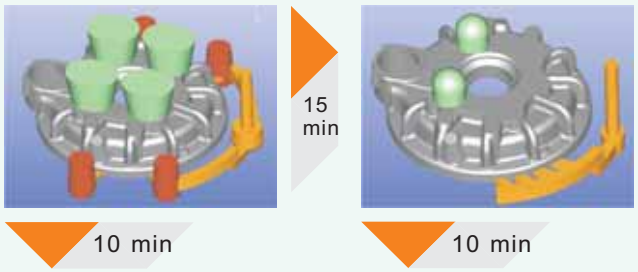
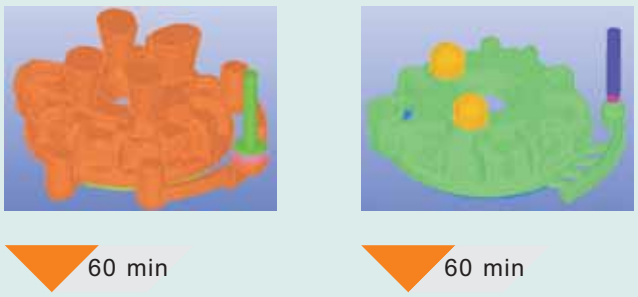
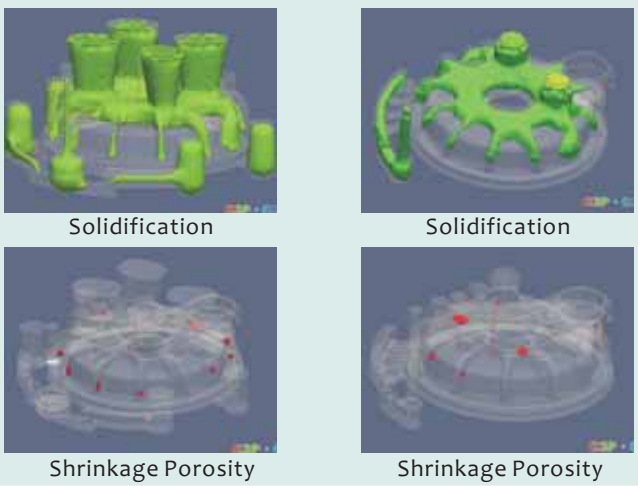
CAST-DESIGNER for Gravity

Upfront design & analysis system for casting industry







Cast-Designer helps engineers to quickly convert ideas into 3D CAD solid model, and subsequently evaluate the casting design. According to the result of the CPI analysis, engineers can make critical modifications and easily achieve a satisfactory design solution

30 minuts

to design one casting system

Special focus on "DESIGN" & "DESIGNER"

Fast validation based on FEM technology

Integration of expert system and CAE technology
A tailor-designed mould planning & simulation system for casting industry

Cast-Designer is a quick casting design and analysis tool based on upfront design & analysis technology. The core of the "upfront design & analysis technology" is to allow engineers to conduct fluid flow, heat transfer and solidification analysis by the assistance of combination of expert system and CAE technology, it helps engineers to make a "Right" engineering decision in the early design stage of a project. Upfront design & analysis technology has already been becoming a very important role in main stream design process.

