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Why isn't the die casting society panicking? And what to do instead of panicking

Background

As the title says: why is there not a sense of panic in the foundry sociality as we from our recent experiences see some major concerns and threats both to producers of die castings as well as for the buyers of die casted components. Our analysis comes from our daily work with foundries and their customers in automotive and mostly we are focusing on the ongoing EV developments at most of the world's car makers. For us the changes we see are happening, yet in small scale, will probably create a perfect storm in the casting society that is going to change our whole industry in a few years, and it has started why we often ask ourselves: why is there not a sense of panic or fierce activities in our industry?

A summary of what we think will happen

This text is long so to give our reader a head up from the start seems to be in order so here is the summary:

The foundry industry will change dramatically and rapidly in a few years with results as: serious sourcing and delivery problems for automakers, a -50% reduction in the number of smaller foundries in combination with an increased capability and size of large foundries. Investments will be large and new business models will be in place but maybe not for all regions we are used to. Also alloy producers will have to develop fast as sustainable alloy is a prerequisite to deliver to major brands. In short, a perfect storm is coming where many generations of hard work and created values will vanish.

How did we end up here?

The disruptive technology change driven by electrification, where Tesla has shown a way to do development fast, is showing how fast a new technology can be adapted and the effect is clear in how the brand loyalty is under attack, driven by performance and hype when a new brand can be the most valued car company in a reasonable short time.

The initiative from Tesla might have been alarming for the western carmakers but maybe the bigger concern they see is the potential pressure from Chinese brands in a few years. We had the same situation in the need of the 70:ies and through the 80:ies with the market entrance of Japanese brands that seriously challenged European brands, not unlikely that we will see this pattern repeat itself again but this time from Chinese brands. What makes this scenario worrying is found in aspects as the Chinese auto industry has: massive size, the number of customers in their internal market, strong back up from governments but also a very attractive resource bank in terms of materials for batteries and other key raw materials.

Fueled by the drive towards a 0-emission society going electric seems to be the only alternative from many perspectives why all car makers are following this path in a process of seldom seen development speed with enormous investments in development not to be behind the competition.

But then, what will happen in the background of all these development projects? We have now been reading article after article about the brights future of castings in general and die casting in specific but the more we read, the more we learn from our daily work we get more convinced that the truth is the opposite: **this is a perfect storm where every second foundry will be out of the market before 2030.**

The reasons and drivers of change

If one is proposing such a dramatic future outlook for our industry there must be strong factors that are pushing the industry in such direction. What we see and have learnt from a great number of customer interactions are the following.

Sustainability

The root driver, directly or indirectly, of all changes we see and describe in this paper. When regarding the CO2 and other sustainability drivers it falls into three categories: CO2 from the production of the vehicle, the emissions caused by the vehicle and the changes in the mindset of consumers. Given this massive transition the automakers are deeply focused on EV development as brand loyalty is challenged by younger generations of car buyers that are sensitive to environmental impacts why having a less traditional view of a car spec versus their parents. In short, having the right brand but low range is a catastrophe versus the other way around is probably a given success. Best example of this is Tesla and Rivian as they are young, successful in attracting customers and fast in their development.

