



Product Line: Design and development of Automotive BIW welding Tool and Fixture.

Challenges:

This was a development project to have a unique welding tool for two different car body panels which were designed for different Car programs for an Automotive giant.

AES had to provide a cost effective solution in less than a month as the customer had a scheduled time frame for launching the product to proto type manufacturing.

The tool had to be designed such that the total cycle time for Robots to complete the welding is minimized.

The tool was to be designed on CATIA V5 as the client was using CATIA V4 and migrating to V5.

Inputs Provided:

- Product model of FRONT BSA, on CATIA V4 with complete 3D CAD database.
- Weld Matrix data and RWD (Request for Wiring Diagram) for understanding of sequence of operations.
- Existing Tool for reference.

Methodology:

AES team at Onsite worked closely with the Engineering Team by performing Competitor Benchmark study and evaluating the current design for test requirements to qualify for production.

Designs were made for Power Clamps, Locating Pins, Weld Guns and Robot End Effectors with all necessary adjustments and other provisions. Perfect selection was made for Power Clamp Cylinders and various weld Gun types, so that the cycle time has been reduced and tool was verified for assembly and dismantling and for all manufacturability.

Tools Used:

CAD – Catia V5; Modules – Part Modeling, Sheet Metal, Assembly & Drafting
Weld Study & Tolerance stack up analysis

Solutions Provided:

- Product & Process study, Brainstorming & Concept Designs to make the unique tool.
- Cost effective Material selection (Clamp, Shot pins) & Simplified manufacturing process.
- Complete 3D modeling, Detailed Design & Tolerance Stack-up.
- Simulated the entire tool on ROBCAD for any collision between Tooling & ROBOTS when welding in progress.

Benefits:

- Cost effective as the client could use a single tool for two different car programs.
- Manual work has been eliminated for loading and unloading of body panels.
- Very flexible sequence of operation and reduced cycle time for the joining process.
- The design enhancement on these aspects helped customer to launch the product in lesser time.