Trends, Problems & Metal Finishing Outlook

TURI Metal Finishing Forum
May 20, 2004

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The Policy Group
Snapshot: Surface Finishing in 2004

Globalization Pressures & Challenges

Asia
Pressures on Prices

Global Sourcing

U.S.
Pressures on Processes

Coating Options

Europe
Pressures on Products

New Market Demands
Snapshot: Manufacturing Job Losses Since 2000

- Of the 2.8 million total, over 50% of job losses in five industries:
  - Computer & electronics
  - Transportation equipment
  - Machinery
  - Fabricated metals
  - Apparel

- 17 of 21 industries constituting U.S. manufacturing sector have sustained losses exceeding 10 percent

- Surface Finishing Market Research Board – loss of 40K – 70K jobs

- This time really is different – Cyclical vs. Structural Losses
  - Over 70 percent structural losses
U.S. Import Trends from China and from Other Pacific Rim Countries (% of total U.S. imports)
Output & Employment in the Manufacturing Sector: Jobs Down, but Output Constant

Manufacturing Employment as Share of Total Employment
Manufacturing Output vs. Real GDP
Competitiveness: Cost Position of U.S. vs. Trading Partners

Raw Cost Position of the United States and Its Nine Largest Trading Partners, 2002

U.S. dollars per hour worked

Impact of external overhead costs

Supply Chain Trends & European Pressure

Drivers

US Regulatory and Overhead Demands

* EU Directives & Market Demands

Global Competition

OEMs & DoD

Primary Suppliers

Finishing

Agenda for Surface Coatings: Engagement - Procurement / R&D

Design of Products, Practices, Protocols

Surface Coating Options & Solutions

Research, Procurement Policies

Responses
Pentagon: Driver or Bellwether on Emerging Technologies & the Environment?

- $100 million in funding for enviro research & testing programs
  - Focus on non-electrolytic processes
  - Recent Pentagon meetings on metals & coatings technology
    - December 2003 – Joint Strike Fighter & nickel
    - March 2004 – corrosion #1 priority / “dry coatings” at depots

- Finishing Strategy: Informing Pentagon R&D Priorities, Analysis and Procurement & Maintenance
  - Key Industry Concerns:
    - Eliminate potential “bias” in emerging decision making
    - Review environmental impacts, functionality / applicability & cost in programs

- Project: Joint DoD-Finishing Industry Symposium / Workshop on Technology
Pentagon – Selected Technology Programs focusing on Reduced Environmental Impacts

- Department of Defense Environmental Security Technology Certification Program
- Department of Defense Joint Group on Pollution Prevention
- Department of Defense Propulsion Environmental Working Group
Key Websites: HCAT.ORG / SERDP.ORG

Or go to www.hcat.org

- Click on HCAT Member Workspace
- Check that you have the proper browser
- Click button to enter site

Username: hcatguest
Password: hcat
Significant U.S. “Non-Regulatory” Developments for Nickel

RECENT ACTION (U.S. National Toxicology Program)
- 10th Report on Carcinogens – December 2002
- **Determination**: Nickel compounds upgraded to “known” human carcinogen
Significant U.S. “Non-Regulatory” Developments for Nickel

- PENDING ACTION (US EPA Risk Assessment)
  - Major decision on soluble Ni compounds
  - Industry study (TERA, 1999) and scientific input have role in outcome

- KEY: EPA currently engaging in additional round of internal review in light of NTP nickel listing (& EU developments)

- Expected publication – Imminent?
Nickel Developments: Pressure on Processes & Products

New US HHS Cancer Classification and US EPA Risk Assessment

- **Regulatory**: Triggers or accelerates new regulation
  - OSHA hazard communication
  - Review of OSHA permissible exposure limits
  - Review of EPA requirements – esp. air, water

- **Market**: Material end uses / “de-selection” in supply chain
  - Automotive
  - Aerospace / defense

- **Industry Action**: Engagement with Decision makers
  - The Regulatory “Domino Effect”
  - Changing “Vicious Circle” to “Virtuous Circle” in the federal regulatory / research agenda
Nickel & Automotive Trends

