FAILURES WITHIN ROTOMOULDING - Part 5

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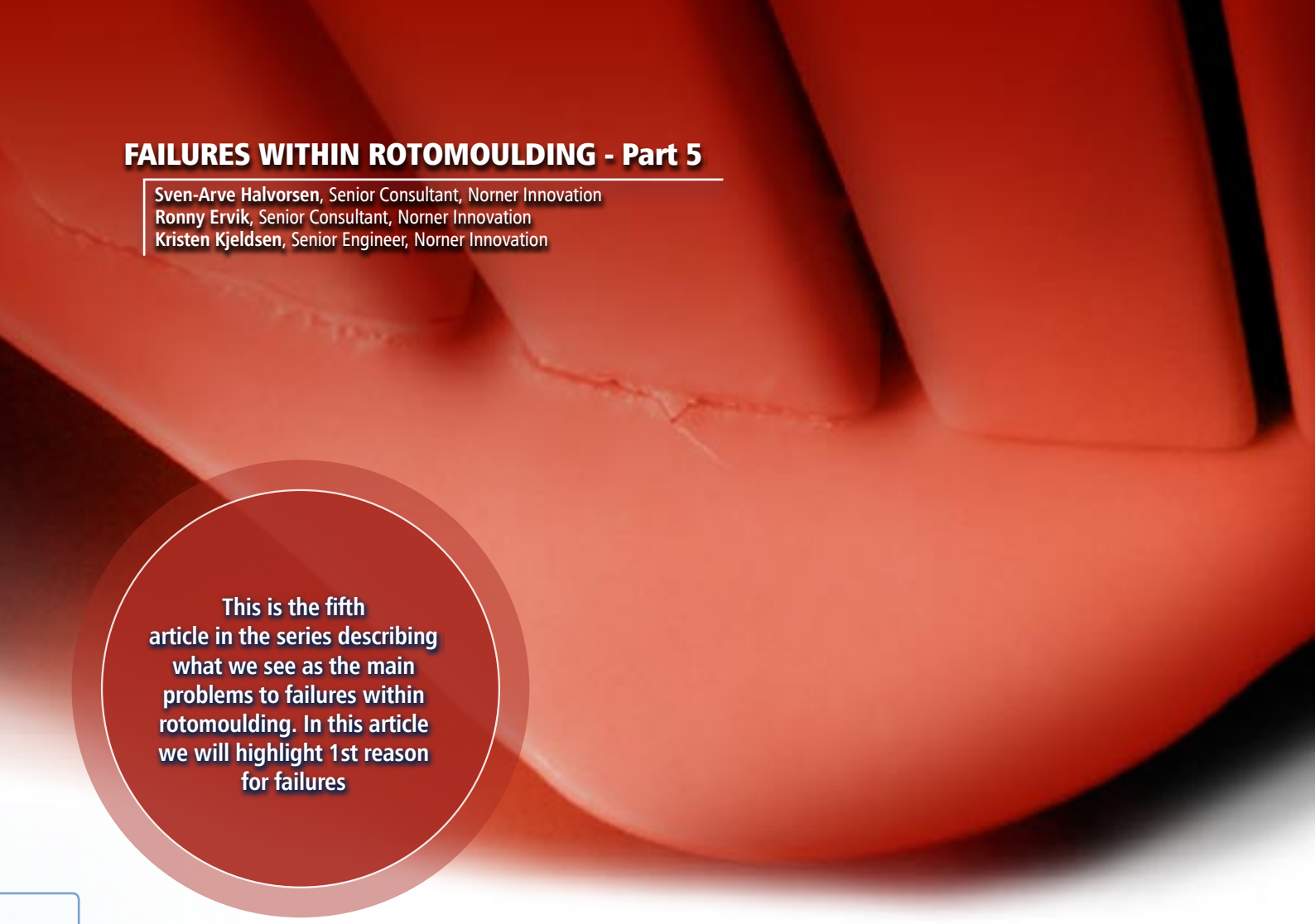

This is the fifth article in the series describing what we see as the main problems to failures within rotomoulding. In this article we will highlight 1st reason for failures

1. Processing.

At last, the main reasons why products are failing in service are related to processing. The attached image illustrates the problem very well.

