



In the effort to preserve and maintain the fragile ecology of our planet, these recently selected abstracts are presented to help readers of *Journals of Materials Engineering and Performance* stay current on legislation and compliance with global environmental issues and regulations. They are reprinted from *Metals Abstracts* and *Materials Business File* with permission from *Materials Information*, a joint service of *ASM International*,[®] *Materials Park, Ohio*, and the *Institute of Materials, London, England*.

Estimate of Maximum Ambient Isocyanate Levels From an Isocyanate-Based Clearcoat Application. In the Fall of 1989, a major automotive assembly plant in Michigan became one of the first U.S. plants to spray a two-component, polyisocyanate-base clearcoat paint. The paint is primarily composed of relatively high molecular weight diisocyanate polymers (primarily the isocyanurate), with only a trace of the more volatile hexamethylene diisocyanate monomer. Although isocyanates are generally toxic, <1% of the total sprayed is thought to be emitted from the stacks. While other studies have investigated aspects of worker safety, none have considered the ambient concentrations that result from stack emissions of these compounds. To determine the potential environmental impact of the isocyanate emissions, the maximum 8 h ambient concentrations of isocyanates downwind of the plant were estimated under full production and worst-case meteorology, and these values were compared to acceptable ambient levels determined under Michigan's proposed air toxins rule. Measurements of isocyanate monomer and polymer concentrations made in Dec 1989, at a single spray booth module in the plant, were scaled to the full production rate to estimate maximum stack emission rates. Maximum ambient concentrations were calculated using the relationships between stack emissions and ambient levels of volatile organic compounds that had been generated for the plant's original air permit application. The results of these calculations indicated that the maximum ambient concentrations that could be expected were $0.026 \mu\text{g}/\text{m}^3$ for the monomer and $0.280 \mu\text{g}/\text{m}^3$ for the polymer—levels more than an order of magnitude below the Michigan guideline limits.

M.A. Ferman and R.L. Ross. Cited: Conference Proc.: *Advanced Coatings Technology* (Dearborn, MI), 10-12 June 1991, ESD—The Engineering Society, Detroit, MI, 1991, p 127-136 [in English]. PHOTOCOPY ORDER NUMBER: 199311-57-1460.

Experience With a Recirculated Air Paint Booth With VOC Controls. In 1985, the Ohio EPA issued a Permit to Install (PTI) to Navistar International Transportation Corporation for the construction of a new paint facility adjacent to the existing assembly plant near Springfield, OH. The major provision of the PTI was the requirement to capture and destroy at least 85.5% of the VOC emitted from the two recirculating air top coating lines. It was determined during an exhaustive emissions testing program that the capture efficiency component was the limiting factor for compliance. The difficulties in quantifying capture efficiency have already been discussed by McDaniel et al. (1990). It was determined that numerous variables have a great impact upon maintaining the capture efficiency of a recirculated air system. Some of the most important variables to Navistar's system were paint chemistry, booth cleanliness, and employee relations.

T.W. McDaniel. Cited: Conf. Proc.: *Advanced Coatings Technology* (Dearborn, MI) 10-12 June 1991, ESD—The Engineering Society, Detroit, MI, 1991, p 105-107 [in English]. PHOTOCOPY ORDER NUMBER: 199311-57-1414.

Chasing Those Elusive Cyanide Ions. The discharge limits on toxic substances, such as cyanide, are getting tighter and tighter every year. Zinc platers—especially shops using barrel plating equipment—have the most difficulty meeting the strict discharge limitations. Although chloride and alkaline zinc bath formulations have gained wide acceptance, cyanide solutions are still used in many specialized plating operations.

T.H. Martin. Cited: *Plat. Surf. Finish.*, Vol 79 (No. 11), Nov 1992, p 23-26 [in English]. ISSN: 0360-3164. PHOTOCOPY ORDER NUMBER: 199310-58-1164.

EPA/OSHA Government Regulations Summary for the Finishing Industry. There are a number of regulations promulgated by EPA and

OSHA that directly affect the finishing industry. An overview is given of the applicable regulations for electroplating, metal products finishing, and paint-spraying facilities. The information that is presented summarizes the major points of each regulation and provides references on where to obtain more detailed information. Numerical data is given on the pollutant limits (metals, organics, cyanides) in effluents from electroplating works.

