COLLOQUIUM ANNOUNCEMENT
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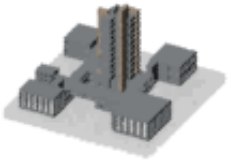

Subdepartment **Engineering Fluid Dynamics - CTW**
Department **Mechanical Engineering**

As part of his / her masterassignment

Remco Olimulder

will hold a speech entitled:

Fluid induced radial thrust phenomena in low specific speed diffuser pumps

Date: 16-11-2015
Time: 13:30 hr
Room: ZH-286

Summary:

With pump design being pushed to the limits of the current hydraulic design methods, new problems arise in the rotor dynamic design field. For low specific speed diffuser pumps, the radial forces differ from what is predicted with the design methods such that increased shaft deflection is observed. Low specific-speed diffuser pumps have a rotating impeller within a stationary diffuser ring with tight running clearances. The main forces acting on the shaft are fluid induced interaction forces between the impeller and diffuser and imbalance forces. The stationary component of the fluid induced force has generally been empirically determined while the unsteady component is largely disregarded. Based on these observations, a more comprehensive knowledge of the forces occurring and their relationship to pump performance and rotor dynamical behavior is required.

The goal of the thesis is to determine steady and unsteady radial forces acting on the impeller of low specific speed diffuser pumps. A test pump has been fitted with pressure gauges, shaft strain and shaft displacement measurement equipment. With this setup, shaft displacement and strain can be measured as well as the static pressure around the impeller. Tests were performed for different pump configurations. Results of these tests are correlated to known hydraulic forces.

For several pump configurations the rotor dynamic behavior is also numerically simulated with a beam element method. The beam element method is first validated using several documented test cases. Then the complete rotor dynamic package, consisting of the impeller, shaft and bearings is modeled in the beam element method. Expected radial forces are given as input after which the rotor dynamical behavior is simulated. The numerical and experimental results are compared. A difference is found in absolute values however the results do show a similar trend.

Assessment committee: chairman,

prof. dr. ir. C.H. Venner	(chairman)
dr. ir. N.P. Kruyt	(mentor)
ir. N. Platenkamp	(mentor from company)
dr. ir. H.J.M. Geijselaers	(external member)

(Signature)

d.d.