Methanol Safe Handling & Poison Prevention

Dom LaVigne
Director of Government & Public Affairs -- Asia Pacific/Middle East

Methanol Safety Presentation
December 2016
Contents

- About MI
- What is Methanol?
- Methanol Safety
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History

- The Methanol Institute (MI) was first formed in 1989 to represent US methanol producers in Washington.

- 27 years later, MI is truly a global trade association supporting the expansion of the methanol industry in every corner of the world from offices in:

  Singapore | Washington | Brussels | Beijing
MI STRATEGIC PARTNERS

- Asian Clean Fuels Association
- Bach Mai Hospital Poison Control Center
- China Nitrogen Fertilizer Industry Association
- Chinese Association of Alcohol & Clean Ether Fuels & Automobiles (CAAEFA)
- Gulf Petrochemicals and Chemicals Association (GPCA)
- Hanoi Medical University (HMU-IPMPH)
- International DME Association (IDA)
- International Methanol Producers & Consumers Association (IMPCA)
- LIAM Charitable Fund
- Peking University Center for New Global Energy Strategy Studies
- Tajikistan State Committee on Investment
- Uzkimyosanoat
Committee Structure

Engagement

- R & D
  - Conversion technology
  - Environmental
  - Economics
  - Advocacy

- Legal & Regulatory Affairs Committee
  - Safe Handling tools
  - Health effects research
  - Training

- Global Reach
  - Awareness
  - Education
  - Prevention

- Market Development Committee
  - Technical assistance
  - Market research
  - Development

- Global Fuel Blending Committee
  - Research
  - Commerciality
  - Specifications

- Legislative & Regulatory Affairs Committee
  - Bridging science to regulatory
  - Public policy
  - Derivative support

- Medical & Regulatory Affairs Committee
  - Tools
  - Health effects research
  - Training

- Best Practices & Safety Committee
  - Technical assistance
  - Market research
  - Development

- Product Stewardship Committee
  - Research
  - Commerciality
  - Specifications

- Strategic Partnerships Committee
  - Technical assistance
  - Market research
  - Development

- Marine Fuels Committee
  - Safe Handling tools
  - Health effects research
  - Training

- Bootleg Alcohol Prevention Sub-Committee
  - Awareness
  - Education
  - Prevention
Product Stewardship

- Develop safe handling tools
- Organize methanol health effects research
- Provide training & guidance to emerging market leaders
- Bootleg (adulterated) alcohol prevention programs
Bootleg Alcohol Prevention

- Develop sustainable, global pilot program to prevent methanol poisonings
- Two current programs: Indonesia and Vietnam
- Community & Medical Education focus
MI Web Site

- Central, global methanol hub:  [www.methanol.org](http://www.methanol.org)

- Information & Resources available for methanol buyers, consumers/general public, governments, media, etc.
Technical Bulletins

- Communicates best practices to handle methanol at distribution points
- Technical information accessible (free)
02 WHAT IS METHANOL?
Feedstock: Abundant/Sustainable

Market: Large/Diverse

Methanol:
- M3
- M15
- M85
- M100
- GEM
- MTBE
- biodiesel
- DME
- marine
- fuel cell
- MTG

Chemicals:
- plastic
- paint
- glue
- and much more

Syngas

Fuels & Energy

RENEWABLE
- Biomass
- CO2
- Non-bio

FOSSIL

WWW.METHANOL.ORG
# Methanol: Essential Chemical Building Block

![Methanol in Our Lives Diagram](image)

## Methanol In Our Lives

<table>
<thead>
<tr>
<th>Primary Derivatives</th>
<th>Derivatives</th>
<th>Diverse Demand Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FORMALDEHYDE</strong></td>
<td>Urea formaldehyde</td>
<td>Renovation, new building activity, automobile production, panelboard substitution for solid wood, changing wood panel mix, growth in high technology chemicals.</td>
</tr>
<tr>
<td></td>
<td>Phenol formaldehyde</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,4 butanediol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acetal Resins</td>
<td></td>
</tr>
<tr>
<td><strong>ACETIC ACID</strong></td>
<td>Acrylic esters</td>
<td>Building activity, durable output: automobile production, clean air legislation, packaging trends, growth in plastic recycling, paints and coatings.</td>
</tr>
<tr>
<td></td>
<td>Acetic anhydride</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acetophenone, acetic acid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solvent acetate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solvent esters</td>
<td></td>
</tr>
<tr>
<td><strong>CLEAN FUELS</strong></td>
<td>Methanol-water blends</td>
<td>Demand for better health/cleaner environment, clean air legislation goals, displacement of gasoline components e.g. lead, aromatics, safety and engine performance.</td>
</tr>
<tr>
<td></td>
<td>Fuel cell “hydrogen-carrier”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reformulated gasoline</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E85</td>
<td></td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td>Methyl methacrylate</td>
<td>Total chemical production, general economic activity, alternative fuel developments, environmental pressures.</td>
</tr>
<tr>
<td></td>
<td>Methylene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chloromethanes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Direct use</td>
<td></td>
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</tbody>
</table>
Where is Methanol Produced?

- **2016**: 115 MMT global capacity; **74 MMT** forecasted demand
- **2021**: 135 MMT global capacity; **97 MMT** forecasted demand

China accounts for over 50% of the world’s methanol production and consumption.

