Coatings Industry Perspective

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Assessing and Managing Toxic Risk from Alternative VOC Compounds
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Assessing and Managing Risk from Alternative VOC Compounds

- The REAL responsibility for manufacturers of paints and coatings is managing ….
  - ALL ***health, safety and environmental*** risks from
  - ALL ***hazardous substances*** used in formulations
- Today's symposium, however limited in scope, has precedent for policymaking

Formulating a Paint

- The “simple” breakdown of components:
  - The FILM…. generally a polymer comprised of diverse monomers that help impart required performance properties for the applied substrate (i.e. “scrub-ability”, gloss retention, scratch resistance, flexibility, etc.)
  - The PIGMENTS… generally used to “hide” the surface, provide “color”, or allow for some other useful property (i.e. corrosion inhibition, UV reflectance, etc.)
  - The “ADDITIVES”… generally that help the formulation succeed by allowing it to flow onto the substrate, flatten out, and adhere properly over time… but there are many more additive functionalities
  - The SOLVENT… increasing just water (globally 85% of architectural coatings and greater than 50% of industrials)
    - NO SECRET WHY – “environmentally preferable”, … cheaper
    - So why continued use of VOC’s (and non-VOC alternative compounds)?
      - TECHNICALLY NECESSARY

The Ongoing "VOC" Management Issues

- Acknowledged ***overall decreasing use of VOC's*** by the paint and coatings industry
  - A **GLOBAL** phenomena driving R&D
- Real ***and*** unfounded ***activist concerns*** about chemicals management (general and specific)
- Customer requirements (performance)
- Proactive innovation requires a diverse focus
  - ***For the record, it is not all about VOC's!***

Some Terminology

- Risk Assessment
  - the determination of quantitative or qualitative value of **risk** related to a **concrete situation** and a **recognized threat** (also called **hazard**).
- Risk Management
  - is the identification, assessment, and **prioritization** of risks followed by coordinated and **economical** application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events
- Risk Mitigation
  - Is the systematic reduction in the extent of exposure to a risk and the likelihood of its occurrence… also called **RISK REDUCTION** (NOTE: No prioritization requirement, no economic consideration, and focus is on RISK REDUCTION – which often centers around **USE REDUCTION**)

Industry Trade Practice

- ***Product Stewardship***… a dynamic practice that is defined and evolving, covering all aspects of…
  - Product Design
  - Raw Material Selection
    - **Product/Risk Management Strategy**
  - Manufacturing Processes
  - Packaging, Labeling and Hazard Communication
  - Shipping and Transport
  - Customer “care”… product performance as well as end use and application concerns
    - Air Pollution Control
    - Worker Health and Safety
    - Waste Management

Product Risk Management Strategy

- Both (inherent) hazard and exposure influence risk which can be managed by:
  - Selecting a chemical ingredient with less hazardous properties
  - Limiting exposure (Administrative Means, Personal Protection Equipment, Engineering Controls)
- Coordinated efforts between the raw materials supplier (hazards) and the coatings manufacturer (exposure)

Product Risk Management Strategy

- Exposure assessment can be done at **many levels of sophistication**
  - **Subjective** - “High vs. Low” (i.e. VOC’s vs. Pigments)
  - **Qualitative** - Low vs. High Vapor Pressures, FLAMMABILITY
  - **Quantitative** – More important for high hazard potential (i.e. STOT, Chronic Toxicity and FLAMMABILITY)
- **Informed decision** on whether or not the materials may be acceptable to safely manufacture and use the finished coating
  - More often than not, the fire risk of VOC’s drives decision (defined loss experience)

Industry Trade Practice - LABELS

- Labels convey defined HAZARDS and PRECAUTIONS for use (Risk Management Information)
  - ACA Industry Labeling Guide (Fifth Edition) established labeling practices
    - Aligned with OSHA and CPSC requirements (FHSA)
    - Interprets “level of evidence” for “appropriate hazard warnings”
    - Integrates use experience (dynamic nature of labeling)

Industry Trade Practice - GHS

- Revised OSHA Hazard Communication Standard (HCS) adopts United Nations Globally Harmonized System (GHS) for Classification and Labeling of Hazardous Chemicals
  - GOAL: Harmonized classifications help establish effective risk communication; workers and other end users get consistent, reliable hazard information - INFORMS USE DECISION

Sample Label 1: Assigning Hazards
OSHA HCS 2005

DANGER!

EXTREMELY FLAMMABLE LIQUID AND VAPOR
VAPORS MAY CAUSE FLASH FIRE
VAPOR HARMFUL. CAUSES EYE, SKIN, NOSE
AND THROAT IRRITATION.

