

Technology migration of Rheocasting

Abstract

The industrialization of various semi solid techniques has been limited firstly by not being industrialized to a acceptable level to implement in high volume production. Also due to limited capacity that thus stops larger companies as they require low risks in their complicated supply flows. This means that the next blocking point is the slow technology migration of sei solid technique.

This whitepaper describes the opportunities to lower both process cost and total cost for aluminium die casted parts using the Rheocasting process without having to make changes in the preferred suppliers list by using a model for thechnology migration on a broader scale.

Background

Rheocasting, which is a semi solid process for aluminium casting, has been patented since 2006 and has been under continual development for 10 years to become a fast and cost-effective process. Parts made with Rheocasting are giving a lot of cost advantages on part-level as well as for the total cost perspective. Since 2017 the process has gone from being a promising process to catch a large interest from especially the automotive industry and the telecom industry. The reason for the increase of interest is due to:

- Thermal management for 5G development in telecom
- Emission demands meaning ligheter and stronger parts in the automotive
- The development of electrical cars

However interesting and now proven via various parts in production lies the question of how to handle the technology migration for the high-volume production needed in the automotive industry?

Market outlook for Rheocasting

We believe that 5-15 % of all parts made with High Pressure Die Casting (HPDC) will be more cost effective with the improved functionality of Rheocasting. This due to the cost drivers as:

Same production cost as HPDC

- Ability to chose from a widere sortment of alloys
- More or less doubled tool life length
- Leak free parts, no cost for impregnation
- High mechanical values, as the void level is very low

As the picture shows, there has been a long development phase, almost 10 years to make the process stable and commercially effective. As of today there are a number of smaller volume parts in production and at current stage Comptech has been nominated to three large development programs why the breakthrough is claimed to have happened, and hence the need for the TMS solution.

Technology Migration Solution

How to solve the catch 22 for semi solid casting?

The TMS solution offered by Comptech has been developed with some larger customers in co-operation with Comptech during 2017 and 2018. The reason for the interest in this solution are the following:

Comptech is to small to handle the potential volumes. Some plans includes 10-20 casting machines and these scenarios in combination creates a demand for the nex 5-10 years of 50-100 casting cells. To invest in this at a pace that the market requires is impossible.

2:nd source, larger customers requieres that there is a 2:nd source that can be started within 12 monts from SOP in a program, most often during ramp up of the production volume of the project. The problem here is that there are a very limited companies that can offer Rheocasting why there must be some sort of implementation of the process at at least one more foundry.

Maintain the current supplier base, the supplier base is often representing a great value in terms of knowledge of the customer, deep technical understanding of the parts produced and also an effective organization that can handle the day to day business with the customer. To change a supplier is in this view a great risk as well as a waste of the values built up during a lang time.

The need of competition

The need of competition, to drive cost development larger customers need a system of suppliers that are competing with cost of parts, service and development why a single source situation without competition is seemed as risky and should be avoided.

The need of development sites, as the interest is large there must be development capacity enough for several projects that runs in parallel why there must be a competence base build up in relatively short time that can be used for the various projects where semi solid technology will enable better components.

IP rights is often in the discussions as there is a possibility to reach agreements via Comptech to “box in” a solution tied to an specific application and thus create a time frame where the customer can benefit from the development and hence lock out competition and thereby gain full effect of investments in R&D and project costs.

How does the TMS process work?

All discussions are considering the main steps in our model and these are:

- Pre product SOP
- Production proof
- Sourcing expansion

The underprocesses that are needed are most often a mixture of trials, tests and support to R&D projects. In summary most of the most frequently support from Comptech are shown in the picture below.



Cost of a TMS-program

The total cost is solely depending on the ambitions of the customer, the components complexity and the level of the suggested foundry to become the 2:nd source. However, to simplify a project the costs are considered in the table below.

Cost driver	Typical cost range	Why/Remark
Pre SOP	10-100 kEUR	Most often just some test bars
Pre SOP	Industrialization: Simulations Alloy test as cast	The amount of hours needed depends on the parts complexity
Production proof	Soft tooling often used	To enable design changes and to develop most optimal tool design for serial (hardened) tools
	Production tools has the same cost as for HPDC	Same size and production cost, however min 60% longer tool life length (shots) Production in Sweden for a shoreter serial volume is normally more expensive due to labour costs
Sourcing expansion	To installment of equipment: Worst case 500 kEUR Normal case 300 kEUR	Based on that there are a suitable casting machine
IP rights	40-60 kEUR/year	Depends somewhat if there are exclusivity involved for the customer

As seen from the above example the lead time is as shortest 37 weeks from agreement to the SOP of component at the 2:nd source.

Authors



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Since 1998 in managerial roles in sales and marketing and operation departments as project leader, group manager and line manager for groups ranging from 5 to +90 employees.

Experienced in change management and has been working in the fields of telecom, trucks and general industry with business development and operational development.

As responsible for marketing and sales in small and large companies the achievements has been from start of sales in SME's to successful sales of complex high volume products. Success factor has been development of business model.

Per Jansson

CEO Comptech AB

Per is one of the owners of Comptech and his history in the company goes all the way back to his childhood. After graduating as an engineer in the nineties Per played a critical part in the company development in Wales and China adding competence within production technique and sales.

The past decade Per has been the driving force behind Comptech's research and development within Rheocasting, identifying the techniques vast potential. Working in close relationship with Jönköping University he's managed to enable the company to its frontline position of semi-solid casting solutions.