The rotomoulding process is a unique production method for plastics. All the different steps in the process, heating, sintering, densification and cooling are taking place on the inside of the mould.

There are several process variables and some of them can be influenced by the molder:

- the oven temperature
- the oven time
- the amount of the material
- the rotation speed and ratio

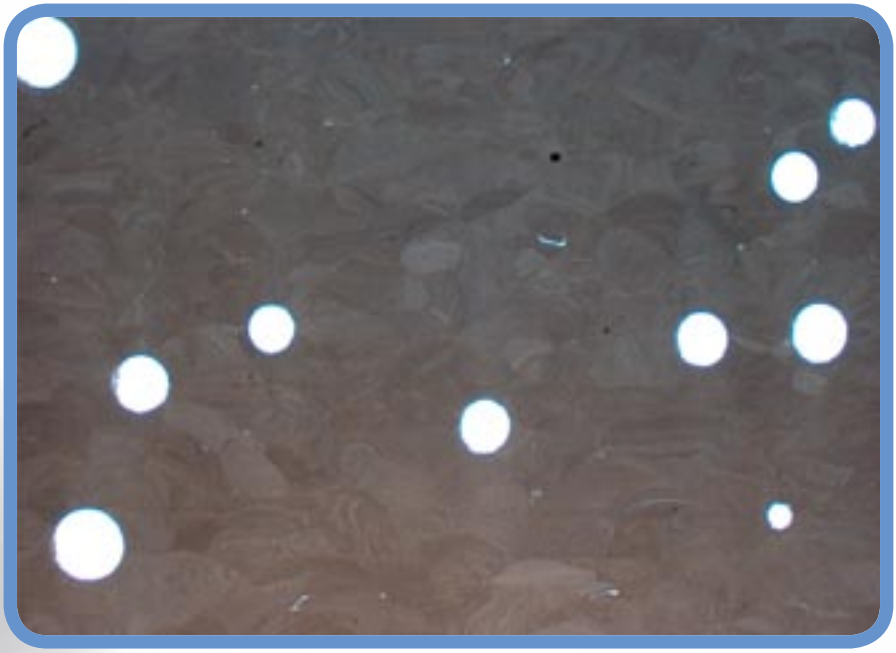

Fig.1. Under processed article

- the cooling time
- the cooling medium
- the demoulding temperature

In addition there are materials and mould variables that can influence the properties of the end product, but to a certain extent not be influenced by the molder:

- the particle size and particle size distribution
- the melt flow rate
- the density
- the material of the mould
- the mould shape and design
- the efficiency of the oven
- the efficiency of the cooling

The time in the oven to heat up the polymer in the mould to the point where all the material has melted will be influenced by the mentioned variables. E.g. the oven temperature will have an effect on how long the oven time will be. The amount of material and the type and thickness of the mould will have the same effect.

With reference to known literature we say that to achieve optimum quality of the end product, PIAT (Peak Internal Temperature) should be targeted to around 220°C. Another way of having optimum properties is to have lower PIAT, but longer oven time.

Bubbles in the product wall can be critical for products properties. The size and the placing of the bubbles through the wall will influence the mechanical properties. If the bubble is near by the inside surface of a product, an outer influence on the product can lead to propagation from bubble to bubble. Hence, the product can fail.

We recommend producing products without bubbles in order to have optimum mechanical properties in the product.

There is today a trend towards machines controlled not only by time, but also according to temperature. We think this is a good move, because in this way we secure that products are produced identical from cycle to cycle and not dependent of variations in the ambient temperature - winter and summer periods - and eventually fluctuations in the oven during the rotomoulding process.

In our five articles we have focused on what we see as problem areas within the rotomoulding industry. We have tried to highlight the problems and how to overcome them. In order to be able to compete with other production techniques in the future, we think it is necessary to improve on quality and have this as our top priority.

Hopefully our articles can help to put focus on this, and that our recommendations can help out the molders in daily life.

Please do not hesitate to contact us, if you have questions or problems you want to discuss or need help to solve.

Fig. 2. Section of under processed article