**Methanol production markets include:**
Azerbaijan, Brunei, China, Equatorial Guinea, Iran, Kingdom of Saudi Arabia, Malaysia, New Zealand, Oman, Russia, Trinidad & Tobago, United States, Uzbekistan

- **Significant new US capacity** in the coming years

Source: IHS Markit, November 2016
Global Methanol Chemical & Energy Demand

Source: IHS Chemical

© 2016 IHS
Oil Displacement Drives Demand Growth

Global Methanol demand by application (Million Metric Ton)

China methanol demand by application (Million Metric Ton)

Source: IHS Chemical, November 2015
Methanol’s Benefits

1. **Safe**
   - Methanol biodegrades quickly
   - Soluble in water
   - Can be washed off with soap/water
   - Harder to ignite than petrol, burns with 1/8 the heat

2. **Economical**
   - Economically competitive, non-subsidized
   - Produced from variety of feedstocks
   - Complex infrastructure, handling not needed

3. **Proven**
   - 74 MMT worldwide demand forecasted for 2016
   - 160,000 vehicles in China using methanol fuel
   - Stena *Germanica*, Methanex new-build tankers
03 METHANOL SAFETY
While accidents can happen, *most of these incidents were preventable.*

Understand methanol handling risks – mitigate those risks

Product stewardship: primary concern for MI & members

MI’s methanol safe handling tools
## Must Knows of Methanol

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable</td>
<td>Burns with a clear, low heat flame</td>
</tr>
<tr>
<td>Biodegrades</td>
<td>Quickly</td>
</tr>
<tr>
<td>Soluble</td>
<td>In water</td>
</tr>
<tr>
<td>Toxic</td>
<td>As absorbed in the body</td>
</tr>
<tr>
<td>Impact</td>
<td>Confined to size of spill</td>
</tr>
</tbody>
</table>
Managing the Health Risk

Four Routes into the Body

Inhalation
Skin Contact
Eye Contact
Ingestion

Methanol
Managing the Health Risk

Treatment for Inhalation

Remove the person to fresh air - IF IT IS SAFE TO DO SO.

May require artificial respiration.

Obtain medical attention – possibility of delayed onset of symptoms.
Managing the Health Risk

Treatment for Skin Contact

Remove clothing that is soaked with methanol; treat clothing as hazardous (flammable).

Wash affected area with soap and water for 15 minutes.

If irritation occurs, seek medical attention.
Managing the Health Risk

Treatment for Eye Contact

Immediately flush with gently running water.

Continue for at least 15 minutes

Ensure all surfaces and crevices are flushed by lifting upper and lower eyelids.

Obtain medical attention.
Managing the Health Risk

Treatment for Ingestion

Swallowing even small amounts of methanol can be life threatening.

Onset of symptoms may be delayed for 18 – 24 hours

Do **NOT** induce vomiting

Obtain medical attention immediately

Drinking ethanol blocks methanol metabolism

Hospital injection of Fomepizole
04

BOOTLEG ALCOHOL PREVENTION
Bootleg Alcohol Poisoning is a Global Issue
India Methanol Poisonings

- Nearly 5,000 cases since 1992
- 1,500+ fatalities

Causes:

- High taxes and bans on alcohol
- Improperly-brewed alcohol
- Methanol-laced legitimate spirits
- Adulterated alcohol sold in legitimate packaging
Symptoms

- Hyperventilation
- Visual disturbances, blindness
- Headache, vertigo
- Vomiting, abdominal pain
- Coma, Death

Onset of Symptoms can vary from 30 mins to 72 hours; average is 24 hours.
Treatment Options

1. Fomepizole
2. Oral or IV Ethanol

Administer #1 or #2 immediately

Duration of antidote: Give until 12-24 hours after dialysis is finished or until blood results are normal.

3. Dialysis (intermittent, high flow): give for least 6-8 hours;
MI Bootleg Alcohol Prevention Subcommittee (BAPS) Mission

- Protect public health, mitigate incidences of global mass poisonings
- Mission: Develop sustainable, global pilot program
- Pillars: Community & medical education, law enforcement, government
- Indonesia programs began in 2013; Vietnam in 2016
Community & Medical Education Programs (CEP & MEP)

- CEP: Educate local communities about methanol poisoning

- MEP: “Train-the-trainer” programs for medical/healthcare workers

- Hanoi Medical University (HMU) research study in Phu Tho Province

- Govt: Relationship-building, training with health & law enforcement authorities
Government & Law Enforcement

- Collaborate with political stakeholders, food safety departments
- Briefings for country travel boards
- Seek inclusion of poisoning training in medical school curricula
Pharmaceutical & Technological Goals

- **Goal 1: Consumers**: Litmus dipstick test to check for methanol in beverages
- **Goal 2: Medical professionals**: Glucose-based, diabetes-like prick test
- **Goal 3: Technology**: Develop cheaper method for identifying alcohol content in unopened bottles
- **Goal 4: Pharmaceutical**: Make Fomepizole cost-affordable and widely available
Possible Areas for Collaboration

• Indian toxicology and poison control center professionals
• Identify collaboration opps with global partners
• Active data monitoring and response to at-risk locales
• Fomepizole & detection technology availability
• MI educational information dissemination
05
WE ARE HERE
TO HELP
CONTACTS

01 • GREG DOLAN
CEO
gdolan@methanol.org

02 • CHRIS CHATTERTON
COO
cchatterton@methanol.org

03 • DOM LAVIGNE
Director of Government & Public Affairs (AP/ME)
dlavigne@methanol.org / +65 6325 6302

04 • LARRY NAVIN
Senior Manager External Affairs
lnavin@methanol.org

05 • EELCO DECKER
Chief EU Representative
edekker@methanol.org

06 • KAI ZHAO
Chief China Representative
kzhao@methanol.org

07 • APRIL CHAN
Executive Manager
achan@methanol.org

08 • SHEEVA NOSHIRVAN
Executive Assistant
snoshirvan@methanol.org