ASIA–PACIFIC VIBRATION CONFERENCE ’93

Held at the Kitakyushu International Conference Center,
November 14-18, 1993

Sponsored by
The Dynamics, Measurement and Control Division of
The Japan Society of Mechanical Engineers

Co-sponsored by
Chinese Mechanical Engineering Society
Korea Society of Mechanical Engineers
Institution of Engineers, Australia
Institution of Professional Engineers, New Zealand
Canada Society for Mechanical Engineers
Kitakyushu City

Published by
The Dynamics, Measurement and Control Division of
The Japan Society of Mechanical Engineers

Copyright © 1993 by The Japan Society of Mechanical Engineers
All rights reserved.
CONTENTS

Volume 1

KEYNOTE LECTURE

November 15 Monday   (Main Hall)
10:30 The Aerodynamic Mechanisms of Flow-Induced Vibrations of Structures
    Y. Nakamura (Kyushu Univ., Japan)

SYMPOSIUM

November 15 Monday   (Room A)
FIVES: Vibration of Tube Array
13:20 Nonlinear fluid-stiffness-controlled instability of a tube row in crossflow
    S. H. Chen, S. S. Chen (Argonne National Lab., USA) 8
13:40 "Locking-in effect" on tube bundle vibration
    H. Tanaka, K. Tanaka, H. Tukamoto, T. Iijima (Kyushu Inst. of Tech., Japan) 14
14:00 Turbulence-induced tube vibration by parallel two-phase jet flow from baffle plate
    K. Kawamura, A. Yasuo (Central Research Inst. of Electric Power Industry, Japan) 20
14:20 An experimental study on fluidelastic vibration of a tube array by cross flow
    T. Nakamura, K. Fujita (Mitsubishi Heavy Industries, Ltd., Japan) 25
14:40 Statistical correlations of random fluid forces acting on a tube bundle in cross flow
    F. Inada, A. Yasuo, K. Kawamura (Central Research Inst. of Electric Power Industry, Japan) 31
15:00-15:30 Break

FIVES: Vibration of Bluff Body
15:30 Vortex method with moving boundary condition for simulation of unsteady fluid force and
critical velocity on a single circular cylinder in a single phase flow
    H. Tanaka, K. Tanaka, T. Iijima, Y. Sakamoto (Kyushu Inst. of Tech., Japan) 35
15:50 Dynamic characteristics of long-span suspension bridges with crossed hangers
16:10 Experimental and numerical studies on aerodynamic forces of an oscillating cylinder with a
circular and a rectangular cross-section
    A. Okajima, Donglai Yi, M. Kobe, H. Ueno (Kanazawa Univ., Japan) 46
16:30 Application of biorthogonal functional series to hydrodynamic analysis of offshore structures
    M. Markiewicz (Cracow Univ. of Tech., Poland), O. Mahrenholtz (Technische Univ. Hamburg-Harburg, Germany) 51

November 16 Tuesday   (Room A)
FIVES: Vibration of Rotor/Pipe Containing Liquid
9:30 A combined support of an one-span pipe conveying compressible liquid
    V. A. Dzhupanov, J. D. Stevenson, G. G. Thomas (Stevenson & Associates, USA) 57
9:50 Self-excited vibration of a pipe in a high-speed hollow cylindrical rotor filled with a liquid
Y. Jinnouchi (Kyushu Inst. of Tech., Japan), S. Kubo (Kurume Inst. of Tech., Japan), Y. Araki
(Kyushu Inst. of Tech., Japan), J. Inoue (Prof. Emeritus, Kyushu Inst. of Tech., Japan)

10:10 Dynamic stability of a high-speed rotor containing a coaxial annular cavity filled with liquid
Y. Jinnouchi, Y. Araki (Kyushu Inst. of Tech., Japan), J. Inoue (Prof. Emeritus, Kyushu Inst. of
Tech., Japan), K. Takeshita (Fukueko Industrial Tech. Center, Japan)

10:30 Vibration of a rotor containing boiling coolant
A. Yasuo, K. Kawamura, F. Inada (Central Research Inst. of Electric Power Industry, Japan)

10:50 Suppression of torsional vibration by a sectored hollow rotor containing liquid
Y. Sato, K. Koshimizu (Saitama Univ., Japan)

11:10-13:00 Lunch

FIVES: Control of FIV

13:00 Control of flow-induced fluctuations on flexible structures
S. M. Swei (Taiwan Technical Consultants, Inc., Taiwan, China), C. C. Chang (Hong Kong
Univ. of Science and Tech., Hong Kong), Y. T. Jiang (Purdue Univ., USA)

13:20 Galloping control of a cantilever beam using \textit{H}_{\infty} control theory
Y. Z. Liu, J. Tani, S. Chonan (Tohoku Univ., Japan)

