

TPV AUTOMOTIVE

Lightweight construction using friction stir welding (FSW) in the automotive industry

INDUSTRY

Automotive

PLACE

Brežice, Slovenia

DELIVERY

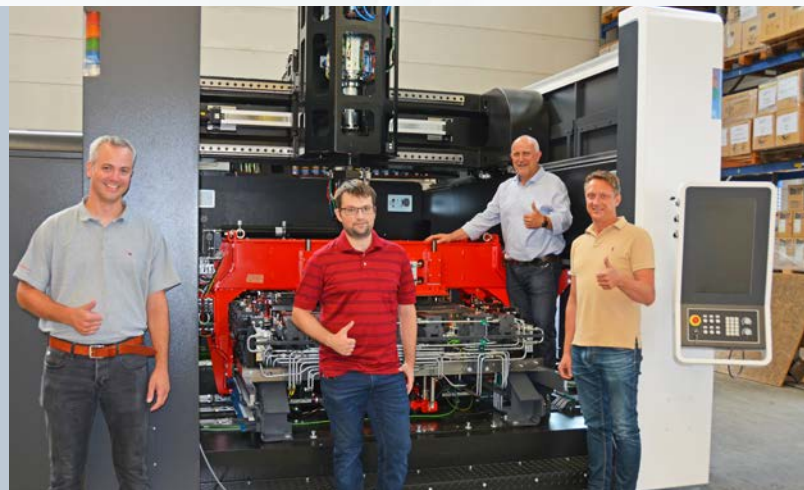
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SOLUTION

Six FSW gantry machines with MonoSTIR

CUSTOMER

TPV AUTOMOTIVE, headquartered in Novo mesto, Solvenia, has several (production) sites in Slovenia and Serbia. The company has more than 60 years of experience in the automotive sector and currently employs more than 900 people. TPV AUTOMOTIVE exports its products to more than 20 countries, and numerous well-known automotive manufacturers are among the company's customers.



INITIAL SITUATION

The cooperation between TPV AUTOMOTIVE and Grenzebach already started back in 2018 at the 'Aluminium' trade fair in Dusseldorf. TPV AUTOMOTIVE ordered two FSW gantry machines back then. Since 2020, these are running at the Brežice site under series conditions in three shifts per day.

As electric vehicles with the aim of climate-friendly mobility gain in importance, the demand for battery trays is also steadily increasing. To meet this demand, TPV AUTOMOTIVE wants to increase its production performance and expand its friction stir welding production line.

» Alongside the high weld seam quality, the speed of the process steps is naturally decisive in serial production. Grenzebach's technology has completely convinced us with regard to these two important criteria. «

Emir Šoštarec

Director of Supplier Quality Development at TPV AUTOMOTIVE



CHALLENGES

Battery trays are a structure-relevant component of electric vehicles. Therefore, they must be welded to be one hundred percent tight, so that no liquid can leak through should the battery be damaged.

Aluminum is also known to be difficult or not melt-weldable at all, among other things due to its aluminum oxide layer. In addition to a high weld seam quality, the friction stir welding technology should

weld safely and efficiently and be smoothly integrated into the existing production line.

IMPLEMENTATION

The collaboration between the two companies started with prototype welding at Grenzebach's headquarters in Hamlar, Germany.

Grenzebach designed a gantry system with high axis dynamics and precise weld path guidance in the HYDROPOL® machine bed for very

high stiffness and low dynamic compliance and deformation. Due to the high welding depth, TPV AUTOMOTIVE uses the one-piece tool with rotating shoulder (MonoSTIR).

After a shop test in Hamlar, four gantry machines were transported to Slovenia. The integration into the existing production line went smoothly with no downtime.

BENEFITS

Performance

The six gantry machines can deliver 3,000 parts per week.

Quality

The gantry machines achieve reliable and repeatable weld quality – perfect for serial production.

Integration

The gantry machines are smoothly integrated into an automatic production line – a robot supplies the FSW machines with components.

CONCLUSION

Friction stir welding is perfect for the production of aluminum components. Grenzebach's four-axis FSW gantry systems enable absolute process reliability and carbon neutrality over the entire working range. With the six FSW gantry machines from Grenzebach, TPV AUTOMOTIVE can further enhance their production performance. One gantry machine produces about 80 battery trays per day. So, the six machines can deliver 3,000 parts per week.

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