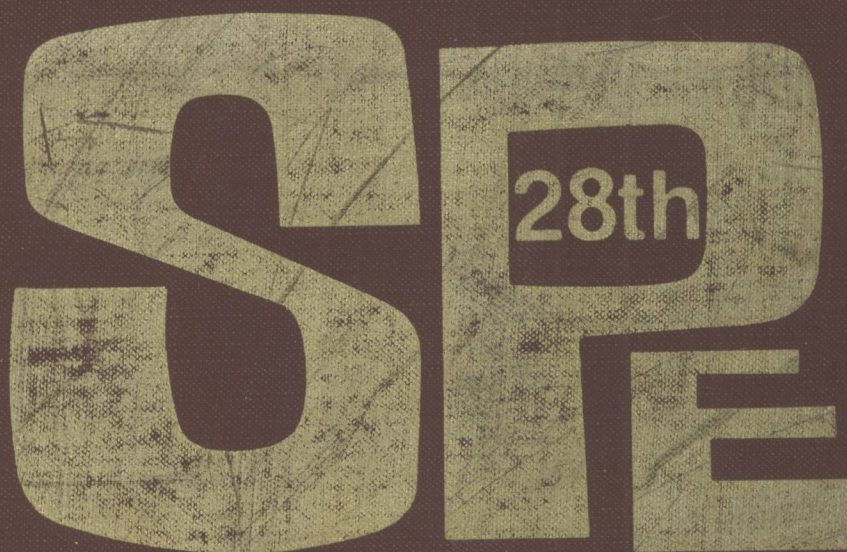
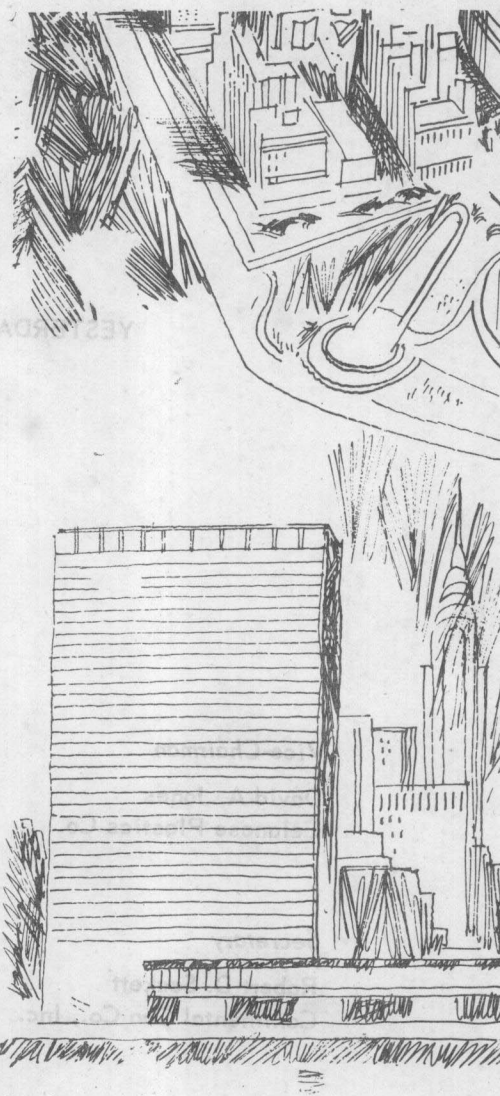
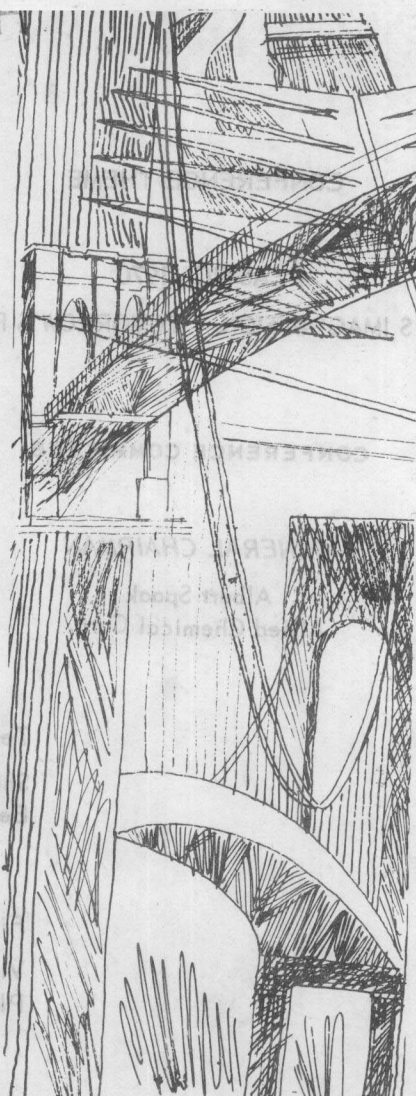