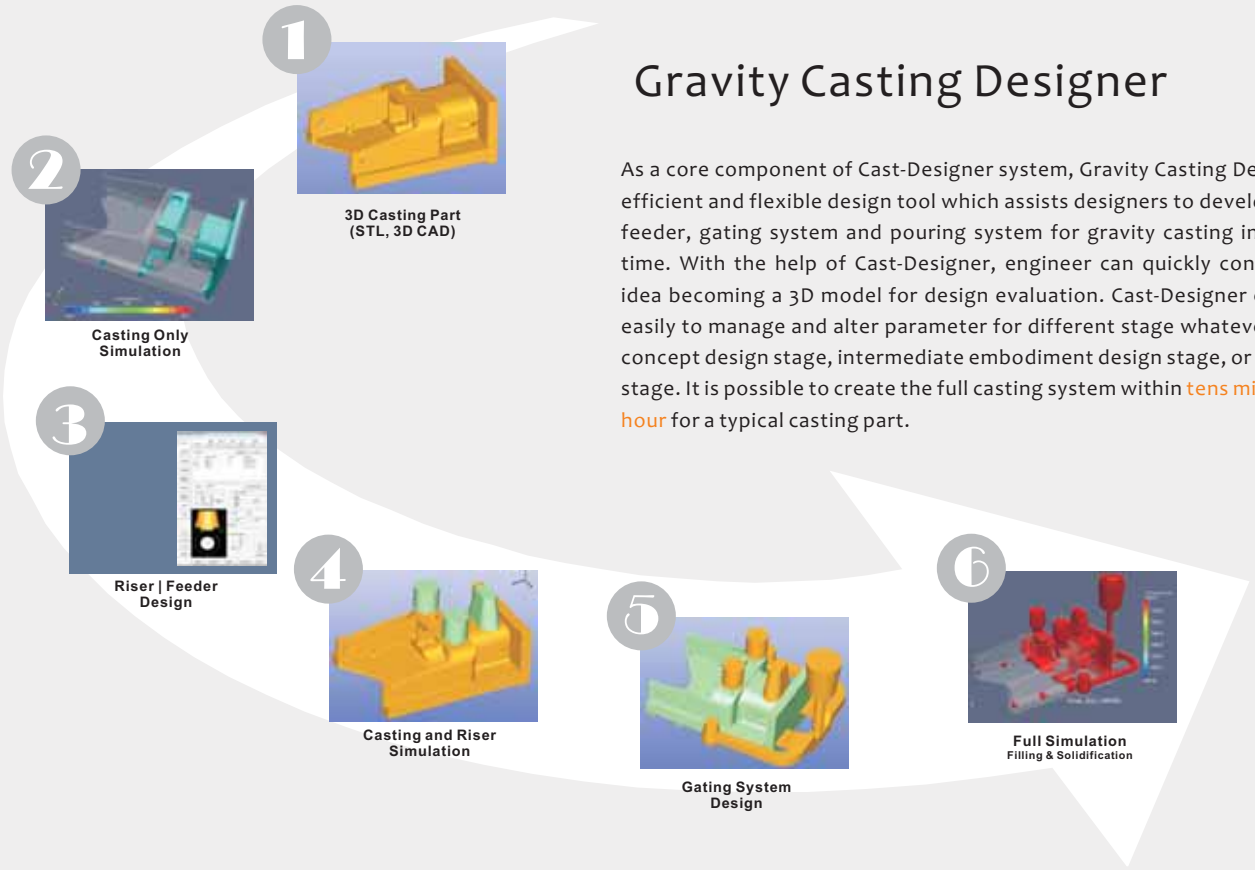
With Cast-Designer, users can optimize a casting design by detecting the part features with potential metal flow and solidification problems, evaluating riser and chill, gate system and pouring system design alternatives in the early design stage. Even a novel with limited experience in simulation who can easier to undertake the design setup in very short period of time. In other word, Cast-Designer can help the industry to achieve the target of '**Time to Market**'.

Support Casting Process

- Sand Casting
- Gravity die casting
- Tilt casting
- Centrifugal Casting
- High pressure die casting
- Low pressure die casting
- Los wax/ investment casting
- Lost foam

C3P SOFTWARE

Gravity Casting Designer



As a core component of Cast-Designer system, Gravity Casting Designer is an efficient and flexible design tool which assists designers to develop riser and feeder, gating system and pouring system for gravity casting in very short time. With the help of Cast-Designer, engineer can quickly convert design idea becoming a 3D model for design evaluation. Cast-Designer enable user easily to manage and alter parameter for different stage whatever for initial concept design stage, intermediate embodiment design stage, or final design stage. It is possible to create the full casting system within tens minute to one hour for a typical casting part.