A.N. Mabbett. Cited: *Prod. Finish. (Cincinnati)*, Vol 57 (No. 1-A), Oct 1992, p 281-290, 292-294 [in English]. ISSN: 0032-9940. PHOTOCOPY ORDER NUMBER: 199309-58-1094.

Silver Concentrations in Radiographic Processing Wash Water and Waste Minimization. Federal, state, and local governments are imposing stricter limits on silver in radiographic effluents. Many users are concerned about silver carried out of the fixer tank, within the film, into the wash tank. Some codes require the waste wash water to be contained and then hauled away for treatment. Evidence is presented of the relatively low silver content in the wash water and ways to reduce both silver content and total water volume. There are many factors that affect silver carry-forward. These include chemical quality, processor quality in squeegee rollers, wash-water flow rate, temperature, film-feeding practices, and the mix of film type, size, and percentage of exposure. To be able to meet regulations in the least expensive manner, it is important to understand the circumstances or levels of compliance and ways to maintain or meet compliance. W.E.J. McKinney. Cited: *CSNDT J.*, Vol 13 (No. 4), July-Aug 1992, p 27-28, 30-33 [in English]. ISSN: 0826-8343. PHOTOCOPY ORDER NUMBER: 199309-43-0277.

World Copper Smelter Sulfur Balance—1988. In 1989, the U.S. Bureau of Mines initiated a contract to gather engineering, operating, and environmental cost data for 1988 for 30 major foreign primary copper smelters in market-economy countries. Data were collected for 29 of the designated smelters together with information on applicable environmental regulations. Materials balance data obtained were used with available data for the eight U.S. smelters to determine the approximate extent of copper smelter sulfur emission control in 1988. A broad characterization of the status of sulfur emission control regulation was made. The 37 U.S. and foreign smelters represented roughly 73.2% of world and 89.3% of market economy primary copper production in 1988. The 29 non-U.S. smelters attained 55.3% control of their input sulfur in 1988. Combined with the 90.4% control of U.S. smelters, an aggregate 63.4% sulfur control existed. Roughly 1,951,100 mt of sulfur was emitted from the 37 market economy smelters in 1988. Identifiable SO₂ control regulations covered 72.4% of the 29 foreign smelters, representing 66.5% of smelting capacity. Including U.S. smelters, 78.4% of the major market economy smelters were regulated, representing 73.1% of smelting capacity. Significant changes since 1988 that may increase sulfur emission control are noted.

S.W. Towle. Cited: Report No. 9349, Information Circular, U.S. Bureau of Mines, 1993 [in English]. PHOTOCOPY ORDER NUMBER: 199309-42-0947.

History-Making Coke Oven Rule Now One for the Books. The unprecedented coke oven rule that the steel industry, the United Steelworkers, environmental groups, and state and federal environmental protection agencies spent most of 1992 negotiating is now final, the U.S. Environmental Protection Agency said. The negotiated agreement was signed by the groups in late Oct 1992, but it has taken the agency almost a year to fine-tune the agreement into a rule. The negotiations were the first successful efforts of government working with industry to develop amendments to the Clean Air Act. The first method of compliance, called the maximum achievable control technology (MACT) track, calls for cuts in current coke

oven emissions by 66% by 31 Dec 1995. The companies must adhere to residual risk standards by 31 Dec 2003.

L. Viani. Cited: *Am. Met. Mark.*, Vol 101 (No. 205), 22 Oct 1993, p 1, 9 [in English]. ISSN: 0002-9998. PHOTOCOPY ORDER NUMBER: 199311-S4-0083.

HCFC for Rigid Insulation Foams. The use of HCFC 123 and/or HCFC 141b to replace CFC 11 for blowing rigid polyurethane (PUR) foams is discussed. HCFCs have similar characteristics to CFC 11, but they have a significantly reduced effect on the ozone layer. Results of studies indicate that CFC 11 can be replaced by HCFC 141b for the majority of rigid PUR foams. The transition from CFC 11 to HCFC 141b can be made without any investment and with an increase in formulation cost of ~10%.