Society of Plastics Engineers
28th ANNUAL TECHNICAL CONFERENCE
AMERICANA HOTEL, NEW YORK, N.Y.
MAY 4th-7th, 1970



SPRE

28th

Society of Plastics Engineers
28th ANNUAL TECHNICAL CONFERENCE
AMERICANA HOTEL, NEW YORK, N. Y.
MAY 4th-7th, 1970

CONFERENCE THEME

PLASTICS 1970

YESTERDAY'S IMAGINATION – TOMORROW'S REALIZATION

CONFERENCE COMMITTEE

GENERAL CHAIRMAN

Albert Spaak
Allied Chemical Corp.

Vice-Chairman

David A. Jones
Celanese Plastics Co.

Secretary

Robert D. Sackett
Continental Can Co., Inc.

Publicity

Philip D. Stokes, Jr.
Plastics World Magazine

*Visual Aids, Signs,
Special Printing*

George T. Reed
Norman Bragar Co.

Ladies Program

Ester Roche
Celanese Plastics Co.

Technical Program

Shiro Matsuoka
Bell Telephone Labs., Inc.

Finance

Victor B. Merrill
Plastic Molders Supply Co., Inc.

Entertainment

Eric Ross
Alpha Chemical & Plastics, Inc.

Ushers

Frank J. Cutroni
Acme Plastic Machinery Corp.

Conference Manager

John H. Hyden
Society of Plastics Engineers, Inc.

28th ANNUAL TECHNICAL CONFERENCE
SPONSORED BY THE NEWARK SECTION
SOCIETY OF PLASTICS ENGINEERS
TECHNICAL PROGRAM COMMITTEE

Chairman
Shiro Matsuoka
 Bell Telephone Labs., Inc.

Conference Manager
John H. Hyden
 Society of Plastics Engineers, Inc.

Program Board

Sheldon Atlas
 Bronx Community College

Leonard S. Buchoff
 Cox & Co.

Jack E. Glatt
 Keolyn Plastics, Inc.

Christ D. Kacalieff
 Chris Kaye Plastics Mfg. Co.
Albert J. Monack
 Newark College of Engineering

Bernie A. Olmsted
 Package Machinery Co.

John L. O'Toole
 Allied Chemical Corp.

Julius M. Schiller
 IBM Corp.

Albert Spaak
 Allied Chemical Corp.

Papers Review Board

Richard A. Ahlbeck
 Consultant

Robert F. Anderson
 American Cyanamid Co.

Robert L. Bergen
 Uniroyal, Inc.

Donald W. Biklen
 The Standard Oil Co. (Ohio)

Herb Blaies
 Ford Motor Co.

Lee L. Blyler, Jr.
 Bell Telephone Labs., Inc.

Lionel R. Bolduc
 Hampshire Manufacturing Co.

Robert Bonner
 E. I. Du Pont De Nemours & Co., Inc.

Thomas Callahan
 USM Corp.

Leroy N. Chellis
 IBM Corp.

Louis P. Cipriani
 American Cyanamid Co.

Charles Chipman
 Koehring Co.

F. R. Czech

Michael A. Delia
 Delia Assoc.

Harry DuBois
 J. Harry DuBois Co.

James Gahl
 McGraw-Edison Power
 Systems Div.

Anthony Giovanonne
 Packaging Industries Corp.

Philip Godley
 Improved Machinery, Inc.

William Greive
 Owens-Illinois

Paul Grindrod
 Oscar Meyer & Co.

Thomas W. Haas
 American Standard, Inc.

R. E. Harmon
 PPG Industries

Arthur C. Hart
 Bell Telephone Labs., Inc.

L. B. Heller
 Amoco Chemicals Corp.

James N. Herman
 Owens-Illinois

Peter Hold
 Farrel Corp.

T. W. Huseby
 Bell Telephone Labs., Inc.

A. C. Karbum
 Adell Chemical Co.

Reuben Koep
 Reuter, Inc.

