

# Volume I

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*The papers in the "Proceedings" section are based upon the material the authors would have presented at the 2020 conference Architectural Plastics & Polymer Composites in the 21st Century: Design & Preservation of Contemporary & Historic Architecture that was cancelled due to the Covid-19 pandemic. Posters and the first section of supplemental material (Appendix A) follow the papers in this volume. The additional supplemental articles and items (Appendix B) and the CD – Understanding Polymeric Materials are contained in Volume II.*

### **PROCEEDINGS**

- Plastics: A Brief Perspective on the Materials & Their Development  
*Committee on Plastics Education, Society of the Plastics Industry, Inc.*
- Conserving Plastics in Architecture: Challenges in Identification, Conservation, and Replication  
*Odile Madden, PhD, Margherita Pedroni, Chandler McCoy, AIA, and Janine Koeppen*
- The Monsanto House of the Future: A Creative Collaboration in Structural Plastics That Was Ahead of Its Time  
*Roger N. Goldstein, FAIA, and Glenn R. Bell, PE, SE, F.SEI*
- Polymer Materials in Architectural Applications: Building on Traditional Knowledge and Innovative Technologies in Materials Selection for Long-Term Success  
*Michael Dimitriou, PhD, Jericho Moll, PhD, and Maureen Reitman, ScD, PE*
- Carbon>Building: Toward a Carbon Ontology  
*Prof. Mark Goulthorpe*
- Emerging Roles for Polymers in Glazing, Windows, and the Building Façade  
*Stephen Selkowitz*
- Fire and Composites: The Path Forward  
*Alexander B. Morgan, PhD*
- Traditional Polymer Materials in Innovative Architectural Applications: Understanding How Advances in Design Affects the Materials Selection Process  
*Christopher White, Ph.D, Michael Dimitriou, PhD, Jericho Moll, PhD, and Maureen Reitman, ScD, PE*
- Conservation and Restoration of the Great Pagoda at Kew: The Re-creation & Reinstatement of the Iconic Structure's Lost Dragons through Research, Craftsmanship, and Innovation  
*Craig Hatto, FRSA*
- Appropriateness of Synthetic Materials in Historic Districts  
*Charles Sullivan*
- Restoration of an Original Buckminster Fuller Dome: Restoring a Forgotten Piece of Architectural History  
*Eric Goetz*
- Preserving Plastics: An Evolving Material, a Maturing Profession  
*Odile Madden, PhD, and Dr Thomas J. S.Learner*
- The Eden Project: The Genesis of Eden  
*Andrew Whalley, RIBA, FAIA, FRSA*
- The Use of Plastics and Polymer Composites for Structural and Other Building Components  
*Edmund P. Meade, PE, FAPT*
- The Museum of the Future: Engineering an Iconic Façade  
*Benjamin J. Leslie, CPEng., IntPE, APEC Engineer*
- Weathering of GRP: Field Assessments and Surveys  
*John A. Fidler, RIBA, IHBC, Intl. Assoc. AIA, FRICS, FSA, FRSA, FIIC, FAPT*
- Herman Miller Furniture Factory to Bath Spa School of Art and Design  
*Andrew Whalley, RIBA, FAIA, FRSA*
- Advances in Plastics and Polymer Composites Fabrication  
*Justin Jin*
- Glass-Reinforced Plastic: Architectural Uses for an Industrial Material  
*Andy Groarke, Lukas Barry, and Ana Maria Ferreira*
- National Aquatics Center: The Water Cube  
*Haico Schepers*
- Germany's First 3L Renovated Homes: Revitalization of the Brunck District in Ludwigshafen, Germany  
*Justin DeMarco, CSI, CDT*
- Conservation of GRP Buildings, Towards a Future Heritage Strategy  
*Robert Loader, RIBA, ARB*
- Architectural Use of Advanced FRP Systems: Creating Unique Roof and Dome Structures  
*Dr. Mark Hobbs, CEng, MRINA*
- Building Without Tradition – A Musing on Plastics, Newness and Authenticity  
*David N. Fixler, FAIA, FAPT, LEED*

## **APPENDIX A – Posters & Supplemental Material #1**

Some Plastics Timeline Highlights from the 1930s to the mid-1960s

Information Sources: A Few References on Life Cycle/Service Life Assessment, Achieving Near Zero/Net Zero Buildings, Energy Saving Methods/Materials for Buildings

NIST - BEES Online 2.1 – Building for Environmental and Economic Sustainability

Commonly Used Abbreviations for a Range of Plastics

Terminology – Brand/Trade Names of Some Commonly Used Plastics

Some Additional References – Books, Articles, Professional Societies

The POPART Project

Material Properties – A 3-D Slice through Material Property Space

Properties of Various Materials Used in Construction – Comparison Chart

Bridge Construction: Plastics Used in the Building of Vehicular & Pedestrian Bridges (Information on innovations in 3D equipment and printing of bridges is included.)

