MAGNA

MAGNA POWERTRAIN

Engineering Center Steyr

Dip Paint Modules for Industry

- ALSIM basic
- ALSIM dyn
- ALSIM rotdip
- ALSIM fill&drain
- ALSIM cad interface
- ALSIM postprocessor
- ALSIM multithreading

ALSIM software

DIP PAINT SIMULATION

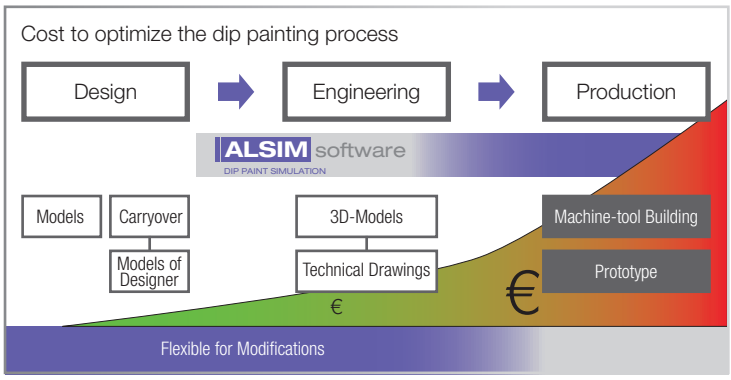
alsim.ecs.steyr.com

During dip painting, it is of uttermost importance to attain full surface coverage. Bubbles of air can prevent full surface coverage and therefore, e.g., the application of corrosion protection agents, which in turn substantially reduces product quality. Equally important is that excess fluid will be able to drain off after dipping, otherwise fluids of two subsequent application baths may mix, or puddles of excess fluids may lead to cracks after drying.

All this has to be considered during the development of structures that are to be dip painted, and the dip process itself. ALSIM supports this development by simulating the dip paint process of complex structures and highlighting spots where bubbles of air or puddles of fluid will form. With ALSIM you will be able to identify and fix these spots early on in the development process, which otherwise could only be done very late.

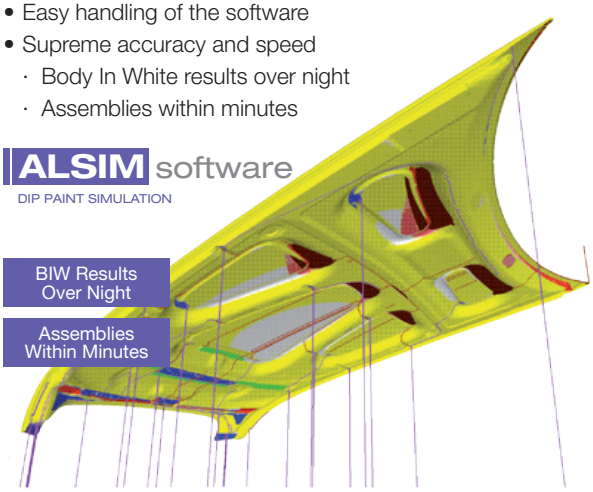
Workflow

- Import
  - Triangulated surface mesh of solids or surface models
  - Paint shop pathway as a series of 3D movements and rotations
- Simulation fill&drain (Interactive 3D Visualization at each pathway step through the bath)
  - Air bubbles
  - Fluid puddles
  - Cavities
  - Path of puddles and bubbles
- Export
  - CAD (Catia, NX)
  - Excel
  - HTML

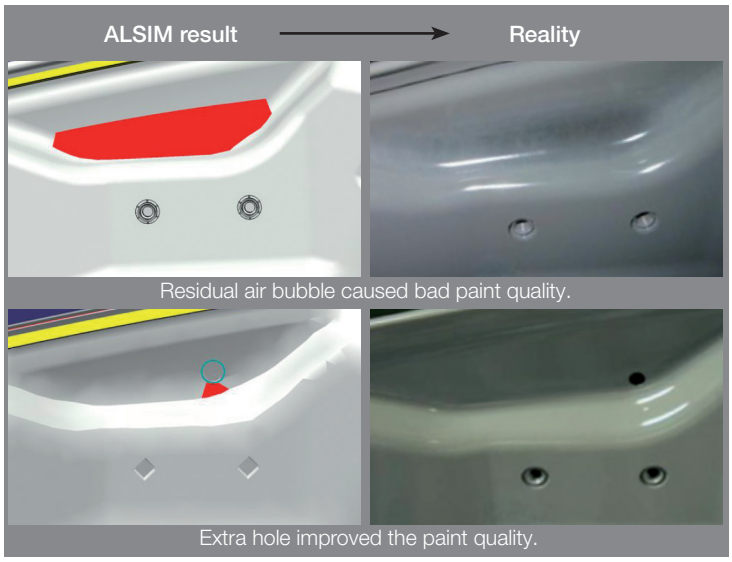


Benefits

- Geometrical change in the early engineering stage by analyzing:
  - Non painted areas
  - Liquid carryovers
  - Its causers
- Prevention of late and expensive design modifications in the prototype phases
- Arbitrary 3D pathway allows simulation of a wide range of paint shops
  - Comparison of paint shops
  - Opening angle of the component (e.g. car door, engine hood)
- Reduction of liquid cavities within drying chamber
- Reduction of guarantee claims on the long run
- Detection non-drained off liquid and optimal pathway through bath
- Suitable for large and complex structures
- Windows and Linux is supported
- Easy handling of the software
- Supreme accuracy and speed
  - Body In White results over night
  - Assemblies within minutes



Example Daimler AG



Customer feedback of Daimler AG

- Non and bad painted areas always accord with reality.
- Location of residual liquid fits to reality.

Modules

ALSIM Basic

ALSIM Dyn
Rotation within and outside of bath (excluding dipping through bath surface) without consideration of physical properties

ALSIM RotDip
Rotation during whole dipping process (including dipping through bath surface) and integration of pressure

ALSIM fill&drain
Time related fill&drain results

ALSIM CAD Interface
Export to CATIA or NX

ALSIM Postprocessor
Speed up post processing; fast detection of causers for special selsected problem areas; generation of 3D-pdf

ALSIM Multithreading
Reduce total computation time

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