Die casting is dead, long live die casting!

This may be a very strong sentence but our point is that High Pressure Die Casting (HPDC) as we know it is undergoing rapid changes in terms of technology, industrial structure and the customer demands. As the changes are so big, we think it is in order to speak about a technology shift that probably will change our industry in a few years.

Driving forces of change

For all changes there are pull and push mechanisms that eventually change a whole industry, changes that very often happen very fast. In our analysis we have identified the following:

Automotive designers are facing larger challenges than ever

The weight reductions and the power increase have been in focus for the last 20 years but the entrance of eMobility, hydrogen and hybrid cars has turned up the requirements. What we have seen so far are the following requirements:

- *Thin wall thicknesses*
- *High elongation and strength as cast*
- *Leak free parts*
- *Weldable parts*

Professionals with experience of HPDC understand that components and structures with the above requirements are thus seeking for solutions that are harder and harder to find with HPDC despite the development of the casting machines the last 30 years.

The processes needed for environmentally friendly transportation

As an outcome the design of tomorrows' cars will probably require more processes besides the ones used in the automotive production of today. The problem for those designers of new types of cars is the lack of mechanical properties, fatigue properties, engineering support from suppliers as most novel processes has yet not reached a production and engineering capacity in line with the need from developers.

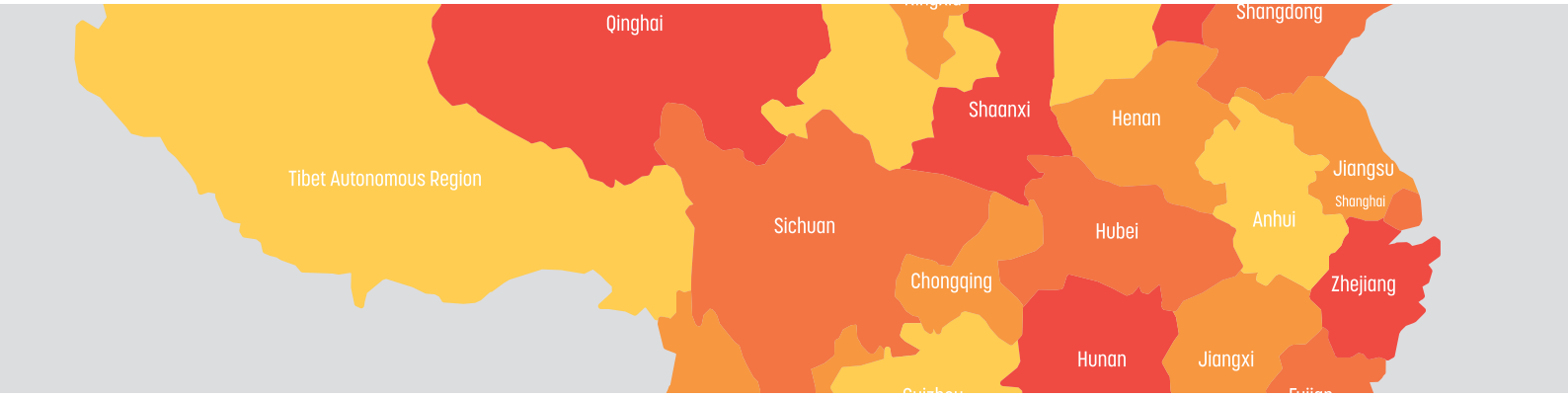
The need of the market will thus probably result in a greater number of processes used in a vehicle and also that larger OEM´s must engage on a higher level to secure not only production capacity but also engineering and know how for these new processes to get the support needed.

The fast development of competence and design capabilities in China

China has made a shift from low level parts to become a casting nation that produces the most complex and challenging components that the automotive industry needs. Not to a surprise as 50-55% of the tonnage is made in China, but the drivers behind this development are of interest.

The willingness to invest, while we in Europe must have every project in order, Chinese companies invest in new technology and then start the sales process why they already have a competence level of novelties to bring to the developers.

The strategic sourcing mistake that is killing Europe. As cost has been the major driver, the HPDC industry in Europe consists of some great big corporations with large resources, but still the vast majority of HPDC foundries are small, regional and perfectly without resources to meet the new challenges on the market as their customers have pushed the price level for 30 years and the result is that long term evolution is simply not possible in their budgets.



The search for bigger machines and complex processes

All parts are becoming larger and more complex as the most cost effective design is the design with fewer parts. For the casting industry this means that the larger locking force the better as larger parts can be produced. But with locking forces exceeding 4000 tons new challenges rise as:

- *Sourcing problem, there is simply not enough capacity in very large machines*
- *Complicated sourcing and the investments are very high*
- *Flow length problem as long flow lengths most often means increased wall thickness*
- *Tools management becomes a problem that results in increased costs*

To avoid the above, all means to lower the locking force requirements must be used why the discussions about metal pressures, hybrid solutions, welding are believed to give opportunities and as the results from these projects are promising a potential outcome is that the search for larger machines that 4500 tons will be ended and hence a lot of those investments could be futile, leaving investors with an investment that will be hard to defend in the long run.