The change over from ICE to EV

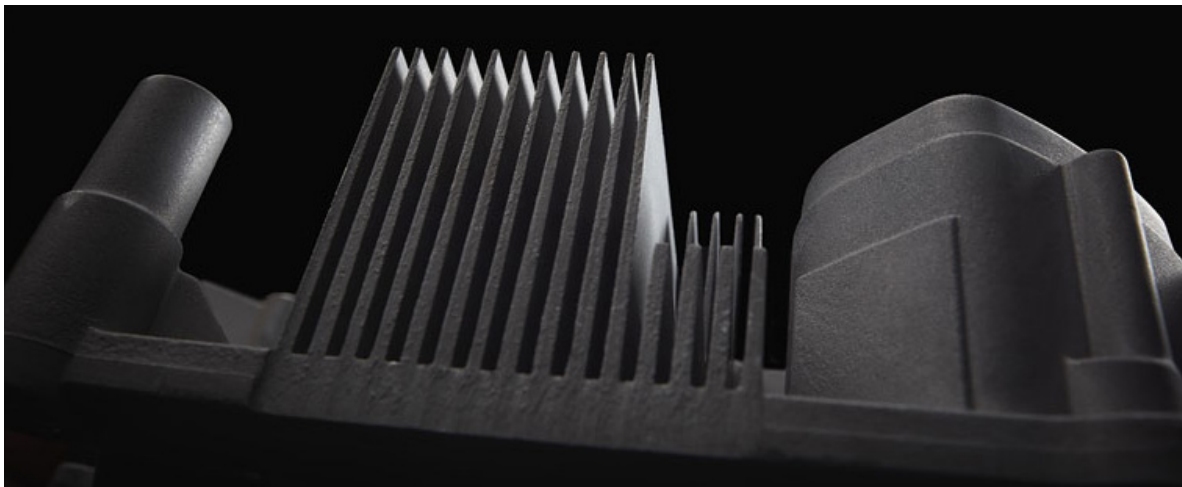
The speed of the development and market acceptance of EV's has probably surprised most of us and the speed seems just to increase, and the transition has gone so far that we now face the fact: EV's are here to stay. The impact in sales in numbers and time varies between different researchers but most of them points out a 50% ICE vs 50% EV's around 2030 to 2035. This is creating a chicken race and we are seeing new systems being integrated in new platforms why news about successes due to high margins will probably be mixed with news about recalls and other quality problems. It has never been more risky business to be a car manufacturer.

EV's reduces the overall business in the foundry industry.

It has been shown in a number of studies that the number of parts in a EV is reduced very much, from typical 2500 - 2000 part numbers down to 200 - 400, depending of how each study is made. The exact figures are not of interest in the light of the fact that 60-80% lesser part numbers mean a dramatic reduction in business opportunities for a foundry. Also, by tradition, many foundries are "type casted" for specific applications and parts where they have experience and know how, but as many of these parts are not present in an EV those foundries must find new applications for their capacity. The question for each foundry after assessing that they are in the line of being hit by this downturn is how their customers regards them and how important they are in the eyes of their customer?

The properties demanded are hard to fulfill with HPDC

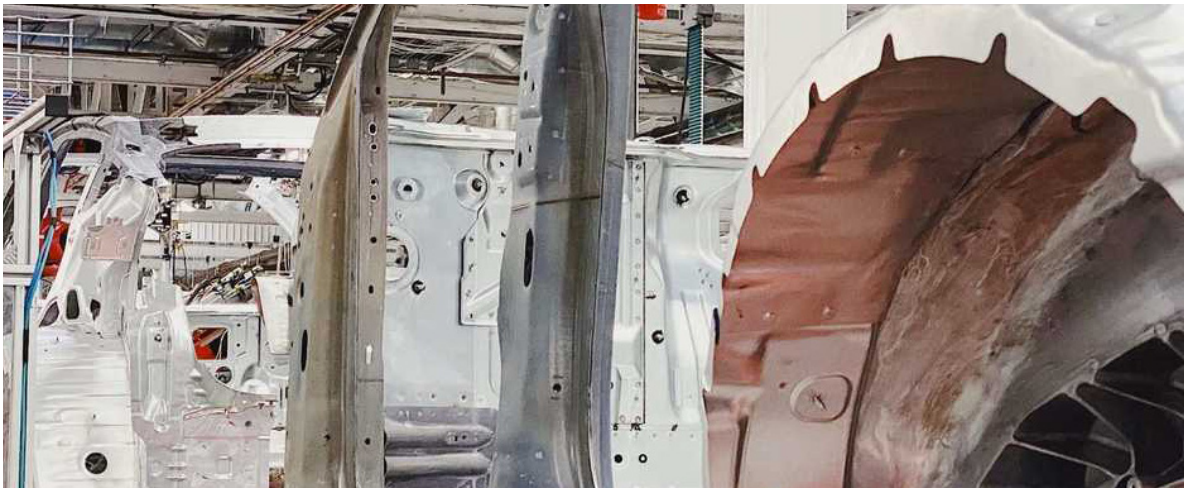
HPDC has been a strong and reliable source of complex shapes with moderate requirements of mechanical properties. For the first waves of weight reductions the process has delivered what designers has asked for but here we see a change. Giga castings, new shock towers, CO2 compressors, electrical power trains are demanding higher elongation and higher thermal conductivity than a traditional eutectic alloy can deliver why designers are looking in other direction to find solutions for their designs. Other materials, alloys and newly developed processes are key in this.



