New Material Design Leads to an Other Casting Quality – Solidification, Stress, Mechanical Properties

Reinhard Vomhof.
RWP GmbH, Germany.

ABSTRACT

The requirements for the (virtual) development of new products are more and more a challenge for the precise forecast of mechanical properties. Therefore we look manly to:

- Strength
- Stiffness
- Elongation
- Fatique
- etc.

This should lead to:

- Reduction of development time
- Saving on prototype buildings
- Reduction of weight
- Increasing of quality

To reach the targets the exact knowledge of the physical data and mechanical properties of the used materials are very important. Today in most cases the developers have to use the physical data of homogenous material as given in literature. Real products (e.g. castings) are never homogenous due to always different local conditions (e.g. porosities, grain size).

The demand to get more and more information about the material properties already in the design stage of a new component leads to the necessity to know more about the building mechanism of the basic matrix. This paper gives one important step to get more detailed information about the mechanism of building different mechanical properties depending on the matrix build by different solidification conditions.

The creation of virtual Material with respect of alloying elements will improve the forecast of mechanical properties.