George P. Koo
 Allied Chemical Corp.

Walter Kosy
 Borg-Warner Corp.

S. C. Lange
 Tenneco Advanced Materials, Inc.

Harold R. Lee
 General Electric Co.

C. Thomas Levett
 Phillips Petroleum Co.

Bryce Maxwell
 Princeton University

William K. McConnell, Jr.
 AAA Plastic Equipment, Inc.

Lawrence McKenna
 Union Carbide Corp.

Morris A. Mendelsohn
 Westinghouse Electric Corp.

Albert W. Meyer
 Plastics Institute of America

William Neil
 Chas. T. Main, Inc.

Edmund A. Newton
 Ford Motor Co.

Irvin E. Poston
 General Motors Corp.

S. L. Reagan
 University of Detroit

Thomas B. Reeve
 E. I. Du Pont De Nemours & Co., Inc.

R. J. Reso
 Hercules Inc.

Alan Riga
 Lubrizol Corp.

Karl Rollius
 Fanner Manufacturing Co.

James A. Rolls
 Diamond Shamrock Co.

H. S. Ruekberg
 Continental Can Co., Inc.

Brian M. Rushton
 Hooker-Occidental Corp.

Charles Sargent
 Tetford Corp.

Alfred W. Seiling
 Morton Chemical Co.

Allan F. Sherr
 American Cyanamid Co.

John A. Stahl
 B. F. Goodrich Chemical Co.

Louis Street
 Frank W. Egan & Co.

Ralph B. Symons
 R. B. Symons & Assoc.

Charles Waechter
 Chas. T. Main, Inc.

B. F. Weber
 Ford Motor Co.

B. P. Wenninger
 IBM Corp.

Randolph Wertz
 Adell Chemical Co.

R. F. Westover
 Bell Telephone Labs., Inc.

James Wilgus
 Midland Ross Corp.

John H. Wing
 Borden Chemical Co.

Walter Zagar
 Allied Chemical Corp.

STATEMENT OF SPE PUBLICATION POLICY

for

ANNUAL TECHNICAL CONFERENCE PAPERS

1. All papers submitted to and accepted by the Society for presentation at its Annual Technical Conference become the property of the Society of Plastics Engineers, Inc., and all publication rights are reserved by the Society.
2. The Society shall make known those papers it wishes to publish within two weeks after the close of the Annual Technical Conference.
3. The Society shall not grant previous or simultaneous publishing rights to any of the papers it intends to publish.
4. The Society shall, at the time it makes known the papers it intends to publish, release all other papers to the authors with the stipulation that, if published elsewhere, credit be given both the Society of Plastics Engineers and the Annual Technical Conference.
5. The Society shall not be responsible for statements or opinions advanced in publications, reports, papers, or in discussion at its meetings unless specifically approved by Council.

An abstract of any paper presented at the Annual Technical Conference may be published provided this abstract does not exceed one-third the length of the original paper as it appears in the Conference preprint. Such abstract may be published without obtaining further permission from the Society provided credit is given to the Society of Plastics Engineers, the Annual Technical Conference and the authors of the specific paper.

CONTENTS

SESSION 1

ENGINEERING PROPERTIES AND STRUCTURE - 1 "STRUCTURE-PROPERTY RELATIONSHIPS FOR POLYMER SYSTEMS"

Moderator: Thomas W. Haas
American-Standard, Inc.

	Page
Correlation between Steady-State Flow Curve and Molecular Weight Distribution of Polyethylene	1
Ramesh N. Shroff and Mitsuzo Shida Chemplex Co.	
The Influence of Molecular Weight on the Melt Rheology of Polypropylene	5
Douglas P. Thomas General Electric Co.	
Capillary Extrusion of Composite Materials	13
Timothy T. S. Lim Uniroyal, Inc.	
Cold Rolling of Polymers. 1. Influence of Rolling on Properties of Amorphous Polymer	20
Lawrence J. Broutman and R. S. Patil Illinois Institute of Technology	
The Effect of Pigments on the Heat and Light Stability of Polypropylene	29
Christopher W. Uzelmeier Shell Chemical Co.	
A Novel Polycaprolactam-Polyethyleneimine Graft Co-Polymer	34
H. J. Oswald, J. R. Pedersen and A. C. Reimschuessel Allied Chemical Corp.	

SESSION 2

VINYL - 1

Moderator: Elliott Linsky
Borden Chemical Co.

