HB

201

Bill No. Committee Substitute for House Bill 201 (HESS) Date January 18, 1988

Title "An Act relating to hazardous painting certification."

Contact: Richard Arab
465-4856

Eileen Plate
465-2700

Committee Substitute for House Bill No. 201 (HESS) is designed to assure the competency of persons employed to perform hazardous painting in the state and thereby prevent harmful exposures to workers who apply toxic and hazardous paints, to their co-workers and to the public.

Under the provisions of this bill, a painter who is employed or contracted to perform hazardous painting must complete an approved training program and be certified. The training program would consist of instruction in and a demonstration of each person's knowledge and skill in using safe work practices and appropriate equipment.

The potential harmful effects of long-term exposure to paint are explained in Section 1 of the bill. The department believes that many of the illnesses and injuries described can be avoided if professional painters receive training in the safe use of paints and solvents and in the proper personal protective equipment available to them. The public and building occupants near painting projects can be better warned and protected by certified professional painters who use appropriate isolation and curing times. Workers' families, as well as other members of the community, need to be protected from the exposure to toxic material, such as lead chromate, brought home on the individual worker's person or clothing.

Under the provisions of this bill, the department would establish minimum requirements for certification training programs; review and approve such programs; issue certificates to persons who present evidence of having completed an approved training program; and enforce the certification requirements.

The requirement for employing certified painters will be limited to businesses that perform hazardous painting as part of their operations. This will eliminate from the scope of the bill the normal casual painting contracts such as a contract between a homeowner and a worker to repaint a house. Also, the bill does not cover latex (water-based) paints which are the most widely used paints in residential building. The intent of the bill is to limit it as much as possible to commercial painting where the more hazardous paints are encountered.

The effective dates in Sections 3 and 4 of the bill anticipated passage of the provisions in 1987. Since this did not occur, these dates need to be changed to July 1, 1988 and January 1, 1989, respectively.

The Department of Labor supports the certification concept presented in this bill.

APPROVED:

Jim Sampson, Commissioner
Department of Labor

POSITION PAPER/Department of Labor

STATE OF ALASKA
1988 LEGISLATIVE SESSION

BILL VERSION: CSHB 201 (HESS)
PUBLISH DATE: _____

FISCAL NOTE

REQUEST:

Revision Date: _____
Title: "An act relating to hazardous painting certification."
Sponsor: House Labor and Commerce
Requestor: House Finance

Agency Affected: Labor
BRU: Labor Standards and Safety
Components: Occupational Safety and Health

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93
PERSONAL SERVICES		64.8	77.5	77.5	77.5	77.5
TRAVEL		10.0	5.0	5.2	5.3	5.5
CONTRACTUAL		13.2	17.3	17.8	18.4	18.9
SUPPLIES		1.1	1.4	1.4	1.5	1.5
EQUIPMENT		1.6	0	0	0	0
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	90.7	101.2	101.9	102.7	103.4
CAPITAL						
REVENUE	0	100.0	150.0	50.0	100.0	150.0

FUNDING: (Thousands of Dollars)

GENERAL FUND		90.7	101.2	101.9	102.7	103.4
FEDERAL FUNDS						
OTHER						
TOTAL	0	90.7	101.2	101.9	102.7	103.4

POSITIONS:

FULL-TIME		2.0	2.0	2.0	2.0	2.0
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

(See attached)

Prepared by: Tom Stuart, Director — Phone: 465-4870
Division: Labor Standards and Safety — Date: 1/15/88

Approved by Commissioner: Jim Sampson — Date: 1/15/88
Agency: Labor

Distribution (by preparer):
- Legislative Finance
- Legislative Sponsor
- Requestor
- Office of Management and Budget
- Impacted Agency(ies)

Fiscal Note Analysis
CSHB 201 (HESS)

This bill would require the department to adopt regulations covering persons who are employed in "hazardous painting." The department would issue certificates, for a fee, to persons who complete an approved training course. The department would also enforce the provisions of the bill by inspections and through the issuance of citations.

Expenditures:

In order to effectively administer this program the department would require two new positions, an Industrial Hygienist I, and a Clerk Typist III. The Industrial Hygienist would help develop the required regulations and training program guidelines. Also, a tracking system would be created to monitor approved training programs and to account for certificates and fees. This position would travel to inform employer and employee organizations of the new law.

The Clerk Typist III would begin work six months after the Hygienist. This would allow time for the regulations to be developed and implemented. The Clerk would then process the requests for certification and operate the in-house tracking systems.

Revenues:

It is estimated that 1,000 persons will take the required training course and apply for a certificate during the last six months of FY 1989. During the second year, the number of applications is expected to increase to 1,500 as most persons who want to be certified will have completed training by the end of FY 1990. During the third year, the number of applicants is estimated to drop to approximately 500 as only new entrants into the painting occupation will need certification. In FY 92 and FY 93, activity is expected to increase as persons who received certificates in FY 89 and FY 90 must be re-certified. (The certification will be valid for three years).

Estimated Revenue:

	FY 89	FY 90	FY 91	FY 92	FY 93
Certificates Issued	1,000	1,500	500	1,000	1,500
Fee	$ 100	$ 100	$ 100	$ 100	$ 100
	$100,000	$150,000	$50,000	$100,000	$150,000

Assumptions:

1. An effective date of July 1, 1988 for the program except for the certification requirement that will go into effect on January 1, 1989.

2. The certificate fee would be established at $100.

3. Inflation on non-personal services items will be 3% per year.

Position Title	No. of Positions	Range/Step	Barg. Unit
Industrial Hygienist I	1	19A	GGU

Time Status	Staff Months	Location	Election District
PFT	12	Anchorage	

Type of Expenditure		Amount
1	2	3
Salary	40.032	
Benefits	12.009	
Premium Pay		
Other		
Total Personal Services		52.041
Travel		10.000
Contractual		9,700
Commodities		700
Equipment		1,600
Other		
Total Cost		74,041

Funding Source for Total Cost		
Federal Receipts	1002	
G. F. Match	1003	
General Fund	1004	74.041
GF Program Receipts	1005	
Other		

Justification

This position would work on developing the required regulations and training programs necessitated by the bill. Also, the position would develop an in-house system to keep track of the training programs and certificate holders. As training programs are implemented, this position would ensure compliance with the provisions of this bill.

Costs include $10,000 for travel to inform workers and employers of the new law. Normal contractual, commodities and one-time furniture purchases are also included.

Request For New Position

Agency Labor

BRU Occupational Safety and Health

Component Occupational Safety and Health

FY 89

Position Title	No. of Positions	Range/Step	Barg. Unit
Clerk Typist III	1	8A	GGU

Time Status	Staff Months	Location	Election District
PFT	6	Anchorage	

Type of Expenditure		Amount
1	2	3
Salary	9,786	
Benefits	2,936	
Premium Pay	--	
Other	--	
Total Personal Services		12,722
Travel		0
Contractual		3,522
Commodities		350
Equipment		0
Other		0
Total Cost		16,594

Funding Source for Total Cost		
Federal Receipts	1002	
G. F. Match	1003	
General Fund	1004	16,594
GF Program Receipts	1005	
Other		

Justification

This clerical position would provide support for the in-house tracking system and would process the requests for certification. Costs include normal contractual and commodities.

The position would start six months after the program has begun to allow time for the regulations and tracking system to be implemented. The position would work 12 months after the first year.

Request For New Position

Agency Labor

BRU Occupational Safety and Health

Component Occupational Safety and Health

Revised Date

FY 89

STATE OF ALASKA
THE LEGISLATURE

POUCH Y - STATE CAPITOL
JUNEAU, ALASKA 99811
907-465-3800

LEGISLATIVE AFFAIRS AGENCY

LEGISLATIVE REFERENCE LIBRARY

May, 1988

Copies of minutes listed below were originally included in this file. The minutes are available on the STAIRS database CMPR. In order to save space copies of minutes have not been left in the files.

Mary Van Nimwegen

H L+C 4-7-87 1:30p.m.

HOUSE COMMITTEE REPORT

(7)

Date referred: 3/20/87

FURTHER REFERRALS: HESS

DATE: 4/7/87

The Labor & Commerce Committee has considered HB 201

"An Act relating to hazardous painting certification; and providing for an effective date."

RECOMMENDS:

[ ] replace with CS HB 201 (L&C)

[X] the same title

[ ] a new title

[ ] attached amendment(s)

[X] do pass

[ ] do not pass

[ ] no recommendation

[ ] individual recommendations

[ ] additional referral to the ________________ Committee

ADOPTS: [ ] __________letter of intent

ATTACHES NEW FISCAL NOTE(s):

[X] fiscal impact

[ ] zero fiscal note

[ ] zero with analysis

[ ] same as previous fiscal note published ________________

[ ] same as previous zero fiscal note published ________________

SIGNING DO PASS:

[signatures: ... Cliff Davidson, Dave Donley, ... Ellis, ..., ... Furnace, ... Hoffman]

SIGNING OTHER RECOMMENDATIONS:

Dave Donley

Chairman's signature

from Dept. of Labor

RIGHT-TO-KNOW VIOLATIONS

October 1, 1985 - April 6, 1986

Total Violations: 185 establishments were cited for Right-to-Know violations during this period. The Alaska Occupational Safety and Health Section inspected 1,432 establishments during this period.

By industry:

Oil & Gas	2
Construction	49
Seafood Processing	12
Lumber & Wood	3
Other Manufacturing	20
Transportation	9
Wholesale Trade	6
Retail Trade	13
Real Estate	1
Automotive Repair	43
Other Services	18
Health Services	3
Educational Services	3
Government Agencies	3
Total	185

MSDS NO. 14

DUPONT

MATERIAL SAFETY DATA SHEET

September 1, 1985

ACRYLIC LACQUER PRIMERS AND SEALERS

Section I

Manufacturer
E. I. du Pont de Nemours & Co. (Inc.)
Finishes & Fabricated Products Dept.
Wilmington, Delaware 19898
Telephone: Product information (800) 441-7515
Medical emergency (800) 441-3637
Transportation emergency 800-424-9300
(CHEMTREC)

Product: 30S, 70S, 80S, 100S, 110S, 131S, 181S, 1934S, 1985S, 2129S, 2184S, 45285
D.O.T. Hazard Class: Flammable Liquid
Paint UN 1263

Section II — Hazardous Ingredients (See Section X for specific product codes and additional ingredients)

Primary Ingredients	CAS No.	Vapor Pressure (20°C mm Hg.)	Exposure Limits*
1. Butyl acetate	123-86-4	8	150ppm-A,O
2. Acetone	67-64-1	185	1000ppm-O
3. Methanol	67-56-1	96	200ppm-A,O
4. Toluene	108-88-3	22	100ppm-A
5. Isopropyl alcohol	67-63-0	31	400ppm-A,O
6. VM & P naphtha	64742-89-8	~45	100ppm-A,O
7. Ethyl acetate	141-78-6	76	100ppm-A,D
8. Xylene	1330-20-7	8	100ppm-A,O
9. Methyl ethyl ketone	78-93-3	95	200ppm-A,O
10. 2-Ethoxyl butyl acetate	112-07-02	0.3	225ppm-A,O
11. Acrylic resin	None	None	None

*A = ACGIH TLV O = OSHA D = Du Pont internal limit

Section III — Physical Data

Evaporation rate: Slower than ether
Vapor density: Heavier than air
Solubility in water: Slight
Percent volatile: 63.4-84.0% (By volume)
Approximate boiling range: 129°F-401°F
Density: 7.6-11.1 #/gallon

Section IV: Fire & Explosion Data

Flash point (Method): 20-73F (Closed cup).
Approx. flammable limits: 1.1-14%.
Extinguishing media: Foam, carbon dioxide, dry chemical
Special fire fighting procedures: Full protective equipment, including self-contained breathing apparatus, is recommended. Water from fog nozzles may be used to cool closed containers to prevent pressure build up.
Unusual fire & explosion hazards: When heated above the flash point, emits flammable vapors which, when mixed with air, can burn or be explosive. Fine mists or sprays may be flammable at temperatures below the flash point.

Section V — Health Hazard Data

Ingestion: Gastro-intestinal distress.
In the unlikely event of ingestion, call a physician immediately and have names of ingredients available.
Inhalation: May cause nose and throat irritation. May cause nervous system depression characterized by the following progressive steps: Headache, dizziness, nausea, staggering gait, confusion, unconsciousness. Laboratory studies with rats have shown that petroleum distillates cause kidney damage and kidney or liver tumors. These effects were not seen in similar studies with guinea pigs, dogs, or monkeys. Several studies evaluating petroleum workers have not shown significant increases of kidney damage nor kidney or liver tumors. Excessive human exposure to methanol including absorption through the skin may lead to: fatigue, headache, anaesthetic neurologic effects, and visual difficulties ultimately including blindness. Extremely high concentrations of butyl acetate have caused blood changes and weakness in laboratory animals. 2-Ethoxy butyl acetate can be absorbed through the skin in harmful amounts. In studies in laboratory animals has produced damage to red blood cells and kidneys. Very high concentrations of Methyl ethyl ketone have caused embryotoxic effects in laboratory animals. Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.
If affected by inhalation of vapor or spray mist, remove to fresh air. If breathing difficulty persists, or occurs later, consult a physician.
Skin or eye contact: May cause irritation or burning of the eyes. Repeated or prolonged liquid contact may cause skin irritation with discomfort and dermatitis.
In case of eye contact, immediately flush with plenty of water for at least 15 minutes; call a physician.
In case of skin contact wash with soap and water. If irritation occurs, contact a physician.

Section VI — Reactivity Data

Stability: Stable
Incompatibility (materials to avoid): None reasonably foreseeable
Hazardous decomposition products: CO, CO2, smoke, oxides of heavy metals reported in Section X
Hazardous polymerization: Will not occur

Section VII — Spill or Leak Procedures

Steps to be taken in case material is released or spilled: Ventilate area. Remove sources of ignition. Prevent skin contact and breathing of vapor. Confine and remove with inert absorbant.
Waste disposal method: Do not allow material to contaminate ground water systems. Incinerate absorbed material in accordance with federal, state and local requirements. Do not incinerate in closed containers.

Section VIII — Special Protection Information

Respiratory: Do not breathe vapors or mists.
Wear a properly fitted vapor/particulate respirator approved by NIOSH/MSHA (TC-23C) for use with paints during application and until all vapors and spray mist are exhausted. Follow the respirator manufacturer's directions for respirator use.
Ventilation: Provide sufficient ventilation in volume and pattern to keep contaminants below applicable OSHA requirements.

Acrylic Lacquer Primers & Sealers #s 30S, 70S, 80S, 100S, 110S, 131S, 181S, 1934S, 1985S, 2129S, 2184S, 45285

Protective clothing: Neoprene gloves and coveralls are recommended.
Eye protection: Desirable in all industrial situations. Include splash guards or side shields.

