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Research Laboratory
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Research and Development

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Project Summary

Proceedings: Pollution Prevention Conference on Low- and No-VOC Coating Technologies

Coleen M. Northeim and Ella Darden

The report documents a conference that provided a forum for the exchange of technical information on coating technologies. It focused on improved and emerging technologies that result in fewer volatile organic compound (VOC) and toxic air emissions than traditional coating emissions. Among the new products and improvements focused on were an electrophoretic urethane coating, a zero-VOC house paint, and developments involving such inorganic polymers as zinc silicates and silicones. Coatings for such substrates as metal (aerospace), wood (furniture), plastic, foil, and concrete were also discussed.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

Surface coating operations release approximately 19% of stationary area source volatile organic compound (VOC) emissions. Many of these sources cannot be impacted by add-on controls at a reasonable cost due to their small size and/or the difficulty of capturing emissions. The reduction of solvent emissions from architectural and other coatings continues to rely on prevention technologies, such as the replacement of VOC with water or nonphotochemically reactive solvents, the use of high solids coatings, or improvement of the efficiency of transfer of the coating to the coated surface. In current practice, reformulation with nonphotochemically reactive solvents may lead to other environmental problems, such as increased toxicity, greater stratospheric ozone depletion potential, and worsened multimedia effects.

A conference, "Pollution Prevention Conference on Low- and No-VOC Coating Technologies," was held May 25–27, 1993, in San Diego, CA. The conference was sponsored by the U.S. Environmental Protection Agency (EPA), Research Triangle Institute (RTI), and the American Institute for Pollution Prevention (AIPP). The conference provided a forum for the exchange of technical information on coating technologies. Specifically, the conference focused on improved and emerging technologies that result in fewer VOC and toxic air emissions than traditional coating systems.

Approximately 230 people attended the conference: about 50% were from industry, 40% from government, and 10% from consulting firms and universities. There were three registrants each from Taiwan and the United Kingdom; and one each from Sri Lanka, Norway, and the Philippines. Conference registrants are listed in Appendix A of the proceedings.

Approximately 40 technical papers were presented at the conference, divided into 11 sessions focusing on such topical areas as coating technologies, specific coating applications and case studies, application equipment, and pollution prevention concepts. Several papers focused on new products and improvements in these areas, such as an electrophoretic urethane coating, a zero-VOC house paint, and de-

velopments involving inorganic polymers such as zinc silicates and silicones. Coatings for substrates, such as metal (aerospace), wood (furniture), plastic, foil, and concrete, were also discussed.

Conference Program

Portions of the conference program follow, including the session topics, paper titles, and authors. The project report includes copies of the presented papers that were submitted for inclusion in the proceedings.

Conference Scope

The purpose of this conference is to provide a forum for the exchange of technical information on coating technologies. One of the primary objectives of the conference will be the presentation and discussion of improved coating technologies that result in fewer volatile organic compound (VOC) and toxic air emissions. The conference is designed to benefit coating manufacturers and users and representatives of government, academia, environmental groups, and other research and development organizations. Research and case studies will be presented that are specifically applicable to the architectural and industrial maintenance (AIM), aerospace, automotive, wood furniture, and printing industries. The sessions will consist of technical paper presentations and are planned to allow for discussion periods and active participation by all attendees.

Tuesday, May 25

Session 1: Opening Session, Moderator–Coleen M. Northeim, RTI

8:15 a.m.
Welcome by Richard J. Sommerville, Air Pollution Control Officer, San Diego County Air Pollution District, San Diego, CA

8:30 a.m.
Keynote by Paul Eisele, Director of Health Safety & Environmental Affairs, Masco Corporation, Taylor, MI

9:00 a.m.
Coating Research in the U.S. EPA's Organics Control Branch, Michael Kosusko, U.S. Environmental Protection Agency, Air and Energy Engineering Research Laboratory, Research Triangle Park, NC

9:20 a.m.
Using Life-Cycle Analytical Techniques to Assess Alternative Coating Systems, Keith A. Weitz and John Warren (Speaker), Research Triangle Institute, Research Triangle Park, NC

Session 2: Technologies, Moderator–Robert McCrillis, U.S. EPA/AEERL

10:00 a.m.
Radiation Curing Technology: Ultraviolet and Electron Beam Processing, Richard Stowe, Fusion UV Curing Systems, Rockville, MD