D. Mouton. Cited: *Macplas Int.*, (No. 10), July 1993, p 81-82 [in English]. PHOTOCOPY ORDER NUMBER: 199311-P4-0052.

Fighting for the Facts on PVC. John Svalander takes over as director of the European Council of Vinyl Manufacturers (ECVM) at a time when the debate on PVC appears to be nearing a turning point. Efforts by the PVC producers' organization, part of Cefic's Association of Plastics Manufacturers in Europe (APME) grouping, to put the debate on logical, scientific grounds are paying off, he says. Svalander points to the recent declaration by the Norwegian Environment Ministry that enough is known about the PVC question to decide that Norsk Hydro's 200,000 tonne/year PVC project can proceed, as a landmark decision in events that have seen PVC producers until now fighting a rearguard action against the environment lobby. In giving the permit, the ministry accepted that the new plant would release VCM, PVC, and organic matter to the atmosphere and water, but determined that "these will have minor environmental consequences." J. Baker. Cited: *Eur. Chem. News*, Vol 60 (No. 1589), 11 Oct. 1993, p 24 [in English]. ISSN: 0014-2875. PHOTOCOPY ORDER NUMBER: 199311-P4-0050.

U.K. Diecasters Breathe Clean Air in Germany. In Germany, the TA Luft requirements are in effect a strong recommendation on emission levels which each Lander in the Federal Republic interprets individually. For new diecasting installations, the requirement to capture and control fume arising from lubrication and spraying has persuaded machine suppliers to recommend a package approach. Foundries must obtain a license to operate new machines from the authorities and therefore satisfy them that clean air regulations will be met. Frech Engineering has struck an alliance with Keller Lufttechnik, a leading supplier of air pollution control equipment, based on the venturi scrubber principle, and also bag and cartridge filters, while Buhler has a close relationship with KMA, a company that favors electrostatic precipitators for diecasting machine fumes but also makes a range of equipment, notably biological filters for industries such as food processing. Frech-owned foundry Moneva, Winterbach, which produces ~400 to 450 tonnes/year of aluminum pressure diecastings has an early Keller Lufttechnik installation, a dry system without the latest water injection droplet separation, which copes adequately with fumes from the foundry's five cold chamber machines. The situations in Braas Dachsyste-me GmbH and Magma GmbH are also detailed.

Cited: *Diecasting World*, Oct 1993, p 94, 96-97, 100 [in English]. ISSN: 0965-6111. PHOTOCOPY ORDER NUMBER: 199311-G4-0096.

The European Common Market and Transport of Secondary Materials and Waste. On 1 Feb 1993, the European Parliament adopted the text of the Basle Convention including some specific regulations about the transport of foundry waste within and outside EEC countries. This brings their policy in alignment with the existing OECD regulations about recycling and disposal of hazardous wastes. Some specifics are mentioned. Aluminum, copper, and zinc are discussed.

F. Veys. Original Title: [Die Europäische Gemeinschaft und die Verbringung von Sekundärrohstoffen und Abfällen]. Cited: *Metall*, Vol 47 (No. 5), May 1993, p 469 [in German]. ISSN: 0026-0746. PHOTOCOPY ORDER NUMBER: 199311-G1-0304.

OCMA Battles Great Lakes Initiative. In the spring of 1992, the EPA brought forth its proposal for cleaning up the pollution in the Great Lakes. The guidelines, known as the Great Lakes Water Quality Initiative, would standardize chemical control regulations in Ohio, Michigan, Wisconsin, Illinois, Indiana, Minnesota, Pennsylvania, and New York. New restrictions could cost factories, municipal wastewater plants, and other polluters between \$80 and \$505 million. OCMA members are concerned, particularly about their nonferrous foundry members who undoubtedly will be hard hit, should the initiative pass. The association is upset that the

guidelines focus only on point source discharges with little attention to urban runoff, agricultural runoff and deposition, or air deposition. There is also concern that the guidelines will be enforced by the Ohio EPA office statewide, not just along Lake Erie. The public comment period on the initiative ended 13 Sept 1993.

Cited: *Foundry Manag. Technol.*, Vol 121 (No. 8), Aug 1993, p 8 [in English]. ISSN: 0360-8999. PHOTOCOPY ORDER NUMBER: 199310-S4-0077.

Bethlehem Fined \$6 Million. Bethlehem Steel Corporation was fined \$6 million by U.S. District Court Judge for failing to meet hazardous waste disposal guidelines at its Burns Harbor, IN, USA, mill. The fine was the result of a 1990 lawsuit filed against Bethlehem and Inland Steel Co., East Chicago, IN, and Federated Metals Corp., Whiting, IN, by the Environmental Protection Agency and the Justice Department for a wide range of alleged violations. Inland and Federated have since settled their cases. Specifically, the lawsuit charged that Bethlehem failed to correct underground injection well releases as required by its permit, follow closure requirements for its landfill and lagoons, provide financial assurance for proper landfill closure, follow guidelines for ground-water monitoring, provide proper controls at its landfills, and submit the second phase of its permit application as mandated by the Resource Conservation and Recovery Act. The federal judge ruled in March that Bethlehem violated those pollution laws.

