Case Study
Technology transfer that connects. FSW* at apt

Implementing Friction Stir Welding
at apt together with RRS Schilling GmbH

*Friction Stir Welding

Aluminium-processing companies today face the challenge of integrating new manufacturing technologies flexibly and reliably to meet the rising demands of electromobility. When a well-known international agricultural machinery manufacturer commissioned apt to develop and produce a battery housing, one of the key requirements was to join the components using **Friction Stir Welding (FSW)** – a process apt had not previously used.

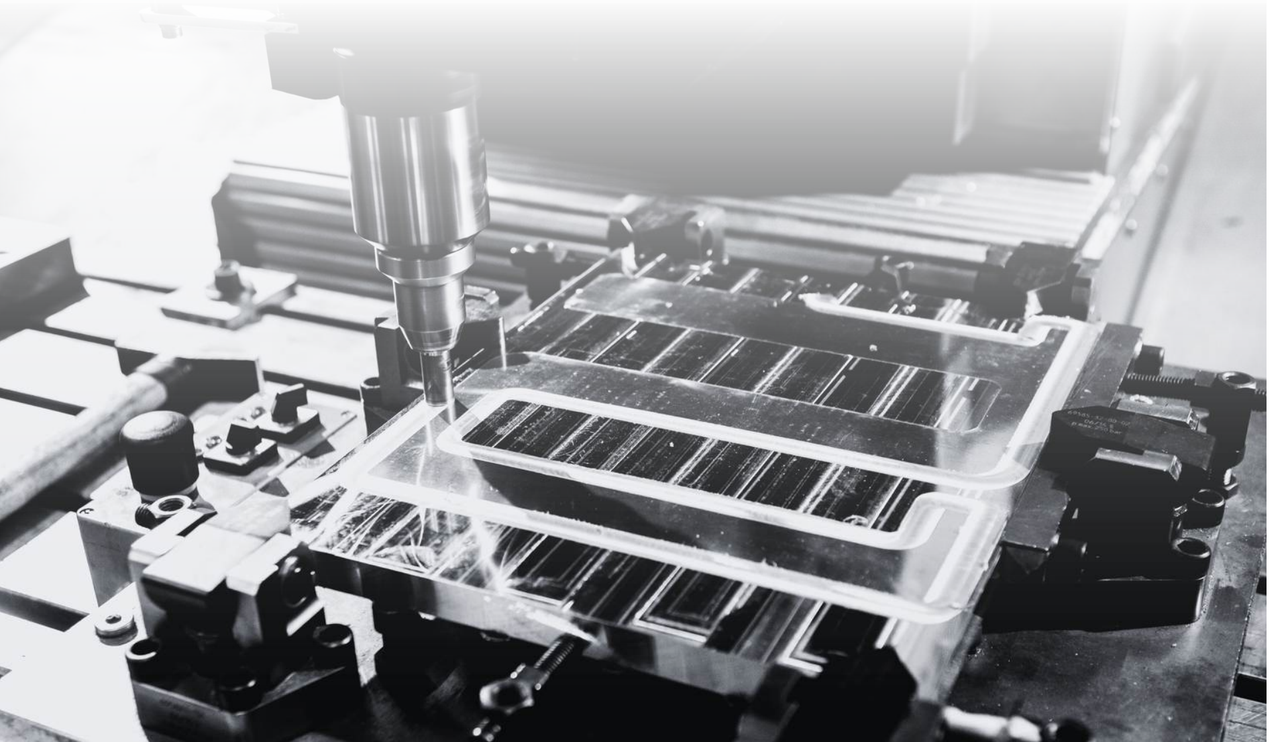
To implement the process, apt chose to collaborate with **RRS Schilling**, an experienced specialist in FSW technology and unique retrofit solutions for CNC machines.

About RRS Schilling GmbH

Founded in 2011 in Schwarzenbek, RRS Schilling GmbH is a technology-oriented welding company specialising in friction stir welding. Through continuous development of the process, also in cooperation with universities, the company sets standards in this emerging technology. With a modern machinery base and a specialised team, RRS Schilling manufactures even large series in short timeframes. Customers from the automotive, shipbuilding, aerospace, medical technology, and other industries rely on the high-quality welding solutions provided by RRS Schilling.