13:40 Active control of unstable vibrations of a rotating disk confined in water-filled narrow space
M. Watanabe, F. Hara (Science Univ. of Tokyo, Japan)

14:00 Control of shedding frequency of the Karman vortex street by heating a circular cylinder
K. Noto, H. Nakanishi, T. Nakajima (Kobe Univ., Japan)

14:20 Experimental and theoretical study of active vortex control passing a barrage in the flow
T. Iwatsubo (Kobe Univ., Japan), K. Fujita (Mitsubishi Heavy Industries, Japan), S. Kawamura
(Kobe Univ., Japan), T. Inui (Sumitomo Metal, Japan)

14:40-15:10 Break

FIVES: Fluid–Structure Interaction

15:10 Vibration of a thin cylindrical shell induced by fluid overflow
Y. Eguchi, K. Yamamoto (The Japan Atomic Power Co., Japan), T. Ito, K. Fujita (Mitsubishi
Heavy Industries, Ltd., Japan)

15:30 Theoretical study on flow-induced vibration of a cylindrical weir due to fluid discharge
K. Hirotta, T. Ito, K. Fujita, T. Kodama (Mitsubishi Heavy Industries, Ltd., Japan)

15:50 Coupling vibration analysis of fluid and structure using an FEM displacement method
Y. Hori, M. Kanoi (Hitachi, Ltd., Japan), F. Fujisawa (Gifu Univ., Japan)

16:10 Transient vibration response of transformer coils under external short circuit (Nonlinear vibration
analysis of a fluid-structure induced problem)
N. Tsujiuchi, T. Koizumi (Doshisha Univ., Japan), S. Itoh, H. Murakami (Mitsubishi Electric
Corp., Japan)

16:30 Characteristics of unsteady fluid forces acting on a rotating circular cylinder partially submerged
in water
F. Hara (Science Univ. of Tokyo, Japan), N. Maruyama (Hitachi, Co., Ltd., Japan)

November 17 Wednesday (Room A)

FIVES: Suppression of FIV and Noise

10:00 Active vibration control of free surface oscillations in a transferring liquid container
S. Kaneko (Univ. of Tokyo, Japan), H. Namba (All Nippon Airways, Japan)
10:20 Suppression of wind-induced vibration in cable-stayed bridge tower with impact mass damper
K. Ogawa (Kawasaki Heavy Industries, Ltd., Japan), T. Ide (Nihon Doro Kodan, Japan),
T. Saitou (Kawasaki Heavy Industries, Ltd., Japan)

10:40 Suppression of Karman vortex excitation of a circular cylinder by another cylinder located
downstream in cruciform arrangement
H. M. Bae (National Fisheries Univ. of Pusan, Korea), T. Takahashi, M. Shirakashi (Nagaoka
Univ., Japan)

11:00 Study on the noise reduction in a centrifugal fan
S. Suzuki, F. Nakaya (Hosei Univ., Japan), G. Minorikawa (Ebara Research Co., Ltd., Japan)

11:20 Aerodynamic noise emitted from a solid body with a longitudinal vortex
S. Ogawa, I. Kamimoto, M. Kuroda (Mazda Motor Corp., Japan)

November 15 Monday (Room B)
FIVES: Aero- and Hydroelasticity
13:20 Numerical simulation of shock-stall flutter of an airfoil using the Navier-Stokes equations
K. Isogai (Kyushu Univ., Japan)

13:40 A study of the near-wake flow of a self-oscillating circular cylinder in a uniform flow
Y. Ochiai, T. Suzuki, R. Waka, S. Tanabe (Tottori Univ., Japan)

14:00 Modeling of aeroelastic effects on car dynamics
Y. Kojima (Toyota Central R&D Labs., Inc., Japan), H. Ohta (Nagoya Univ., Japan), O. Murata
(Toyota Central R&D Labs., Inc., Japan)

14:20 Wave induced vibration influences on hydroelastic performance of ships and long term hull
stresses
C. F. Liu, M. Katory (Hong Kong Polytechnic, Hong Kong)

14:40-15:10 Break

FIVES: Pressure Pulsation in Pipeline
15:10 Hybrid control of response of pressure pulsation of fluid in piping excited by compressor
S. Yamamoto, A. Sone, A. Masuda, T. Kyomoto (Kyoto Inst. of Tech., Japan)

15:30 Dynamic characteristics of axisymmetric cavity type snubbers in pulsation analysis
T. Fujikawa (Ashiya Univ., Japan)

15:50 Digital simulation method for pressure pulsations in reciprocating compressor-piping systems
(New compressor model)
M. Kato, E. Hirooka, Y. Inoue, S. Sato (Kobe Steel, Ltd., Japan)