M. Beirne. Cited: *Am. Met. Mark.*, Vol 101 (No. 175), 10 Sept 1993, p 6 [in English]. ISSN: 0002-9998. PHOTOCOPY ORDER NUMBER: 199310-S4-0076.

EPA on MACT and State Programs. In the United States, representatives of the Clean Air Management Partnership (CAMP)—comprised of chlorine, the Composites Fabricators Association, the International Cast Polymer Association, and the National Marine Manufacturers Association—met with staff from the U.S. Environmental Protection Agency (EPA) Office of Air Quality Planning and Standards (OAQPS) in June at EPA offices in Durham, NC. The purpose of the visit was to determine EPA plans for developing Maximum Achievable Control Technology (MACT) standards for the composites industry and to establish a working relationship between industry representatives and OAQPS staff. The agency position on MACT was detailed. Following the meeting, CAMP launched a two-part program. One part focuses on the EPA survey of the composites industry. The second part will be a major effort to educate the agency on composites manufacturing processes and feasible controls.

J. Schweitzer. Cited: *CI on Composites*, Aug-Sept 1993, p 20-21 [in English]. PHOTOCOPY ORDER NUMBER: 199310-D4-0013.

New Controls on Cadmium Come Into Effect [in Europe]. New legislation restricting the marketing and use of cadmium, a toxic metal, came into force on 31 July 1993. The Environmental Protection (Controls on Injurious Substances) (No. 2) Regulations 1993 implement a European Community Directive agreed upon in 1991. The Directive bans three uses of cadmium and its compounds. First, it may not be used to color finished products made from a specified list of plastics; such colored products or components with a cadmium content >100 ppm may not be marketed. Second, it may not be used to stabilize specified finished PVC products; such stabilized products and components with a cadmium content >100 ppm may not be marketed. Nor may it be used to plate metallic products or components used in specified sectors or applications; these plated products and components may not be marketed.

Department of Environment (U.K.), London, 2 Aug 1993 [in English]. PHOTOCOPY ORDER NUMBER: 199310-G4-0092.

Chrome Free—Hassle Free. Wells Aluminum, Monett, MO, is a closely held custom aluminum extruder/fabricator with seven plants in the Midwest and Southeast. About 300 men and women work at its Monett/Cassville, MO, plant, where they extrude and finish storm door and window shapes, primarily. The paint line was installed in 1978. For the first ten years, chrome phosphate was used to clean, etch, and pretreat the extrusions. Starting in 1987, EPA regulations made treatment and disposal of chrome-containing effluents very expensive and cumbersome. Wells looked at several different products, they found the Chrome Free pretreatment system from Bulk Chemicals, Mohrsville, PA. Chrome Free gives freedom from all those regulatory hassles and from future liability.

V.M. Cassidy. Cited: *Mod. Met.*, Vol 49 (No. 8), Sept 1993, p 48-51 [in English]. ISSN: 0026-8127. PHOTOCOPY ORDER NUMBER: 199310-G4-0089.

Furthermore...

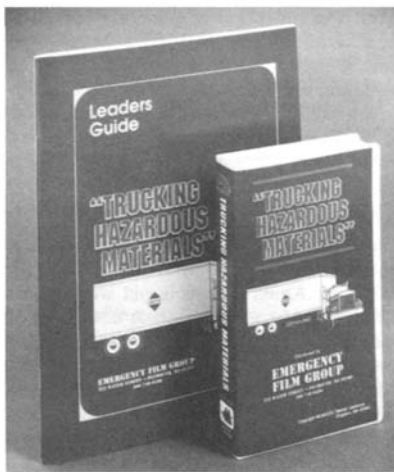
A new *environmentally sound process for recycling tires* has been developed by the **AGA Group**, Sweden, in cooperation with **Recovery Technologies, Inc.**, Canada. The concept is based on deep freezing and not only saves natural resources and solves waste disposal problems, but in addition also reduces refining costs. Whole tires are fed into a shredder. The resulting rubber chips are then treated inside a 12 m-long freezing tunnel, where liquid and gaseous nitrogen cool the fragments to temperatures below -80°C . In a hammer mill the chips are separated into three components: steel, textile, and rubber granules, which can be classified into sizes ranging from 5 mm to just under 0.4 mm. A wide range of applications are proposed for the granules: athletic tracks and other sports surfaces, noise barriers, automotive products, rubberized asphalt and similar geotechnical surfaces, among others.