	Page
New Techniques Evaluate the Mechanism of Polyvinyl Chloride/Plasticizer Interaction During Blending	40
James R. Wallace, Peter Kozak and Fernand Noel Imperial Oil Enterprises, Ltd.	
Plasticizer Ester Performance as a Function of Hydroxyl Position in Linear Alcohols	46
James W. Hayden Shell Development Co.	
Synergism in Thermal Stabilization of PVC	48
Rudolph D. Deanin, James F. Landers, Jr., Richard W. Byczko and Ira Linzer Lowell Technological Institute	
Coacervates as Suspension Agents for Polymerizations.	53
James M. Church Columbia University	
Roman Pozorski Wilson Pharmaceutical and Chem. Co.	
A New Modified PVC Polymer	56
E. N. Skiest, P. K. Shen and R. L. Jalbert Borden Chemical Co.	
Acrylic Modifiers in Plasticized PVC	60
John T. Lutz, Jr. Rohm and Haas Co.	

CONTENTS

SESSION 3

PLASTICS IN BUILDINGS

Moderator: Joel Stahl
Stahl Industries

	Page
Prefabrication and Other Routes to Low-Cost Housing With Plastics	62
Jerry Miron and Irving Skeist Skeist Laboratories, Inc.	68
What About the All-Plastic House?	72
Edward G. Obeda Branson Sonic Power Co.	76
Cementitious Plastics	81
Vincent Sussman Allied Products Corp.	
Continuous Processing Machinery for Cellular Urethane Foam	
Edgar H. Maus, Sr. Kornylak Corp.	
Engineering of Rigid PVC Building Products to Meet End-Use Criteria	
John A. Stahl B. F. Goodrich Chemical Co.	

SESSION 4

THERMOSETTING MOLDING - I

Moderator: Ralph B. Symons
R. B. Symons Associates, Inc.

	Page
Quality Control Requirements for Custom Molded Parts	82
Edward F. Bachner, Jr. and Grant Ulmer Chicago Molded Products Corp.	84
Gating Systems for Thermosets - Part 1 & 2	91
Robert W. Bainbridge Hooker Chemical Co.	100
Edward F. Borro, Sr. Rodgers Plastics Equipment, Inc.	104
Model of Screw Injection Parameters for Thermosetting Plastics	
B. L. Talwar and L. T. Ashlock ITT Cannon Electric	
Thermoset Molding Fast Curing Methods	
Stephen H. Bauer Hull Corp.	
Versatile, Fast-Curing Polybutadiene Thermosetting Resins	
H. J. Barth and J. J. Robertson The Firestone Tire & Rubber Co.	

SESSION 5

ENGINEERING PROPERTIES AND STRUCTURE – II “NEW TECHNIQUES IN POLYMER SCIENCE AND ENGINEERING”

Moderator: Bryce Maxwell
Princeton University

	Page
Thermomechanical Studies of Polymer Deformation: A Thermodynamic Analysis of a Viscoelastic Material in Sinusoidal Deformation	110
I. J. Duvdevani, J. A. Biesenberger and C. G. Gogos Stevens Institute of Technology	
Quantitative Thermal Analysis of Polyblends	115
H. E. Bair Bell Telephone Laboratories, Inc.	
Crystallization Studies on Deformed Polybutene – 1 Melts	118
Anthony Wereta, Jr. and Costas G. Gogos Stevens Institute of Technology	
Electromagnetic Method for Bonding Thermoplastic Materials	125
Mark Chookazian EMABond, Inc.	

SESSION 6

VINYL PLASTICS – II

Moderator: Peter P. P. A. Burnett
Ford Motor Co.

	Page
A Review of Fibers, Yarns and Fabrics for the Vinyl Industry from the Point of View of a Coated Fabrics Manufacturer	130
Glen E. Sarver B. F. Goodrich Industrial Products Co.	
Synthetic Fibered Substrates for the Vinyl Industry	133
Armand A. Durante Deering Milliken, Inc.	
Fibers, Yarns and Fabrics for the Vinyl Industry	137
H. E. Frey National Cotton Council of America	

SESSION 7

BLOW MOLDING – I

Moderator: Herbert S. Ruekberg
Continental Can Co., Inc.