Section IX — Special Precautions

Precautions to be taken in handling and storing: Observe label precautions. Keep away from heat, sparks and flame. Close container after each use. Ground containers when pouring. Wash thoroughly after handling and before eating or smoking. Do not store above 120°F.
Other precautions: Do not sand, flame cut, braze or weld dry coating without a NIOSH/MSHA approved respirator or appropriate ventilation.

Section X — Notes

Product Codes	Additional Ingredients
30S, 70S, 80S	1, 2, 3, 4, 5, 6, 11
100S, 110S	4, 5, 7, 8, 11
1984S, 1985S	1, 2, 4, 6, 6, 7, 8, 9, 10, 11
2129S	1, 2, 4, 5, 6, 9, 10, 11
131S, 181S	4, 5, 7, 8, 11
2184S	1, 2, 4, 5, 6, 3, 11

Additional Ingredients	CAS No.	Vapor Pressure (20°C mm Hg.)	Exposure Limits*
(1) 30S, 70S, 100S, 131S, 1984S, 1985S, 2129S also contain:			
Titanium Dixoide	13463-67-7	None	10mg/m³-A 15mg/m³-O

In a lifetime inhalation test, lung cancers were found in some rats exposed to 250 mg/m³ respirable titanium dust. Analysis of the titanium dioxide concentrations in the rat's lungs showed that the lung clearance mechanism was overwhelmed and that the results at the massive 250 mg/m³ level are not relevant to the workplace.

(2) 80S, 110S, 181S, 1984S, 1985S also contain:			
Non-hazardous natural pigment	None	None	None
(3) 30S, 70S, 80S, 100S, 110S, 131S, 181S, 1984S, 1985S also contain:			
Hydrous magnesium silicate	7789-06-2	None	2mg/m³-A, 15 mg/m³-O

Repeated and prolonged overexposure to Talc may lead to typical X-ray changes and chronic lung disease. The TLV is based on respirable dust that contains no asbestiform fibers and less than 1% crystalline silica.

(4) 100S, 110S, 1984S and 1985S also contain:			
Barium sulfate	7727-43-7	None	10mg/m³
(5) 1984S and 1985S also contain.			
Zinc oxide	1314-13-2	None	10mg/m³-A

*A = ACGIH TLV O = OSHA D = Du Pont internal limit

The data in this material safety data sheet relate only to the specific material designated herein and do not relate to use in combination with any other material or in any process.

Product Manager
Refinish Sales

Printed in U.S.A.

7-10

MATERIAL SAFETY DATA SHEET

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
DUTCH BOY PAINTS
P.O. Box 6709
Cleveland, Ohio 44101

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
10-Apr-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NUMBER
17-10

® - Trade Mark

PRODUCT NAME
Exterior Latex House Paint, White

PRODUCT CLASS
Latex Paint

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.

NO INGREDIENTS IN THIS PRODUCT ARE HAZARDOUS
AS DEFINED BY THE DEPARTMENT OF LABOR.

pH - 9.5

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
212 - 388	62.6	10.82

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION — FLASH POINT >199 F PMCC — LEL N.A.
Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Extreme heat may cause closed containers to burst.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE
ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure may result in lightheadedness and staggering gait.
Irritant to skin and upper respiratory system.

Continued on page 2

17-10 EXTERIOR LATEX HOUSE PAINT WHITE

MERGENCY AND FIRST AID PROCEDURES
If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN: Wash affected area thoroughly with soap and water.
If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

Section VI -- REACTIVITY DATA

TABILITY -- Stable
AZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
AZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

TEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.
STE DISPOSAL METHOD
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

RECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.
Protect against dust which may be generated by sanding or abrading the dried film.
ENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by MIOSH/MSHA for protection against materials in Section II.
PROTECTIVE GLOVES
Required for long or repeated contact.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Section IX -- PRECAUTIONS

OL STORAGE CATEGORY -- 3B
RECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.
THER PRECAUTIONS
This coating contains materials classified as nuisance particulates, for example itanium dioxide, calcium carbonate, etc. (see ACGIH TLV List, Preface and Appendix D), hich may be present at hazardous levels only during sanding or abrading of the dried film.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

5-0675B
Hein
4/3/87

Original sponsor: Labor and Commerce Committee

IN THE HOUSE

BY THE LABOR AND COMMERCE COMMITTEE

CS FOR HOUSE BILL NO. 201 (L&C)

IN THE LEGISLATURE OF THE STATE OF ALASKA

FIFTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to hazardous painting certification; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. FINDINGS. The legislature finds that

(1) during the course of their work over a period of years painters are exposed to large amounts of toxic substances, which react with body tissues and cause health problems that sometimes become evident only after years of exposure;

(2) studies have indicated that as many as 84 percent of painters suffer neurotoxic effects from exposure to various solvents and coatings, approximately 54 percent of painters experience upper and lower respiratory problems, and approximately 28 percent of painters have chronic bronchitis;

(3) at least four studies by the National Institute of Occupational Safety and Health concluded that 43 percent of painting-related accidents resulted from air conditions in the work environment;

(4) approximately 21 percent of construction accidents involve painters, representing an accident rate four times higher than any other construction craft; and

(5) a study by the Johns Hopkins University found that persons who have ever performed new construction painting, maintenance painting, or specialty painting have a risk of developing lung cancer that is 250 percent higher than the risk for persons who have never painted.

* Sec. 2. AS 18 is amended by adding a new chapter to read:

CHAPTER 63. HAZARDOUS PAINTING CERTIFICATION.

Sec. 18.63.010. HAZARDOUS PAINTING CERTIFICATE REQUIRED. (a) A person may not employ or contract with a professional painter to perform hazardous painting unless the painter holds a current valid hazardous painting certificate issued by the department.

(b) The department may impose a civil fine of not more than $1,000 on a person who violates this section.

(c) Violation of this section is a class B misdemeanor.

Sec. 18.63.020. ISSUANCE OF CERTIFICATE. (a) The department shall issue a hazardous painting certificate to an applicant who has completed an application and submitted a certificate fee. A certificate is valid for three years.

(b) An application for issuance of a hazardous painting certificate shall be on a form prescribed by the department. An application for initial issuance of a certificate must include proof that the applicant completed an approved basic hazardous painting certificate program not more than 30 days before the application was received by the department.

(c) An application for certificate renewal must include proof that the applicant completed an approved refresher hazardous painting certificate program not more than 30 days before the date the application was received by the department.

Sec. 18.63.030. FEE. The triennial fee for a hazardous painting certificate is $100.

Sec. 18.63.040. CERTIFICATE PROGRAMS. (a) The department shall

(1) establish requirements for basic and refresher hazardous painting certificate programs;

(2) review, and approve or disapprove, programs proposed by contractors, labor organizations, public and private schools and

vocational education institutions, and others;

(3) assist persons who propose programs to meet requirements for approval.

(b) A basic hazardous painting certificate program must include instruction and written and practical testing in methods of ventilation, respirator selection, chemical reaction to body tissue, proper use of painting tools, knowledge of relevant health and safety laws and regulations, including relevant portions of state occupational safety and health standards adopted by reference under 8 AAC 61.010, and other appropriate subjects.

(c) A refresher hazardous painting certificate program must include instruction and written and practical training necessary to ensure that a person who completes the program will be knowledgeable about new developments and changes related to hazardous painting that have occurred since the person completed a basic hazardous painting certificate program.

(d) A hazardous painting certificate program conducted by an employer of a person enrolled in the program must also meet the requirements of AS 18.60.066.

Sec. 18.63.050. INSPECTIONS AND CITATIONS. The department shall

(1) inspect job sites to ensure that persons performing hazardous painting are certified as required under AS 18.63.010 and are performing the work safely; and

(2) issue citations to persons who employ or contract with a professional painter in violation of AS 18.63.010(b).

Sec. 18.63.060. REGULATIONS. The department may adopt regulations necessary to implement this chapter.

Sec. 18.63.100. DEFINITIONS. In this chapter

(1) "department" means the Department of Labor;

(2) "hazardous painting" means the application of a substance containing a pigment or containing or combined with a toxic or hazardous substance, as defined in AS 18.60.105, in vaporized, liquid, or particulate form to create a coating that will adhere to a surface to protect or preserve the surface; "hazardous painting" does not include the application of water-based paint that does not contain emulsion epoxies or isocyanates;

(3) "professional painter" means a painting contractor, an employee of a painting contractor, or a person engaged in the business of painting, but does not include a casual laborer, a commercial artist, or a person who creates artworks.

* Sec. 3. Section 1 of this Act and AS 18.63.020, 18.63.030, 18.63.040, 18.63.060, and 18.63.100, added by sec. 2 of this Act, take effect July 1, 1987.

* Sec. 4. AS 18.63.010 and 18.63.050, added by sec. 2 of this Act, take effect January 1, 1988.

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

Bill Version : HB 201
Publish Date :

REQUEST:

Revision Date:
Title : "An Act relating to hazardous painting certification."
Sponsor : House Labor and Commerce
Requestor : House Labor and Commerce

Agency Affected : Labor
BRU : Occupational Safety and Health
Components : Occupational Safety and Health

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES		64.8	77.5	77.5	77.5	77.5
TRAVEL		10.0	5.0	5.2	5.3	5.5
CONTRACTUAL		13.2	17.3	17.8	18.4	18.9
SUPPLIES		1.1	1.4	1.4	1.5	1.5
EQUIPMENT		1.6	0	0	0	0
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	90.7	101.2	101.9	102.7	103.4
CAPITAL						
REVENUE		200.0	100.0	50.0	150.0	75.0

FUNDING: (Thousands of Dollars)

GENERAL FUND		90.7	101.2	101.9	102.7	103.4
FEDERAL FUNDS						
OTHER						
TOTAL	0	90.7	101.2	101.9	102.7	103.4

POSITIONS:

FULL-TIME		2	2	2	2	2
PART-TIME						
TEMPORARY						

ANALYSIS : (Attach a separate page if necessary)

(See attached)

Prepared by : Tom Stuart, Director
Division : Labor Standards and Safety
Phone : 465-4870
Date : 3/27/87

Approved by Commissioner : Jim Sampson
Agency : Labor
Date : 3/27/87

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)
Senate Secretary

Fiscal Note Analysis

HB 201

This bill would require the department to adopt regulations concerning persons who are employed in "hazardous painting." The department would issue certificates, for a fee, to persons who complete an approved training course. The department would also enforce the provisions of the bill by inspections and through the issuance of citations.

Expenditures

In order to effectively run this program the department would require two new position, an Industrial Hygienist I and Clerk Typist III. The Industrial Hygienist would help develop the regulations to enforce this bill. Training program guidelines would be developed, and fees for certifications set. Also, an in-house tracking system would be created to monitor approved training programs and to account for certificates and fees. This position would travel to inform employer and employee organizations of the new law.

The Clerk Typist III would begin work six months after the Hygienist. This would allow time for the regulations to be developed and implemented. The Clerk would then process the requests for certification and operate the in-house tracking systems.

Revenues

We are estimating 2,000 persons will take the required training course and apply for a certificate the first year. This would cover persons employed to paint commercially as well as those self-employed. During the second and third year we estimate the number of applications would drop by 50%, but in the fourth year the number will increase as re-certification will be required. (The certification will be valid for three years).

Estimated Revenues:

	FY 88	FY 89	FY 90	FY 91	FY 92
Certificates Issued	2,000	1,000	500	1,500	750
Fee	100	100	100	100	100
	200,000	100,000	50,000	150,000	75,000

Assumptions

1. An effective date of July 1, 1987.
2. The certificate fee would be established at $100.
3. Inflation of non-personal services items will be 3% per year.

Position Title			No. of Positions	Range/Step	Barg. Unit	Gov.	Approv.	Disapp.
Industrial Hygienist I			1	19A	GGU			
Time Status	Staff Months	RP Number	Location	Election District		Leg.		
PFT	12		Anchorage					

Type of Expenditure		Amount
1	2	3
Salary	40,032	
Benefits	12,009	
Premium Pay	---	
Other	---	
Total Personal Services		52,041
Travel		10,000
Contractual		9,700
Commodities		700
Equipment		1,600
Other		
Total Cost		74,041

Receipt Code	Funding Source		
	Federal Receipts	1002	
	G. F. Match	1003	
	General Funds	1004	74,041
	I-A Receipts	1005	
	Program Receipts	1028	
	CIP Receipts	1061	
	Other		

For B&M Use Only
Key Number __ __ - __ __ - __ __ - __ __ - __ __

Justification

This position would work on developing the required regulations and training programs necessitated by the bill. Also, the position would develop an in-house system to keep track of the training programs and certificate holders. As training programs are implemented, this position would ensure compliance with the provisions of this bill.

Costs include $10,000 for travel to inform workers and employers of the new law. Normal contractual, commodities and one-time furniture purchases are also included.

Request For New Position

Agency Labor

BRU Occupational Safety and Health

Component Occupational Safety and Health

Revised Date

FY 87

Position Title	No. of Positions	Range/Step	Barg. Unit	Gov.	Approv.	Disapp.
Clerk Typist III	1	8A	GGU			

Time Status	Staff Months	RP Number	Location	Election District	Leg.		
PFT	6		Anchorage				

Type of Expenditure		Amount
1	2	3
Salary	9,786	
Benefits	2,936	
Premium Pay	---	
Other	---	
Total Personal Services		12,722
Travel		0
Contractual		3,522
Commodities		350
Equipment		0
Other		0
Total Cost		16,594

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For B&M Use Only
Key Number __ __ - __ __ - __ __ - __ __ - __ __

Justification

This clerical position would provide support for the in-house tracking system and would process the requests for certifications. Costs include normal contractual and commodities.

The position would start six months after the program has begun to allow time for the regulations and tracking system to be implemented. The position would work 12 months after the first year.

