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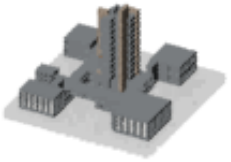

Subdepartment **Engineering Fluid Dynamics - CTW**
Department **Mechanical Engineering**

As part of his / her masterassignment

Arjan Slaper

will hold a speech entitled:

An inverse-design method for centrifugal pump impellers, incorporating blade thickness

Date: 27-08-2015
Time: 13:00 hr
Room: ZH 286

Summary:

Turbomachines are used in many different applications in society. The design process of turbomachinery is time consuming. To reduce the time required for the initial phases of the design process, an inverse-design method can be employed. An inverse-design method specifies the required performance of a machine and generates a corresponding geometry for the impeller.

Many different assumptions can be made for an inverse-design method. A common simplification is to neglect the blade thickness. Such methods have been developed in either two or three dimensions. These methods proved successful and applicable in the design process.

At the University of Twente an inverse design method for two- and three-dimensional cases with impeller blades without thickness has been developed, based on potential-flow theory. When blade thickness was implemented in the two-dimensional inverse-design method, the method was not very robust in the two-dimensional case and therefore not suitable for the three-dimensional case.

This research focuses on applying different methods to update the impeller blade geometry in the iterative solution process in order to achieve a robust working algorithm. The future development of three-dimensional inverse design methods with blade thickness was kept in mind, so the method should be applicable in three-dimensional cases as well. The focus lies on radial pump impellers with a given thickness distribution. Firstly, the effect of blade thickness on several flow parameters was studied. Secondly, the new method has been implemented in a potential-flow inverse-design algorithm and tested to verify its validity. Thirdly, numerical experiments have been performed to investigate the influence of the loading distribution on the generated impeller geometry.

Assessment committee: chairman,

Prof.dr.ir. C.H. Venner	(chairman)
Dr.ir. N.P. Kruyt	(mentor)
Prof.dr.ir. T.H. van der Meer	(external member)
Dr.ir. R. Hagmeijer	(internal member)

(Signature)

d.d.