	Page
The Use of Carbon Dioxide in the Plastics Industry	138
Robert N. Bose CO ₂ Consultants Co.	
Processing Characteristics of High Density Polyethylene Blow Molding Resins and their Correlations with Rheological Parameters	142
K. C. Chao and W. C. L. Wu Chemplex Co.	
High Shear Behavior of High Density Polyethylene in Processing Equipment	148
L. V. Cancio, A. A. Hass and M. Shida Chemplex Co.	
Injection Blow Molding – A Review	154
Emery I. Valyi	

SESSION 8

THERMOSETTING MOLDING - II

Moderator: John W. Krieger
Union Carbide Corp.

	Page
Automated Rotary Transfer Encapsulation of Electronic Parts	160
M. J. Fortin Fortin-Latchford Ltd.	
The New Concept - Liquid Resin Molding	162
Hugo L. Uglione, Jr. Hull Corp.	
Variability of Similar Thermoset Compounds - A Molder's Viewpoint	165
L. T. Ashlock ITT Cannon Electric	
Effect of Molding Conditions on Flow of Thermosets	174
D. W. Sundstrom and L. A. Walters Rogers Corp.	
Evaluation of the Effect of Cure on Mechanical and Flow Properties of a Diallyl Phthalate Thermoset	178
Soo Y. Choi Allied Chemical Corp.	

VINYL PLASTICS - II

Moderator: Peter P. A. Burnett
Ford Motor Co.

A Review of Fibers, Yarns and Fabrics for the Vinyl Industry from the Point of View of a Coated Fabrics Manufacturer	130
Glen E. Sarver B. F. Goodrich Industrial Products Co.	
Synthetic Fibrated Substrates for the Vinyl Industry	133
Amund A. Duntze Deshing Milliken, Inc.	
Fibers, Yarns and Fabrics for the Vinyl Industry	137
H. E. Frey National Cotton Council of America	

SESSION 7

BLOW MOLDING - I

Moderator: Herbert S. Ruekberg
Continental Can Co., Inc.

The Use of Carbon Dioxide in the Plastics Industry	138
Robert N. Bose CO ₂ Consultants Co.	
Processing Characteristics of High Density Polyethylene Blow Molding Resins and their Correlations with Rheological Parameters	142
K. C. Gao and W. C. L. Wu Chemplex Co.	
High Sheet Behavior of High Density Polyethylene in Processing Equipment	148
L. V. Cancio, A. A. Hass and M. Shida Chemplex Co.	
Injection Blow Molding - A Review	151
Emery J. Volvi	

SESSION 10

ENGINEERING PROPERTIES AND STRUCTURE – III “ENGINEERING PROPERTIES OF PLASTIC MATERIALS”

Moderator: Paul W. Kinney
Celanese Plastics Co.

	Page
Evaluation of Several Track Resistant Resins	191
R. A. Kurz Westinghouse Electric Corp.	
Effects of Moisture on Unreinforced and Glass Fiber Reinforced Nylon	196
George W. Woodham and Donald R. Pinkston Dart Industries, Inc.	
Influence of Design and Molding Conditions on Mechanical Properties of a Molded Part	200
P. Hubbauer, H. E. Bair and P. G. Kelleher Bell Telephone Laboratories, Inc.	
Et Polymer – A Novel Elastomeric Thermoplastic	204
P. F. Hartman, C. L. Eddy and G. P. Koo Allied Chemical Corp.	
Flame Retardant Compositions of Styrenebutadiene Foams	215
Darwin A. Dalzell and Robert J. Nulph Michigan Chemical Corp.	
Halon® G-700 – A New Creep-Resistant PTFE	219
Malcolm N. Riddel, George A. Toelcke and John L. O'Toole Allied Chemical Corp.	

SESSION 11

BLOW MOLDING – II

Moderator: Richard A. Ahlbeck

SESSION 11

VINYL PLASTICS – III

Moderator: Joseph R. Darby
Monsanto Co.

	Page
Vinyl Dispersion Coatings for Foam Flooring and Fabrics	226
L. J. Friedman Hooker Chemical Corp.	
The Effects of Formulating and Processing Variables on the Physical Properties of Vinyl Foams	232
J. T. Renshaw, J. A. Cannon and J. D. Hinchey Monsanto Co.	
Hot Melt Flow Properties of Vinyl Plastisols for Chemically Blown Foam Laminates	240
Charles D. Buckley Uniroyal Inc.	
The Use of Silicone Rubber Casting Bands for the Manufacture of Expanded and Non-Expanded PVC Materials	247
A. Duerden Imperial Chemical Industries Ltd.	
The Critical Volume Concept In Plastisols	251
Christian W. Johnston and Charles H. Brower Tenneco Chemicals, Inc.	