Contains Acetone, Toluene, Heptane, and Isopropyl Alcohol. May affect the brain or nervous system causing dizziness, headache or nausea. Harmful or fatal if swallowed.

NOTICE: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

Vapors may ignite explosively. Keep away from heat, sparks and flame. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone. Prevent build-up of vapors by opening all windows and doors to achieve cross-ventilation.

Use only with adequate ventilation. Do not breathe vapors or spray mist. Ensure fresh air entry during application and drying. If you experience eye watering, headache or dizziness or if air monitoring demonstrates vapor/mist levels are above applicable limits, wear an appropriate, properly fitted respirator (NIOSH approved) during application. Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

First Aid: If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical attention immediately. If swallowed, do not induce vomiting. Get medical attention immediately. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. (Destroy contaminated shoes.)[1] (Thoroughly clean contaminated shoes.)[1]

If spilled, contain spilled material and remove with inert absorbent. Dispose of contaminated absorbent, container and unused contents in accordance with local, state and federal regulations.

KEEP OUT OF REACH OF CHILDREN

Company name and address

Sample Label 1: Assigning Hazards
OSHA HCS 2012

PRODUCT ABC

DANGER

Highly flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes serious eye irritation
Causes skin irritation
May cause drowsiness or dizziness
Suspected of damaging fertility
May cause damage to organs through prolonged or repeated exposure

Prevention: Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep container tightly closed. Ground/Bond container and receiving equipment, Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wear protective gloves/eye protection/face protection. Wash [insert appropriate areas] thoroughly after handling. Use only outdoors or in well-ventilated area. Avoid breathing dust/fume/gas/mist/vapors/spray. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product.

Response: In case of fire, use [appropriate media, specified by the manufacturer/supplier or the competent authority] to extinguish. If on skin (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. If on skin: Wash with plenty of soap and water. Take of contaminated clothing and wash before re-use. If skin irritation occurs, seek medical advice/attention. If swallowed, or you feel unwell: Immediately call a poison control center or doctor/physician. Do NOT induce vomiting. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. Specific treatment (see ... on this label). If inhaled: Remove to fresh air and keep at rest in a position comfortable for breathing. If exposed or concerned: Get medical attention/advice.

Storage: Store locked in a well-ventilated place. Keep cool.

Disposal: Dispose of contents/container in accordance with local/regional/national/international regulations.

Company name and address
Telephone Number

Sample Label 5: Powder Coatings
OSHA HCS 2005

WARNING!

POWDER DUST CAUSES IRRITATION TO EYES,
SKIN, NOSE, THROAT AND LUNGS.
POWDER DUST MAY FORM EXPLOSIVE MIXTURE WITH AIR.

Contains: (Name specific ingredients that contribute substantially to the product's hazard.) Avoid breathing powder dust. Wear an appropriate, properly fitted respirator (NIOSH approved with approved dust pre-filter) during application unless air monitoring demonstrates dust level is below applicable limits. Follow respirator manufacturer's directions for use. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Finely divided powders are potentially explosive when suspended in air. Keep away from heat, sparks, flame or any type of ignition sources including static electricity, welding or flame cutting operations.

First Aid: In case of eye contact, flush immediately with plenty of water for at least 15 minutes and get medical attention. If inhaled, or swallowed, get medical attention.

In case of spillage, sweep or collect with vacuum equipment approved for use in hazardous locations and place in closed impervious container for disposal. Dispose of in accordance with local, state or federal regulations.

FOR INDUSTRIAL USE ONLY
Company name and address
Phone Number

Sample Label 5: Powder Coatings[1]
OSHA HCS 2012

PRODUCT ABC

DANGER

Toxic if swallowed.
May cause an allergic skin reaction.
Causes serious eye damage.
Toxic if inhaled.
May cause genetic defects.
May Cause damage to organs through prolonged or repeated exposure
May form combustible dust in concentrations in air

Prevention: Wash [insert appropriate areas] thoroughly after handling. Do not eat, drink or smoke while using this product. Avoid breathing dust/fume/gas/mist/vapor/spray. Use only outdoors or in well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves. Wear eye protection/face protection.

Response: If swallowed, or you feel unwell: Immediately call a poison center/doctor. Specific treatment (see… on this label). Rinse mouth. If on skin: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If inhaled: Remove victim to fresh air and keep comfortable for breathing.