Request For New Position

Agency Labor
BRU Occupational Safety and Health
Component Occupational Safety and Health

FY 87

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

Bill Version: HB 201
Publish Date:

REQUEST:

Revision Date:
Title: "An Act relating to hazardous painting certification."
Sponsor: House Labor and Commerce
Requestor: House Labor and Commerce

Agency Affected: Labor
BRU: Occupational Safety and Health
Components: Occupational Safety and Health

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES		64.8	77.5	77.5	77.5	77.5
TRAVEL		10.0	5.0	5.2	5.3	5.5
CONTRACTUAL		13.2	17.3	17.8	18.4	18.9
SUPPLIES		1.1	1.4	1.4	1.5	1.5
EQUIPMENT		1.6	0	0	0	0
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	90.7	101.2	101.9	102.7	103.4
CAPITAL						
REVENUE		200.0	100.0	50.0	150.0	75.0

FUNDING: (Thousands of Dollars)

GENERAL FUND		90.7	101.2	101.9	102.7	103.4
FEDERAL FUNDS						
OTHER						
TOTAL	0	90.7	101.2	101.9	102.7	103.4

POSITIONS:

FULL-TIME		2	2	2	2	2
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

(See attached)

Prepared by: Tom Stuart, Director — Phone: 465-4870
Division: Labor Standards and Safety — Date: 3/27/87

Approved by Commissioner: Jim Sampson — Date: 3/27/87
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Request For New Position

Agency Labor

BRU Occupational Safety and Health

Component Occupational Safety and Health

Revised Date

FY 87

Position Title	No. of Positions	Range/Step	Barg. Unit	Gov.	Approv.	Disapp.
Clerk Typist III	1	8A	GGU			
Time Status	**Staff Months**	**RP Number**	**Location**	**Election District**	**Leg.**	
PFT	6		Anchorage			

Type of Expenditure		Amount
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Request For New Position

Agency Labor
BRU Occupational Safety and Health
Component Occupational Safety and Health

FY 87

MSDS NO. 14

DU PONT

MATERIAL SAFETY DATA SHEET

September 1, 1985

ACRYLIC LACQUER PRIMERS AND SEALERS

Section I

Manufacturer
E. I. du Pont de Nemours & Co. (Inc.)
Finishes & Fabricated Products Dept.
Wilmington, Delaware 19898
Telephone: Product information (800) 441-7515
Medical emergency (800) 441-3637
Transportation emergency 800-424-9300
(CHEMTREC)

Product: 30S, 70S, 80S, 100S, 110S, 131S, 181S, 1934S, 1985S, 2129S, 2184S, A5285
D.O.T. Hazard Class: Flammable Liquid
Paint UN 1263

Section II — Hazardous Ingredients (See Section X for specific product codes and additional ingredients)

Primary Ingredients	CAS No.	Vapor Pressure (20°C mm Hg.)	Exposure Limits*
1. Butyl acetate	123-86-4	8	150ppm-A,O
2. Acetone	67-64-1	185	1000ppm-O
3. Methanol	67-56-1	96	200ppm-A,O
4. Toluene	108-88-3	22	100ppm-A
5. Isopropyl alcohol	67-63-0	31	400ppm-A,O
6. VM & P naphtha	64742-89-8	~45	100ppm-A,O
7. Ethyl acetate	141-78-6	76	100ppm-A,D
8. Xylene	1330-20-7	8	100ppm-A,O
9. Methyl ethyl ketone	78-93-3	95	200ppm-A,O
10. 2-Ethoxyl butyl acetate	112-07-02	0.3	225ppm-A,O
11. Acrylic resin	None	None	None

*A = ACGIH TLV O = OSHA D = Du Pont internal limit

Section III — Physical Data

Evaporation rate: Slower than ether
Vapor density: Heavier than air
Solubility in water: Slight
Percent volatile: 63.4-84.0% (By volume)
Approximate boiling range: 129°F-401°F
Density: 7.6-11.1 #/gallon

Section IV: Fire & Explosion Data

Flash point (Method): 20-73F (Closed cup).
Approx. flammable limits: 1.1-14%.
Extinguishing media: Foam, carbon dioxide, dry chemical
Special fire fighting procedures: Full protective equipment, including self-contained breathing apparatus, is recommended. Water from fog nozzles may be used to cool closed containers to prevent pressure build up.
Unusual fire & explosion hazards: When heated above the flash point, emits flammable vapors which, when mixed with air, can burn or be explosive. Fine mists or sprays may be flammable at temperatures below the flash point.

Section V — Health Hazard Data

Ingestion: Gastro-intestinal distress.
In the unlikely event of ingestion, call a physician immediately and have names of ingredients available.
Inhalation: May cause nose and throat irritation. May cause nervous system depression characterized by the following progressive steps: Headache, dizziness, nausea, staggering gait, confusion, unconsciousness. Laboratory studies with rats have shown that petroleum distillates cause kidney damage and kidney or liver tumors. These effects were not seen in similar studies with guinea pigs, dogs, or monkeys. Several studies evaluating petroleum workers have not shown significant increases of kidney damage nor kidney or liver tumors. Excessive human exposure to methanol including absorption through the skin may lead to: fatigue, headache, anaesthetic neurologic effects, and visual difficulties ultimately including blindness. Extremely high concentrations of butyl acetate have caused blood changes and weakness in laboratory animals. 2-Ethoxy butyl acetate can be absorbed through the skin in harmful amounts. In studies in laboratory animals has produced damage to red blood cells and kidneys. Very high concentrations of Methyl ethyl ketone have caused embryotoxic effects in laboratory animals. Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.
If affected by inhalation of vapor or spray mist, remove to fresh air. If breathing difficulty persists, or occurs later, consult a physician.
Skin or eye contact: May cause irritation or burning of the eyes. Repeated or prolonged liquid contact may cause skin irritation with discomfort and dermatitis.
In case of eye contact, immediately flush with plenty of water for at least 15 minutes; call a physician.
In case of skin contact wash with soap and water. If irritation occurs, contact a physician.

Section VI — Reactivity Data

Stability: Stable
Incompatibility (materials to avoid): None reasonably foreseeable
Hazardous decomposition products: CO, CO2, smoke, oxides of heavy metals reported in Section X
Hazardous polymerization: Will not occur

Section VII — Spill or Leak Procedures

Steps to be taken in case material is released or spilled: Ventilate area. Remove sources of ignition. Prevent skin contact and breathing of vapor. Confine and remove with inert absorbant.
Waste disposal method: Do not allow material to contaminate ground water systems. Incinerate absorbed material in accordance with federal, state and local requirements. Do not incinerate in closed containers.

Section VIII — Special Protection Information

Respiratory: Do not breathe vapors or mists.
Wear a properly fitted vapor/particulate respirator approved by NIOSH/MSHA (TC-23C) for use with paints during application and until all vapors and spray mist are exhausted. Follow the respirator manufacturer's directions for respirator use.
Ventilation: Provide sufficient ventilation in volume and pattern to keep contaminants below applicable OSHA requirements.

Acrylic Lacquer Primers & Sealers 1985, 2129S, 1315, 1815, 2184S

Protective clothing: Neoprene gloves and coveralls are recommended.
Eye protection: Desirable in all industrial situations. Include splash guards or side shields.

Section IX — Special Precautions

Precautions to be taken in handling and storing: Observe label precautions. Keep away from heat, sparks and flame. Close container after each use. Ground containers when pouring. Wash thoroughly after handling and before eating or smoking. Do not store above 120°F.
Other precautions: Do not hand, flame cut, braze or weld dry coating without a NIOSH/MSHA approved respirator or appropriate ventilation

Section X — Notes

Product Codes	Additional Ingredients
30S, 70S, 80S	1, 2, 3, 4, 5, 6, 11
100S, 110S	4, 5, 7, 8, 11
1984S, 1985S	1, 2, 4, 5, 6, 7, 8, 9, 10, 11
2129S	1, 2, 4, 5, 6, 9, 10, 11
131S, 181S	4, 5, 7, 8, 11
2184S	1, 2, 4, 5, 6, 3, 11

Additional Ingredients	CAS No.	Vapor Pressure (20°C mm Hg.)	Exposure Limits*
(1) 30S, 70S, 100S, 131S, 1984S, 1985S, 2129S also contain:			
Titanium Dioxide	13463-67-7	None	10mg/m³-A 15mg/m³-O

In a lifetime inhalation test, lung cancers were found in some rats exposed to 250 mg/m³ respirable titanium dust. Analysis of the titanium dioxide concentrations in the rat's lungs showed that the lung clearance mechanism was overwhelmed and that the results at the massive 250 mg/m³ level are not relevant to the workplace.

(2) 60S, 110S, 181S, 1984S, 1985S also contain:			
Non-hazardous natural pigment	None	None	None
(3) 30S, 70S, 80S, 100S, 110S, 131S, 181S, 1984S, 1985S also contain:			
Hydrous magnesium silicate	7789-06-2	None	2mg/m³-A, 15 mg/m³-O

Repeated and prolonged overexposure to Talc may lead to typical X-ray changes and chronic lung disease. The TLV is based on respirable dust that contains no asbestiform fibers and less than 1% crystalline silica.

(4) 100S, 110S, 1984S and 1985S also contain:			
Barium sulfate	7727-43-7	None	10mg/m³
(5) 1984S and 1985S also contain:			
Zinc oxide	1314-13-2	None	10mg/m³-A

*A = ACGIH TLV O = OSHA D = Du Pont internal limit

The data in this material safety data sheet relate only to the specific material designated herein and do not relate to use in combination with any other material or in any process.

Product Manager
Refinish Sales

Printed in U.S.A.

MATERIAL SAFETY DATA SHEET

6

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
DUTCH BOY PAINTS
P.O. Box 6709
Cleveland, Ohio 44101

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
10-Apr-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NUMBER
17-10

® - Trade Mark

PRODUCT NAME
Exterior Latex House Paint, White

PRODUCT CLASS
Latex Paint

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.

NO INGREDIENTS IN THIS PRODUCT ARE HAZARDOUS
AS DEFINED BY THE DEPARTMENT OF LABOR.

H - 9.5

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether

VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
212 - 388	62.6	10.82

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION — FLASH POINT >199 F PMCC — LEL N.A.
Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Extreme heat may cause closed containers to burst.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE

ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure may result in lightheadedness and staggering gait.
Irritant to skin and upper respiratory system.

Continued on page 2

ERGENCY AND FIRST AID PROCEDURES

If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN: Wash affected area thoroughly with soap and water.
If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

Section VI -- REACTIVITY DATA

TABILITY -- Stable

ZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

ZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

EPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

TE DISPOSAL METHOD

Incinerate in approved facility. Do not incinerate closed container. Dispose of in cordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

ECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact ith skin and eyes. Wash hands after using.

Protect against dust which may be generated by sanding or abrading the dried film.

ENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

ESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by NIOSH/MSHA for protection against materials in Section II,

ROTECTIVE GLOVES

Required for long or repeated contact.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Section IX -- PRECAUTIONS

OL STORAGE CATEGORY -- 3B

RECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep container closed when not in use. Transfer only to approved containers with complete nd appropriate labeling. Do not take internally. Keep out of the reach of children.

THER PRECAUTIONS

This coating contains materials classified as nuisance particulates, for example itanium dioxide, calcium carbonate, etc. (see ACGIH TLV List, Preface and Appendix D), hich may be present at hazardous levels only during sanding or abrading of the dried film.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Editorial

Solvent Neurotoxicity:

The Current Evidence

In view of the current debate regarding the nature and extent of solvent-related neurotoxicity, a brief review of relevant scientific issues and recent research findings seems useful. Unfortunately, as interest increases, the literature expands proportionately, and the authors have reviewed only a fraction of the available work in an attempt to summarize the current state of knowledge and to indicate the directions for future research.

Exposure, Absorption, Distribution, and Excretion

Exposure to solvents is ubiquitous in modern industry.[1] The list of chemical substances is long and many commercial products consist of combinations of several organic compounds. Systemic absorption is accomplished through lung[2] or skin[3] and is facilitated by a variety of host- and substance-specific factors.[4]

During the initial absorption period, solvents tend to be distributed to organs in concentrations proportional to regional blood flow.[5] As a result, during acute exposure, CNS solvent uptake proceeds rapidly and, if sufficient concentrations are reached, acute intoxication may result. The potential for causing acute intoxication varies widely among different organic solvents: those with low blood solubility (eg, methyl chloroform) reach saturation at relatively low blood concentrations and, consequently, cause less transient CNS disruption.[2] High solubility solvents (eg, styrene) show the potential for progressively increasing blood concentration, with attendant increasing risk, which is increased even further by physical exercise. Agent-specific lipid solubility characteristics and organ-specific lipid content also determine the tissue deposition. Nervous system tissue, with its high lipid content, is thus a repository for lipophilic organic solvents.

Address correspondence to: National Institute for Occupational Health, 1600 Clifton Rd, Atlanta, GA 30333 (Dr Baker).

0096-1736/86/2803-0125$00.00/0

Excretion occurs primarily through renal or pulmonary routes. Most agents have relatively short (ie, hours to days) whole body half-lives. Exposure to multiple agents or drugs (eg, ethanol) may prolong excretion.[6]

Peripheral Nervous System

A characteristic distal, symmetrical sensimotor peripheral neuropathy has been clearly demonstrated following exposure of humans and animals to several specific solvents: *n*-hexane, methyl-*n*-butyl ketone (MBK), and carbon disulfide. This disorder has characteristic histologic features (focal axonal swelling with distal axonal degeneration), predictable dose-response relationships, well-described clinical-pathologic correlates, and a relatively consistent clinical course.[7] Thus, the evidence for implicating these substances as human neurotoxic agents is well developed. Although peripheral nervous system (PNS) toxicity of these agents is most apparent clinically, all have been shown in animal studies[7] to damage the CNS as well.

Less convincing evidence exists linking mixed solvent exposure to clinically significant peripheral nerve disorders. Obviously, where commercial solvents are contaminated by known neurotoxic agents (eg, MBK in methyl ethyl ketone formulations) peripheral neurotoxic effects may occur. In the commonest circumstance of exposure to solvent mixtures, such as that encountered by painters or lacquerers, epidemiologic studies have shown increased rates of adverse PNS symptoms and electrophysiologic abnormalities on nerve conduction testing and electromyography. As recently summarized by Seppalainen[8] for the First International Conference on Solvent Toxicity held in Stockholm in October 1984, increased risk of PNS disorders appears to be present in certain populations. However, the relationship of those disorders to specific agents has not been elucidated. Furthermore, clear distinctions between clinical and subclinical neuropathy have not been made in all studies, rendering interpretation difficult. In studies of currently exposed groups, the rates of PNS toxicity have been less than CNS effects.

Central Nervous System

Most of the confusion and disagreement regarding solvent neurotoxicity relates to CNS effects. In view of the complexity of CNS function and of solvent exposures, such controversy is not surprising.[9] To achieve some uniformity of diagnosis, a World Health Organization (WHO) working group recently proposed a syndrome categorization scheme for CNS conditions caused by exposure to toxic workplace chemicals, including solvents, metals, and pesticides (Tables 1 and 2). The acute intoxicating effects of organic solvents have been well recognized for years; the symptoms consist of feelings of dizziness, lightheadedness, and incoordination. Transient psychomotor impairment frequently accompanies such symptoms.[10] Such studies of acute episodes do not demonstrate consistent effects on tests of psychomotor function, with the exception of reaction time, at exposures below current permissible exposure limits (PEL). Termination of exposure appears to result in total return of function and loss of symptoms. Acute toxic encephalopathy associated with cerebral edema is well-recognized as an effect of excessive exposure to lead, mercury, and other toxic agents. The condition has not been described as a characteristic finding in excessive short-term solvent exposure.

Evidence does exist that three chronic conditions occur in individuals with solvent exposure. The mildest, organic affective syndrome, as recently defined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III),[11] represents a reversible mood disorder which occurs in individuals with chronic solvent exposure.[12] Typical symptoms include increased fatigue, irritability, depression, and loss of interest in daily activities. Other toxic substances (eg, lead[13]) also appear to cause this syndrome, which reduces upon removal from exposure to the offending agent.[14] Although difficult to distinguish from other conditons, this syndrome does have characteristic clinical features that allow for identification of affected individuals, the most important of which are the temporal relationship of symptoms to sustained solvent exposure and the consistent pattern of symptom reporting among people with this condition.