Industry design and validate process in Cast-Designer

Phase I, Feeding system design
(riser, chills etc.)

- *Part analysis in wall thickness or using 'part only' simulation*
- *Shrinkage analysis base on simulation result*
- *Riser design with 'Gravity gating system design' expert system*
- *Redo the simulation in 'Casting plus riser(s) and chill(s)' mode*
- *Shrinkage analysis again*

Phase II, Gating system design
(turbulence free and no cold-shuts)

- *Gating system design with 'Gravity gating system design' expert system*
- *Pouring system design with the same tools*
- *Mould filling simulation with full casting system*
- *Solidification simulation after filling and check shrinkage*

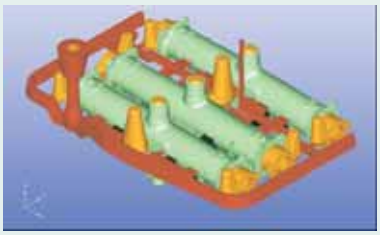
Riser and Feeder Design

Embedded Riser and Feeder Module guide the user swiftly towards the optimized design of a feeding system

By this knowledge base build in Riser Calculator help design to

- Select the correct riser size and shape
- Define the amount of risers
- Optimize riser neck size.

Inner Gate and Runner Design



1, Build in wizard to define flow path and section parameters quickly
2, Generate feature sections in pre-defined curve or wire directly
3, Section shape could be rectangle or circle
4, various styles in solid model generation
5, Take account of the efficiency of metal flow in runner design
6, Real time WYS/WYG visualization for both 2D and 3D

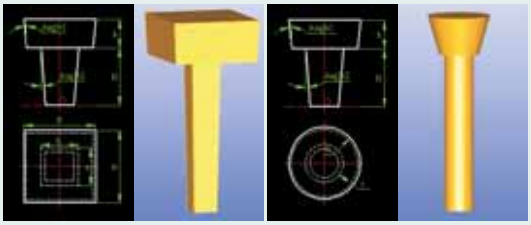
The criteria of a success gating system is it shouldprevent turbulence and cold-shut during filling process, and it could solve the air problems, mould erosion, oxides and surface defects in all gravity casting process.

Gate System Design Advisor

Guiding designer carries out the gating system design process in a simple way. Basing on the mass or volume of casting as well as geometry dimension and material type, the system can estimate the filling time automatically. It also can calculate the final section areas for ingate, runner and sprue runner. All the number of gates and runners could be evaluated and adjusted in real time.

Pouring system Design

1, Support various types pouring system
2, Full parameterized and standard design
3, easily to customize
4, Real time WYS/WYG visualization for both 2D and 3D

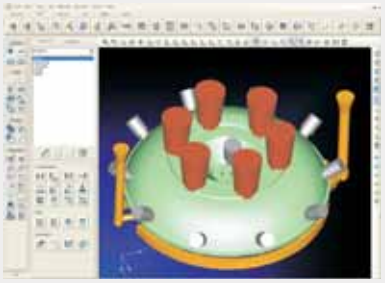


CAST-DESIGNER CPI

Based on its unique innovative technology, Cast-Designer CPI (Casting Process Insight) is the sole really practical tool on the marketing today to support designer and engineer to make fast decision for casting part and mould design. It is capable to reflect varieties of dynamics and physical behaviors of fluid flow, heat transfer and solidification in details. Comparing with traditional numerical simulation, CPI is solely based on CAD environment, and provides nearly real-time analysis results. The beauty of CPI is the full couple with the design functions of Cast-Designer and quickness to obtain the analysis results at the conceptual design stage. There may be many alternative designs, a quick tool is important to run all designs and remove the poor designs. Thus at this stage, the traditional numerical simulation is not applicable.