SESSION 12

PLASTICS IN ELECTRICAL INSULATION - I "SYMPOSIUM ON NEW ADVANCES IN TRANSFER MOLDING OF ELECTRONIC MODULES"

Moderator: Charles A. Harper
Westinghouse Electric Corp.

	Page
Transfer Molding of Electronic Modules - Module Design Considerations	260
H. G. Carter and C. L. Marriott Westinghouse Electric Corp.	
R. L. Buckelew U.S. Army Missile Command	
Transfer Molding of Electronic Modules - Effects of Process on Embedded Components	266
Carroll L. Marriott and George M. DiGiacomo Westinghouse Electric Corp.	
Transfer Molding of Electronic Modules - Internal Stress Studies	273
George M. DiGiacomo Westinghouse Electric Corp.	
Transfer Molding of Electronic Modules - Material and Process Studies	281
Charles W. Wyble and F. Timothy Parr Westinghouse Electric Corp.	
Transfer Molding of Electronic Modules - Relationship of Mold Design and Flow of Molding Compound	293
Charles D. Larson Westinghouse Electric Corp.	

SESSION 13

BLOW MOLDING - II

Moderator: Richard A. Ahlbeck

	Page
Post-Molding Shrinkage of High Density Polyethylene Milk Bottles - Part I	299
James D. Frankland, John R. Weeks and Alan J. Fox Sinclair-Koppers Co.	
Post-Molding Shrinkage of High Density Polyethylene Milk Bottles - Part II	302
James D. Frankland, John R. Weeks and Alan J. Fox Sinclair Koppers Co.	
PVC and Acrylic Blow Molding	305
Bernard Strong Strong Plastics Inc.	

SESSION 14

ENGINEERING PROPERTIES AND STRUCTURE - IV "ENGINEERING DESIGN OF PLASTIC STRUCTURES"

Moderator: Robert L. Bergen, Jr.
Uniroyal, Inc.

	Page
Missile Launcher Liner Material Part I. Development of Structural Design	308
M. A. Mendelsohn, H. J. Connors, R. H. Runk and G. B. Rosenblatt Westinghouse Electric Corp.	
Missile Launcher Liner Material Part II. Effect of Polymer Composition and Processing on Physical Properties	315
M. A. Mendelsohn, R. H. Runk, H. J. Connors and G. B. Rosenblatt Westinghouse Electric Corp.	
Durability of GRP Boats	322
Hugo du Plessis	

SESSION 15

PROCESSING CONTROL SYMPOSIUM "PLANNING EXPANSION IN THE 1970'S"

Moderator: Michael A. Delia
Delia Associates

	Page
Engineering and Planning Methods Used to Design and Construct New Plant Facilities	328
Charles J. Waechter Chas. T. Main, Inc.	
A Realistic Evaluation of New Manufacturing Facilities	337
William N. Neil Chas. T. Main, Inc.	
Computerization of Operations is a Challenge to Research Engineers	341
Gerald C. Heldrich Wheaton Industries, Inc.	
Trends in Processing Equipment Advances During the 1970's	343
Peter Hold Farrel Co.	

SESSION 16

PLASTICS IN ELECTRICAL INSULATION - II "NEW TEST METHODS AND IMPROVED ENCAPSULANTS FOR ELECTRONIC APPLICATIONS BY THE MATERIAL SUPPLIERS"

Moderator: Edward Hakim
U.S. Army Electronics Command

	Page
Evaluation of Corrosive Characteristics of Encapsulant Materials	349
George R. Johnson Dexter Corp.	
Evaluation of Encapsulation Grade Thermosets VS. End Use Requirements for Semi-Conductor Application	353
George Bednarz Allied Chemical Corp.	
Improved Resins for Epoxy Molding Materials	354
George Salensky Union Carbide Corp.	
Single Component, Liquid Molding Compounds	359
George G. Duncan Rogers Corp.	

SESSION 17

ENGINEERING PROPERTIES & STRUCTURE - V SYMPOSIUM - FLAMMABILITY IN POLYMERS - I

Moderator: T. W. Huseby
Bell Telephone Labs., Inc.