Circle (62)

The National Association of Corrosion Engineers (NACE), Houston, Texas, is offering a new seminar focused on lead-based paint abatement inspection and compliance. "Get the Lead Out" is a comprehensive three-day program designed to provide registrants with a thorough understanding of the legal and technical issues surrounding lead-based paint abatement and removal. The seminar reviews and explains OSHA Regulation 29 CFR Part 1926.62, the Interim Final Rule on Lead Exposure in Construction, other applicable regulations, and general industry good practice procedures. Items addressed in addition to liability issues are: reasons for removal and containment; personnel hazards and protective measures; testing for critical levels; methods of abatement, removal, and containment; and procedures for testing, handling, transporting, and disposing of hazardous waste.

Circle (63)

A comprehensive training video for drivers and loading dock personnel designed to help satisfy DOT training requirements (49 CFR 172-177) has been released by **Emergency Film Group**, Plymouth, Massachusetts. "Trucking Hazardous Materials," along with an accompanying leader's guide, provides at least 4 h of training in the proper handling and transportation of hazardous materials. The film describes the nature of hazardous materials as defined by the nine DOT hazard classes and tells how to use labels, placards and markings to identify hazmat containers. Other topics



Emergency Film Group

covered include filling out shipping papers properly, using the DOT hazmat tables, correct loading and unloading procedures, and packing groups. Drivers are also taught how to react safely in the event of an unexpected spill or leak in order to best protect the community and the environment.. The 52-page Guide includes pre/post-seminar tests, ideas for classroom activities to reinforce the training topics, and certification forms appropriate for record-keeping, as required by the DOT.

Circle (64)

North American companies worried about the Eco-Audit regulations adopted in the European Community and their potential impact can look to the **National ISO 9000 Support Group**, Caledonia, Michigan, to provide full information on how to register as environmentally "green." Full-service networking through computer bulletin boards, Fax-on-Demand, a newsletter, and technical advice is available covering the Eco-Audit regulations of Europe, and the British Standard 7750, in particular. Circle (65)

A closed-loop recycling program designed to assist in reclaiming post-industrial scrap such as sprues, runners, and rejects, as well as post-consumer finished parts of polycarbonate, nylon 6, nylon 6/6, modified PPC, polyetherimide, PBT, and ABS resins and compounds, is announced by **Bay Resins**, Millington, Maryland. The company re-pelletizes scrap into a material suitable for re-use in a blend with the virgin material, or into a material meeting the specifications for the original material.

Circle (66)

A breakthrough in water purification has been developed by **Fountainhead Technologies**, Pawtucket, Rhode Island. Ongoing studies have revealed that silver activates oxygen in water to instantly destroy bacteria and viruses. Used for decades in conjunction with copper and small amounts of chlorine to purify swimming pool water, a potential is now suggested for the use of



Fountainhead Technologies

silver in purifying water for drinking, agriculture, food processing, and hospital use, as well as for providing ultrapure water for chemical processes and wastewater treatment. A new process developed by the company in which silver is used by itself as the catalyst, yielded results of an instantaneous 99 kill-rate for bacteria within a 2.0 and 2.5 s contact time.

Circle (67)

Events.....

Eighth International Symposium: Solving Corrosion Problems in Air Pollution Control Equipment (AIRPOL/94), 15-17 November 1994, Berlin, GERMANY, sponsored by the **National Association of Corrosion Engineers**, Houston, Texas: A timely and relevant forum for professionals concerned with selection, design, manufacture, use, maintenance, and operation of air pollution control equipment. The main objective is to solve corrosion problems in power station (utility) flue gas desulfurization (FGD) systems and in municipal and industrial waste incinerators.

Circle (68)

49th Annual Industrial Waste Conference, 9-11 May 1994, West Lafayette, Indiana, USA: Site remediation; industrial/hazardous wastes; waste minimization; residuals management; stabilization/solidification; wastewater treatment; landfill technology; incineration; new products/processes; legal aspects; property transfers; case histories and related research/design/operation.

Circle (69)