Halley VI Antarctic Research Station: GRP Cladding for an Extreme Environment

*Hugh Broughton*

PES Tensile Mesh with Protective PVC Coating for Ventilated Façade Screens, Sun Shades, and Other Applications (Details are provided on the material, plus case histories, e.g., the printed mesh façade screen of Rice University's new garage building.)

Polymeric Materials in the Restoration of Lost Architectural Details

*David W. Torrey, AIA*

Cast Steel Connections for Lightweight Structures

*Castconnex*

The Use of PVC in a Variety of Architectural Structures (Case histories involving educational, religious, industrial, airport, social club and athletic facilities as well as a pavilion and an art work installation are detailed.)

ETFE - Use as a building membrane/cladding material with information on applications including the monumental entertainment center in Kazakhstan and stadiums in New Zealand, Singapore, and the United States

Preserving Plastics in the Collection of the Harvard Art Museums

*Georgina Raynor, Susan E. Costello, Angela Chang, and Elizabeth La Duc*

The ArtLab: A Flexible Polycarbonate Building

Futuro: Rescue, Relocation, and Restoration Challenges

*Milford Wayne Donaldson, FAIA*

*NOTE: Any paper, article, or other literature contained in Volume I or in Volume II that is not attributed to an author/authors, or to a company/organization, has been produced by Susan E. Schur for this publication.*

# Volume II

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*Note: Volume I contains the “Architectural Plastics & Polymer Composites in the 21st Century” Conference Proceedings Plus papers, posters, and supplemental materials #1.*

### APPENDIX B

#### Supplemental Material #2

Recyclability & Properties Chart for Plastics

Fossil Fuels, The Building Industry & Human Health: Evaluating Toxicity in Architectural Plastics

*Franca Trubiano, Chloe Onbargi, Antonio Rinaldi, and Zachary Whitlock*

Formaldehyde: Housing Applications

*American Chemistry Council*

Paint and Coating Guide

*Mark Edwards*

Acrylic Emulsion Technology: From Plastics to Paints It Changed Our World

*American Chemical Society*

Plastic Identification Tool

Strategy for the Preservation of Plastic Artefacts in Museum Collections: Final Report -Executive Summary

Surface Cleaning/Graffiti Removal from Art Work and Architecture

Nanomaterials and the Nanorestart Project: A Challenging Three Year Project

Fire Test and Fire Safe Material Development

*University of Dayton Research Institute*

Counting Carbon: Low Global Warming Potential Blowing Agents for Closed Cell Spray Foam

*Spray Polyurethane Foam Alliance*

Spray Polyurethane Foam Roofing Takes Center Stage in an Historic Theater’s Second Act

*Spray Foam Coalition*

Carbon Fibers

Polycarbonate in Construction

*Kenneth Schwartz*

Styrene – Fact Sheet

*Styrene Information and Research Center*

FRP in Architectural Applications

Yitzhak Rabin Center: Innovation in Composite Use

The Bakelizer: A National Historic Chemical Landmark

Monsanto House of the Future – Recap

*Roger N. Goldstein, FAIA, LEED AP and Glenn R. Bell, PE, SE, FSEI*

Building with the Power of Plastics

*American Chemistry Council*

Plastic Pipe

BIPV Technologies & Market Overview

*Build Up*

More Sustainable Construction with Plastic Materials

*Modern Building Alliance*

Embodied Carbon in Buildings – Facts & Figures

*Carbon Leadership Forum*

Embodied Carbon in Construction Calculator (EC3) Tool

*Carbon Leadership Forum*

Neopor® – Innovation in Insulation

*BASF*

Technology & Conservation – Listing of Available Back Issues and Materials from Past Conferences

The Use of Substitute Materials on Historic Building Exteriors (Preservation Brief 16)

*Sharon C. Park, AIA*

Safe Plastics & Fabrics for Exhibit & Storage

*National Park Service, Janet Pasiuk*

#### CD: Understanding Polymeric Materials

The CD contains the full content of 43 historic and contemporary publications.

*Any paper, article, or other literature contained in Volume I or in Volume II that is not attributed to an author/authors, or to a company or organization, has been produced by Susan E. Schur for this publication.*