621.224.01:532.5

Runaway Characteristics of Propeller Turbines*

(by Airfoil Theory)

by Yasuo ISHII**

In this paper, the author presents the theoretical formulae concerning the characteristics of the propeller turbines at runaway state. These formulae, with their simple expressions, agree with the experimental results.

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621.6-3:532.5

Opening and Closing Moments of Valves Combined with Turbomachines*

(Examples of Butterfly Valves)

by Yasuo ISHII**

In this paper, the author has made a study on the method of calculating opening and closing moments of valves located at iniet or outlet of turbomachines such as water turbines, pumps and pump-turbines. Several examples calculated with this method revealed the typical features peculiar to the kinds of the machines.

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536.46 : 662.612.32

Stability of Diffusion Flame*

(4th Report, Experiments on the Stabilities of Aerated Flames in Parallel Air Flows and of Flames in Lateral Air Flows)

by Hisao HATTORI**

Blow-off limits of aerated propane flames in forced parallel air flows and in open atmosphere are determined experimentally. When concentration of fuel is very rich (fraction of stoichiometric >2.58), the experimental results agree qualitatively with the blow-off equation in the first report.

As the last experiment of these investigations (1st~4th reports), blow-off limits of aerated and diffusion flames in lateral air flows are determined. The main results obtained are as follows:

(1) Blow-off air velocity ${}_{bl}v_a$ gradually increases with the increase of gas velocity ${}_{bl}v_f$ in laminar conditions, but suddenly decreases when flame becomes turbulent.

(2) As ${}_{bl}v_f$ decreases, ${}_{bl}v_a$ tends to reach constant values which are functions of burner dimensions and fuel properties, and the relations of these converged ${}_{bl}v_a$ to the burner diameter, minimum quenching distance and maximum burning velocity of the fuel proper and fraction of stoichiometric F are given by experimental formula.

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532.542:621.6.04

Some Experiments on Mixture Flow of Sand and Water in a Horizonatal Pipe*

(2nd Report, Some Considerations on Sliding Flow)

by Sadao KUZUHAHA**

A sliding flow of sand or gravel (about 0.5~5.0 mm in granular size) in water in a horizontal transparent smooth pipe (38.5 mm in inner diameter, 4 000 mm in length) was observed and loss of head was measured.

In order to analyze such a flow, the author worked out a calculating formula which expressed the loss of head when water and granular solid flow formed two separated layers in a closed pipe under some assumptions, and compared the calculated results with the data obtained by measurement.

From the calculation of the correlation coefficients between the calculetsd values and the measured data, and observation of the flow, it is concluded that gravels of 1~3 mm form a typical sliding flow.

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532.542:621.6.04

Some Experiments on Mixture Flow of Sand and Water in a Horizontal Pipe*

(3rd Report, Some Considerations on a Flow with Alluvial Bed)

by Sadao KUZUHARA**

In the hydraulic transport of sand or gravel