

Engineering Foundation Conferences

MIXING XI

New England College
Henniker, New Hampshire
August 2-7, 1987

FINAL PROGRAM

Sunday, August 2, 1987

3:00 p.m.-9:00 p.m.

REGISTRATION AND CHECK-IN

6:30 p.m.

DINNER

9:00 p.m.-11:00 p.m.

SOCIAL HOUR

Monday, August 3, 1987

7:45 a.m.

BREAKFAST

9:00 a.m.

Welcome - Engineering Foundation Representative
Introduction - E. B. Nauman, Rensselaer Polytechnic
Institute, Conference Chairman

9:15 a.m.-12:00 Noon

TURBULENCE AND MIXING

Chairman: G. Tatterson, Texas A&M University

"Turbulence Data for the Rushton and Prochem Maxflo
Impeller with Comparisons Made to a Three Dimensional
Turbulence Model Using k-e Closure"

R. P. Zipp, H. Wu and G. K. Patterson, University of
Arizona and K. W. Schneider and R. D. Verqunst,
Prochem Ltd., Canada

"The Velocity Field Relative to a Stirred Tank Turbine
Blade"

R. V. Calabrese, N. A. Bryner, B. J. Sadoff and C. M.
Stoots, University of Maryland and The National Bureau
of Standards

"Pipeline Mixing in a 90° Bend: Effects of Injection
Point and Secondary Flow"

L. M. Sroka and L. J. Forney, Georgia Institute of
Technology

"Study on the Turbulence in Aerated Agitated Tanks"
W. M. Lu and S. J. Ju, National Taiwan University

"Fluid-Dynamic Behavior of Multiple Impeller Systems:
Part I: Single Phase Liquids, Part II: Gas/Liquid
Systems and Part III: Slurries"

F. Magelli, M. Nocentini, D. Fajner and G. Pasquali,
University of Bologna

12:00 Noon

LUNCH

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Monday, August 3, 1987 (continued)

2:00 p.m.-5:00 p.m.

AD HOC SESSION

5:00 p.m.

SOCIAL HOUR

6:00 p.m.

DINNER

7:00 p.m.-10:00 p.m.

MIXING CHARACTERIZATION

Chairman: U. Mann, Texas Tech University

"Turbulent Three-Dimensional Velocity Profiles in Turbine Stirred Vessels"

S. Y. Ju, T. M. Mulvahill and R. W. Pike, Louisiana State University

"The Use of Chemical Indicators to Measure Micromixing"
H. L. Toor and U. V. Shenoy, Carnegie Mellon University

"Mixing Characterization of Pulp Suspension"
R. J. Kerekes and C. P. J. Bennington, University of British Columbia

"Mixing of a Tracer in a Closed-Stirred Vessel: A Network-of-Zones Analysis of Direct Visual Observations by Video"
R. Mann, E. A. Rasekoala and M. Didari, University of Manchester, Institute of Technology

"Measurement Methods and Analysis of Bivariate Data for Reactive Liquid-Liquid Dispersion System in CSTR"
J. H. Bae, L. L. Tavlarides and M. Stamatovic, Syracuse University

"Characterization of Mixing in a Koch-Type Static Mixer Using a Gamma Camera"
R. H. Hsu, Alireza Sedaghat and F. S. Castellana, Columbia University

10:00 p.m.-11:00 p.m.

SOCIAL HOUR

Tuesday, August 4, 1987

7:45 a.m.

BREAKFAST

9:00 a.m.-12:00 Noon

MULTIPHASE MIXING

Chairman: L. L. Tavlarides, Syracuse University

"A Model for Drop Breakup in Turbulent Stirred Dispersion"
R. Ghandhi and R. Kumar, Indian Institute of Science

"Solid-Liquid Mass Transfer to Suspended Particles Smaller than the Kolmogoroff Length Scale of Turbulence"
P. M. Armenante and D. J. Kirwan, New Jersey Institute of Technology

Tuesday, August 4, 1987 (continued)

"Sound Spectra in an Aerated, Agitated Tank"
G. B. Tatterson, Texas A&M University

"Effect of Gas Density on Bubble Size and Power Draw
in Rushton Turbine Agitated Vessels"
K. Takahashi, W. J. McManamey and A. W. Nienow,
University of Birmingham

"Dispersion Coefficients for Ideal Bubbly Flow in
Truely Vertical Bubble Columns"
R. G. Rice and M. A. Littlerfield, Louisiana State
University

"Coalescence in Liquid-Liquid Dispersions"
R. Muralidhar, T. Tobin and D. Ramkrishna, Purdue
University

12:00 Noon

LUNCH

2:00 p.m.-4:00 p.m.