Parts are bigger, and getting bigger all the time

We all have seen the Tesla initiative where the new class of applications of Giga castings are out for display, and we see a number of similar projects are under development why it is safe to assume that this trend will now lose its power in the transition of how a car is built. Once the analysis is made it is hard to turn back as the giga casting concept offers savings in the production of a car. There are also savings in terms of administrative staff as cost engineering, quality and logistics that normally is fully occupied to manage some 60-70 parts that are welded in a traditional body in white that now seems to be replaced by one giga casting.

Giga castings, battery boxes, side beams and other larger applications also gaining size why the total number of very large parts can be 5 per each car which is fantastic for the designers and production economist, but here lies the calculation error in all these positive reports about the bright future of die castings: they calculate the tons. The number of castings are reduced, the weight increases but, this is not a market for the majority of foundries on this globe, hence our negative attitude to the positivism and conformal thinking in our industry.



The required machine sizes are growing

As parts grow bigger the required locking force follows, good news for DC machine producers, but bad news for foundries that will be stuck with large investments on a falling market as ICE drive train demand is decreasing and the new businesses demands new investments. Not a nice place to be sitting at white mid-size machines with free capacity and still a need to invest heavily to follow the market. Imagine the market for second-hand DC machines and the price drop on those that will follow when foundry after foundry are trying to change their installed base of machines.

Geopolitical drive towards local content

Energy and raw material and the task to keeping a nations population working in combination with making the world more sustainable is mixed together into an interesting geopolitical situation where different measures are taken, from tolls to development of circular demand for imports under the environmental label. Given also the uneven spread of raw material there is easy to see that there will be no easy trade negotiations in the future.

What is going to happen?

To make a forecast we have made and that we are using in our long-term planning consists of a list with the following projected effects based on the described changes we see in the demand from OEM's and Tier 1:ns.

The whole structure of the casting industry will change

Let's face it: most foundries are small and have been working with low margins for many years. Key points to survive is a high utilization of investments and low labor cost. Given a foreseen reduction of turnover of 20% upcoming year is in most cases not enough to keep them running. This means that foundries will have to take action in different ways: bankruptcy or mergers or finding a smart way out by any means in technology or innovation. There will most probably not be any early warning as foundry managers are a tough breed that has been working in harsh environments for many years and learnt how to operate with auto tier 1: ns as customers, why we can expect many news in our industry the years to come. And let's face it, we have seen how sensitive this industry is already from the dieselgate a few years back where also some old names vanished and factories where closed and we saw some intercompany mergers happen.

Sourcing and delivery problems

Looking at the casting market most of the parts produced are bought by Tier 1: ns and most often from smaller foundries. We believe that a small foundry will be more sensitive to the changes we see coming and will be the first ones to suffer from lower turnover why sourcing problems will start in the supply flows of Tier 1: ns giving the OEM's problems and also allocate large resources to control multiple crisis. The second problem the buyer has in such a market will be to manage this situation when a part with decreasing volumes shall be moved to another foundry. Shortages in supply and price increases are likely to be seen as results. Questions who to pay for these increased costs?



Higher degree of competition, knives out

As the overcapacity is hitting the industry for ICE parts with some 10-20% reduction of volumes the competitive landscape will change, and we already see signs of this. The results will most probably be that suppliers of these castings will be attacked from competitors why price levels will decrease and hence lower the margin. The strategic goal will be to have full capacity usage to make any money, or to step out from the business.