Chronic toxic encephalopathy of mild or severe degree has been reported among solvent-exposed individuals. In addition to cognitive and mood symptoms, persons with these conditions display evidence of functional impairment, particularly reduction in psychomotor and short-term memory ability (Table 2). The most convincing scientific evidence derives from studies of individuals who have abused solvent-containing products. For example, four patients were found to have evidence of severe, multifocal CNS damage with cortical, cerebellar, and brainstem atrophy, electrophysiologic abnormalities, and neuropsychological deficits following prolonged inhalation abuse of toluene.[15] Epidemiologic studies of solvent-exposed populations (Table 3) have shown neurobehavioral changes that have varied between studies due to differences in exposure, measurement of health effect, study design, and analysis strategy.[8] Other investigations have shown increased rates of solvent exposure in patients with dementia-like syndromes[37,38]; these studies are difficult to interpret in that broad case definitions were used which included a variety of neuropsychiatric conditions. Further case-referent studies are needed to clarify the results of those two investigations. More restrictive case definitions should be used for future studies than were used in previous research.

The conclusion from these studies is that there appear to be syndromes of solvent-related CNS dysfunction of varying severity with similar qualitative features. As the severity increases, reversibility becomes progressively less likely and demonstrable structural abnormalities (eg, cortical atrophy) progressively more likely. The underlying pathogenesis of toxic encephalopathy due to solvents is unclear and requires further study. The lack of consistent dose-response relationships in chronic epidemiologic studies makes it difficult to determine whether current exposure to levels below accepted PELs is truly hazardous. In fact, a recent US study[39] failed to observe consistent neurobehavioral def-

TABLE 1

Acute Organic Mental Disorders

A. Acute intoxication
1. Pathophysiology: pharmacologic effect
2. Duration: minutes or hours; no sequelae
3. Clinical: acute CNS depression, psychomotor impairment
B. Acute toxic encephalopathy
1. Not clearly documented with organic solvents
2. Pathophysiology: cerebral edema, CNS capillary damage
3. Duration: hours or days; may cause permanent deficits
4. Clinical: coma, seizures

TABLE 2

Chronic Organic Mental Disorders

A. Organic affective syndrome
1. Pathophysiology: unclear
2. Duration: days or weeks; no sequelae
3. Clinical: Depression, irritability, loss of interest in daily activities
B. Mild chronic toxic encephalopathy
1. Pathophysiology: unclear
2. Course: insidious onset; Duration: Weeks or Months; reversibility: variable
3. Clinical: fatigue, mood disturbances, memory complaints, attentional complaints
4. Reduced CNS function
a. Psychomotor function (speed, attention, dexterity)
b. Short-term memory
c. Other abnormalities common
C. Severe chronic toxic encephalopathy
1. Pathophysiology: unclear, often associated with structural CNS damage
2. Course: insidious onset; Duration: indefinite, usually irreversible
3. Clinical manifestations
a. Loss of intellectual abilities of sufficient severity to interfere with social or occupational functioning
b. Memory impairment
c. Other
1) Impairment of abstract thinking
2) Impaired judgment
3) Other disturbances of cortical function
4) Personality change
4. Reduced CNS function
a. Types of abnormalities similar to mild chronic toxic encephalopathy More pronounced and pervasive functional deficits
b. Some neurophysiologic and neuroradiologic tests abnormal

TABLE 3

Epidemiologic Studies on Chronic Neurotoxic Effects of Solvents

Exposure/Population	Subjective Symptoms	Visual/Motor Performance	Memory	Verbal Concept Formation	Mood	Reference
Car painters	+*	+	+	+	+	Hanninen et al[16]
Lacquerers	+				+	Struwe et al[12]
Car painters	+					Husman[17]
House painters	+	+	+	+	+	Arlien-Soborg et al[18]
Spray painters	+	+	+	−		Elofsson et al[19]
House painters		+	−			Hane et al[20]
Solvent-poisoned	−	+	+	−		Lindstrom[21]
Viscose rayon		+	+	−		Harkonen[22]
Laminators		+	−	−		Harkonen et al[23]
Jet fuel-exposed		+	−			Knave et al[24]
Printers		−	+	−		Hanninen[25]
Steel workers		+			−	Anshelm Olson[26]
Dry cleaners		−				Tuttle et al[27]
Viscose rayon	+	+	−	+	+	Hanninen[28]
Styrene-exposed		+	−			Lindstrom et al[29]
Methylene chloride		−	−			Cherry et al[30]
Industrial painters	+	+	+			Anshelm Olson[31]
Toluene		+	−			Iregren[32]
House painters		+	+			Lindstrom et al[33]
Carbon disulfide		−	−			Putz-Anderson et al[34]
Toluene		−	−	+		Cherry et al[35]
Solvent-exposed		+	−			Cherry et al[36]
Solvent-exposed	+	+	−	+	+	Gregerson et al[38]

* + = adverse effect was observed; − = effect was tested for but not observed.

icits and current exposure documented at levels well below relevant PELs.

Other Neurologic Targets

A variety of other neurologic syndromes have been associated with exposure to specific solvents.[5] These include cerebellar ataxia (toluene), trigeminal and facial neuropathy (trichloroethylene contaminated with dichloroacetylene), parkinsonism (carbon disulfide), psychosis (carbon disulfide and toluene), and optic neuropathy (methanol). These associations derive mostly from case reports and dose-response relationships are lacking.

Future Trends

In view of the broad use of solvents in US workplaces[40] and the variety of neurologic syndromes attributed to excessive solvent exposure, much attention will be focused on the issue of solvent neurotoxicity in the future. In European countries, increasing numbers of workers are receiving compensation benefits for chronic solvent neurotoxicity. In response to this trend and other issues, the WHO Regional Office for Europe convened a working group to recommend diagnostic criteria for chronic CNS solvent toxicity in June 1985. The recommendations of that group correspond to the categorization scheme described in this article (Tables 1 and 2).

Although the available studies are in many cases imperfect, the accumulated evidence indicates that PNS and CNS toxicity is occurring in workers with excessive exposure. As yet unresolved are the difficult issues of dose-response relationships and pathogenetic mechanisms. In view of the vulnerability and limited regenerative capacity of the nervous system and the obvious functional importance of an intact nervous system, protection of neurologic function is of extreme importance. To accomplish this goal, prudence dictates that solvent exposure be controlled through accepted industrial hygiene measures. Medical monitoring of exposed workers should be reserved for selected situations in which degree of exposure (or solvent absorption) can be measured along with specific tests of nervous system function. Epidemiologic studies that carefully quantify both exposure and effect in long-term prospective investigations are essential to improve our understanding of this complex issue.

Authors' note (added in proof): A recent international workshop[41] has refined and clarified the terminology noted in Table 2 and has indicated directions for correct practice and future research. In this scheme, the mildest form of CNS dysfunction (type 1) was described as "central nervous system symptoms" rather than "organic affective syndrome." Mild toxic encephalopathy was subdivided into two types depending upon the predominant neurobehavioral deficit: sustained mood or personality change (type 2A) or intellectual impairment (type 2B). Severe chronic toxic encephalopathy (type 3) was felt to have features characteristic of dementia as defined in DSM-III.[11]

In light of current knowledge, certain control strategies are felt to be appropriate[41]:

1. Routine environmental monitoring should be performed to assure that current exposure limits, particularly those for peak exposures, are not exceeded.
2. Substitution of less toxic solvents for those with demonstrated high neurotoxic hazard should be accomplished.
3. Comprehensive worker training and educational

programs on solvent hazards should be implemented and their effectiveness evaluated.

4. In situations where workers are found to have evidence of solvent neurotoxicity, the individual's exposure should be controlled, preferably by removal to a solvent-free work environment. Follow-up of the individual should be performed to evaluate the course of the health condition.

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COVER STORY

Isocyanates in the workplace— a hidden, deadly threat

By Kevin Cook
FuelLine Staff Writer

Except for a bright scarlet rash spreading over his right hand, Kevin Novinger at first thought he had the flu.

Dizzy, nauseous, short of breath and sweating heavily after only his second week of painting cars for a Harrisburg, Pa. dealership, Novinger shrugged off the symptoms and continued working.

"I was toughing it out because if you get something wrong with you and you're off work more than three or four days you're out the door," said the 35-year-old Camp Hill, Pa. resident who began painting cars at age 16. "I was brought up in a working class family with the ethic that you stay on the job until you die."

Novinger's ethic almost came true. In the weeks ahead his symptoms persisted and worsened. He experienced frequent nosebleeds and pounding headaches. The rash quickly spread up his arms and appeared on his legs. His speech became slurred, his walk unsteady, but he still worked.

Several months later in May 1977, Novinger was told by a doctor that he was being poisoned by new paints, binders and solvents he was using at the dealership. He immediately quit his job, but his illness was by then irreversible.

What followed was a rapid descent into a hellish existence that for nine years has kept Novinger bedridden and almost completely deprived of sight, taste, smell and balance.

The Novingers on their wedding day. Of her husband, Darlene Novinger now says, "He does not plan on a future. He lives on a day-to-day basis."

"I didn't think anything would happen to me," said Novinger. "I didn't think it would happen because I believed the government wouldn't let it happen. It's a hell of a shock finding out there's nothing you can do."

Wearing sunglasses and lying on a sofa bed in a darkened living room, Novinger was within arm's reach of numerous drug vials littering the carpet. He is diagnosed as having nervous system dysfunction and myocardeoneuropathy (heart muscle atrophy) caused by volatile chemicals containing neurotoxins—primarily isocyanates.

Isocyanates—first commercially developed in Europe in the 1930s—are widely used in the production of polyurethanes found in foams, adhesives, electrical insulation and paints and lacquers commonly used by automobile bodyshops to make car coatings harden quickly.

Isocyanates are known to irritate the respiratory tract and produce asthma-like symptoms in workers inhaling them even at very low concentrations. And according to the National Institute of Occupational Safety and Health (NIOSH): "Death may result from exposure at high concentrations."

Destroyed nerves

Today, Novinger's body could be compared to a circuit box with blown fuses. Left toothless and without most of his body hair, dependent on a urine catheter because he has no bladder control and limited to only pinpoint vision in his left eye, Novinger also suffers from a wide array of other symptoms attributed to destroyed nerves, nerve tissues and glands.

"He is battling severe depression," said Novinger's wife, Darlene, who with her husband last February was awarded just under $1 million after a four-year federal district court fight with several U.S. and German corporate defendants directly or indirectly linked to her husband's poisoning. Myers Oldsmobile Sales & Service—the dealership where Novinger says he was poisoned—went out of business two years ago and was protected by law from being sued.

"There is no amount of money in this world to compensate for what happened to him," Darlene Novinger said of her husband. "He does not plan on a future. He lives on a day-to-day basis."

(See ISOCYANATES, page 14)

COVER STORY

ISOCYANATES, from page 4

The Novingers originally demanded more than $500 million in damages, saying they wanted to build a hospital for disabled painters. The defendants—E.I. Du Pont de Nemours & Company; General Motors; Mercedes-Benz of North America; Daimler-Benz A.G.; and BASF Farben & Farben—challenged the Novingers' claims that their products were potentially hazardous or were even used at all by Novinger. In one court document an attorney for Mercedes accused him of "malingering."

Toothless, his face bloated from water retention, limited to only pinpoint vision in his left eye, Novinger also suffers from symptoms attributed to destroyed nerves, nerve tissues and glands.

Although Novinger's case may be an extreme one, "There are many materials now used in the automotive industry that are highly toxic and unknown to the worker," said Dr. C. J. Abraham, a Mineola, N.Y. toxicologist.

Kevin Novinger must spend his days on a sofa bed in a darkened room, his medications always within reach.

"There are inadequate warnings and instructions on the products and working conditions are not safe," Abraham said. "As a result, unbeknownst to the worker ... over a period of time they [the products] can have an effect on his whole system."

"Toxic chemicals are a major threat to painters that rivals or exceeds the better-known health threats to asbestos workers and even to coal miners," said Rod Wolford, health and safety director for the International Brotherhood of Painters and Allied Trades (IBPAT) in Washington, D.C.

"A dead worker can't produce and a sick worker can't produce much better," Wolford said. "For members of our union this is an extremely serious problem that threatens not only the painter's health but the well-being of the whole industry."

Growing danger

Although many commonly used products—like water-soluble or latex-based paints—have not been proven harmful, there are more than 300 neurotoxic chemicals and 150 carcinogens (cancer-causing agents) potentially present in paints, according to a four-year study of paint hazards completed last year by the Johns Hopkins University School of Public Health in Baltimore, Md.

Other studies show a growing danger as manufacturers develop and market new chemical compounds. According to the Labor Department's Occupational Safety and Health Administration (OSHA), a new and potentially toxic compound is introduced into the American workplace every 20 minutes of every working day.

"The problem is, every time you'd get a new piece of information you'd have to change your label. Labels are expensive and difficult to print."

—Steve Sides
Nat'l Paint & Coatings Assn.

Yet, labels on many containers bear only trade names, with others revealing little about the contents.

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The absence of information is largely due to a lack of uniform regulations and a practice sometimes found among suppliers of raw materials who will not disclose chemical contents to manufacturers because they are considered trade secrets. Containers for some industrial-use paints show only code numbers.

Chronic painter's syndrome

Early symptoms of neurotoxic poisoning are dizziness, exhilaration, headaches, blurred vision and slurred speech. Hallucinations, permanent disorientation, paralysis and other signs of injury to the central nervous system can follow.

Such symptoms in Scandinavian countries have been given the name "chronic painter's syndrome." Studies on the subject there date back to the 1930s, and strict labeling of paint products and restrictions on usage have been in place for some time.

But in America—where the toxic effects of popular paint and solvent chemicals like toluene and benzene have only recently become firmly established—painters can still remain in the dark.

Among information conspicuously absent from most labels are instructions on early symptoms of over-exposure or emergency treatment:

"If affected by inhalation of vapors or spray mists remove to fresh air," admonishes a typical label. "If breathing difficulty persists, consult a physician ..."

This label belongs to Du Pont's Lucite acrylic laquer additive 355-S—now found in almost every automotive bodyshop as a replacement product for Du Pont's predecessor 155-S that Novinger says was among the products that poisoned him.

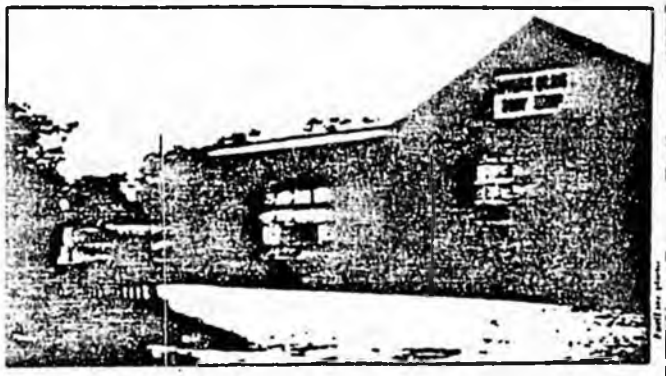
The new product contains two isocyanates and the toxic solvents toluene and hexamethylene. The label goes on to warn:

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

Misleading labels

But that warning does not mention isocyanates—binders, not solvents. It also implies that toxic solvents pose a serious health risk only through long-term overexposure or if the product is purposely mishandled or abused, said Frank Carsner, president of the Portland, Ore.-based Toxic Victims Association.