Casting Designer for MCAD

Cast-Designer for MCAD is used as a plug-in to fully integrate to the existing MCAD system for better integration and data sharing. User can use their normally used CAD system to create a part model and then input the model to Cast-Designer through the MCAD bundle. While the casting system design is completed, user can input back the complete design setup to the MCAD system for fine-turning the design. In this process, as long as operating in accordance with MCAD regulations, there should be no any data loss, and some advanced features of MCAD system could be used for final CAD assembly, such as Boolean operations, surface cleaning and filleting, etc.



CAST-DESIGNER users interface, with OpenCASCADE technology

CAST-DESIGNER for MCAD

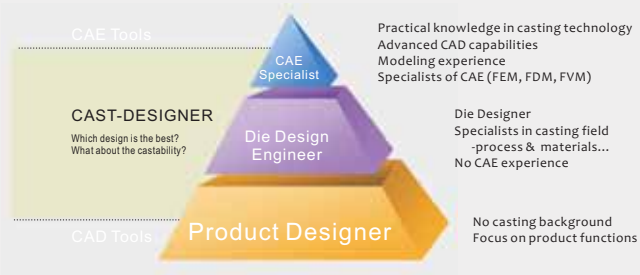
SUPPORT VERSION

CAD SYSTEM	SUPPORT VERSION
Pro/ENGINEER	2000 - Wf5, Creo
UG NX	17 - Nx7
SolidWorks	2004 - 2011

Software language: English, Japanese, Chinese

Upfront Analysis vs Tradition CAE Simulation

It is well known the traditional numerical simulation is not applicable or very expensive for the concept stage. The data to run a numerical simulation is usually not available yet, for example runner geometry. Due to the complexity of the equation system to be solved, numerical simulation is too time consuming, usually hours or even days. Tradition model is also a heavy job.



Cast-Designer do the best to make a balance on easily usage, robust and functions, the user can solve at least 80% industrial problems in an express and effective way.The advance module can provide the full capability of CAE system.

Excellent Mesh Technology

- Very fast and robust meshing, fully automatically
- Flexible to control the element size in different direction (X/Y/Z)
- Support multi solid geometries, no Boolean operation required before meshing
- CAD or mesh or mixed CAD & mesh as original data
- Special treatment for CAD defects, such as geometry gap, overlay, intersection or unclose
- Advance technology for tin dimension or complex region
- Advance mesh smoothing technology to match the geometry feature
- Powerful mesh asembly function

General FDM/FVM mesh with 378,535 elements
To have a good description of casting geometry, fine grid is necessary and still with energy loss on curved edges.

Cast-Designer CPI Advance mesh with 22,740 elements

Thanks the coarse mesh and mesh mapping technology, Cast-designer CPI advance mesh have a better representation for casting and mould with very less mesh, no energy loss and the operation is full automatic.

Best in Class of CPI

Solver Technology

- Base on Finite Element Method (FEM) technology
- Fluid flow calculations are described by the full Navier-Stokes equation and couple to thermal analysis
- Simulate the physical phenomena and mechanical behavior of metal filling, solidification and cooling process, such as temperature, velocity, pressure, liquid/solid factors etc.
- Innovation technology to speed up simulation in express, half hour to one half hour for almost cases
- Submit job to solver in directly and batch queue mode
- Both 32 bits and 64 bits solvers, Windows and Linux
- Support parallel computing technology for big or huge model
- Mechanical module for both machanical and thermal stress and deformation

Model Setup

- Only one windows page to setup casting process, boundary condition and control parameters for flow, heat transfer and solidification simulation
- With rich material data in database, casting and mould material could be selected from database directly
- Pre-defined template for die casting process, as well as user can define the process in free, such as piston velocity, pressure, mould size and HTC etc.
- All conditions and parameters could be save as template file for future usage
- Support user customization

Result & Reporting

- Introduce special customized ParaVIEW as post-processors. ParaVIEW is a famous software and used widely in HPC, it is very powerful and flexible
- Rich analysis results in various formats, such as contours, vectors, sections and curves, it is also support animation and VRML
- Support plug-in filter for post-process, similar the concept of Photoshop
- Report module to support auto-reporting to save at least 70% time for document

Industry validation of CAST-DESIGNER

Casting Design to Simulation

Material Database

The build-in material database of Cast-Designer includes most casting alloys and a variety of casting material to fit the needs from difference industries and customers.