POSTER SESSION

"Rushton Impeller Loading in Cavitating and Boiling
Liquid"
J.M. Smith, L. Smidt and F. Verbeek. University of Surrey
and Technical University Delft

"Solid Concentration Profiles in Slurry Reactors Stirred
with Multiple Impellers: Recent Results"
F. Magelli, D. Fajner, M. Nocentini and G. Pasquali,
Institute of Impianti Chimici University, Italy

"Instrumentation Development for the Study of Multiphase
Mixing"
M. H. Palmer, Fluid Mixing Processes, BHRA

"Impeller Loading in Boiling and Near Boiling Reactors"
J. M. Smith, A. Schoenmaker, L. Smidt, University of
Delft and University of Surrey

"Correlation for Flooding Transition"
G. B. Tatterson, Texas A&M University

"Interfacial Area for Gas-Liquid Contacting in a
Multiple Impeller Agitated Column"
S. Kumar, S. A. Ahmad, S. Pannase and R. N. Sharma,
Indian Institute of Technology

"The Hollow Blade Disk Turbine for Dispersion and
Gas/Liquid Mass Transfer"
M. M. C. G. Warmoeskerken and J. M. Smith, University
of Delft and University of Surrey

"Hydrodynamics & Solid-Liquid Heat Transfer in a Three
Phase Fluidized Bed"
B. Grandjean, P. J. Carreau and J. Paris, Ecole Polytechnique
University

Tuesday, August 4, 1987 (continued)

"Solvent Extraction from Spherical Particles in a Continuous Flow Evaporator"
K. J. Liekhus, and T. R. Hanley, Florida State University

"Interfacial Area Production by a Tee Jet for Kerosine/Water System"
R. L. Long, Jr., New Mexico State University

"Index of Refraction Matching Requirements for Measurement of Stirred Tank Velocity via Two-Color Laser Doppler Anemometry"
C. M. Stoots, and R. V. Calabrese, University of Maryland

"Comparison of the Distributions of the Turbulence Energy Dissipation Rate of Rushton and Prochem Max Flow Impellers"
H. Wu and G. K. Patterson, University of Arizona, and K. W. Schneider and R. D. Verqunst, Prochem Ltd., Canada

"Special Mixing Problems in Flue Gas Desulfurization Systems"
G. Zeiler, EKATO Corporation

"Power Consumption of Anchor Impellers in Viscous Newtonian and non-Newtonian Fluids"
P. Ayazi Shamlou, University of College London

5:00 p.m.

SOCIAL HOUR

6:00 p.m.

DINNER

7:00 p.m.-10:00 p.m.

MULTIPHASE MIXING

Chairman: L. L. Tavlarides, Syracuse University

"Characteristics of Gas-Liquid Mass Transfer"
J. Y. Oldshue, K. S. Lally and T. A. Post, Mixing Equipment Company

"Breakup and Coalescence of Liquid Drops in Porous Media"
W. L. Olbricht, Cornell University

"Effect of Mechanical Agitation on Microbial Processes"
J. Placek, S. A. Lemmel and W. M. Teague Enzyme Bio-Systems Ltd.

"Measurement of Droplet Motions in Turbulent Liquid Dispersions"
X. B. Reed, Jr., University of Missouri

"Breakup and Coalescence of Dispersed Drops in an Agitated Tank"
M. Konno, T. Muto and S. Saito, Tohoku University

"Industrial Mixing Problems in Solid-Liquid Separations"
C. G. Koen, Consultant, France

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Tuesday August 5, 1987 (continued)
10:00 p.m.-11:00 p.m. SOCIAL HOUR

Wednesday, August 5, 1987
7:45 a.m. BREAKFAST

9:00 a.m.-12:00 Noon MIXING AND MASS TRANSFER IN BIOLOGICAL SYSTEMS
Chairman: G. K. Patterson, University of Arizona

"The Application of Prochem's QV Theory to Gas Dispersion in Mechanically Agitated Fermenters"
R. D. Vergunst and K. W. Schneider, Prochem Mixing Equipment Ltd.

"A Tapered-Energy Approach for Optimum Fermenter Operation"
J. A. von Essen, Philadelphia Mixers

"Bubble Hydrodynamics and Mass Transfer at High Reynolds Number and Surfactant Concentration"
G. Andrews and S. Wong, State University of New York

"Bubble-Liquid Mass Transfer in Gas-Liquid-Solid Systems"
J. J. Frieling and J. M. Smith, Delft University of Technology

"Mixing and Scale-Up of an Oxygen-Sensitive Culture"
J. R. Bourne, Tech. Chem. Laboratory, Switzerland

12:00 Noon LUNCH

2:00 p.m.-5:00 p.m. AD HOC SESSION

5:00 p.m. SOCIAL HOUR

6:00 p.m. DINNER

7:00 p.m.-10:00 p.m. MIXING AND CHEMICAL REACTION
Chairman: R. J. Adler, Case-Western Reserve University