"The notice is definitely stilted and misleading and there's a sim-



Now defunct, Myers Olds Body Shop, where Kevin Novinger painted cars, was protected by workmen's compensation laws from being sued—a regulation the painters union wants to change.

do and they deliberately downgrade the toxicological effects so that it will sell."

In a second warning the label seems to make a veiled reference to isocyanates by saying: "Vapors and spray mists harmful if inhaled ... exposure may cause lung injury and allergy or respiratory reaction."

It also recommends wearing supplied-air respirators, gloves, and protective eyewear and clothing "... until all vapor and spray mists are exhausted."

One Du Pont spokeswoman who would not allow her name to be used said all Du Pont Labels "...go beyond known hazards and warn of potential hazards." Yet the label makes no reference to NIOSH and other findings that isocyanates can cause death.

The 355-S label was introduced in March 1985 and goes considerably further than the caution on Du Pont's old 155-S label that said only: "Vapor harmful. Causes eye irritation."

"Current labels are adequate in terms of safety," the Du Pont spokeswoman said, declining further comment. Repeated requests for further comment from Du Pont officials went unanswered.

Dollars versus disclosure

But there is documented evidence that some major paint manufacturers have in the past weighed the merits of more detailed labeling against the cost of lost business if

(See ISOCYANATES, page 18)

COVER STORY

ISOCYANATES, from page 15

their competitors reveal less-threatening information on their labels.

And according to Dr. John F. Keppel—pulmonary physician at Providence Hospital in Portland, Ore. and acknowledged as a leading medical expert on isocyanate toxicity: "Manufacturers are worried about scaring workers who use their paint."

"I think they really haven't been straightforward in their labeling so the worker knows what they mean," said Keppel, who has treated about 40 isocyanate poisoning cases in the past decade. About two-thirds of those cases involved automotive body painters, with most of the rest coming from other painting fields, he said.

Few lawsuits, widespread ignorance

There are no reliable statistics on the number of workers poisoned each year by products they have contact with. If lawsuits were an accurate reflection, then only about 75 to 100 persons nationwide now suspect they were overexposed to isocyanates, according to one legal expert.

"We don't see a lot of these cases because up until recently people didn't know what the hell was causing their illness and they wouldn't see a specialist," said Dr. James Frenkil, director of Central Medical Centers—four clinics in the Baltimore/Washington area treating industrial and occupational illnesses.

"What we see and hear from others is the tip of the iceberg in terms of illness and injury," agreed Wolford of the painters union. He said a 1977 mortality study of the union's workers in New York found their life expectancy to be 11 years less than the average American's—prompting ongoing health and safety awareness programs for thousands of union members.

There are more than 300 neurotoxic chemicals and 150 carcinogens potentially present in paints, according to a four-year study completed in 1985 by Johns Hopkins University in Baltimore, Md.

Few product liability or negligence suits are brought against paint manufacturers and other corporations because of widespread ignorance among injured parties, said Alan Kanner, attorney for the Novingers.

"My impression is that the [manufacturing] industry is very well aware that neurological illnesses are often difficult to connect with workplace exposure," Kanner said. "I think the industry is afraid that if the word gets out that this is a problem, there may be a lot of lawsuits coming out of the woodwork.

"For every Kevin Novinger, there's probably 100 others out there who have suffered some kind of injury," Kanner said.

Victims support group

Carsner of the Toxic Victims Association suspects the same. He formed the association in 1983 with four other former diesel truck painters—all of whom shared a common concern that they were poisoned while working at Portland's Freightliner Corporation.

Carsner, 45, was with Freightliner from 1973 to 1981, when he said he was fired "for absenteeism and misconduct because I kept going to the doctor and complaining about the hazards."

Carsner said he began using Du Pont solvents and polyurethane enamels in 1976. Working in a ventilated spray booth while always wearing a charcoal-filtered "dog-mask" respirator over his mouth and nose and keeping vaseline smeared over his exposed face, Carsner said he followed label recommendations to the letter.

"The labels implied that you didn't even need to wear a respirator," Carsner said. "In fact, they implied that up until the last couple of years."

Not until about eight months following his firing was Carsner diagnosed as having isocyanate

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poisoning. Meanwhile, other Freightliner diesel painters were becoming seriously ill on the job. Carsner's former foreman later died of kidney failure; another worker succumbed to respiratory failure and a brain tumor, he said.

Carsner is not bedridden like Novinger but his symptoms are still grim: short-term memory loss, body pains, liver and kidney damage, one eye tumor and several other tumors the size of quarters on his body. Now on heavy doses of steroids, he does not expect to live another decade.

But for Carsner and nine other Freightliner ex-painters counted in the membership of Toxic Victims Association, partial retribution was realized two years ago in the form of a reported $3 million settlement with the diesel manufacturer and two paint and chemical manufacturers. Additional lawsuits filed by some members are still in litigation.

Government response

The federal government—accused by critics of responding to the problem with lead feet—recently issued a Hazard Communication Standard impacting manufacturers of hundreds of thousands of products containing some 2,300 toxic substances.

In 1981, as part of its plan for a general reduction in regulations, the Reagan administration shelved a strict labeling regulation proposed by the Carter administration. That regulation had called for potentially toxic products to carry explicit explanations of ingredients, directions for use, and symptoms and treatment of toxic reactions.

Last November OSHA issued its standard that took effect in May. The standard requires about 300,000 manufacturers to inform their employees through training programs and reference material of possible health and safety hazards,

Rod Wolford of the painters union: "There are fewer OSHA inspectors than game wardens . . ."

recommended exposure limits, handling precautions, and appropriate protective equipment and emergency first-aid procedures.

Although covering about 14 million employees, the standard is criticized for not going far enough because it places no labeling requirements on potentially toxic products reaching the private sector workplace.

In fact, the standard's issuance prompted outcries from unions and public interest groups which recently led to a federal district court of appeals order that OSHA broaden the standard to include other industry sectors and pre-empt state regulations.

But Steve Sides of the National Paint and Coatings Association—made up of manufacturers—said current labeling practices will not be changed by a new standard.

"The chemical industry is the safest industry in the U. S.," he said. "The problem is, every time you'd get a new piece of information you'd have to change your label. Labels are expensive and difficult to print."

Proposed solutions

Wolford said a 1985 survey conducted by his union—representing some 180,000 workers—found that 50 to 80 percent of respondents reported typically using no respirator or only a dusk mask in a variety of painting jobs.

"It's possible for a person trying to compete to actually trade off lives and health to make a profit. The current system lets that occur," he said. "There are fewer OSHA inspectors than game wardens—so few that the odds of an inspection is about once in 100 years."

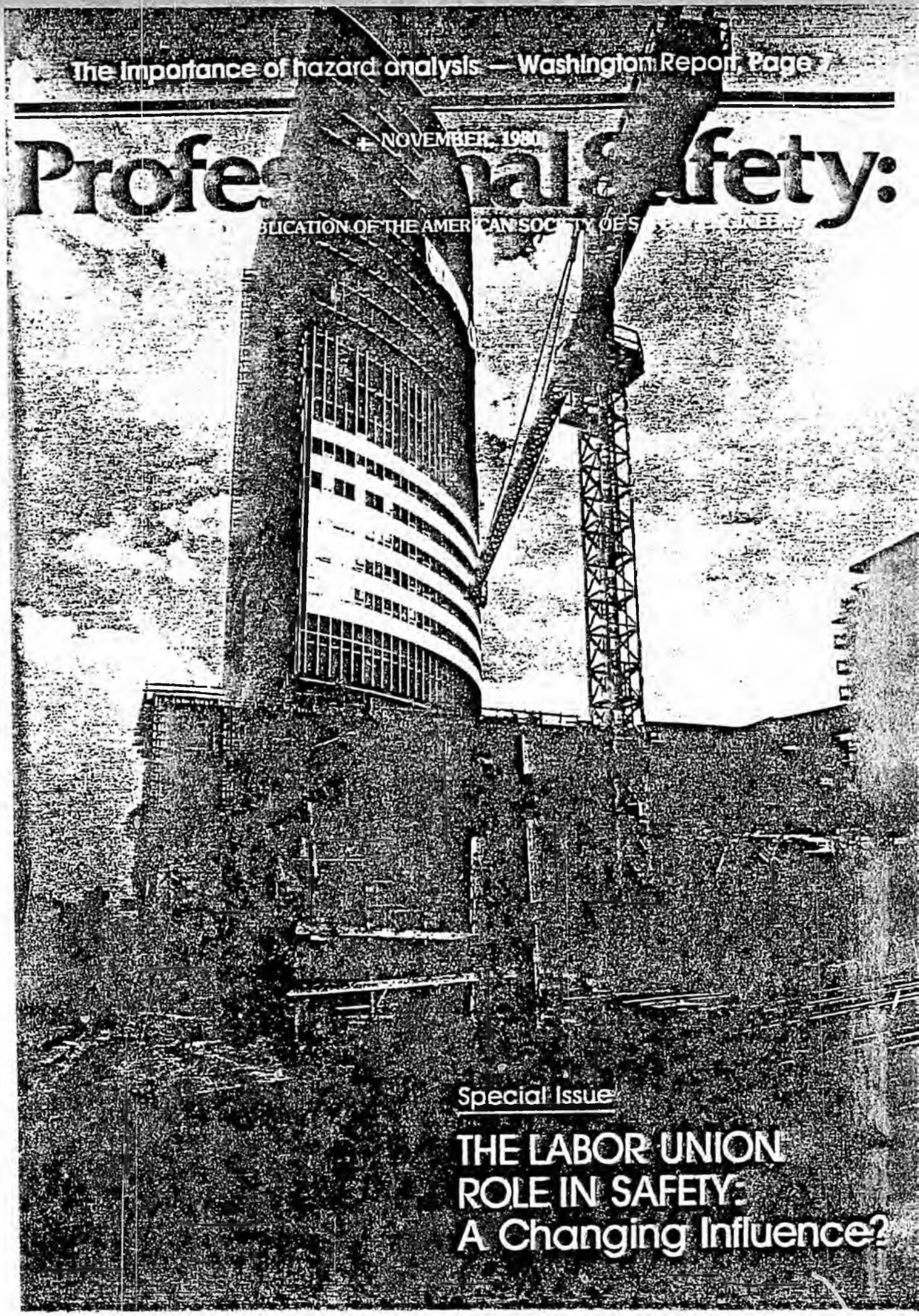
Businesses not meeting safety inspection standards usually face only small fines without the threat of loss of license, Wolford said. His union supports tax incentives for businesses that invest in health and safety improvements; stepped-up inspections and fines that exceed purchase and maintenance costs of protective equipment; and abolishment of state laws barring individuals from suing current or former employers if they are collecting on occupational illness compensation claims, as was Novinger.

And for painters handling toxic paint chemicals with less than utmost caution, the consequences can be devastating—as Carsner and the Novingers know too well.

"There is no certain way to keep the chemicals from coming in unless you have a forced-air [air-supplied] system," Carsner said. "I have seen all kinds of spray booths, and I haven't seen any that keep the product away from the worker to the point that he could get by without a chemical-proof suit and a full-face respirator with forced air."

"By publicizing Kevin's story we want to fight back so this doesn't happen to other people," Darlene Novinger said as she sat on the sofa bed with an arm draped over her husband's side.

"It's not fanaticism that keeps me going," she said, "just a moral obligation."□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ROLE IN SAFETY:
A Changing Influence?

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Photo by Les Crandell

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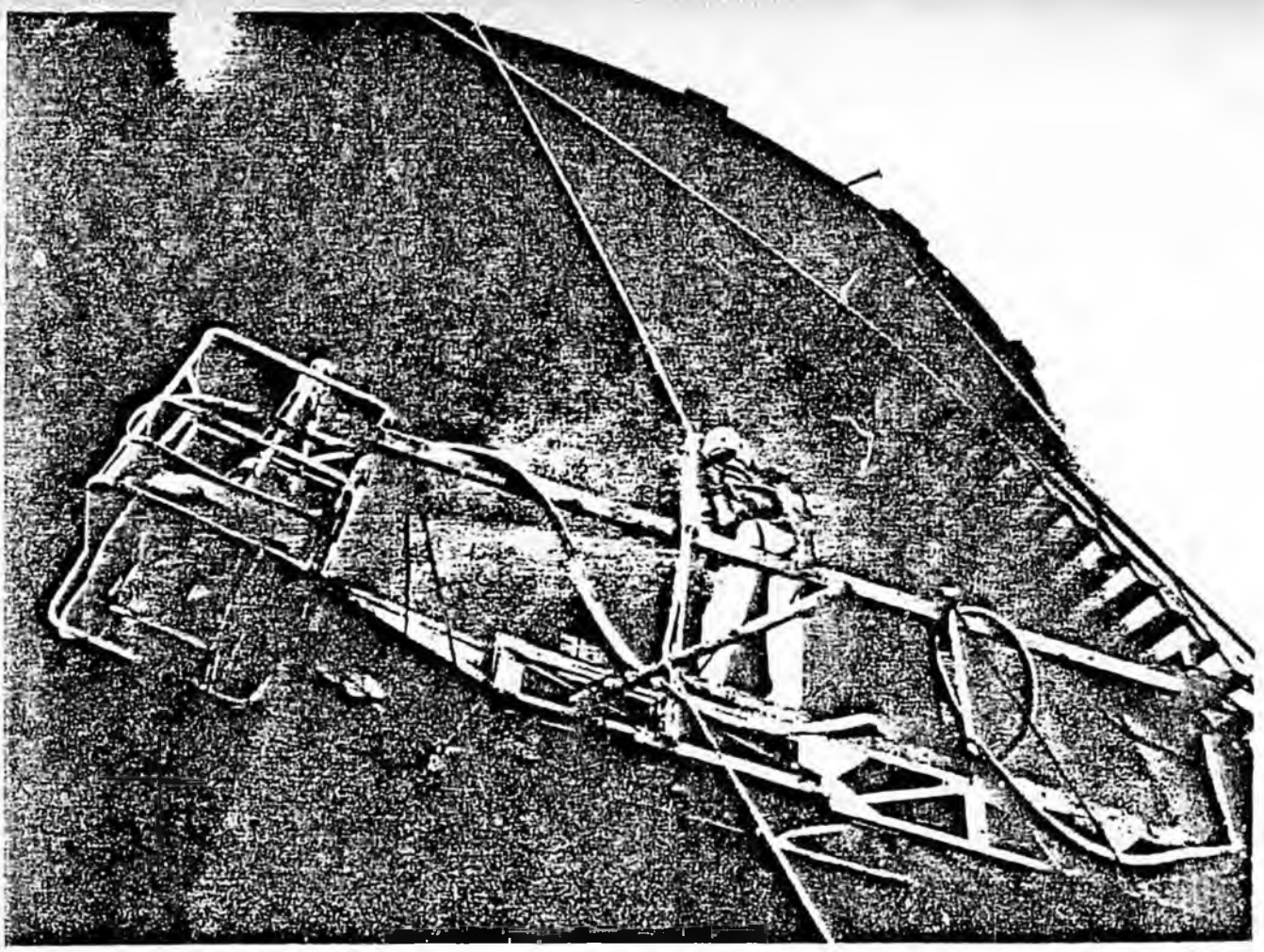


All photos by Les Crowfoot

The decade of job safety

One labor union's r[illegible]n safety

by Marilyn B. Larson and Rodney D. Wolford

The 200,000-member International Brotherhood of Painters and Allied Trades has existed since 1887. It has sought more wages, more benfits, more job security, more training and more for retirement. IBPAT started its death benefit fund in the 1800's, created health and welfare plans in the 1900's and a Department of Apprenticeship and Training in the 1950's, and in the 1960's established its National Pension Plan.

