesta 10, 3000 Celje, Slovenia**
**www.corda-orodjarna.si | info@corda-orodjarna.si | +386 (0)3 8302 250**