The big ones will be bigger, as multi support is key to OEM's

Industrialization, ramp up and deliveries of large castings with complex shapes and high mechanical requirements will take its toll why only foundries big enough to carry the cost of people in R&D and development can act as support in the design of new platforms, fueling the growth of the large foundry groups. Also, the big ones will be big enough to participate in the buildup for giga part where we do see a need of people, capacity, and capability to manage everything from investments to technology why one outcome is probably new business models between foundry groups and OEM's, hence giving them a high level of importance to the OEM's.

DC machine builders are facing a new world

When ICE's are losing numbers a large quantity of DC machines in the small and mid-segment of machines will become available why it will probably be hard to make sales in these segments. In the same time the Giga presses offer opportunities but these installations will require more than just a machine why there will be an development from DC machine producers to embrace for them odd areas as metallurgy, tools and competent people in order to support their customers risks.

Glimpse of light, the opportunities

We think that we are right in the more dark descriptions one has to think about alternative strategies and tactics to come out of this transition as a winner. And there are a few ways and glimpses of light available for the ones who dares to act:

Speed

The foundry industry is a very slow-moving industry why the ones that can be faster is winning. With faster we mean faster in idea development, decision and execution of: mergers, introduction of new technology or a new marketing and business model.

Decisions and information

The one that understands and acts on information and takes decisions fast, before the competition, will probably win. We foresee some negative decisions, but if not taken the end result will be worse why we strongly thing that the ones that get information and dares to act will be the winners of tomorrow. To be decisive and to get information is for free, not to act will be costly

Technology

New ways of building tools, casting and other innovations are developing fast to meet the increased demands and it has never been this easy to find information and also to communicate novelties to the market. This is giving foundries that act a great chance to take a pole position towards the market and their customers to be able to make interesting offers. No one will be able to change overnight, but with something new the foundry will be regarded in another light and have access to more than just what this new technology is giving in terms of opportunities and information.

Geopolitical movements

Trade war is a strong word, but we all see some restrictions on the global market in combination with that large low-cost countries are not low cost anymore gives a movement to find more regional sourcing when transportation costs and other costs are to be optimized. The outcome of these movements is that new markets are opening where foundries can attract more business in new places and regions.

What to do?

Steal business from other fields and processes is the simple answer to this question. By this we propose that with new or adjusted technologies a foundry can challenge other processes where there is an market available where the competition from other HPDC producers are not that tough. Some examples we see in our work where a smaller investment in technology acts as a game changer:

