Effective Automotive Engineering Solutions
Fixture Design & Robotic Simulation for BIW Manufacturing
Core Capability - Domains

- Aerospace & Turbo machinery Components
- Industrial
- Oil & Gas
- Valves/ Pumps/ Pipes
- Chemical & Processing
- Electronics/ Semiconductor/ MEMS
- Gas Turbine
- Steam Turbine
- Automotive
- Power Generation
- Energy
- Environmental/HVAC/ Building/Construction

AES
CAD/FEA/CFD

www.aesglobalservices.com
AES Automotive group is well trained with good understanding of Automotive BIW Welding Fixture and Robotic simulation concepts, and can work for different customer standards and requirements.

AES uses its proven methodology of onsite and offshore resources to deliver value to its customers.

AES manages and executes various ongoing design and analysis projects with onsite project coordinators and offshore engineering staff located in India to provide better, faster and more cost-effective solutions to its global customers.
AES AUTOMOTIVE DIVISION

Departments

- BIW FIXTURE DESIGN
- ROBOTIC SIMULATION
Project Organisation

Rama Chandra Panda
Vice President – Engineering

Govindarajan. V
Vice President – Operations

Raghuram. S
Director Of Engineering

Hariharan. G
Delivery Head

Saranya. S
Project Manager - Simulation

Simulation Engineers
5 Members Team

Suresh Kumar. N
Project Manager
BIW Welding Fixture Design

Design Engineers
15 Members Team
TOOL & FIXTURE DESIGN
FOR
BIW MANUFACTURING
Work Areas

- BIW Welding Line
- Welding Fixture Design & Detailing
  1. Geo Station Design & Detailing
  2. Respot Station Design & Detailing
- End Effector Design & Detailing
- Pallet Tooling
- Hold Buck Units
Welding Fixture Units

• Weld gun Units
• Clamp Units
• Base Units
• Locating Pin Units
Welding Fixture Design Process

- Study of Clamping Plan
- Understand the Sequence of operations
- Application of NAMMS Standards
- Selection of Various Commercial items
- Apply Mechanical Design Standards
- Verify the Feasibility with interacting tools
- Verify the Design for Manufacturability
- EOAT Design for Welding & Material Handling
- Design Modifications of Welding Fixtures
Welding Fixture Detailing

- Detailing of Welding Fixtures and EOAT’s
- Detailing as per various Standards like Gm/DC
- Expertise on GM toolkit (KB tool)
- Detailing to meet Customer Specifications and Manufacturing Setup
- NC Components Detailing
- Part Detailing
- Welded Construction Detailing (Construction Hole etc.)
- Unit level Layout and BOM creation (Clamps, Locating Pins & Bases)
- Key sheet and BOM Creation for Weld Stations
ROBOTIC SIMULATION
Services

Providing various application services for Robotic Simulation of Automotive Components.

Operations

• Material Handling
• Spot Welding
• Arc Welding
• Sealant Application
• Stud Welding
• Pedestal Applications
Project Services

- Feasibility Study
- Process Simulation
- Design Simulation
- Design Validation
- Process Optimization
- Sequencing
- Weld Spots Distribution
- Offline Programming
Feasibility Study

- Reacheability study with the input tools
- Placement of the tools and the robots
- Feasibility study of spots
Stage 1 Simulation

- Approval of Tooling and Facility Designs
- Initial Path Creation
- Swapping of the Spots if Needed
- Initial Programming
- Process under cycle.
Stage2 Simulation

- Robot Path Finalization
- Collision free Workcell
- Finalization of Robot and Tooling Placement
- DXF out of the tool placement
- Swept volume Creation
- Payload Entry
Offline Programming

- Final Programming
- Attributes entry according to customer standards
- Fixture Programming
- Sequence Creation
- I/O Connection
- Cycle time under Control
Documentation

- Weld Matrix Creation
- Robot Data Sheet Creation
- SIM Status Report Creation
- Open Issues Report Creation
- Cycle time Report Creation
Case Study -1

Client : North American Client

Product Line :

Phase1, Phase2 & Phase3 Simulation of Rear Floor Body line

Objective :

- Design Validation of Welding fixture, Holding Systems, Pallet Tooling, Weld gun and EOAT has done and reported in the issue list with suggestion for the Designers.
- Weld gun Selection for all Welding station
- Collision free path creation for the whole line
- Offline programming for all the Robots
- RDS and Weld Matrix Creation.
Challenges:

Weld gun Selection is the main challenge in this project. AES Engineers has done a great job in this area and given very good suggestions to our customer to make the system work.

Tool Used : USPOT
Case Study -2

Client: North American Client

Product Line:
- Phase 1, Phase 2 & Phase 3 Simulation of Front Floor Body line

Objective:
- Design Validation of Welding fixture, Holding Systems, Pallet Tooling, Weld gun and EOAT has done and reported in the issue list with suggestion for the Designers.
- Weld gun Selection for all Welding station
- Collision free path creation for the whole line
- Offline programming for all the Robots
- RDS and Weld Matrix Creation.
Challenges:
Cycle time is the major challenge in this project. AES Engineers has to work out in the paths to make the system under cycle.

Tool Used: USPOT
Case Study -3

Client : Indian Client
End User : European Major OEM
Product Line :
Phase1,Phase2 & Phase3 Simulation of Hood line
Objective :
- Design Validation of Welding fixture, Holding Systems, Pallet Tooling, Weld gun and EOAT has done and reported in the issue list with suggestion for the Designers.
- Weld gun Selection for all Welding station
- Collision free path creation for the whole line
- Offline programming for all the Robots
- RDS and Weld Matrix Creation.
Challenges:

Cycle time & gun selection are the major challenges in this project. AES Engineers has to work out in the paths to make the system under cycle.

Tool Used: ROBCAD
Simulation Software

- UltraSpot
- Robcad
- Igrip

CAD Software

- Pro E
- Unigraphics
- Catia V5
- Solid Works
- Inventor
- Autocad
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Thank You