

## **Bachelor / Master Project, Spring 2010**

### **Determination of Boundary Conditions and Properties by using Inverse Methods**

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Inverse methods can be used in solidification processes for the estimation of boundary conditions or physical properties of materials. These methods are based upon a good agreement between calculated and measured temperatures of the process at a given location and time.

In this project cylindrical castings of Al-Zn alloys will be solidified under one-dimensional heat flow conditions. Several thermocouples will be placed at various heights of Al-Zn alloys. Temperatures measured within a solidifying ingot will be used to deduce the temperature dependant thermal conductivity of various Al-Zn alloys with different Zn concentrations. Heat flow leaving the ingot during solidification will be determined by an inverse calculation of the temperatures at locations of the copper chill.

This semester project will therefore consist of:

- Directional solidification of different Al-Zn alloys for temperature measurements.
- Inverse calculations of measured temperatures by using commercialized software CALCOSOFT or by using your own code written by programming language C/C++.