Steal from extrusion

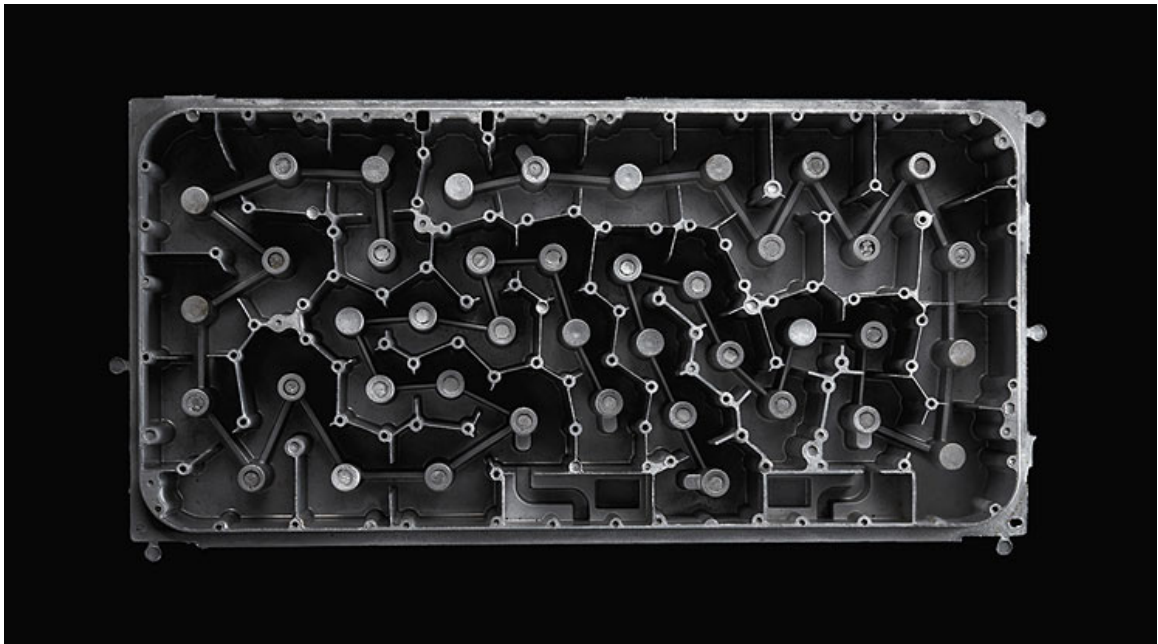
Extrusion is used for the heat conductivity but with casting in semi solid state alloys with very high heat conductivity are castable into complex shapes giving a great advantage especially in the telecom industry and later for automotive e drive trains where we see the same need of needed properties. The best part of this market segment is that it is increasing steadily with the development in electronics and also with the number of electrical driven applications as for example cars and e-bikes.

Challenge the LPDC and PM industry

Steal from the Low pressure die casting and permanent mold industry by using other casting technologies as again, Rheocasting is in this case a killer application as it gives lower cost by combing properties from LPDC with the productivity and production cost of HPDC. If anyone wants to get the size of this market one has only to check the fact that the alloy A 356 is to most commonly used alloy in the world and most of the tons are consumed by LPDC and PM foundries.

Give the world more effective forged parts

Use trim pressing in combination with casting of wrought alloys and then the forging market opens due to the decreased cost of raw material giving a substantial cost saving and or margin contribution. This way of producing parts are much easier that all the attempts we have seen to create the perfect casting buy using semi solid for effective after feeding to reduce shrinkage porosity and then to make the final forging step that will create a very good deformation hardening. Probably the most cost effective way to produce parts close to the theoretical strength of aluminum.



But then, how to reach these markets?

The path to success is clearly not only buying some new technology, the new tech is best developed in the right surrounding that is financial stable to afford investments and also for the expansion in new markets why we besides development in technology also do some of the points below:

1. *Take a decision if to wait and see or to take initiative. If to wait and see just stop reading now and throw this article in the bin.*
2. *Get a competent board of directors. Reason is that there will be a need of a strong and competent board of directors that can serve the management with guidance why the recruitment of such people with experiences from other fields than just casting is highly advisable. For example: people in tech development, marketing experts, deep design understanding on system level and mergers and acquisitions.*
3. *Get Your marketing together. The casting industry is filled with good foundries with bad marketing. Everything is looking the same and an add or two per year on Linked in does not make anyone aware of Your company and the same old brochure is hardly read by those that really takes decisions that influences on Your future, and those people are hardly the ones that visits Your both on a trade fair.*
4. *Get big. If You are small, grow with alliances and mergers before it is to late. Form a group out of 4 factories and You can always gather volume in two chosen sites. Better own 2 good sites that 4 that are suffering with overcapacity. If You are strong, You will win also later when others are suffering and with strength follows: easier to get attention, easier to get funding and easier to attract key people and to carry the cost of important employees.*

Final words

Covid 19, geopolitical movements and EV's changing our market, our lives and our future but this is yet another transition of an industry. We have seen this happen through history as shipbuilding, production of clothing, typewriters, and yes the list is long. To believe that nothing is going to happen would be naïve on a high level but maybe we are too negative. But if you do not agree with some points, what if we are right in most of them? How will this affect you? Of course, we are uncertain about some things but certain in one: who that acts will win.

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