The technology level of the die casting industry

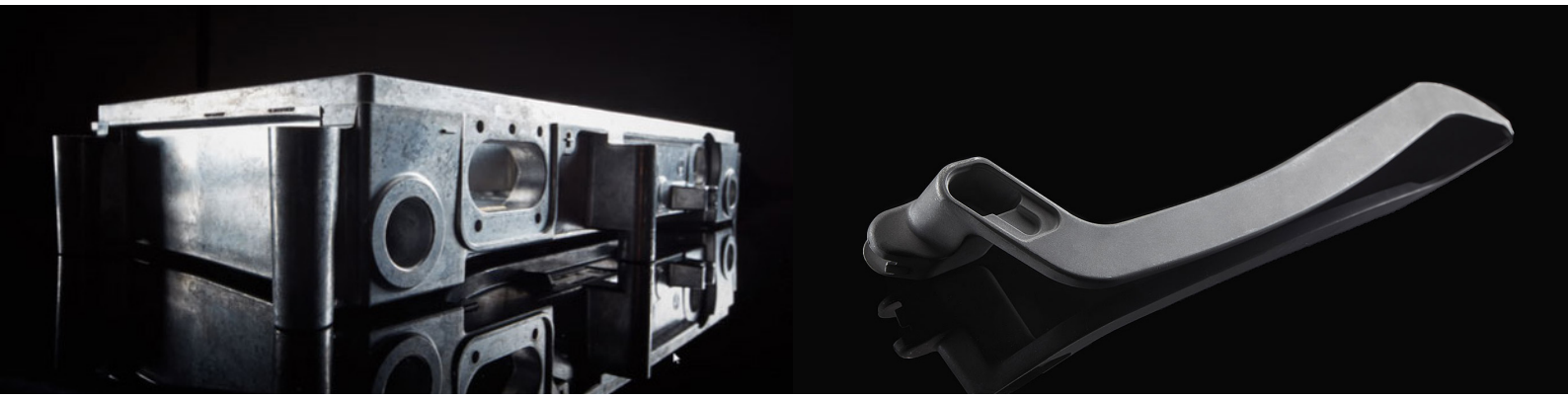
So if we are right, then it must be a brilliant future for foundries as there are clear signs of development needs, higher volumes and a strong driver in terms of environment friendly transportation. In our thinking the picture is greatly scattered as follows:

The development has been small to moderate over 20 years. It is mostly the same machine builders with more data from the process but there have not been any revolutionary steps, more a few percent yearly.

On the alloy side the OEM´s has been working with the same alloys all the time as there has been little need for new development. Here there is a big gap that is proven every time there is a discussion with a senior designer within the automotive industry.

The majority of foundries are small, 3-9 casting machines that are family owned and with profit margins giving that most foundries on the market have more or less just adapted to the OEM demands and streamlined their operation why there has not been much room for development in technology.

Our conclusion is that a slow and moderate technology development has now created a gap of the level of technology that is not meeting the requirements for environmentally friendly transportation.



The most probable result

If we are right there is a perfect storm in terms of a technology shift for a great portion of the HPDC market as we see it today and the main driver: the search for environmental friendly ways of living will drive these changes as customers are becoming more and more aware of the problems.

Due to this we think that the following changes will take place during the next 10 years:

- *Logistic cost will be higher by taxation and legislation, more regional sourcing to be expected and new technologies by this must be in three continents*
- *The industrial structural changes, from many small firms towards a fewer and larger firms*
- *The process continuum will be expanded rapidly so the R&D focus will increase in the industry, fueled by OEM´s mostly with strong Universities and research institutes*

Most important of all that happens in all these changes in the history of mankind: Old rules are set aside, decisive and agile companies take advantage and prosper and new ways of business are developed.

Examples of technology solutions from GISSCO and Comptech

End and discussion

To be discussed in our opinion is the development of the greater good and a more structured discussion in our industry in terms of the environment. Sending components around the world based on business where the labor cost is the driving force will certainly not be favored as legislation and regulatorily demands are and will be increased. One might argue that it is up to the consumer and in some cases China, EU and other regional superpowers to steer and control, but what if we in this industry would start to address the issues already in discussions between larger consumers and producers of castings, process development and know how to sharpen the value proposition to the end customer?

Jessada Wannasin
Founder, Owner, and CEO
GISSCO Co., Ltd.

GISS Technology

Per Jansson
CEO and Owner
Comptech group

COMP tech
castings and moulding innovation