	Page
Mechanisms Associated with Polymer Combustion and its Suppression	362
Paul C. Warren Bell Telephone Labs., Inc.	
Chemical Extinction of Diffusion Flames as Related to Flameproofing of Plastics	368
E. C. Creitz Nat'l Bureau of Standards	
Steady-State Combustion of Polyolefins	369
D. E. Stuetz Celanese Research Co.	

SESSION 18
EXTRUSION - I
"MELTING ZONE OF THE EXTRUDER"

Moderator: William Nissle

French Oil Mill Mach. Co.

	Page
Melting Zone of Extruders-Analysis and Calculations	373
Chan I. Chung	
Esso Res. & Eng. Co.	
Melting Zone of the Extruder	374
B. H. Maddock	
Union Carbide Corp.	
Melting Instability in Screw Extruders	375
D. I. Marshall	
Western Electric Co.	
Melting in a Single Screw Extruder	376
Robert B. Gregory	
Egan Machinery Co.	

SESSION 19

PLASTICS IN ELECTRICAL INSULATION - II
"METHODS USED FOR SELECTING ENCAPSULANTS AND
RELIABILITY OF ENCAPSULATED ELECTRONIC DEVICES"

Moderator: Frank M. Bell
Dexter Corp.

	Page
The Contribution of the Plastics Engineer in the Electronics Industry	377
Stanley G. Schroter and Herbert Shapiro	
Raytheon Company	
Resin Systems Used for Encapsulation of Microelectronic Packages	380
Henry Hirsch	
Intern'l Bus. Mach. Corp.	
Contamination and its Effect on Transfer Molded Ceramic Capacitors	388
R. W. Nufer and L. C. Anderson	
Intern'l Bus. Mach. Corp.	
Spalling Resistance Index for Plastics	394
J. M. Schiller and F. G. Pugliese	
Intern'l Bus. Mach. Corp.	
Semiconductor Device Encapsulation, a Problem of Material Systems Design	399
Steven Baird	
Texas Instruments Co.	
Reliability in Plastic Encapsulated Semiconductors	400
Erwin A. Herr and Albert Fox	
General Electric Co.	

SESSION 20

INJECTION MOLDING - I "THE FACTORS CONTROLLING QUALITY"

Moderator: Philip Godley
Improved Machinery, Inc.

	Page
The Role of the Injection Machine in Product Quality	408
Gordon B. Thayer Global Engineering & Management Services	
Quality in the Injection Mold	410
Robert G. McGee USM Corp.	
Injection Molding Process Control	419
Rodney J. Groleau Control Process, Inc.	
Accessory Equipment for Injection Molding	423
Dewey Rainville The Rainville Co., Inc.	
Injection Molding - The Factors Controlling Quality - Part Design	426
James H. Crate E. I. duPont deNemours & Co., Inc.	
Effect of Material on Quality Control in Injection Molding	427
Warren A. Sharp Monsanto Co.	

SESSION 21

MISCELLANEOUS

Moderator: William Greive
Owens-Illinois

	Page
Computer Control of Large Numbers of Plastics Machines	430
H. E. Harris Harrel, Inc.	
Measurements for Control in Injection Molding	435
Donald C. Paulson Control Process, Inc.	
New Plating Polymers	441
F. A. Leary Uniroyal, Inc.	
Colorants for High-Temperature Polymers	445
George F. Sonn Inmont Corp.	
The Use of Thermogravimetric Analysis in Determining the Track Resistance of Epoxy Compounds	450
George H. Jaehers and Thomas J. Gedemer McGraw Edison Power Systems Div.	
Plastic Beer Case Hinges on HDPE	455
B. L. Oliver and B. W. Heinemeyer The Dow Chemical Co.	

SESSION 22
ENGINEERING PROPERTIES & STRUCTURE
SYMPOSIUM - "FLAMMABILITY IN POLYMERS - II"

Moderator: D. A. Opp
 IBM Corp.

	Page
National Bureau of Standards Program In Flammable Fabrics	458
Elio Passaglia	
Nat'l Bureau of Standards	
Relative Toxicity of Selected Polymeric Materials Due To Thermal Degradation	459
George Epstein and Julian Heicklen	
The Aerospace Corp.	
A Study of Flame Retarded ABS, Polystyrene and Polyester Systems	463
Joseph DiPietro and Heinrich Stepniczka	
Michigan Chemical Corp.	
The Polymerforming Reactions of 3, 3, 3-Trichloropropylene Oxide	469
H. C. Vogt and P. Davis	
Wyandotte Chemicals Corp.	