Mould materials:

- Green sand
- Dry sand
- Chemical sand
- Cr sand
- Zr sand
- Special sand
- Silicon carbide
- Graphite
- Die
- Insulation
- Filter

Casting alloy:

- Cast iron: grey, SGI, CGI
- White cast iron
- Ni-Resist D2, D5
- SiMo
- Carbon steels
- Stainless steels
- Copper alloys
- AlSi7 up to AlSi12
- Mg-alloys
- Zn-alloys

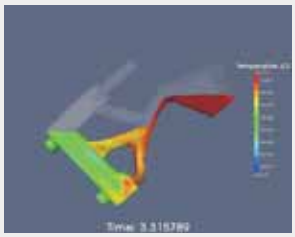
Metal flow validation: Yellow line, experimen test result

Platform Advice

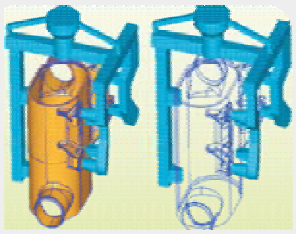
O.S.: *Windows XP (32bits), Vista, Windows 7 (both 32 bits & 64 bits)*
Processor:
Intel core i3, i5, i7 and above or AMD 2.0G and above
Memory: *4GB and more memory can get a good performance*

Display:*Support1280*1024 and above resolution and 128MB display memory is required.*
Mouse: *Three-button engineer mouse is required.*
Harddisk: *200GB or above free hard disk space*

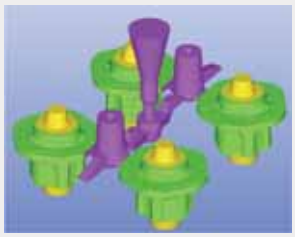
DVD-ROM with writable capability for data backup is also an optional.



Tilt Casting

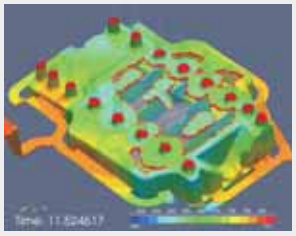


Investment Casting

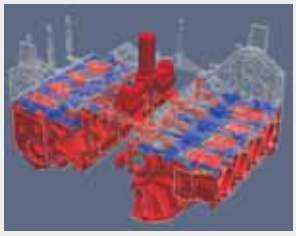


Design Plans Comparison

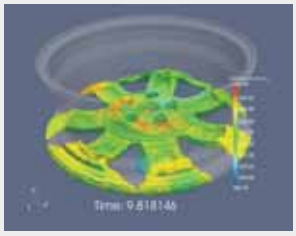
Gravity Die Casting (Automotive Part)



Engine Casting



Wheel (LPDC)



For Distributor Section

Data Exchange Capability

CAD General:
STEP/IGES/BREP/STL/DXF

CAM System:
STL

CAD Advance
(with additional license fee)
CATIA/UG NX/PRO-E/ SOLID-WORKS

CAE Mesh:
STL/ANSYS/IDEAS NASTRAN/PATRAN

About Us

With the combination of software development, advanced analysis, extensive product development experience and cost effective local human resources, C3P Engineering Software Internationa Co., Limited provide industry and manufacturing business with comprehensive solutions and engineering services on a global basis to meet their expectation in high quality, on-schedule delivery within cost target. Our business scope covers software development, professional engineering service and application software integration. More info please visit: www.c3p-group.com | www.cast-designer.com

Partnerships

Flyer Version: CD_GVT_2.1

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