Europe: Nickel is NOT currently included in ELV Directive

- BUT, potential negative decisions re EU nickel risk assessment could “override” even favorable US decisions on H&E risk

- Future Scenarios for Automotive
  - Market: Restricted Materials Management Policies
    - RMMS currently in place address mainly reporting for substances of concern

- Industry / GR Engagement with OEMS, Tier 1/Tier 2
California Nickel Developments: Drinking Water

Office of Environmental Health Hazard Assessment (OEHHA) Public Health Goal (PHG) for Nickel Compounds

- PHG for nickel compounds lowered to 12 ppb from 50 ppb (2001) – initial proposal was 1 ppb
- U.S. EPA drinking water standard ~ 100 ppb
- Background sources – OEHHA reported avg. 15

- PHG is NOT a regulatory standard!
Los Angeles Basin Nickel Developments

South Coast Air Quality Management District
Rule 1426 – Adopted May 2003

- Emission controls considered for non-chromium plating operations, including nickel
- AQMD used Negotiated Rulemaking process to identify regulatory options and develop rule
- Rule is essentially a 2-year mandatory data collection effort (purchase records, NO source testing):
  - Non-chrome electroplating operations
  - Not applicable to electroless nickel operations
OSHA Chrome Worker Exposure Limit

Impacts

- Hard & Deco Chrome & Anodizing

Rulemaking Milestones

- Small Business Impact Review – Completed
- Notice & Comment – Fall 2004
- Hearings – Winter 2005

Significant Issues

- Economic Feasibility – Latest OSHA estimate = $5,000
- Technical Feasibility – Challenge of reaching low levels
Current PEL: 100 ug/m³ Chromic Acid
52 ug/m³ CrVI (ceiling concentration)

Revised PEL:

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Chrome PEL: Components of A Final Rule

- Dramatically Revised PEL
- Action Level
- Exposure Assessment
- Segregated Regulated Areas
- Methods of Compliance
- Respiratory Protection
- Protective Work Clothing
- Hygiene Facilities/Practices
- Housekeeping
- Medical Surveillance
- Hazard Communication
- Recordkeeping
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Regulation-Driven Technologies: US OSHA Replacement Options for Cr Electroplating

- **Substitute Materials**
  - Trivalent Chromium
  - Nickel-Boron Plating Chemicals
  - Cobalt-Based Plating Chemicals

- **Substitute Processes**
  - Pressure Controlled Atomization Process (Thermal Spray)
  - High Velocity Oxygen Fuel Processes
  - Amorphous Nanocrystalline Composite Depositions
  - Flexible Preceramic Coatings Deposition
  - Organic Sealants Application
  - Inductive Coupled Radio Frequency Plasma Torch
Finishing’s $100,000 Regulatory Relief Package: 
Selected Targets

- Hazardous Waste
  - F006 Rule

- Water (Post-MP&M Rule)
  - Pretreatment Streamlining Rule

- Air
  - Exemption from USEPA federal permitting requirements
  - Chrome air toxics regulations

- Risk
  - Revise USEPA criteria for assessing metals
  - Inform OEM / Pentagon research efforts
  - Inform US and European risk / regulatory efforts on nickel in products

- OSHA
  - Chrome worker exposure limits
Selected Government Relations Projects / Products & Initiatives

- “Future of Finishing” – $75,000
- Surface Finishing Technology Symposium – Pentagon
- Benchmarking Tools for Surface Finishing - $200,000
- EMS / ISO 14000 Training Programs – $200,000
- Nickel Finishing Emissions Study – $75,000
- “Nickel Strategy Group” with Nickel Institute
- Nickel Carcinogenicity Study – NiPERA – $1.2 million
The Future of Surface Finishing

Multiplicity of Challenges

Markets

Economics

Technology

Sustainability

Regulation
Where the Industry’s Going...

- Strategy – The Long Term...
  - Assess trends
  - Anticipate impacts
  - Measure opportunities
  - Offer solutions
  - Launch the right initiatives
  - Execute effectively
  - Succeed in the future!