Labor's fight for the passage of the Occupational Safety and Health Act of 1970 was won with dedication—such as IBPAT's—to the principle of more and better protection for all working men and women.

Organizing a committee

In early 1970, IBPAT General President S. Frank Raftery organized the National Joint Safety and Health Committee to look into safety and health problems of painters and allied tradesworkers.

The committee has met twice each year since its beginning, bringing labor, management, government and scientists together to seek solutions to the complex safety and health problems of the paint trades. Through the National Joint Safety and Health Committee, IBPAT first came to Dr. Irving J. Selikoff of the Mount Sinai School of Medicine of the City University of New York. Dr. Selikoff reached into the core of IBPAT membership with scientific measurements to confirm what some had suspected but none had really known before. Many of IBPAT's members suffer effects from exposure to substances of the paint and allied trades. Many die, Selikoff said, and more endure needless damage to their health and well-being.

In September 1974, at the Twenty-Third General Convention, President Raftery declared the "Decade of Job Safety," a stepped-up attack on the health and safety hazards of the trades. In March, 1975, the National Joint Safety and Health Committee reviewed preliminary results of Dr. Selikoff's

When wet mud is applied to drywall seams, the taper may not need a respirator—although it is recommended; but when the seam is sanded, the respirator is a must.

examinations of 600 convention delegates. Many examined delegates had given up the tools of the trade to toil in administrative and leadership functions of the union. Even so, x-rays showed 27.4 percent of painters, 28 percent of tapers, 22.5 percent of floorcoverers and 32.6 percent of sandblasters had lung abnormalities. This large number of abnormal x-rays—better than one in four of examined delegates—shocked IBPAT's officers and members. When the findings appeared in the *Painters & Allied Trades Journal*, many members wrote to request thorough examinations.

A three-point program

By June of 1975, the National Joint Safety and Health Committee had devised a plan for study, based on Dr. Selikoff's work. The committee agreed to a three-point program to: (1) control the asbestos hazard, especially in drywall taping compounds; (2) develop safe work practices for sandblasters; and (3) study the carcinogenic, or cancer-causing, potential of chromates and other paint trade substances. The three problems tackled in the first year of the Decade of Job Safety all yielded results. Drywall taping compounds throughout the United States no longer contain asbestos. Furthermore, safe procedures for using any drywall compound were developed, although not yet widely practiced. Future efforts must alert more members and more contractors to the protections of these practices.

Sandblasting regulations are stronger now—and safer products often substitute for silica sand. Modern, air-conditioned blasting-hoods increase production while providing the best protection for the blaster. The future promises more stringent controls, more monitoring and perhaps even a ban of crystalline silica. But whether or not silica is banned, IBPAT stands ready to defend the interests of its members.

Chromates and cancer are a big concern because of the large amounts of chromate pigment in green, yellow and red paints. The NJS&HC researched chromates thoroughly. The conclusion: chromates cause cancer. Efforts have led to tougher OSHA standards for chromate. But hundreds of other substances still need informed, concentrated attention.

Early in the Decade of Job Safety, Dr. Selikoff also examined 1,400 other IBPAT members throughout the United States. In Toledo, 200 members; in St. Louis, 750; and in Kansas City, 100 members were examined. The findings—published as "Investigations of Health Hazards in the Painting Trades" and widely distributed throughout IBPAT and the government—appeared in a six-part series in the *Painters & Allied Trades Journal* in 1976 and '77.

All this early activity delivered a conclusive bundle of facts. A painter's life span is 11 years shorter than the average worker's. And the risk of cancer is three to five times greater. The painting industry, which is essentially a chemical industry, combines exposures to many highly toxic substances with work at heights on scaffolds, ladders, tanks, platforms, bridges, spiders, bosun's chairs and man-lifts. Painters consistently rank among the top five of more than 90 trades in the number of worker compensation awards received. No wonder OSHA classifies painting as a "high-risk" occupation.

It is evident that it doesn't have to be this way. No problem on the jobsite is beyond a solution. Some problems will take time and research, but for others solutions already exist.

Education and information

Educating members and informing the public of the hazards of the paint trades became a top priority. President Raftery and the General Executive Board sought practical ways to deliver this urgent message.

In October 1975, IBPAT submitted to the Occupational Safety and Health Administration an unsolicited proposal for education and training of 25,000 members. In November 1976, more than a year after submitting the proposal, the contract was awarded to IBPAT. The proposal was in competition with nearly 50 other organizations, including universities and research groups, for the chance to provide education to its own members. IBPAT's concept would take the message where it was needed: to the worker.

March 28, 1977, IBPAT received its first funding award to develop materials to educate painters and allied tradesworkers in the recognition and avoidance of the hazards of their occupations. The OSH Project is unique among occupational health and safety programs. It is unique because it works. It works because it uses programmed learning in printed texts and videotape modules. Practical-minded tradesworkers identify with the modules because visuals show real jobsites. General painters, abrasive blasters, drywall tapers, paint makers and floorcoverers—each trade receives modules for its own special safety and health hazards—and general modules for all trade groups.

In December 1977, the OSH Project pilot tested first-phase materials: for 25 floorcoverers in San Jose, California; 50 sandblasters in Houston, Texas; 75 paint makers in Kansas City, Missouri; and 90 general painters in Buffalo, New York.

Special training seminars

Then in 1978, IBPAT received a second OSHA award to upgrade existing modules, develop new modules and to deliver training in special nationwide seminars. The second award provided innovative training directly to tradesworkers. Producing new modules, publishing the 272-page *IBPAT/OSHA Health and Safety Education Books* and designing the delivery system took the summer of 1978. In September, additional special training materials were developed for glaziers. The glaziers program is modeled on the already produced materials which have proven so successful.

In October 1978, in Sacramento,

California, the first 40 tradesworkers were trained. Twenty-four months and 150 seminars later, over 12,000 members—coast to coast—know how to deal with the safety and health hazards of the paint and allied trades. Some had said IBPAT members were not interested in health and safety. Others had predicted they would not turn out for training sessions. But, even during the first winter that saw road-blocking blizzards all across the midwest and northeast, the attendance figures said the seminars succeeded.

> "Best safety and health program I have ever attended. Instructor was outstanding."
>
> "I liked the video tapes and the step by step way you follow them through the book."
>
> "The course was taught well with plenty of information that could possibly save your life."
>
> "Very modern, easy to understand, valuable information."
>
> "I would not have known about health and safety on the job if it wasn't for the OSH course."

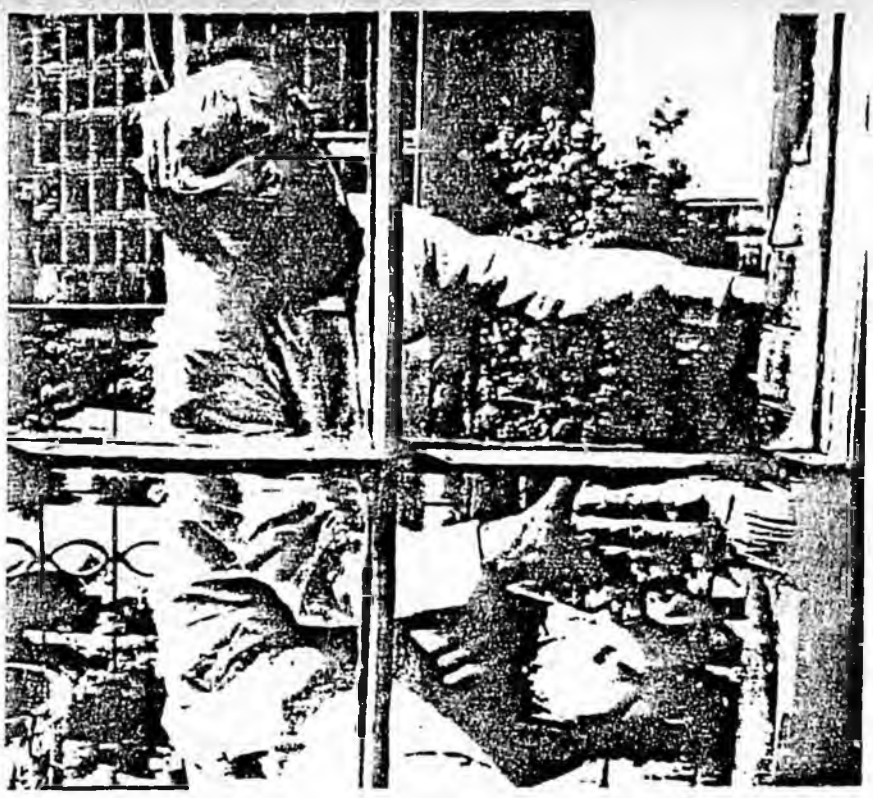
And so did the press. The nationwide training was well publicized—meeting IBPAT's goal to create public awareness and understanding. Some instructors were interviewed by television reporters for local TV news broadcasts, such as WHP-TV in Harrisburg, Pennsylvania, which aired this report:

> Co-sponsored by the Federal Occupational Safety and Health Administration and the national painters' union, today's session was a . . . new on the job safety program . . . designed to teach IBPAT members ways of protecting themselves from the health and safety hazards of their trades . . .
> If successful, Ellenberger says the program will help the union members and their employers learn how to avoid using the more damaging toxic materials.

Training pays dividends

But beyond the accolades, the training was paying real dividends. At an IBPAT/OSH seminar in Texas City, a local union representative realized his members had a serious occupational health problem. Symptoms of anemia were unusually high. The OSH Project examined 20 years of death certificates and found indications of early deaths from respiratory and coronary causes. NIOSH, John Hopkins University School of Hygiene and Public Health and the Mount Sinai School of Medicine are now verifying and evaluating the facts in this situation. This investigation might not have happened without IBPAT's serious concern for the health and safety of its members.

Government agencies, the press, trade associations, medical schools and other unions are frankly amazed at what IBPAT accomplished in so short a time: From research to program design and development to delivery in 18 months. The IBPAT-OSH Project is a startling measure of what a group can do when it rolls up its sleeves to marshal its energies and resources. Only five years into the "Decade of Job Safety," IBPAT has taken a quantum leap forward.



Brush painting is the least hazardous method of application, and because it is the slowest, it is usually reserved for small, inaccessible surfaces.

New program developed

In May of 1979, with training seminars in full swing, IBPAT developed a new jobsite monitoring/medical surveillance program to protect members year-round. The jobsite monitoring/medical surveillance program is—once again—the first of its kind of *any* occupational group. OSHA regards it as a prototype in the construction and maintenance industries where the lack of hazard evaluation and industrial hygiene monitoring on temporary worksites concerns many workers.

As part of the new program, representatives are being trained to identify, evaluate and resolve occupational safety and health problems, using state-of-the-art monitoring equipment such as combustible gas meters, noise dosimeters and passive monitor badges for sampling organic vapors. A "Hazard Index" is currently being developed which will be used to predict likely exposures to solvents *before* a job begins. The "Hazard Index" is undergoing validation through concurrent industrial hygiene measurements and will be further validated by extensive medical monitoring. →

Mixing in preparation for bridge repainting is a special skill of the paint trades; it is also a job which poses hazardous exposures, if protective clothing is not worn. Bridge paints commonly contain lead, chromates or cadmium. In addition, the solvents used are often among the most toxic.

Also included in the jobsite monitoring program are scaffolding evaluation techniques, fire and explosion hazard recognition, heat and noise control and general monitoring for sanitary conditions and safe work practices. The "jobsite monitoring corps" will observe workplaces and record findings on specially designed forms. These forms, along with sampling data, worker questionnaires and on-site photographs, will be analyzed for hazard evaluation and abatement.

At the same time, leading researchers at Johns Hopkins University are completing an epidemiological study of a nationwide population of painters and allied tradesworkers. Morbidity and mortality data produced by this study will allow the OSH Project to locate areas of immediate concern in jobsite monitoring/medical surveillance activities. Information gathered by the jobsite monitoring corps—together with the morbidity and mortality data from Johns Hopkins will enter IBPAT's computer for processing and print-out in formats compatible with those of OSHA, NIOSH, medical schools and trade associations.

Also needed for early detection of harmful exposures to the most hazardous and most commonly used substances of the paint and allied trades is a battery of appropriate medical examinations and a system of recordkeeping to store and retrieve results. Although current OSHA standards *require* employer-sponsored medical examinations for workers handling many substances used in the paint and allied trades, most IBPAT members do not receive regular medical surveillance because of the transient, mobile nature of their employment.

Employers can't keep permanent medical records for temporary employees. Since permanent records are kept for all its members, IBPAT wants to obtain medical examinations for members and maintain permanent medical records with the continuity so necessary to their usefulness—while in no way usurping the employer's responsibility for a safe and healthful workplace.

Jobsite monitoring/medical surveillance is a fledgling program as IBPAT moves into the second half of its "Decade of Job Safety." But it points the direction of the future. IBPAT will continue gathering and compiling information on the safety and health of members for their protection.

IBPAT's four-part plan for the future is this: (1) complete and accurate labels on all paint and allied products; (2) thorough testing of products prior to their introduction into the workplace; (3) assistance for Local Unions and District Councils to establish their own health and safety programs; and (4) nationwide certification standards for painters and allied tradesworkers—union and non-union alike.

Current paint trade product labels are inadequate. The label says only, "contains benzene"—which happens to be a carcinogen, or, "flammable liquid," but nothing about the long-term effects of inhalation and skin absorption. Most labels list no methods for controlling exposure to the product—no engineering controls, no administrative procedures and no recommendations for personal protective equipment. All this information should be on every label—along with the known consequences of failure to take precautions.

Up until now, most health and safety testing of paint trade products is the "field testing" that happens right in our own workplaces. Painters and allied tradesworkers are not guinea pigs. Many workplace hazards can be eliminated through demands for more thorough testing of products prior to their introduction into the workplace—and by testing many substances on its own.