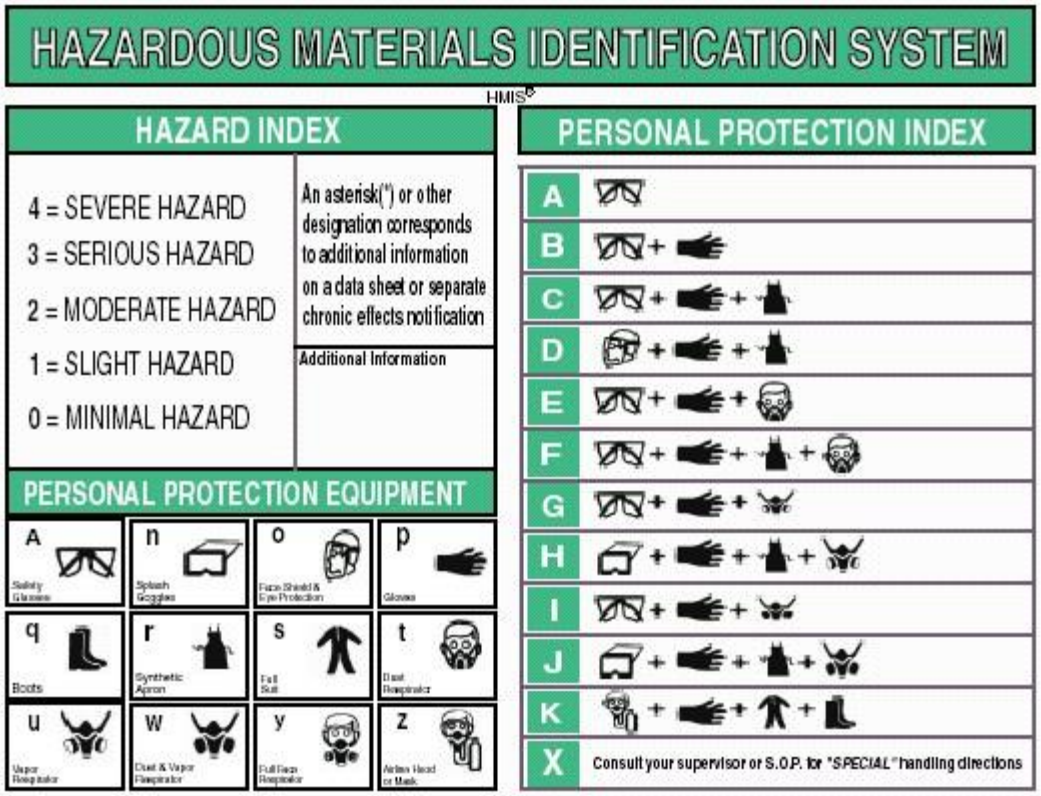
Storage: Store locked up. Store in well-ventilated place. Keep container tightly closed.

Disposal: Dispose of contents/container in accordance with local/regional/national/international regulations

Company name and address
Phone Number

Industry Trade Practice – Customer Support

Workplace Labels and Information:
Work in Conjunction with the Safety Data Sheets and Worker Training



Industry Trade Practice

- Individual (company) efforts – INNOVATION
  - Research and development… "first mover" opportunities vs. "status quo" impacts (TRUE TECHNOLOGY FORCING)
    - CUSTOMER ACCEPTANCE OF NEW TECHNOLOGY – TRAINING AND ONGOING SUPPORT
  - Shared company efforts
    - Research consortiums
    - Venture capital
  - **ALL require reliance on the "official" PROCESS**
    - **Supportive role of GOVERNMENT (including enforcement of EMPLOYER responsibilities)**

Industry Trade Practice

- Collective efforts - COMPLIANCE AND ADVOCACY
  - Reliance on the administrative **process** (ADVOCACY)
    - Constructive notice
    - Comments and testimony
    - Judicial review and litigation
  - Technical guidance (COMPLIANCE)
    - Communicating required formulation changes, administrative aspects
    - Assisting in addressing manufacturing constraints
    - Supporting customer REQUIREMENTS

Informing Policy

- The **role of scientists** (in science policy)…
  - Provide a valid, ADVISORY assessment to policymakers on the likely consequences of their available decisions (i.e. “go” or “no go”)
    - Scientists advisory assessments may differ…
    - Accordingly, adherence to legally established PROCESS is important…
  - Important for scientists to NOT engage in advocacy (published literature has shown such advocacy “disrupts” credibility of process, increases likelihood of legal challenge)

Bottom Line

- The coatings industry and its raw material suppliers are responsible makers/users of chemicals
- Additions to the “formulary” are done carefully, and reflect technical limitations/customer requirements
- Downstream users are informed and able to use the industry’s products safely
- Policymakers, and the regulated community can rely on the legally established processes for decision-making