

Development of a Thermodynamic Simulation Model of HSVA's Ice Model Basin

Introduction

In the Large Ice Model Basin of HSVA model ice is grown using a compressor based refrigerant plant (Figure 1). The plant guarantees heat flux from water surface to the air volume in the basin hall and further transfer of heat from air to refrigerant in vaporizers. The actual temperature and heat flux are important for the model ice growth and are influenced by the parameters of cooling system and the boundary effects. In order to generate reliable input for a model ice growth prediction method, a basic thermodynamic model of the cooling system in combination with building structure, air volume and water basin (Figure 2, left) is required. The simulation model shall reflect the basic thermodynamic processes (Figure 2, right).



Figure 1: Compressors of refrigerant plant

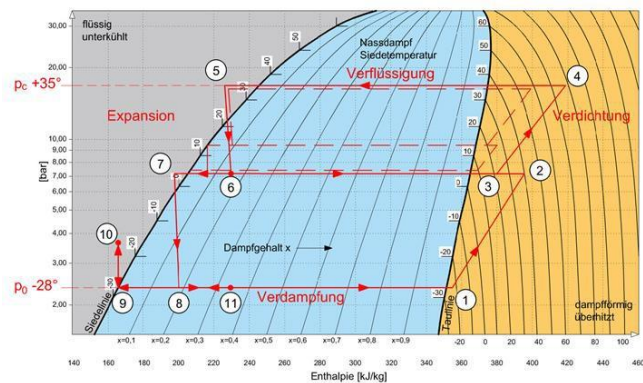
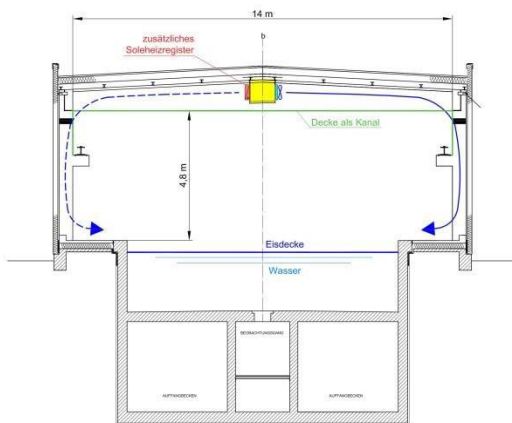


Figure 2: Section of HSVA's ice basin including air flow (left), thermodynamic process of cooling system (right)

Objective:

The main objective is to develop a basic thermodynamic model of the ice basin including the components

- cooling system at different operational parameters
- air volume and ventilation system
- building structure (latent heat)
- water basin

Task assignment:

- Familiarizing with HSVA's Ice Model Basin and model ice preparation process
- Identify relevant components and required level of detail for the simulation model
- Develop a basic thermodynamic simulation model capable to generate input data for model ice growth prediction
- Verification of developed simulation by physical measurements in the basin
- Documentation of development and results in a written report

Contact: jobs@hsva.de

Please mention your earliest start and latest end date for the internship, bachelor or master thesis you're applying for.