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behavior. By a parametric study performed using these factors, it could be concluded that radial flow around a rotating crystal should be restrained to reduce oxygen deposition into the crystal, and moreover that the peripheral speed of the crystal and that of the crucible should be kept constant to avoid crystal striation. This technigue offers high grade crystals.

Toshiba Corporaition, Tsurumi-ku, Yokohama, 230 Japan.

Linear Theory on Seal Water Behavior in Drain Traps (2nd Report, Impulse Response Analysis and Dynamic Drain Trap Performance)

by Yooichiro SAWA, Nobuharu MORII, and Hideo MATSUDAIRA

This paper deals with analysis of the impulse response of the seal water oscillation system for the purpose of giving basic design instructions for drain traps. The impulse response can be discussed using normalized quantities on the displacement of the gravitational center in the seal water and on the seal water flow. The normalized final flow (N. F. F.) is introduced in the criterion of the dynamic performance of drain traps. N. F. F. depends on the system parameters and the normalized initial flow. The fundamental characteristics of N. F. F. are examined. The negative pressure impulse which breaks the trap water seal is defined as an index of the dynamic drain trap performance. It is verified that the value calculated from N. F. F. coincides with the experimental value. The relationship between this index and the seal water depth is clarified.

Numazu College Of Technology, 3600 Ooka, Numazu-shi, 410 Japan

A Study of a Floating Tape Cylinder for the Video Tape Recorder

by Hiroyuki NAKA, Kiyokazu IMANISHI and Takashi ICHIYANAGI

A floating tape type video cylinder named MAF (Micro Air Float) is proposed. This cylinder has spiral grooves with a pump-out effect at the bottom of the upper cylinder. The characteristics of the pump-out pressure of an MAF cylinder are theoretically formulated, and the results agree with the experimental data. Tape floating on the cylinder is measured dynamically with the optical sensor and compared with the normal (grooveless) type cylinder, and it becomes clear that the pressure from the spiral grooves is effective for tape floating, especially at the lower cylinder. The mechanism of tape floating on the cylinder with spiral grooves is discussed, and it is found that the radius difference between the upper and the lower cylinder affects the tape floating.

*Matsushita Electric Ind. Co. LTD (Production Engineering. Lab.) 2-7, Matsuba-cho, Kadoma, Osaka 571 Japan

Performance Study of a Mixed-Flow Impeller by Means of Partial Impellers

by Hisao ENOMOTO, Tatsuo KAWADA*, Hideo OHASHI*, Yoichiro MATSUMOTO* and Kazuhiro TANAKA***

A mixed-flow impeller with a specific speed of 750 (m^3/min, m, rpm) was chosen as a prototype. Quasi three-dimensional potential flow analysis was conducted on the impeller, and three partial impellers having casing geometries equal to 3/4, 2/4 and 1/4 flow-rate meridional stream lines of the prototype impeller were further introduced. The performance of fans with these four impellers was measured and compared with each other. Since they are identical from the view point of potential flow, all differences in performance can be attributed to the viscous effect.

*University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113 Japan.

**Sophia University, 7-1 Kioicho, Chiyoda-ku, Tokyo, 102 Japan.

Resonance Tone Generated by Low Pressure Axial Flow Fans (Effects of Rod Location, Rotational Frequency and Blade Tip Profile on Resonance Tone)

by Yoshio KODAMA and Tohru FUKANO***

Resonance tone is minimized by reducing the tip clearance, to less than about 1 mm. Even under these conditions it occurs with a sufficiently high level if a rod is attached near the leading edge on the suction surface of the blade, as well as if a part of the blade tip is cut off. The fundamental resonance frequency, f, is about 60~70 % of the blade passing frequency and is correlated by a Strouhal number as $f = S_t \cdot W/D$, where $S_t = 0.2$ and W is the relative velocity. D is the characteristic length, which is without exception equal to the integer multiple of 0.076 t, where t is the blade pitch.

*Nagasaki University Faculty of Engineering, 1-14, Bunkyo-machi, Nagasaki, 852 Japan

**Kyushu University 36, Faculty of Engineering, 6-10-1 Hakozaki Higashiku Fukuoka, 812 Japan

Noise Prevention in Tube-Type Heat Exchangers Employed in Gas Turbines

by Shoji SUZUKI, Yoshio UGAI*, Yoshiyuki MARUTA** and Satoshi MORI***

Unusual noise is sometimes caused by tube-type heat exchangers employed to recover waste heat from a gas turbine. There are a few studies on Karman vortex-induced noise from bare tubes or bare-tube banks placed in the air flow, but there is no study concerning Karman vortex-induced noise from finned tube banks. For the purpose of reducing Karman vortex-induced noise from heat exchangers, various finned tube models were made, and Karman vortex-induced noise was compared between this model and finned tubes used in a heat exchanger. As it was confirmed that there was an acceptable parallel between the model and the finned tubes, the effect of interference plates on Karman vortex-induced noise was determined by varying the position and eccentricity of interference plates placed at the trailing end of the finned tube banks. As a result, unusual noise due to Karman vortex-

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