

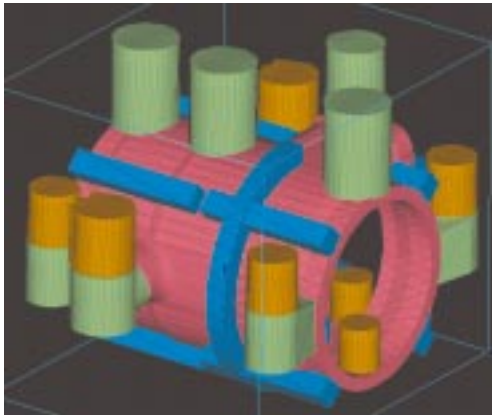
SERVICE SIMULATIONS

for Foundries

CASTech Service Simulations can be used to solve various problems in existing or new castings in those foundries that not yet have their own software. Simulation Service is an inexpensive way to locate problem areas and identify reasons for problems. Different casting solutions for the problem can be simulated quickly. Designing suitable casting system will be faster and expensive test castings can be avoided in the foundry.

Service Simulation Results:

- Mold filling animations
- Solidification animations
- Solidification times and directions
- Shrinkage
- Microporosity
- Hot spots
- Niyama
- Hardness, nodule count and carbide occurrence for ductile irons
- Riser positioning and feeding requirements
- Riser functionality



Case Study 8/95

- A valve body, stainless steel
- No defects allowed

The four simulations took altogether 35 hours of computer time, and the modelling took about two workdays. Altogether the whole process was done in one week, including four meetings between the foundry and the consultant, the modelling and the simulation runs.

Direct savings for the foundry were remarkable. For example 10 hours of repair work per casting was eliminated, plus additional capacity was released in the welding department. The foundry did not want to reveal more accurate figures.

Simulation Benefits:

- Better understanding for what really happens during casting process
- Helps to identify problem areas and the reasons for problems
- Faster and easier rigging system design; possibility to try several ideas fast
- Helps in deciding the optimal casting system and materials
- Shortened lead time, increased production
- Less wastage and scrap castings, improved product quality
- Savings in time, work, materials and energy !!

CastCAE Service Simulation Data Sheet

| |
|-----------------|
| Company: |
| Contact Person: |
| Address: |
| Tel./ Fax: |
| Email: |

| | |
|------------------------------------|------------------|
| Component Name: | |
| Casting Method: | |
| Metal Type & Grade: | |
| Melt Analysis: | |
| Mould/ Die Material & Temperature: | |
| Chill Material: | |
| Sleeve Material: | |
| Pouring Temperature & Time: | |
| Core Material & Temperature: | |
| Mould/ Die Coating: | |
| Core Coating: | |
| CAD-Program Used: | Shell thickness: |

STL Units: millimeters centimeters meters inches

Attachments:

| | |
|------------------------------------------------|--|
| <input type="checkbox"/> Disks: | |
| <input type="checkbox"/> STL of Casting, name: | |
| <input type="checkbox"/> STL of Risers, name: | |
| <input type="checkbox"/> STL of Runners, name: | |
| <input type="checkbox"/> STL of Chills, name: | |
| <input type="checkbox"/> STL of Sleeves, name: | |
| <input type="checkbox"/> STL of Cores, name: | |
| <input type="checkbox"/> SAT-file, name: | |
| <input type="checkbox"/> DXF-file, name: | |
| <input type="checkbox"/> Drawings | |
| <input type="checkbox"/> Photos | |
| <input type="checkbox"/> Thermal Properties | |

Preferred result format:

CD
 Floppy
 Prints

 QuickTime for Windows (MOV)
 QuickTime for Macintosh
 Windows Movie (AVI)

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| Comments: |
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|---------------------|
| Date and Signature: |
|---------------------|

Simulation Ordering Instructions

Providing a 3D-model

If you can provide a 3D-model of the casting (+rigging components), do the following:

- 1) Create an STL-file of the casting itself
- 2) Create an STL-file of the risers, if used
- 3) Create an STL-file of the gating system
- 3) Create an STL-file of the insulating/ exothermic sleeves, if used
- 4) Create an STL-file of the chills, if used
- 5) Create an STL-file of the cores, if of different material than the mould
- 6) Save the STL-files on PC-formatted floppy disks or on PC-formatted ZIP-disk.