10:30 a.m.
Environmental Compliant Thermoplastic Powder Coating, David F. Ellicks, Department of the Air Force, Air Force Corrosion Program Office, Robins AFB, GA

11:00 a.m.
Supercritical Fluid Spray Application of Low-Pollution Coatings for Plastic Substrates, Wayne Miller and Kenneth Nielsen, Union Carbide Corporation, South Charleston, WV, and Tom Morrison, Red Spot Paint & Varnish, Evansville, IN

11:30 a.m.
Utilizing Dispersion Resins with Inorganci Solids in a New Formulary Blending Process to Achieve Synergistic Results of Performance (Expanded Abstract), Philip W. Coscia, Resources Conservatory International, Gustine, CA

Session 3: Powder Coatings, Moderator–Richard Sayad, Dow Chemical Company

1:15 p.m.
Advantages of Powder Coating, Albert Holder, Naval Surface Warfare Center, Annapolis, MD

1:45 p.m.
Aerospace Applications for Powder Coating at Hughes Aircraft Company, Larry Brown, Hughes Missile Systems Company, Tucson, AZ

2:15 p.m.
Fluoropolymer Coatings for Architectural, Automotive and General Industrial Applications, David M. Grafflin, Evodex Powder Coatings, Birmingham, AL

Session 4: Federal Programs, Moderator–John Warren, RTI

3:00 p.m.
US Navy Compliance to Shipbuilding and Ship Repair Environmental Regulations, Alex Kaznoff, Naval Sea Systems Command, Arlington, VA

3:30 p.m.
Low-VOC Coatings Developed by DOE for Environmentally Conscious Manufacturers, Mark D. Smith, Allied Signal, Inc., Kansas City, MO

4:00 p.m.
The Precedent-Setting Use of a Pollution Prevention Project in an EPA Enforcement Settlement, David Nelson, EnviroSearch International, Salt Lake City, UT, and James J. Periconi, Donovan Leisure Newton and Irvine, New York, NY

4:30 p.m.
Army Pollution Prevention Success Stories, Jack Hurd, Army Acquisition Pollution Prevention Support Office, Alexandria, VA, and Mark W. Ingle, Ocean City Research Corporation, Arlington, VA

Wednesday, May 26

Session 5: Encouraging Pollution Prevention, Moderator–Coleen Northeim, RTI

8:00 a.m.
Pollution Prevention Opportunities in Coatings: Educating Those who are Responsible for This Task, Robert B. Pojasek, GEI Consultants, Inc., Winchester, MA

8:30 a.m.
Economic Incentives to Stimulate the Development and Diffusion of Low- and No-VOC Coating Technologies, Brian Morton, Research Triangle Institute, Research Triangle Park, NC, and Bruce Madariaga, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC

9:00 a.m.
Pollution Prevention in the Wood Refinishing Industry, Azita Yazdani, Pollution Prevention International, Inc., Brea, CA

9:30 a.m.
The Importance of Product Stewardship and its Impact on Pollution Prevention, Richard Sayad, Dow Chemical Company, Midland, MI

Session 6: Inorganic Coatings, Moderator–Vic Young, Waste Reduction Resource Center

10:15 a.m.
Long-Term Corrosion Protection With Single-Coat, High-Ratio Zinc Silicate, Parke Schaffer, Jr., Inorganics Coatings, Inc., Malvern, PA

10:45 a.m.
Two Surprises From an Inorganic Zinc-Rich Silicate Coating, C. William Anderson, Marine Environmental Research, Inc., Morehead City, NC

11:15 a.m.
A New Inorganic Coating for Magnesium Alloys With Superior Corrosion Resistance, Alex J. Zozulin, Technology Applications Group, Inc., Grand Forks, ND, and Duane E. Bartak, University of Northern Iowa, Cedar Falls, IA

11:45 a.m.
Inorganic Chemistry as an Option for Formulating High Solids, Low- and Zero-VOC Architectural and Industrial Maintenance Coatings, Christine L. Stanley and Raymond Foscante, Ameron, Brea, CA

Session 7: High Solids & Water Based Coatings, Moderator–Wade Ponder, U.S. EPA/AEERL