SESSION 23
EXTRUSION - II

Moderator: Paul Ahlers
 Leesona Corp.

	Page
Considerations in Choosing Extruder Drives	477
Frank E. Simo	
Eaton Yale & Towne Inc.	
Cost-Profit Monitoring in a Custom Processing Plant	484
John L. Witt	
Alma Plastics Co.	
A Standard Cost Based Plastics Information System	492
James A. Hetzer	
Indus. Nucleonics Corp.	

SESSION 24
PLASTICS IN ELECTRICAL INSULATION - IV
"ENGINEERING OF NEW ENCAPSULANTS FOR ELECTRONIC AND ELECTRICAL APPLICATIONS"

Moderator: Gary A. Pillivant
 Raytheon Co.

	Page
Doryl Resins in Electrical Applications	498
Daniel R. Sassano	
Westinghouse Elec. Corp.	
Low Molecular Weight Butyl Rubber - A New Material for Potting, Encapsulation and Conformal Coatings	503
Jerry S. Glazman	
Enjay Polymer Labs.	
The Fixed Composition Resistor - A Carbon Filled Conductive Plastic System	511
G. F. Chadwick	
Airco/Speer Electronic Components	
Development of a Flexible Epoxy for Encapsulation of Electronic Components	515
J. J. Bielawski	
Western Elec. Co., Inc.	

SESSION 25

PLASTICS IN THE AUTOMOTIVE INDUSTRY

Moderator: Aaron Rosenstein
Chrysler Corp.

	Page
Plastics in the Automotive Industry	519
Charles W. Cleworth Plastics World Magazine	
Automotive Body Panels; Materials, Processes and Equipment	522
H. J. Sharp GKN Plastics Development Centre	
D. Oddy	
Stress Time Superposition of Creep Data and Extraction of Design Information for Coupled Glass-Reinforced Polypropylene	527
L. C. Cessna, Jr. Hercules Inc.	

SESSION 27

EXTRUSION - III

"CONSIDERATIONS IN EXTRUDER DESIGN"

Moderator: Louis F. Street
Egan Machinery Co.

	Page
Studies on the Melt Temperature Profiles of PVC in the Extruder Head	537
H. T. Kim and J. P. Darby B. F. Goodrich Chemical Co.	
Studies in Pressure, Flow and Surging in a Vented Extruder with Rear Valving	544
James F. Carley University of Colorado	
Extrusion - Designing for Quality Performance	552
Paul H. Squires and Carl F. W. Wolf E. I. duPont deNemours & Co., Inc.	
Scale-Up Studies of the Elastic Melt Extruder	558
Bryce Maxwell Princeton University	
Plasticating Theory and Experiments for Single-Screw Extruders	561
R. C. Donovan Western Electric Co.	
Roughness in Flexible PVC Compounds	569
Gerald Bareich Imperial Oil Ltd.	

SESSION 28

COLORING AND FINISHING OF PLASTICS - I REVIEW OF COLORING PROCEDURES

Moderator: F. R. Czech
Americhem, Inc.

	Page
New Color Technology for Plastics Manufacturers	573
Frederick T. Simon Clemson University	
Principles of Pigment Dispersion in Plastics	574
T. B. Reeve and W. L. Dills E. I. duPont deNemours & Co., Inc.	
Automatic In-Plant Dry Coloring - The State of the Art	577
Bernard G. Murray Ferro Corp.	
Color Concentrates for Thermoplastics - A Different View	579
Myles Z. Schneider Ampact Corp.	
High Volume Production of Pigmented Thermoplastics	582
R. L. Adams Werner & Pfleiderer Corp.	

SESSION 29

INJECTION MOLDING - II

Moderator: Thomas Callahan
USM Corp.

	Page
State of Art - Injection of Thermosets	586
Roy Manns Roy Manns & Assoc.	
New Aspects and Experiences in Design of Reciprocating Screw Units and Ways of Broader Application	587
Hans Otto Schiedrum Farbwerke Hoechst AG	
Temperature Profiles in the Injection Molding of Thermoplastics	595
S. Kenig and M. R. Kamal McGill University	
New Ribbon Thermocouples for the Processing Industry	604
J. Nanigian Nanmac Corp.	
A Simple System for Cost Accounting and Profit Control for the Small to Medium Custom Molder	610
W. R. Reinbacher Jupiter Engineering, Inc.	