"Application of Reaction Azo Dye Chemistry to the Study of Micromixing in RIM"
D.E. Leng, CR-Engineering Research Lab,

"A New Look at Some Micromixing Studies"
R. V. Mehta, Eastman Kodak Company

"Scale-Up of Fast Reactions in Stirred Tanks"
J. R. Bourne, Tech. Chem. Laboratory, Switzerland

"Rapid Mixing by the Impingement of Thin Sheets"
R. Demyanovich and J. R. Bourne Tech. Chem. Laboratory, Switzerland

Wednesday, August 5, 1987 (continued)

"A Study of the Effect of Mixing on the Crystallization of Barium Sulfate in a Continuous Stirred Tank Reactor"
D. E. Fitchett and J. M. Tarbell, Pennsylvania State University

"Effects of Sound Waves on Mixing Phenomena"
K. Ogawa, Tokyo Institute of Technology

10:00 p.m.-11:00 p.m. SOCIAL HOUR

Thursday, August 6, 1987

7:45 a.m. BREAKFAST

9:00 a.m.-12:00 Noon

VISCOUS MIXING

Chairman: R. Prud'homme, Princeton University

✓ "Blending of Liquids of Differing Viscosities"
J. M. Smith, University of Surrey, A. Schoenmaker
and I. Bouwmans, Tech. University Delft

✓ "Mixing High Viscosity Visco-Elastic Fermentation Broths"
L. Choplin, Laval University

✓ "A New Definition of the Apparent Viscosity in Mixing of Non-Newtonian Liquids"
R. Zeppenfeld, A. B. Mersmann, Tech. University Munich

"Effects of Geometrical Variables on Helical Ribbon Impellers on Mixing of Pseudoplastic Liquids"
K. Takahashi, T. Yokota, H. Konno, Yamagata University

"High-Low Viscosity Mixing"
C. Meyer and M. Mutsakis Koch Engrg. Company and F. Shreiff, Sulzer Brothers Ltd.

"Change-Can Mixing Technology in High Viscosity Systems"
B. Lagman, C. Ross and Son, Company

12:00 Noon LUNCH

2:00 p.m.-5:00 p.m. AD HOC SESSION

5:00 p.m. SOCIAL HOUR

6:00 p.m. DINNER

7:00 p.m.-8:00 p.m.

VISCOUS MIXING

Chairman: R. K. Prud'homme, Princeton University

"Fluid Mechanics of Jet Impingement Mixing"
Ashok Tyagi, Andrew Hrymak, Philip Wood, McMaster University

"Effect of Mixing on the Structure and Rheology of Water Soluble Polymer Gels"
J. Kramer, A. Chu, R. Prud'homme, Princeton University

Thursday, August 7, 1987 (continued)

8:00 p.m.-9:30 p.m.

SCALEUP AND SCALED UP

Chairman: R. V. Calabrese University of Maryland

"Evaluation of Mixing in Ribbon Agitated Continuous Polymerization Reactor Scaleup"

L. F. Carter, Monsanto Chemical Company

"Anomalies in the Scaleup of Liquid Mixing Equipment"

W. V. Uhl, University of Virginia

"Power, Flow and Shear Characteristics of Mixing Impellers"

R. J. Wietman and J. Y. Oldshue, Mixing Equipment Company

10:00 p.m.-11:00 p.m.

SOCIAL HOUR

Friday, August 7, 1987

7:45 a.m.

BREAKFAST

9:00 a.m.-12:00 Noon

SCALEUP AND SCALED UP

Chairman: R. V. Calabrese, University of Maryland

"Effect of Agitation and Scaleup on Particle Size in Savannah River Precipitators"

T. P. Chang, E. I. duPont de Nemours and Company

"Performance, Prediction Design and Scaleup of Column Extractors/Reactors"

C. Tsouris, V. Kirou, H. Schmidt, L. L. Tavlarides and J. C. Bonnet, Syracuse University

"Scaleup of Angled Blade Agitators and Gas Dispersion and Solid Suspension"

M. Konno, W. Bujalski and A. W. Nienow, University of Birmingham

"Comparison of Gas-Liquid Mass Transfer in Small Agitated Vessels for Early-Stage Scaleup"

T. B. Thompson and K. Krkoska, Dow Chemical Company

"Successful Scale-Up for Non-Standard Mixing Applications"

P. Forschner, Ekato Corporation

"Studies of Interfacial Area in Gas Sparged, Mechanically Agitated Vessels"

S. Bhakuni, S. C. Bhunia and R. N. Sharma, Indian Institute of Technology

12:00 Noon

LUNCH

ADJOURNMENT