1:30 p.m.
The Development of Practical Zero-VOC Decorative Paints, Richard Tuckerman and David W. Maurer, Glidden Company, Cleveland, OH

2:00 p.m.
New Environmentally Acceptable Metal Coating Systems, Peter C. Ryder, Hawking International Limited, United Kingdom, and Peter Hope, LVH Coatings Limited, United Kingdom

2:30 p.m.
Water-Reducible Polyurethane Coatings for Aerospace Applications, Patricia B. Jacobs and David C. McClurg (Speaker), Miles, Inc., Pittsburgh, PA

Concurrent Sessions

Session 8: Applications 1, Moderator–Kevin Dick, Nevada Small Business Development Center

3:15 p.m.
Water Based and UV-Cured Coatings for Plastics, Edwin C. Laird, Coatings Resource Corporation, Huntington Beach, CA

3:45 p.m.
Waterborne Lacquers for Aluminum Foil, William Marwick, Alcan International Limited, England

4:15 p.m.
Lower-VOC Coating System Conversion Costs for Wood Furniture Industry, Mary-Jo Caldwell, Midwest Research Institute, Cary, NC

4:45 p.m.
Development of Ultra-Low VOC Wood Furniture Coatings, Eddy W. Huang, Center for Emissions Research & Analysis, Larry Watkins, South Coast Air Quality Management District, and Robert C. McCrillis, EPA/AEERL

Session 9: Aerospace Applications, Moderator–Robert B. Pojasek, GEI Consultants, Inc.

3:15 p.m.
Replacement of Chromated Epoxy Primers for Ground Support Equipment and Flight Hardware, Marke E. Lindsay, Locheed Missiles & Space Company, Inc., Sunnyvale, CA

3:45 p.m.
An Investigation of Flexibility Test Methods for Low-VOC Aerospace Coatings, Angela J. Brown, Boeing Defense & Space Group, Seattle, WA

4:15 p.m.
Waterborne Maskant, Mark Jaffari, Malek, Inc., San Diego, CA

4:45 p.m.
Low-VOC Organic Coatings for Commercial Aircraft Application, T.D. Leland and C.M. Wong, Boeing Commercial Airplane Group, Seattle, WA

Thursday, May 27

Session 10: Auxiliary Systems, Moderator–Michael Kosusko, EPA/ AEERL

8:00 a.m.
Low Volatility Surface Preparation: A Hybrid Approach, Joseph A. Lucas, Inland Technology Incorporated, Tacoma, WA

8:30 a.m.
Transfer Efficiency and VOC Emissions of Spray Gun Technologies in Wood Finishing, Leslie Snowden-Swan, Pacific Northwest Laboratory, Richland, WA, and Pamela Worner, Pacific Northwest Pollution Prevention Research Center, Seattle, WA

9:00 a.m.
You Can't Always Judge a Paint Spray Gun Cleaning System By Its Cover, Michael J. Callahan and John P. Kusz, Safety-Kleen Corporation, Elgin, IL

Session 11: Applications 2, Moderator–Jack Kowal, Coors Brewing Company

9:45 a.m.
Priority Manufacturing and Environmental Issues at Military Industrial Facilities, John W. Adams, Richard S. Goldman, and Jerry R. Hudson, Concurrent Technologies Corporation, National Defense Center for Environmental Excellence, Jamestown, PA

10:15 a.m.
Low-VOC Dual-Cure Aerospace Topcoat, Kevin E. Kinzer and Steven J. Keipert, 3M Company, St. Paul, MN

10:45 a.m.
UV Pollution Prevention Technology in Can Manufacturing, Erik Donhowe, Coors Brewing Company, Golden, CO

Pollution Prevention Opportunities in the Manufacture of Paint and Coatings, Paul M. Randall, U.S. Environmental Protection Agency, Risk Reduction Engineering Laboratory, Cincinnati, OH

C. Northeim and E. Darden are with Research Triangle Institute, PO Box 12194, Research Triangle Park, NC 27709.
Michael Kosusko is the EPA Project Officer (see below).
The complete report, entitled "Proceedings: Pollution Prevention Conference on Low- and No-VOC Coating Technologies," (Order No. PB94-152246/AS; Cost: $61.00; subject to change) will be available only from:
National Technical Information Service
5285 Port Royal Road
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Telephone: 703-487-4650
The EPA Project Officer can be contacted at:
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