MAGMA News
Thailand Edition

Issue No.: 5 *January 2015*

M5 Engineering
Casting Process Optimized

MAGMA Thai Newsletter

Do you want to publish an article or success story?
info@m5engineering.co.th

Events in 2015

GIFA 2015

6/16/15 - 6/20/15
Düsseldorf, Germany
13th International Foundry Trade Fair with Technical Forum

Thailand MAGMA User meeting 2015

MAGMA
Committed to Casting Excellence

3/12/15
Dusit Princess Hotel (Sri Nakarin Rd. Bangkok)
2nd Thailand MAGMA user meeting.
User presentations and new developments.

2nd MAGMA User meeting in Thailand (12th of March 2015)

MAGMA
Committed to Casting Excellence

We are glad to announce that the 2nd MAGMA user meeting will be held on the 12th of March 2015 (9am-16pm) in Dusit Princess Hotel Bangkok (Srinakarin Rd.). It is allways exiting to get the feedback of our customers and see how they are using simulation. Besides of the User presentation we will intorduce the latest MAGMA news and developments such as the new MAGMA5.3 version highlighting optimisation.

Due to our rapidly increasing number of MAGMA users in Thailand we are looking forward to this event. Your Feedback to us is very important for our improvent and adjustment to the local market. The user meeting is not only for MAGMA users. We would like to welcome everybody who is interessted in simulation/optimisation to join this yearly event.

Please fill out the submission form in the attachment to join. See You there...

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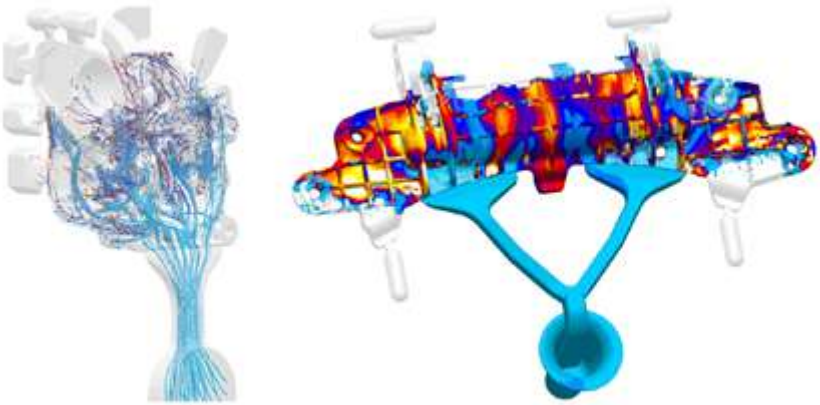
M5 Engineering Casting Process Optimized

Simply Profitable: Simulation in High Pressure Die Casting

The path to lower costs begins with the systematic reduction and elimination of costly casting trials and tooling modifications prior to production. Less scrap, reduced rework and fewer customer rejects all improve your bottom line. Reduced costs give you the edge over your competition.

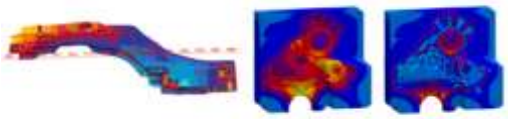
Desirable die casting processes are characterized by casting conditions that avoid gas inclusions, porosity and cold laps but at the same time provide optimal filling characteristics and short cycle times. Economic production aims at an optimum die temperature control, a long die life, small cycle material amounts and perfectly set machine parameters. Using casting process simulation, die casters gain a deeper understanding of their processes and can adjust die design, casting parameters and runner design in such ways that castings of optimal quality can be produced in economical and robust manufacturing processes.



Simulation of turbulence formation and resulting gas inclusions with the MAGMAhpdc module

Understanding and optimizing processes through simulation comprises:

- **Realistic** and detailed mapping of all process steps
- **Optimization** of the filling process and the cooling of the melt in the shot sleeve
- Reduction of **die costs** by evaluating the die design regarding heat-checking and lifetime
- Reduction of **cycle times** through optimization of heating and cooling channels
- **Reduction of quality costs** by avoiding casting defects that arrive from cold laps, turbulence, air entrapment, gas porosity, and shrinkage
- **Time savings** and a **robust layout** of ingates, runners and vents, vacuum channels and overflows
- **Early and reliable** decisions through quantitative predictions of component or tool properties
- Reduction of **production risks** by using a high pressure die casting calculator for the rigging layout
- **Minimization of straightening costs** caused by modifying cooling conditions, quenching, trimming, HT.



MAGMA ^{5} supports measurement procedure: in this case a 6-point method for the analysis of calculated distortions (left). Die temperatures before and after spraying (right).

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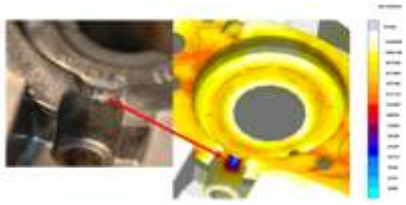
With modules like MAGMAhpdc and other task-specific components, MAGMA 5 offers extensive possibilities to simulate die casting processes in a realistic and reliable way. Among these are:

- Filling and pouring from pouring ladles and dosing furnaces
- Filling and cooling in the shot chamber
- High pressure die casting calculator for the filling of the 1st and 2nd phase, part- and machine-specific
- Consideration of surface tension, venting and vacuum for the shot
- Porosity prediction also considering the 3rd phase (intensification)
- Local squeezing
- Time- or temperature-controlled heating and cooling circuits
- Warm-up of dies with all thermal and time-related boundary conditions
- Local spraying and blowing
- Residual stresses and distortions in castings during solidification after casting removal, gate and overflow cut off as well as during cooling
- Die stress, prediction of die life and heat checking
- Stresses and distortions in castings due to stamping and heat treatment
- Measurement-based evaluation of part distortion



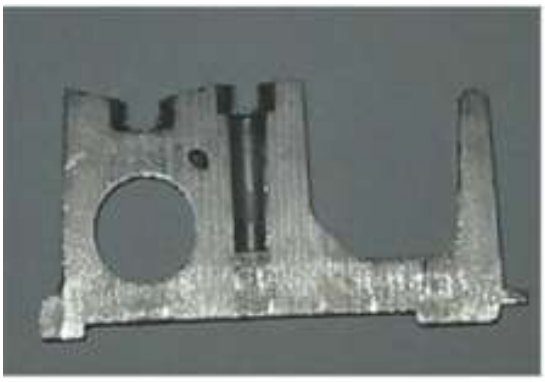
Mathematically estimated lifetime of a die calculated by the MAGMAdielife extension module compared to the real crack pattern of the die.

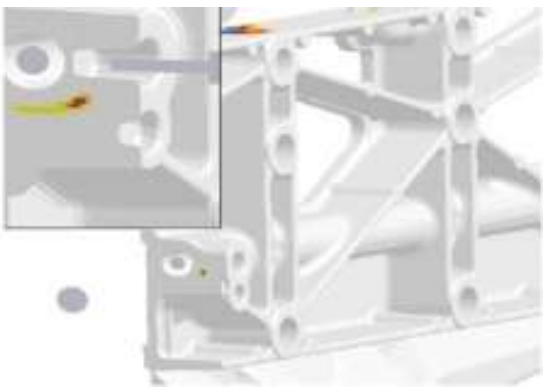
Solving internal casting defects

Triumph in England is a strong advocate of MAGMASOFT ® and asks all suppliers of critical components, like the fuel distributor housing shown here, to use casting process simulation.

During casting trials, porosity was found in a critical location. This problem could be avoided by applying stronger die cooling in this area. Simulations were carried out both with and without the cooling.

The results showed porosity when no cooling was used and that the cooling would correct the problem. A second simulation was used to optimize the time for which the added cooling should be active. The objective was to determine if the porosity behavior would be identical if the cooling was only activated after the die was filled, in order to give other areas of the die enough time to be cooled. A further modification for this die casting was increasing the rib thickness near the problematic area to improve both the filling and solidification patterns.





Fuel distributor housing with internal porosity (left) and simulation results indicate the porosity and showed that additional cooling could eliminate the defect (right)
*** Courtesy of Triumph, UK**

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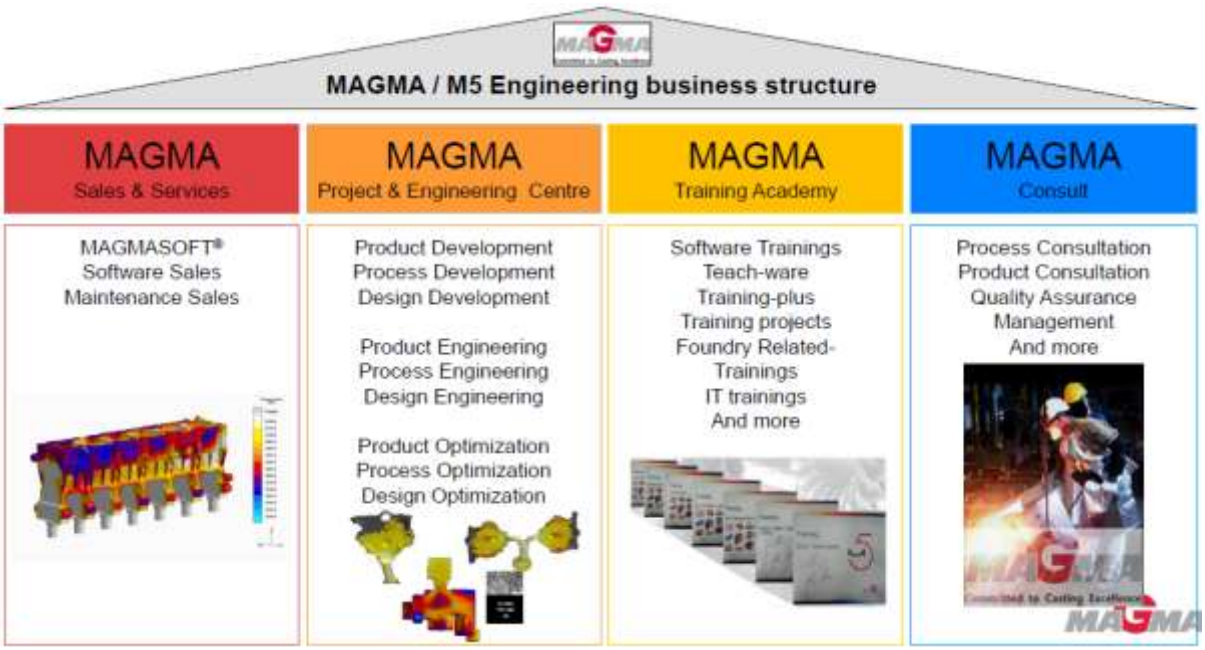
M5 Engineering provides the following services:



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