Organized labor is growing increasingly concerned with job safety and health. But it's a complicated and very technical area. Affiliates need scientific, educational and informational support. They may also need help finding outside funds to get their efforts underway.

St. Louis District Council 2 is the first IBPAT affiliate to open its own Health and Safety Department with a full-time staff of two. Their program includes a battery of ongoing medical tests, and a system of jobsite monitoring modeled on the one designed by the IBPAT-OSH Project. The OSH Project has also assisted in publicizing their health screening program.

Finally, IBPAT believes the com-

plexity of health and safety hazards and the depth of technical knowledge required for safe and healthful work in the trades demand certification of painters and allied tradesworkers. Nationwide certification—including training, performance standards and medical monitoring—is an ambitious undertaking. But work conditions, death and suffering, hardships and severe economic impact on productivity and inflation—all of these things challenge our resourcefulness and our energies.

"IBPAT, its Local Unions and District Councils—as a team—can meet this challenge, as we have met all important challenges in other areas over the last 92 years," General President Raftery told delegates to IBPAT's 24th General Convention in Chicago. "To get more, we must do more," he said, "and there is a lot more yet to be done." Following his message, the delegates voted unanimously to establish a dues-funded Department of Health and Safety at the International's headquarters, to carry forth these programs and build on the momentum of the last five years.

"What happens five years from now?" wonders Raftery. "Will the new chemical and mineral substances of the trades and the new equipment and materials make what we know obsolete? Will we return to the task of basic research of each tool or chemical—*after* it kills our members? Or will we have a system as capable of handling the new component Y as the old component X?" IBPAT has the commitment of Local Unions and District Councils to continue its successes in education and jobsite monitoring/medical surveillance—and to meet its new information gathering and record-keeping goals. Affiliates and many others in the paint and allied trades agree: the second half of the "Decade of Job Safety" must see even greater progress.

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Organic Solvent-Induced Encephalopathy in Industrial Painters

Douglas H. Linz, MD; Patricia L. de Garmo, ANP; William E. Morton, MD, DrPH; Arthur N. Wiens, PhD; Bruce M. Coull, MD; and Robert A. Maricle, MD

Although organic solvents are essential components of an industrial economy, they are not used without risk. The relationship between excessive exposure to organic solvents and subsequent development of chronic encephalopathy has been recognized for nearly 100 years.

Fifteen industrial painters who underwent evaluation in an occupational health clinic for symptoms that they related to their work were found to have a high prevalence of neurasthenic symptoms, most frequently, memory loss and personality change. Although neurologic and screening laboratory examinations showed no consistent abnormalities, psychological tests documented poor short-term memory and an array of neuropsychologic deficits. Personality profiles revealed depression, anxiety, and preoccupation with somatic concerns.

These findings agree well with previous reports of "chronic painter's syndrome." Heightened awareness among industrial physicians and prospective studies to evaluate existing threshold limit values and personal protective equipment requirements are indicated.

Over a period of 14 months, 15 industrial painters were seen in the Occupational Health Clinic at the Oregon Health Sciences University with health complaints that they related to their work. Struck by the remarkable similarity in symptoms reported by the initial three or four painters, the authors reviewed the medical literature and undertook an evaluation of these and subsequent painters along lines suggested by the literature review. A copy of this literature review can be obtained from the authors upon request. The clinical findings of the 15 painters comprise the subject of this report.

From the Departments of Internal Medicine (Dr Linz); Nursing (Ms de Garmo); Public Health and Preventive Medicine (Dr Morton); Medical Psychology (Dr Wiens); Neurology (Dr Coull); and Psychiatry (Dr Maricle), Oregon Health Sciences University, Portland. (Dr Linz, Ms de Garmo, and Dr Morton are also on the staff of the Occupational Health Clinic, Oregon Health Sciences University.

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Methods

The 15 industrial painters completed the clinic's 12-page questionnaire, providing information about their symptoms, job characteristics and exposures, work histories, health problems, and family and reproductive histories. The questionnaire, developed prior to the opening of the clinic, is used to obtain information on all patients seen in the clinic regardless of occupation or exposures. Because a relatively consistent pattern of symptoms occurred in the painters, the authors felt a need to assess whether the symptoms of the painters were related to their work-site exposures rather than to other factors such as unemployment, financial stresses, and pending litigation. Such factors are common in patients seen in the Occupational Health Clinic and might well affect symptom reporting. A recent report[1] ascribed cognitive and affective symptoms, including "impaired memories, lowered spirits, irritability, and a loss of interest in former activities," to premorbid psychological factors, pending litigation, and other causes. Such findings emphasized the importance of including a comparison group with similar stressors.

Physical examinations were performed with particular attention to those components suggested by the painters' symptoms. Neurologic consultation was obtained in six painters because of suspected abnormalities on screening examination. Laboratory evaluation included standardized multichannel automated chemistry panels, urinalyses, and complete blood counts.

A neuropsychologic evaluation[2–3] by different examiners was performed on all 15 painters. This included a patient interview, the Revised Wechsler Adult Intelligence Scale (WAIS-R), measures of auditory and visual

memory function (Rey Auditory Verbal Learning test and Rey-Osterreith Complex Figure test), the Halstead-Reitan Neuropsychology test battery, aphasia screening tests, and the Minnesota Multiphasic Personality Inventory. The Halstead-Reitan battery consisted of the following: Halstead Category test, Tactual Performance test, Seashore Rhythm test, Speech Sounds Perception test, Finger Tapping test, Trail Making test, Strength of Grip test, Sensory-Perceptual Examination, and Tactile Perception test. This particular battery of tests was [illegible] straint for test administration, it was possible to evaluate a comprehensive set of neuropsychologic functions. In addition, because the comparison workers did not also undergo neuropsychologic evaluation, it was imperative to select standardized tests for which normative scores were available. (WAIS-R[4] Rey Auditory Verbal Learning test,[2(426)] Rey Osterreith Complex Figure test,[2(401,448)] and Halstead-Reitan Neuropsychology test battery.[5]

In interpreting and presenting the neuropsychologic test data, the authors made several assumptions. First, we assumed that the painters were not in any way systematically preselected on any of the variables in this test battery, ie, that above-average or below-average individuals were not drawn disproportionately into the occupation. Accordingly, average normative group scores, available for each of the tests, were used as a comparison standard. For example, a full scale intelligence quotient (IQ) of 100 was assumed to be the appropriate normative comparison group for the painters. It was further assumed that, if the performance of an individual fell one standard deviation (16th percentile) below the mean for the normative group, impairment could be suspected. If performance fell two standard deviations (second percentile) below the normative mean, the individual was assumed to be atypical. Thus, assuming that the sample of 15 painters did not differ significantly from the normative sample, about 16% would be expected to score one standard deviation or more below the mean.

Functions assessed included motor functioning, auditory perceptual sensitivity, spatial perception/construction/reasoning, new learning and memory, attention/concentration/tracking, and higher order cognitive functions. The test for significance of a proportion was used to assess the statistical probability of the observed *vs* the expected number of painters scoring at the levels of one and two standard deviations below the normative means.

Psychiatric interviews were obtained for four patients, computed tomographic (CT) brain scans for three, EEG for eight, and electromyograms (EMGs) and nerve conduction velocity measurements for seven patients. Specimens for determination of specific metals and other substances with known or suspected neurotoxic effects were obtained when indicated by exposure history. Work-site measurements of ambient organic solvent concentrations were not available.

Results

Work-site descriptions, job titles, and exposure data for the 15 industrial painters are listed in Table 1. They were employed at three work-sites. All of the painters

TABLE 1

Data on Industrial Painters

Case	Title	Sex	Age	Date of Examination	Exposure Duration	No. of Months Since Last Exposure
Work site A. Employees of light equipment manufacturer; exposed to toluene, xylene, methyl ethyl ketone, acetone, ethyl acetate, ethyl benzene, isobutyl acetate, n-butyl acetate, hexane E, mineral spirits, and naphthalenes; used new paint booth with ventilation design defect.						
1	Industrial painter	F	37	6/82	5 yr (6 wk)*	2
3	Industrial painter	F	24	8/82	3 mo (5 wk)*	3
5	Industrial painter	F	36	8/82	4 mo (8 wk)*	2
Work site B. Employees of heavy equipment manufacturer; exposed to toluene, xylene, ethyl benzene, paraffins, naphthalenes, kerosene, mineral spirits, methyl ethyl ketone, trichlorethylene, and methylene chloride; used paint booths with inadequate waterfall ventilation until air-supply respirators were installed in 1981.						
2	Industrial painter/sandblaster	M	35	6/82	13 yr	4
4	Industrial painter/sandblaster	M	34	8/82	5 yr	8
6	Industrial painter/sandblaster	M	37	8/82	16 yr	3
14	Industrial painter/sandblaster	M	33	7/83	4 yr	30
Work site C. Employees of heavy equipment manufacturer; exposed to toluene, xylene, ethyl acetate, petroleum distillates, and mineral spirits; used paint booth with inadequate ventilation; used respirators with poor fit and with insufficient cartridges for changes; air-supply respirators made mandatory in 1981.						
7	Industrial painter	M	41	9/82	8.7 yr	11
8	Industrial painter	M	40	3/83	3.4 yr	21
9	Industrial painter	M	35	3/83	10 yr	4
10	Industrial painter	M	33	3/83	10 yr	9
11	Industrial painter	M	56	3/83	17 yr (+7 other)†	21
12	Industrial painter	M	40	4/83	8 yr	32
13	Industrial painter	M	40	5/83	20 yr	2
15	Industrial painter	M	56	8/83	5 yr	16

* Period in faulty paint booth.
† Years in other industrial painting jobs.

had worked with cleaning and painting equipment in ventilated paint booths and had charcoal-canister respirators available, although use was inconsistent. A major portion of the painters' work time was spent cleaning surfaces with organic solvents. Other activities included priming, painting, and occasional stripping of old paint. Cans in unventilated compartments of the large machinery being painted. Many painters described extensive skin exposure from dipping rags into solvents without gloves.

The painters ranged in age from 24 to 56 years at the time of examination. The duration of exposure varied widely, from weeks in the presence of a malfunctioning paint booth ventilation system to many years when problems with occupational hygiene were somewhat less dramatic. The authors were unable to develop a satisfactory estimate of dose exposure and no measurements of airborne solvent concentrations were available. None of the painters had hobbies or other activities with significant organic solvent exposure.

The 15 painters and the comparison group of 30 nonpainters, seen during the same time period, were similar with respect to age, sex, and education level, but the painters were more apt to be unmarried and unemployed (not statistically significant). Occupations of control workers and their distribution were as follows: four electricians, four wood products workers, three clerical workers, three heavy equipment operators, two mechanics, two welders, two laborers, a warehouseman, a maintenance worker, an engineer, an industrial cleaner, a mason, a carpenter, a butcher, an oyster shucker, a farm worker, and a textile worker. Duration of the employment for the comparison group ranged from 0.1 to 33 years (mean of 6.7 years). Potential toxin exposures were highly variable depending on their employment, but included some organic solvent exposure for 16 of the 30 workers.

Symptoms

All of the painters, and none of the nonpainters, described the workplace occurrence of symptoms consistent with recurrent acute organic solvent intoxication. These included episodic feelings of drunkenness, ataxia, dysarthria, nausea, shortness of breath, dizziness, headache, disorientation, and, occasionally, combativeness. Four painters had had one or more syncopal episodes at work and one had required emergency hospital treatment. All the painters reported a need for frequent fresh-air "breaks."

Chronic symptoms reported by the painters and nonpainters are presented in Table 2. Painters differed from nonpainters in relating significantly higher frequencies of poor memory, personality change, sleep disturbance, taste-smell abnormalities, dizziness, headache, decreased coordination, and chronic cough. Key symptoms were diminished short-term memory function and a change in personality, often more noticeable to family members or close associates than to the painters themselves. Painters and nonpainters did not differ significantly with respect to other common symptoms, including tension, nervousness, morning fatigue, indigestion, or back pain.

TABLE 2

Prevalence of Symptoms Among Painters and Nonpainters

	Painters		Nonpainters		Significance of Difference
	No.	%	No.	%	
Chronic cough (daily or work days only)	8	53.3	4	13.3	<.05
Headache (weekly or more often)	[illegible]	[illegible]	[illegible]	[illegible]	<.05
Dizziness (daily or more often)	6	40.0	3	10.0	<.05
Sleep disturbance	10	66.7	9	30.0	<.05
Decreased coordination	8	53.3	5	16.7	<.05
Abnormal taste or smell	13	86.7	10	33.3	<.005
Personality change	12	80.0	6	20.0	<.0005
Decreased memory	15	100.0	5	16.7	<.0001
Morning exhaustion	8	53.3	8	26.7	NS
Heartburn/indigestion	4	26.7	3	10.0	NS
Back pain	2	13.3	7	23.3	NS
Tension/strain	9	60.0	20	66.7	NS
Nervousness	5	33.3	11	36.7	NS
Chest pain	6	40.0	4	13.3	NS

Eight painters, four of whom were employed at work site B, reported the periodic occurrence of symptoms suggestive of a seizure disorder. Two had experienced major motor seizures, as well as temporal lobe seizures consisting of brief episodes of staring, lip-smacking, and bizarre behavior followed by unresponsiveness. These spells were preceded by auras of light-headedness, headache, feelings of unreality, and facial rubbing, and followed by postictal fatigue and somnolence. Two painters had experienced only temporal lobe seizures, according to their medical histories. These four had all worked for the same employer at work site B. The remaining four gave histories of circumscribed periods of complete amnesia, raising the suspicion of seizure activity.

Medical histories suggested other possible contributions to symptoms in three painters. Case employee 11 had evidence of possible concomitant mild lead poisoning, (blood lead 40 μg/dL, free erythrocytic protoporphyrin 83 μg/dL). Case employee 14 had a previous head injury resulting in unconsciousness. Case employee 6 had a diastolic blood pressure of 124 mm Hg. Exclusion of these three subjects from a repetition of the analysis of the 12 remaining painters and 30 nonpainters resulted in no changes in the probability calculations listed in Table 2, except that dizziness no longer differed significantly between the two groups ($P < .10$).

As shown in Table 3, there were no significant differences between the two groups in the prevalence of other factors that influence symptom-reporting, such as shift work, previous application for workers' compensation, previous diagnosis of work-related disease, physical activity at work, job stress, and job satisfaction. Smoking, alcoholic beverage consumption and self-health assessment did not differ significantly between painters and nonpainters. Six of the 15 painters had had a previous diagnosis of occupational asthma, caused by hypersensitivity to diisocyanates, and five were receiving workers' compensation for injuries, three for back injuries and two for other musculoskeletal problems. Prevalence

TABLE 3

Prevalence of Confounding Characteristics Among Painters and Nonpainters*

	Painters		Nonpainters	
	No.	%	No.	%
Shift work (Day shift work)	5	33.3	15	50.0
Union membership	12	80.0	24	80.0
Occupational injury or illness leading to termination	5	33.3	9	30.0
Previous application for workers' compensation	5	33.3	9	30.0
Previous diagnosis of work-related disease	6	40.0	9	30.0
Self-reported activity				
Physical activity on job (much or extreme)	11	73.3	20	66.7
Job stress	10	66.7	16	53.3
Job satisfaction	10	66.7	19	63.3
Smoking currently	9	60.0	11	36.7
Ethanol consumption (current)	10	66.7	20	66.7
Health ranking (moderate limitations or worse)	11	73.3	20	66.7

* Significance of differences between painters and nonpainters is >.05.

rate of workers' compensation claims among nonpainters was similar.