About the Process and Its Use in Agricultural Machinery

Friction Stir Welding is a solid-state joining process in which a rotating tool is guided under pressure along the joint line. The frictional heat softens the material, allowing the parts to be joined without the need for filler metals or melting.



For battery housings used in agricultural machinery, FSW is the ideal solution. Agricultural machines operate under extreme conditions, including high temperatures, prolonged operating times, and intense mechanical loads. These factors require exceptionally robust, low-distortion, and airtight joints to ensure the safety and longevity of the batteries.

FSW offers exactly these advantages: homogeneous, high-strength seams, minimal heat input, and maximum process reliability – even for complex geometries. Thus, the process meets the high requirements of the agricultural sector and contributes to the quality and reliability of the battery housings used.

Goals and Strategies

apt aimed to build the technical prerequisites and know-how for friction stir welding (FSW) in-house to operate independently once series production began. The reason lies in the particular advantages of the process: FSW allows apt to reliably meet customer demands from the mobility sector that require extremely strong, low-distortion, and airtight welds.

This creates the foundation for future projects in the field of battery housings as well as other forward-looking lightweight applications. It enables the company to work with flexibility and high quality. At the same time, implementing FSW strengthens apt's machining and finishing capabilities and opens up new opportunities for innovative customer solutions.

Project Progress: From Requirement to FSW Series Readiness

Technical Prerequisites

- **Analysis of customer requirements** and identification of the need to integrate FSW as a new joining process
- The selection of **RRS Schilling as a partner** with a unique method for retrofitting CNC machines and extensive practical experience
- **Production of the prototypes** at RRS Schilling near Hamburg to ensure quality and compliance with customer specifications
- **Retrofitting and qualifying apt's own CNC machines** for the FSW process to enable independent application of the technology

Project Progress: From Requirement to FSW Series Readiness

Knowledge Transfer and Professional Requirements

- **Training of apt employees** by RRS Schilling on the technical fundamentals of the FSW process, as well as hands-on support during implementation
- **Participation in specialist seminars**, e.g., by Aluminium Deutschland, to deepen knowledge of joining technologies and establish it sustainably within the company
- **Implementation and incorporation** of the relevant experience into apt's new value chain

The combination of practical technical feasibility, economic efficiency, and sustainable manufacturing convinced us. Together with RRS Schilling, we converted an existing CNC system into a future-proof production process. The close collaboration with RRS Schilling not only gave us access to friction stir welding, but was also a strategic step towards contemporary aluminium processing.

Christoph Orth, Lead Engineer

This project brought with it a typical requirement from lightweight construction: a battery housing required extrusion profiles with geometries that cannot be pressed in a single piece. We decided to expand an existing CNC machining centre with our FSW technology package. The original functions of the milling machine remain fully intact. In combination with their innovative extrusion technology, our FSW technology now enables apt to realise complex composite geometries. Together with the fixtures we designed, an integrated complete solution was created – from the first concept to series production.

Ole Schmidt, Project Engineer R&D, RRS Schilling GmbH

For us, this project is a prime example of how technology partnerships create real added value. By introducing friction stir welding, we not only met a demanding customer requirement but also elevated our own manufacturing competence to a new level. This opens up entirely new possibilities for us and our customers in future-oriented lightweight solutions.

Philipp Gebhardt, Head of Sales Transport & Automotive

Result and Success: Milestones on the Path to FSW Expertise

The successful implementation of this project demonstrated the crucial role of cooperation in technological advancement. Together with RRS Schilling, we not only delivered the prototypes on schedule but also established friction stir welding (FSW) in our plant in Cheb. We retrofitted and qualified our CNC machines for the patented process, building comprehensive knowledge within a short time.
This partnership is more than a technical step – it has proven to be a strategic milestone for apt and illustrates how we view challenges as opportunities for further development.

apt – Shaping the future with aluminium.

apt-alu-products.com

Monheim, November 19th 2025