

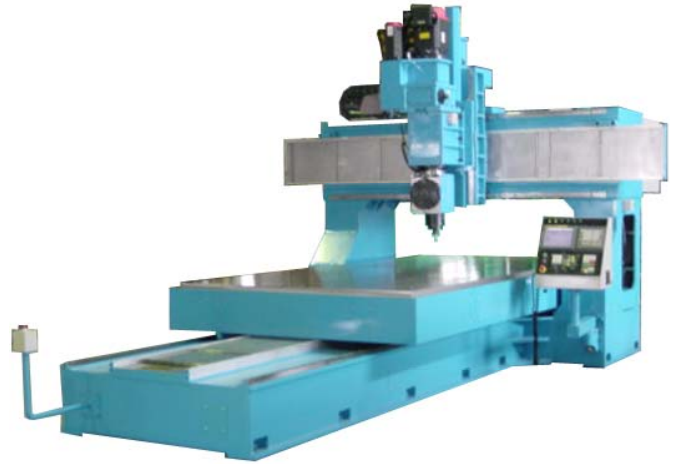
Friction Stir Welding

...from R&D to production

Friction Stir Welding (FSW) is a solid state energy efficient joining technique with several advantages. HITSPIN™ is a FSW equipment developed by HITACHI to provide welding solutions for a wide variety of applications.



1 Dimensional Machine



2 Dimensional Machine



3 Dimensional Machine



Multi Dimensional Machine (Robotic)

FEATURES

- TWI FSW machine license
- Standard and custom machines
- Simple operation by CAD/CAM and CNC
- Tool tracking system
- Self retracting machine head
- Data acquisition system
- Hitachi technical support

APPLICATIONS

Automotive:

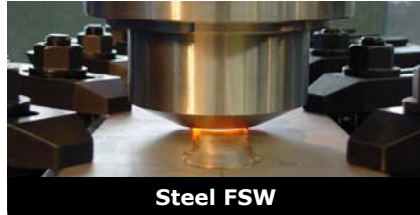
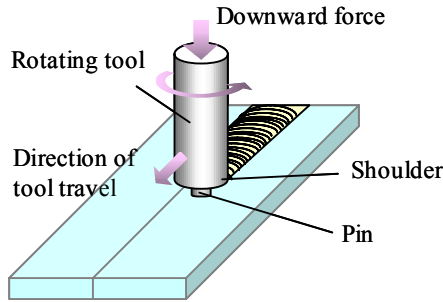
- Body, Panels, Chassis, Suspension, Powertrain
- Structural and Electrical components

Materials and Processes:

- Aluminum, Steel, Magnesium, Copper, etc.
- Castings, Extrusions, Sheets, etc.
- Dissimilar material thickness

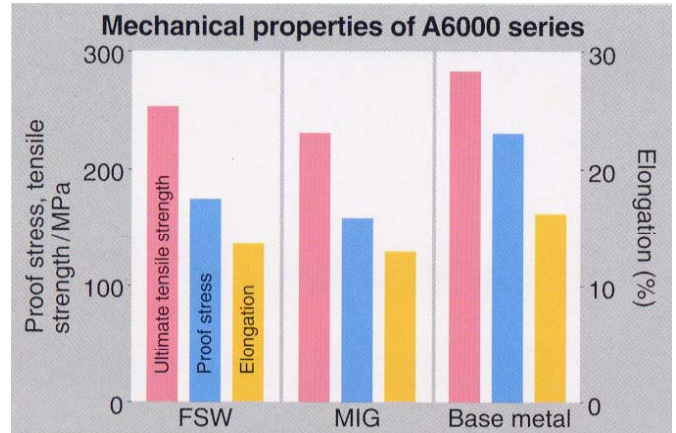
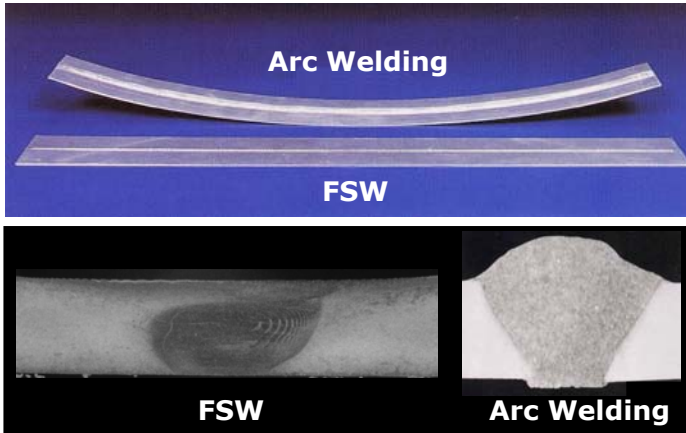
Process Advantages

- Solid state welding process:
 - No melting of base metal
 - No loss of alloying element
 - No fumes or spatter
- Can easily weld:
 - 3D seam
 - Butt, Lap, T-joint, etc.
- Simple process:
 - No shielding gas
 - No consumables (filler wire)
 - No surface treatment



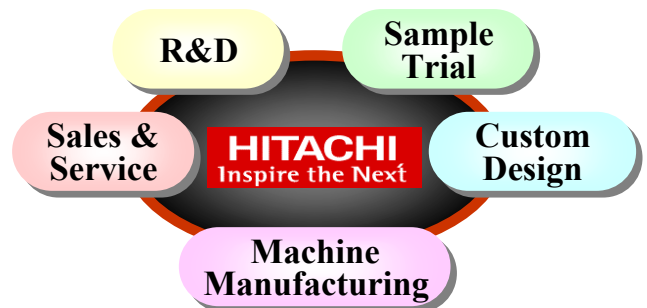
Unique Features

- Very low distortion
- No porosity or solidification cracking
- Weld region has a finer grain structure than the base metal
- Excellent mechanical properties (Strength, Elongation etc.)



Hitachi Solutions

- Collaboration with customers for process development
- Sample trial for FSW evaluation
- A variety of Standard Machines
- Custom Machine design
- Technical support



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