Some information about creating an STL-file (also: SLA-file)

- 1) The STL can be in binary or ASCII format; ASCII is suggested
- 2) Indicate the type of the components in the name of the STL; name the files as **casting.stl**, **risers.stl**, and so on if possible
- 3) Keep the accuracy fairly low; this will ensure easier and more reliable data transfer. A rule of thumb is that an ASCII STL should fit on a floppy (i.e. size no more than 1.4 MB). A binary STL should be about one third of the size of the ASCII STL
- 4) If a coordinate system needs to be selected for creation of STL-files, always use the same for all the components. This ensures that the components will be placed correctly in relation to one another
- 5) If possible, positive Z-axis should point up (gravity in -Z direction)

If you for some reason are unable to get STL-files, you can use .SAT-format (ACIS), although it is not suggested.

Providing a 2D-geometry

If you provide a 2D-drawing of the casting (+rigging components), you can select either of the following methods:

- 1) Blueprints + photographs of the casting
- 2) 2D-CAD drawing in .DXF-format + photographs of the casting

Additional Information

Please fill in the blanks in the data sheet to provide the necessary information to make the simulation. Also, if not clear, indicate the point in the geometry where the melt is poured in.

If you have a deadline for the simulation, please inform us and we try to provide you with the results in given time. Also, indicate the type of the results you are interested in, i.e. filling order, defect locations, shake-out time, etc.

You can provide us with your own thermal properties for the materials.

Please indicate in which format you want the results. If you have a Windows computer available, you can view the AVI movies that we will supply you on a CD or a floppy. If you have QuickTime installed, you can also view the MOV movies. If you do not have a Windows or Macintosh computer available, we can print out the most important results of the simulation.

Thank You for choosing CASTech simulation services!

CastCAE Service Simulation Data Sheet

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|-----------------|
| Company: |
| Contact Person: |
| Address: |
| Tel./ Fax: |
| Email: |

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|------------------------------------|---------------------------|------------------|
| Component Name: | Lever 123 | |
| Casting Method: | Green sand | |
| Metal Type & Grade: | Ductile iron, 65-45-12 | |
| Melt Analysis: | 3.5%C, 2.4%Si, 0.2%Mn | |
| Mould/ Die Material & Temperature: | Furan sand, 20°C | |
| Chill Material: | Grey iron GD | |
| Sleeve Material: | Exothermic | |
| Pouring Temperature & Time: | 1350°C, pouring time 55 s | |
| Core Material & Temperature: | Chromite sand, 20°C | |
| Mould/ Die Coating: | none | |
| Core Coating: | none | |
| CAD-Program Used: | Pro/ENGINEER v 14 | Shell thickness: |

STL Units: millimeters centimeters meters inches

Attachments:

| | |
|-----------------------------------------------------------|--------------|
| <input checked="" type="checkbox"/> Disks: | 3 |
| <input checked="" type="checkbox"/> STL of Casting, name: | 1234part.stl |
| <input checked="" type="checkbox"/> STL of Risers, name: | |
| <input checked="" type="checkbox"/> STL of Runners, name: | |
| <input checked="" type="checkbox"/> STL of Chills, name: | |
| <input checked="" type="checkbox"/> STL of Sleeves, name: | |
| <input checked="" type="checkbox"/> STL of Cores, name: | |
| <input type="checkbox"/> SAT-file, name: | |
| <input type="checkbox"/> DXF-file, name: | |
| <input type="checkbox"/> Drawings | |
| <input checked="" type="checkbox"/> Photos | |
| <input type="checkbox"/> Thermal Properties | |

Preferred result format:

CD
 Floppy
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 QuickTime for Macintosh
 Windows Movie (AVI)

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| <p>Comments: Should be ready by February 10</p> <p>We are interested in the filling sequence and defect locations.</p> |
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| Date and Signature: |
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