

Panuwat Nuaythong 2009: 3D-Simulation of ice forming by Computational Fluid Dynamics Method. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Assistant Professor Kriengkrai Assawamartbunlue, Ph.D. 136 pages.

Ice Block Industry is the one of high energy industry. The reduction time is one factor which can be save the process energy also. This study presents the imitation of 3d simulation of ice forming by fluent package program. The physical data were collected for the most suitable simulation. Then, experiment the change of boundary condition factor, the change of packaging model and reduced the volume to $\frac{1}{2}$ for save the energy process. The factors were considered by 3d simulation which estimated the time change variable by implicit method. The phase change was defined to solidification problem which the accuracy of grid size is 0.5 cm and time step size is 1 sec.

The comparison of the imitation and the experiment found that an average of value was less than 1%. In case study of the packaging model found that the rectangular prism spent the least time about 31 hours which the effective length is 16.15 m. In case study of volume reduction which spent time less than half, found that the trigonal prism spent the least time about 16 hours which the effective length is 14.74 m. According to the analyze of the results found that the effective length investigates the time making an ice block. The packaging model which spends the least time to forming is the effective length about 14-17 m. From this study found that the trigonal prism and rectangular prism are the most appropriate model to from an ice block.

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Thesis Advisor's signature

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