State of the Industry

Kevin A. Buck
Marketing Manager; Adhesives, Coatings & Elastomers
Huntsman
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Outline

• PDA’s 2018 Initiatives
  • What have we accomplished?
  • Future Direction

• Polyurea in 5 Minutes (or the Intro to the Intro to Polyurea Course)

• State of the Industry

• What the Future Holds?
2018 Initiatives – What has been Accomplished?

• Moved to regular, monthly Board of Director calls in 2017
  • Currently scheduled for 4th Thursday of every month
  • Calls are open to all members to participate and influence direction

• Establishment of Annual Budget
  • Movement away from a month-to-month operation back to annualized basis

• Updated Bylaws w.r.t. Board Members and Terms
  • Reinstated International Director (currently open)
  • Consolidated membership categories and established proposed composition of Board
  • Will propose to move terms to Calendar year, not with Annual Meeting
2018 Initiatives – What has been Accomplished?

• Website / Database
  • Website updated and launched on new servers
  • Created “Contractors Corner,” offering information on current opportunities available for bid

• Created Standards Committee
  • Working jointly with SSPC to turn PDA Guidelines into Industry Standards

• Initiated work on Polyurea Webinars
  • Chemistry for the Contractor (in-process)
  • Discussions for additional webinars (Environmental, Health and Safety with Polyurea; and Introduction to Polyurea)
2018 Initiatives – What has been Accomplished?

• Spray – Applicator Training
  • 2 sessions completed during 2018 with a 3rd scheduled for November
  • Only 1 during 2017 and 1 (not full) during 2016

• Association Management
  • As of May 31st, Ken Bowman retired and closed Robstan (Association Management Company since PDA’s inception)
  • Jennifer Crane and DeAnna Martin have launched a new AMC – Crane Martin
  • Crane Martin is currently handling PDA without a contract
2019 Potential Initiatives

• Creation of the “Contractor’s Key to Jobsites” – What do you need to look for and know

• Completion and launch of Webinar Series

• Finalize and unveil to the industry the SSPC / PDA Joint Standards

• Reach out to Academia and bring them back into the PDA family

• Creation of White Paper, demonstrating the strength of unreinforced Polyurea vs. a fully reinforced cold fluid applied membrane
Polyurea in 5 minutes
(or less)
Polyurea in 5 Minutes (or less)

A Technology, not an Application

**POLYURETHANE**

$$\text{OCN}_R\text{R}^*\text{NCO} + \text{HO}_R\text{R}^*\text{OH} \xrightarrow{\text{Catalyst}} \begin{array}{c}
\text{Urethane} \\
\text{link}
\end{array}$$

- Isocyanate Prepolymer
- Polyol

**POLYUREA**

$$\text{OCN}_R\text{R}^*\text{NCO} + \text{H}_2\text{N}_R\text{R}^*\text{NH}_2 \rightarrow \begin{array}{c}
\text{Urea} \\
\text{link}
\end{array}$$

- Isocyanate Prepolymer
- Polyamine

2018 Annual Conference
September 10 – 12
Polyurea in 5 Minutes (or less)

Reaction Conversion

**POLYUREAS**
- Fast cure without catalyst
- Lower reaction activation energy
- Broader temperature application range – mainly lower temperatures

**POLYURETHANES**
- Catalysts used to adjust cure kinetics
- Higher activation energies: more dependence on component temperature
- Maximum rate of reaction not at start

![Conversion Graphs](Image)
# Polyurea in 5 Minutes (or less)

*Polyurea vs. Hybrid vs. Polyurethane*

<table>
<thead>
<tr>
<th>Resin components</th>
<th>Polyurea</th>
<th>Hybrid</th>
<th>Hybrid</th>
<th>Polyurethane</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary</strong></td>
<td>Polyether amine</td>
<td>Polyether amine</td>
<td>Polyether polyl</td>
<td>Polyether polyl</td>
</tr>
<tr>
<td><strong>Extender</strong></td>
<td>Aromatic or aliphatic diamine</td>
<td>Glycol</td>
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</tr>
<tr>
<td><strong>Catalysts</strong></td>
<td>None</td>
<td>Yes</td>
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**NOTE:** Other additives may be present including UV stabilizers, adhesion promoters, compatibilizers, fillers, moisture scavengers.
Polyurea in 5 Minutes (or less)

*Segments vs. Applications*

**Segments**
- Transportation
- Infrastructure
- Oil & Gas
- Defense & Security
- General Construction

**Applications**
- Waterproofing
- Blast Mitigation
- Corrosion Protection
- Wear Protection
- Primary and Secondary Containment

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2018 Annual Conference
September 10 – 12
Pure vs. Hybrid vs. Polyurethane

*Why choose one over another?*

- **Cost vs. Performance**
  - Is Polyurea the correct choice?
    - What are the key performance parameters?
    - Keep an open mind

- **Aromatic vs. Aliphatic**
  - Is UV color stability necessary?
    - Can desired performance be achieved with a topcoat?