16:10 Investigation on the high frequency components contained in the pressure pulsations measured in
the field
H. Matsuda (Chiyoda Corp., Japan), S. Hayama (The Univ. of Tokyo, Japan)

16:30 Vibration and stress analysis of piping system in connection with pressure pulsation by
reciprocating compressor
A. Wakabayashi, S. Arai (Hitachi Techno Eng., Japan), S. Yamada (Tokico Giken Ltd., Japan)

November 16 Tuesday (Room B)
FIVES: Leakage–Flow–Induced Vibration
9:30 Computational solutions for unsteady eccentric annular flows with oscillating boundaries
Dan Mateescu (McGill Univ., Canada)

9:50 Leakage-flow-induced vibrations of an axisymmetric body
M. Arai (Tokyo Univ. of Agri. and Tech., Japan), K. Tajima (Waseda Univ., Japan)
10:10 Study of leakage flow-induced vibration of an axisymmetric cylindrical rod due to axial flow
K. Fujita, T. Ito (Mitsubishi Heavy Industries, Ltd., Japan)

10:30 Leakage-flow-induced vibrations in a narrow tapered passage (The effect of nondimensional parameters)
F. Inada (Central Research Inst. of Electric Power Industry, Japan), S. Hayama (The Univ. of Tokyo, Japan)

10:50 Stability of a cantilever beam subjected to one-dimensional leakage flow
H. Nagakura, S. Kaneko (Univ. of Tokyo, Japan)

11:10 An analysis of fluid structure coupled vibration considering modal added mass
M. Kasahara, H. Ishii, M. Takagi, K. Kawamoto (Hitachi, Ltd., Japan)

11:30-13:00 Lunch

FIVES: Sloshing I

13:00 Self-induced oscillation of cylindrical upward jet impinging on the free surface
M. Iida, H. Madarame, K. Okamoto, M. Fukaya (Univ. of Tokyo, Japan)

13:20 Jet-flutter : Self-induced oscillation of upward plane jet impinging on free surface
H. Madarame, M. Iida, K. Okamoto, M. Fukaya (The Univ. of Tokyo, Japan)

13:40 Effects of tank geometries on self-induced sloshing caused by upward plane jet
M. Fukaya, K. Okamoto, H. Madarame, M. Iida (Univ. of Tokyo, Japan)

14:00 Flow-induced sloshing of in-vessel liquid : Numerical analysis
A. Takizawa (Tokyo Electric Power Co., Japan), S. Kondo (Univ. of Tokyo, Japan)

FIVES: Sloshing II and Liquid Damper

15:10 Nonlinear analysis on sloshing fluid with Large amplitude in tanks
De-chao Wen, Zhao-chang Zheng (Tsinghua Univ., China), Huan-chun Sun (Dalian Univ. of Tech., China), Ke Mi (Tsinghua Univ., China)

15:30 Nonlinear liquid oscillation in a circular cylindrical tank subjected to pitching excitation
H. Takahara, K. Kimura (Tokyo Inst. of Tech., Japan), M. Sakata (Takushoku Univ., Japan)

15:50 Nonlinear vibrations of a structure caused by water sloshing in a rectangular tank
T. Ikeda (Hiroshima Univ., Japan)

16:10 Optimization of mechanical absorbers using liquid damping for transmission line vibrations
F. Welt (The PNG Univ. of Tech., Papua New Guinea)

16:30 Dynamical modelling of shallow water and deep water type rectangular tuned liquid damper with submerged nets
O. Yoshida (Obayashi Corp., Japan), S. Kaneko (Univ. of Tokyo, Japan)

16:50 Effectiveness of shallow water and deep water type rectangular tuned liquid damper with submerged nets for actual structures
Y. Mizota, S. Kaneko (Univ. of Tokyo, Japan)

November 17 Wednesday (Room B)

FIVES: FIV in Turbomachinery

10:00 Rotor vibration analysis of mixed-flow pump with journal bearings
T. Shioyama, K. Ohtomi (Toshiba Corp., Japan)

10:20 Occurrence of sub-synchronous vibration in a multistage turbine pump and its prevention
S. Saito, Y. Kanai (Ishikawajima-Harima Heavy Industries Co., Ltd., Japan)
10:40 Numerical simulation of surge and rotating stall in multistage axial compressors 336
H. Ishii, Y. Kashiwabara (Hitachi, Ltd., Japan)
11:00 Numerical modeling of air-column oscillations excited by heat supply 342
T. Ishii, E. Hihara, T. Saito (Univ. of Tokyo, Japan)
11:20 Swirling-flow induced pressure pulsations in a pipe 348
S. Hayama, T. Nishihara, T. Watanabe (The Univ. of Tokyo, Japan)

Author Index