Opleiding Werktuigbouwkunde

Universiteit Twente
de ondernemende universiteit

COLLOQUIUM

Conform artikel 4.6.8 van het SSNS-wb.

Vakgroep: **Technische Stromingsleer**

In het kader van zijn doctoraalopdracht zal

Sjoerd Cornelis den Daas

een voordracht houden getiteld:

Model for One-Dimensional Flashing Flow at Choking Conditions in a Venturi

Datum: **3 juli 2008**

Tijd: **12:45 uur**

Zaal: **HR N109**

Summary:

The Supersonic Cyclonic Oil Degasser (SCOD) is a novel concept for the stabilization of crude oil. By accelerating the flow in a Venturi tube, the pressure drops below the saturation pressure and dissolved gasses are driven out of the liquid. Downstream of the Venturi, the gas and liquid phase are separated. Besides the large reduction in size and weight compared to conventional separators, the SCOD delivers higher outlet pressures for both the gas- and liquid-phase with a lower vapor pressure.
A one-dimensional flow model for the multi-phase flow in the Venturi had been developed in a preceding study but requires extension. The goal for the present research is an extensive study on the influence of the effects of mass transport and nucleation on the results of the flow model. One single flow model is developed that is applicable for multiple cases of different in- and outlet pressure conditions. The model is validated using experimental data from the experimental facility at the Shell Research and Technology Center Amsterdam, where also the present research has been carried out.
In addition the existing flow model has been extended with equations necessary to account for the effect of the presence, at the inlet of the Venturi, of: free gas; free water; and a multi-component gas mixture. This extended model has been verified and several simulations have been carried out to study the influence of free gas, free water and a multi-component gas mixture at the inlet on the flow through the Venturi. Finally with the extended model, the optimization of the Venturi design is explored. Additional research can be performed on the 'smeared-shock' that occurs in the experimental data but is modeled as a strong shock in the present flow model.

Examencommissie:

prof.dr.ir. H.W.M. Hoeijmakers (afstudeerdocent)

dr.ir. H. van Santen (Shell) (mentor)

prof.dr.ir. T.H. van der Meer

ir. J.J. Slot

ir. P.H.J. Verbeek (Shell)

dr.ir. E.T.A.vander Weide

De afstudeerdocent,

_____

d.d. _____

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