Increasing Performance

<table>
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<th>Aromatic Polyurethane</th>
<th>Aliphatic Polyurea</th>
<th>Specialty Systems</th>
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<td>Increasing Cost</td>
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2018 Annual Conference
September 10 – 12
State of the Industry
In one word - Consolidation

- Consolidation occurring not only in the SPF and Coatings market...
In one word - Consolidation

• But also in the Chemical Material Distribution Standpoint
Material Availability

• Raw Material Supply Continues to Change

Albemarle Declares Force Majeure Due to Shortage of Key Raw Materials in Urethane Supply Chain

BASF further expands production capacity at specialty amines complex in Nanjing, China
- Multi-product specialty amines plant
- Supports rising demand for specialty amines in Asia
- Startup planned in 2019

Ludwigshafen, Germany and Shanghai, China – September 25, 2017

11 Jul 17
Huntsman Completes Capacity Expansion at Singapore Specialty Amines Facility

The Performance Products division of Huntsman Corporation (NYSE: HUN) today announced it has completed the expansion project at its world-scale amines facility in Singapore, with plant capacity now totalling 50,000 tons.

FOR IMMEDIATE RELEASE
July 11, 2017

THE WOODLANDS, Texas – Huntsman Corporation today announced that it has completed a 25,000-ton capacity expansion project at its world-scale amines facility on Jurong Island in Singapore, with plant capacity now totalling 50,000 tons. Approximately 50 employees and contractors work at the facility.
United States
Infrastructure Challenges
Public Infrastructure Spending

Public Infrastructure Has Been Neglected
Infrastructure needs, funded and unfunded, 2016-2025

- **Roads, bridges, transit**: $2 trillion
- **Electricity**: $934 billion
- **Schools**: $870 billion
- **Waterways, ports, levees and dams**: $162 billion
- **Airports**: $157 billion
- **Rail**: $154 billion
- **Water and wastewater**: $150 billion
- **Public parks and recreation**: $114 billion
- **Hazardous and solid waste**: $7 billion

Source: American Society of Civil Engineers 2017 Infrastructure Report Card and Failure to Act series, published 2011-2017
Public Infrastructure Spending

State and Local Governments are the Key

State and Local Governments Own Vast Majority of Public Capital

Value of public non-defense buildings and other structures, 2015

- $731 billion (7%) Federal (non-defense)
- $9.6 trillion (93%) State and local

State and Local Spending on Infrastructure Is at 30-Year Low

State and local capital spending as a share of gross domestic product, 1945-2015

Source: U.S. Bureau of Economic Analysis Fixed Assets

Source: U.S. Bureau of Economic Analysis, based on BEA gross investment which includes spending on structures, equipment, and software.
“Top 10” States with the Worst Infrastructure

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Water and Wastewater Infrastructure

A Continuing Issue according to AWWA

- 2018 State of the Water Industry report
  - Little change in industry health since 2015

- Renewal and Replacement still #1 concern in the industry while Financing for Capital Improvements #2

- Concern over the workforce is now showing up in the Top 10 main issues – specifically
  - Talent attraction and retention
  - Workforce diversity
  - Operator pay rates
  - Loss of trained and experienced employees due to retirements and lack of suitable replacements
Water and Wastewater Infrastructure
*A Continuing Issue according to AWWA*

- Renewal and Replacement Challenges
  - Infrastructure reliability is critically important
  - Access to capital is similar to or better than it has been in the last 5 years
United States Bridge Infrastructure

- U.S. has ~ 614,000 Bridges in Inventory
- National Backlog of Bridge Rehab ~ $123 billion
United States Bridge Infrastructure

Situation is Slowly Improving but Inventory is Aging
Public Infrastructure Spending

- Infrastructure Spending fell in 2017 to $293 billion
- Preliminary projections for 2018 are showing an increase, primarily due to a significant backlog in projects
Public Infrastructure Spending

- Starting backlog is up > 100% for the last 2 years
  - Transportation Terminal Start jumped 120%
  - Rail Projects increased > 100%
  - Overall Transportation projects + 20-25% for the next 2 years
- 2018 Forecast Growth 8.6%
What does the future hold?

Improving Economic Activity for 2018-2019

- Global economic growth projected to be 3.9% in 2018 and 2019
  - Advanced economies (U.S., Japan, Euro-area) projected to increase 2.4% during 2018 and 2.2% for 2019
    - Direct contractionary effects of tariffs are expected to be small
  - China expected to moderate to 6.6% in 2018 and 6.4% for 2019
    - Regulatory tightening of financial sector
    - Softening of external demand
  - Latin America expected to grow 1.6% in 2018 and 2.6% in 2019
    - Driven by higher commodity prices

Source: International Monetary Fund 2018 World Economic Outlook UPDATE, July 2018
Last Words....

• Thank you to our Board Members whose 2 year terms are expiring
  • Staci Wegener, BASF Corporation
  • Andy Phelan, Rhino Linings Corporation
  • Don Dancey, Innovative Painting & Waterproofing, LLC
    • Second go around serving as a Director
    • Past PDA President (2009-2010)
  • Ray Scott, PolyTech Consulting, Inc.
    • Founding Member of PDA
    • Past PDA President (2002-2004)
    • Interim Past President (2017)
Last Words....

• And to the Executive Board Members dropping off
  • Winston Gillies, ACE Dragon Coatings & Foam, Inc.
    • PDA Treasurer (2015-2018)
    • Board of Directors (2013-2014)

• Benny Abbot, Specialty Products, Inc.
  • Immediate Past President (2018)
  • PDA President (2016-2017)
  • President-Elect (2015)
  • Board of Directors (2013-2014)
And Now…. 

• Welcome to Rebekah Taylor as the PDA’s President……