SUCCESS STORY FOR SOLIDWORKS DEVELOPMENT

THE CLIENT

A world leader and pioneer of developing engineering simulation software used to predict how product designs will operate and how manufacturing processes will behave in real-world environments. They are developing software to solve the most challenging engineering problems allowing engineers to refine and validate designs at a stage where the cost of making changes is minimal. Their simulation solutions are deployed across automotive, aerospace, defense, electronics, marine and shipbuilding industries serving engineers and researchers in corporations that include Airbus Industries, Air Force Research Lab, Bell Helicopter, Boeing, Rolls-Royce, John Deere, Hitachi, LG Electronics, Lockheed Martin, NASA, Toshiba Corporation, US Navy, GE, Hitachi, Toyota, Honda, BMW and Ford.

MAJOR CHALLANGES

- Understanding the engineering workflow for casting process. The workflow includes selecting casting type and material, defining metal pouring conditions, defining casting temperature, mold temperature and post processing
- Understanding SolidWorks graphics framework to visualize post processing results
- For SolidWorks application development, gleaning adequate knowledge of the following:
  - SolidWorks API Object Model
  - Application objects for SolidWorks
  - Procedure for connecting to new and existing SolidWorks documents
  - Adding custom properties and attributes to SolidWorks documents
  - Development of Visual C++ add-ins for SolidWorks
  - Customizing the SolidWorks user interface with VC++
  - Managing menus and toolbars
  - Notifications in SolidWorks

APPLICATION OVERVIEW

The casting process simulation application is a 3-D Finite Element program for predicting the manufacturability of cast parts. Enthalpy conservation equations and the Navier-Stokes equations are solved for the filling and solidification processes and allowing engineers to analyze design parameters from concept to production.

A user-friendly pre-processor, with capability to read meshes from other mesh generation codes, permits the entering of material properties, process conditions and numerical control parameters interactively. The interactive, dynamic post-processor displays interpreted color graphics of standard casting variables in contour, vector and x-y graph forms.

Simulation of complete casting process in SolidWorks allows selection of application, casting type and material, creation of STL model from existing geometry, and defining metal pouring conditions, 3D grid building and mesh generation.

KEY FEATURES

- GUI and menus to define the process and process parameters embedded in SolidWorks
- Look and feel consistent with existing SolidWorks menus and workflow
- Generation of mesh and solver input files using a command driven, batch version interface
- Solver launching and monitoring
- GUI for post-processing in SolidWorks 3D graphics window
- Software protection in SolidWorks batch interface and solvers

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S O L U T I O N S

TOOLS AND TECHNOLOGIES

Visual C++, **OpenGL**, **SolidWorks API**