Physical Examinations

Physical examinations, performed on all painters, revealed significant hypertension in two and lung examination revealed wheezing in two. Neurologic examinations showed abnormalities that were limited to diffusely altered mental status testing in one painter and evidence of mild distal neuropathy with reduced two-point discrimination in four painters. Physiologic tremor was increased in three painters.

Laboratory Evaluation and Specialized Diagnostic Testing

Routine laboratory testing, performed on all painters, revealed no consistent pattern of abnormality. Mild increases in lactate dehydrogenase and serum glutamate-oxaloacetic acid transferase, pyuria, and microhematuria were present in one painter each and mild leukocytosis (white blood cell count <15,000/mm^3) in two others.

Eight of nine painters with a history of exposure to lead-containing paints had acceptable levels of blood lead and normal serum free erythrocytic protoporphyrins (FEP). One painter had a blood lead level of 0.40 mg/L (normal if less than 0.30 mg/L) and FEP 93 μg/dL (normal if less than 50 μg/dL), suggesting possible lead intoxication. Eleven of 15 painters with respiratory complaints and known exposure to diisocyanates had pulmonary function testing with methacholine challenge performed. Although baseline pulmonary function testing was normal in all, six had positive methacholine challenge testing (>20% reduction in FEV_1).

Eight of 15 painters had waking and sleep EEGs because of suspected seizure disorders. All waking records were normal. However, with sleep studies, paroxysmal discharges diagnostic of a seizure disorder were demonstrated in three patients; all were employed at work site B. CT brain scans obtained in these three painters were normal. EMGs and nerve conduction velocities documented [illegible] peripheral neuropathy in five of seven symptomatic painters tested.

Results of neuropsychologic testing verified symptoms of cognitive disturbance. Tests were performed after EDTA-chelation therapy in the painter suspected of possible lead poisoning and after control of hypertension in the painter with significant hypertension. Intelligence quotients (IQs) from the Wechsler Adult Intelligence Scale-Form R (WAIS-R) were: verbal IQ mean, 89.7 (range 71–105); performance IQ mean, 90.9 (range 78–109); and full-scale IQ mean, 89.3 (range 76–105). Evidence of possible or probable deterioration from a premorbid intellectual potential was noted in five painters (33%), as determined by comparing scores on subtests that were often sensitive to organic impairment (ie, Digit Span, Arithmetic, Block Design and Digit Symbol subtests) to scores on subtests more resilient to such impairment (ie, Information, Vocabulary, and Similarities).

The results of the neuropsychologic assessments for the 15 painters compared with normative scores are shown in Table 4, which reveals that nearly uniformly a larger proportion than 16% of the painters scored one standard deviation or more below the normative means. On a test of simple motor speed (Finger Tapping-preferred hand), only three of the painters scored at the 16th percentile or below, and one of the three scored two standard deviations below the normative mean for this test. Thus, on this particular test and function, the painters did not differ significantly from expected score levels.

On the measure of hand strength (Hand Dynamometer test-preferred hand), a larger proportion (33%) of the painter group scored one or more standard deviations below the mean than would have been expected by chance (16%). Furthermore, 3/15 painters scored two or more standard deviations below the normative mean, a probability of less than .001. Going from simple motor speed and strength to visuomotor coordination tests, the painter group scored below expected levels on both the Trail Making Test A and the WAIS-R Digit Symbol subtest. The two tests involve response speed, motor persistence, visual scanning, and sequencing ability. As a cognitive component was introduced along with the motor functions in these two tests, the painters experienced problems with the cognitive-visuomotor coordination.

The two auditory perceptual sensitivity tests proved quite difficult for many of the painters, as did the spatial perception/construction/reasoning tests, especially the Tactual Performance test and the Rey complex figure test. New learning and memory tests were all difficult for the painters; on the Rey Auditory Verbal Learning test, 14/15 of them scored one or more standard deviations below the normative group mean. The attention/

TABLE 4

Neuropsychologic Test Scores for 15 Painters Compared with Normative Group Scores

Tests	Painters					
	<1 SD			<2 SD		
	N	Proportion Observed (expected = 0.16)		N	Proportion Observed (expected = 0.02)	
Motor functioning						
Simple motor speed/strength						
H-R*: Finger Tapping-preferred hand	3	.20	.674	1	.07	.168
H-R: Hand Dynamometer-preferred hand	5	.33	.067	3	.20	.001
Visuomotor coordination						
Trail Making: Test A	6	.40	.011	5	.33	.001
WAIS-R: Digit Symbol	10	.67	.001	2	.13	.002
Auditory perceptual sensitivity						
H-R: Seashore Rhythm test	9	.60	.001	5	.33	.001
H-R: Speech Sounds	9	.60	.001	7	.47	.001
Spatial perception/construction/reasoning						
Nonvisual						
H-R: Tactual Performance test						
Total time	8	.53	.001	7	.47	.001
Visual						
Rey-Osterreith Complex Figure Test						
Copy Trial	6	.40	.011	4	.27	.001
WAIS-R: Block Design	5	.33	.067	0	.00	.582
Object Assembly	5	.33	.067	0	.00	.582
Picture Completion	5	.33	.067	0	.00	.582
Picture Arrangement	7	.47	.001	2	.13	.002
New Learning and memory						
H-R: Tactual Performance test						
Total time	8	.53	.001	7	.47	.001
Memory	14	.93	.001	6	.40	.001
Location	6	.40	.011	3	.20	.001
Rey Auditory Verbal Learning test						
Trial I	14	.93	.001	4	.27	.001
Trial V	13	.87	.001	13	.87	.001
Rey-Osterreith Complex Figure test						
Recall Trial	8	.53	.001	4	.27	.001
Attention/concentration/tracking						
Trail Making: Test B	13	.87	.001	10	.67	.001
WAIS-R: Arithmetic	8	.53	.001	0	.00	.582
Digit Span	9	.60	.001	2	.13	.002
Digit Symbol	10	.67	.001	2	.13	.002
Higher order cognitive functions						
Old learning and verbal skills						
WAIS-R: Information	7	.47	.001	1	.07	.168
Vocabulary	3	.20	.674	0	.00	.582
Reasoning and judgment						
WAIS-R: Similarities	4	.27	.246	2	.13	.002
Comprehension	2	.13	.764	1	.07	.168
General level						
WAIS-R: Verbal scale IQ	6	.40	.011	3	.20	.001
Performance scale IQ	6	.40	.011	1	.07	.168
Full scale IQ	7	.47	.001	3	.20	.001
Cognitive flexibility						
H-R: Categories test	13	.87	.001	8	.53	.001

* Abbreviations used are: H-R, Halstead-Reitan; WAIS, Wechsler Adult Intelligence Scale-Revised.

concentration/tracking tests were also difficult for the painters, and the proportions of painters scoring one or more standard deviations below expected scores exceeded statistical probabilities at less than the .001 level on all of the tests.

Finally, on the tests designated as assessing higher order cognitive functions, the painter group scored at essentially normative levels on the WAIS-R subscales of vocabulary and comprehension but below the expected level on the full-scale IQ score. The latter observation

is consistent with the interpretation that the test reflects some impairment or drop from original or premorbid levels. The painters had a great deal of difficulty with the Halstead-Reitan category test. This test requires the formulation of abstractions to categorize geometric visual displays and evaluates current learning, abstract concept formation, and mental efficiency. As a group, these painters showed notable impairment on tests of cognitive flexibility, attention/concentration/tracking, new learning and memory, spatial perception/construction/reasoning, and auditory perceptual sensitivity.

It should be noted that the data are reported for the 15 painters as a group. Within this group there were marked individual differences. For example, some painters appeared very impaired and others appeared minimally impaired. Some had had above-average intellectual levels premorbidly and others had been at clearly below-average ability levels. The assumption that the painters, as a group, were probably of average ability premorbidly is supported by some of the test scores that are typically the most resistant to impairment, eg, the vocabulary subscale score.

The Halstead-Reitan neuropsychologic test results and Halstead Impairment Indices are summarized in Table 5. Halstead Impairment Indices exceeded 0.5 in 12 painters (80%), providing evidence of diffuse organic impairment. Aphasia tests on painters revealed dysarthria in four, dyspraxia in four, and acalculia in two, whereas agraphia and dyslexia were each present in only one painter. In total seven painters (47%) had some evidence of aphasia. These painters all had Halstead Impairment Indices of 0.57 or higher.

Painters as a group demonstrated clinically significant elevations (mean test score >70) on MMPI scales measuring somatization, depression, hysteria, anxiety, and schizoid tendencies. Psychiatric interviews failed to indicate primary, major psychiatric illness and supported the formulation that the onset of personality deterioration was temporally associated with recurrent episodes of acute organic solvent intoxication and coincident with the development of neurologic symptoms in the four painters interviewed. Psychiatric evaluations also emphasized the devastating impact, at times, of memory loss and personality change on the family and work life of painters, even when deficits in neuropsychologic evaluations were relatively mild or subtle.

Seven painters underwent evaluation for rehabilitation at another institution approximately 1 year after the initial evaluation and in the absence of further organic solvent exposure. At that time clinical neurologic examinations were normal in all subjects, but four manifested cognitive impairment and one was regarded as unusually mentally slow. Abbreviated neuropsychologic tests showed that all had impairment of visual-spatial perception, regulatory function, short-term memory, abstraction ability, and motor skills. Two had abnormal EEGs. Testing by the evoked response test battery (visual, brain stem, sensory) showed at least one abnormal response in six patients. The nerve conduction test battery (24 measurements) showed six of the seven patients to have two to seven abnormal test results each, primarily sensory latency prolongation or absence of response.

TABLE 5

Prevalence of Organic Brain Damage Among Painters According to Halstead-Reitan Neuropsychologic Test Results

Impairment Indication	No.	%
Halstead Categories test (≥51 errors)	14	93.3
Tactual Performance test		
Total (≥15.2 minutes)	8	53.3
Memory (0–5 blocks remembered)	5	33.3
Localization (0–4 blocks)	11	73.3
Seashore Rhythm test (0–25 correct)	11	73.3
Speech Sounds Perception test (8+ errors)	9	60.0
Finger Tapping test (0–50 taps, preferred hand)	12	80.0
Halstead Impairment Index* >0.5	12	80.0

*Halstead Impairment Index = number of subtest scores in brain damage range.

Discussion

The results of this study confirm the existence of chronic encephalopathy in organic solvent-exposed painters. Painters had significantly higher prevalence rates of symptoms, previously described as a neurasthenic syndrome,[6] than did control workers. Neurologic examinations showed mild distal neuropathy in four painters. Neuropsychologic evaluation showed learning and memory deficits, impaired neuropsychologic functioning, and personality problems. Five painters had sensorimotor peripheral neuropathy on EMG and nerve conduction studies and three had focal paroxysmal EEGs, confirming a clinical suspicion of partial complex (temporal lobe) epilepsy. Painters demonstrated a spectrum of severity of symptoms and signs ranging from those with symptoms of the neurasthenic syndrome, but only mild abnormalities on neuropsychologic and nerve conduction studies, to those with evidence of both organic brain syndrome and peripheral neuropathy. Job retraining in this latter group has proven difficult because these painters have difficulty learning new skills.

This toxic encephalopathy, consisting of both the neurasthenic symptom complex and objective neuropsychologic deficits, was presumably caused by organic solvent exposure rather than some other factor associated with industrial painting. This etiologic association is strengthened by the documentation of similar problems in organic solvent-exposed nonpainters,[7–10] in whom organic solvent exposure is the only common denominator. Chronic neurologic problems are also seen in the nonoccupationally related organic solvent abuse syndromes of alcoholism and glue sniffing.

In Sweden, organic solvent-induced neurologic and neuropsychologic problems have been the subject of intensive investigations for more than 10 years, and patients with these diseases now constitute the largest group of patients seen at many occupational medicine clinics there,[11] replacing the more traditional occupational illnesses.

The availability of detailed neuropsychologic testing has resulted in a sensitive method to screen for early CNS dysfunction in individuals at high risk for neurotoxic syndromes. It permits objective verification of neurologic and psychologic deficits in patients with neurasthenic symptoms. Cognitive deficits and personality changes can be documented.

Recent reviews on behavioral toxicology highlight the role of neuropsychologic testing in the diagnosis of occupationally related organic brain syndromes.[12–15] Specific recommendations have been made for the design of epidemiologic field studies in occupational neurotoxicity.[6] An abbreviated neurobehavioral test battery, administered on-site to facilitate the early detection of neurotoxicity in workers exposed to hazardous substances, has been described.[17,18] As these testing procedures become more widely utilized and accepted, clinicians will have a powerful tool to evaluate workers' neuropsychologic symptoms.

The development of partial complex epilepsy has not been associated with industrial painting. There has been only one report[19] of an association between work-related solvent exposure and new onset seizure disorders; seizures have been reported in toluene-containing glue sniffers.[20] Several studies, however, specifically excluded individuals with seizures from evaluation.[6,21–23]

The authors offer several recommendations for the evaluation of organic solvent-exposed individuals with neuropsychologic symptoms. A history of otherwise unexplained acute intoxications while working, suggesting excessive exposure, should be sought. Patients should be asked about memory problems and personality changes, and this history should be confirmed by family members. If the history suggests possible toxicity, psychologic evaluation, including specific tests of intelligence, memory, personality, and neuropsychologic function, should be obtained. Screening tests for other potential medical, toxic, or psychiatric conditions that might be responsible for the patient's symptoms should be obtained. Previous measures of intelligence and personality, if available, can assist the psychologist in making a determination as to whether deterioration from a premorbid level of functioning has occurred. Psychiatric evaluation is useful in some patients to assess the possibility of underlying psychiatric conditions. EMGs, nerve conduction velocity measurements, EEGs, CT brain scans, and other anatomic and physiologic tests of nervous system integrity should be obtained as indicated on an individual basis.

One disturbing feature of organic solvent-related toxic encephalopathy is that symptoms and objective neurologic and psychologic deficits have developed with low airborne organic solvent concentrations in both Sweden[9] and Finland.[23] Work-site solvent concentration measurements in these studies were approximately one-third of the current permissible exposure limit values in the United States[24] as established by the Occupational Safety and Health Administration. Reevaluation of the adequacy of current recommendations for protective standards and procedures seems necessary.

Given the indispensability of organic solvents and this redocumentation of the association between excessive exposure and subsequent chronic CNS impairment and disability, workers with unavoidable exposures should receive preemployment neuropsychologic tests and periodic retesting for early recognition of CNS effects.

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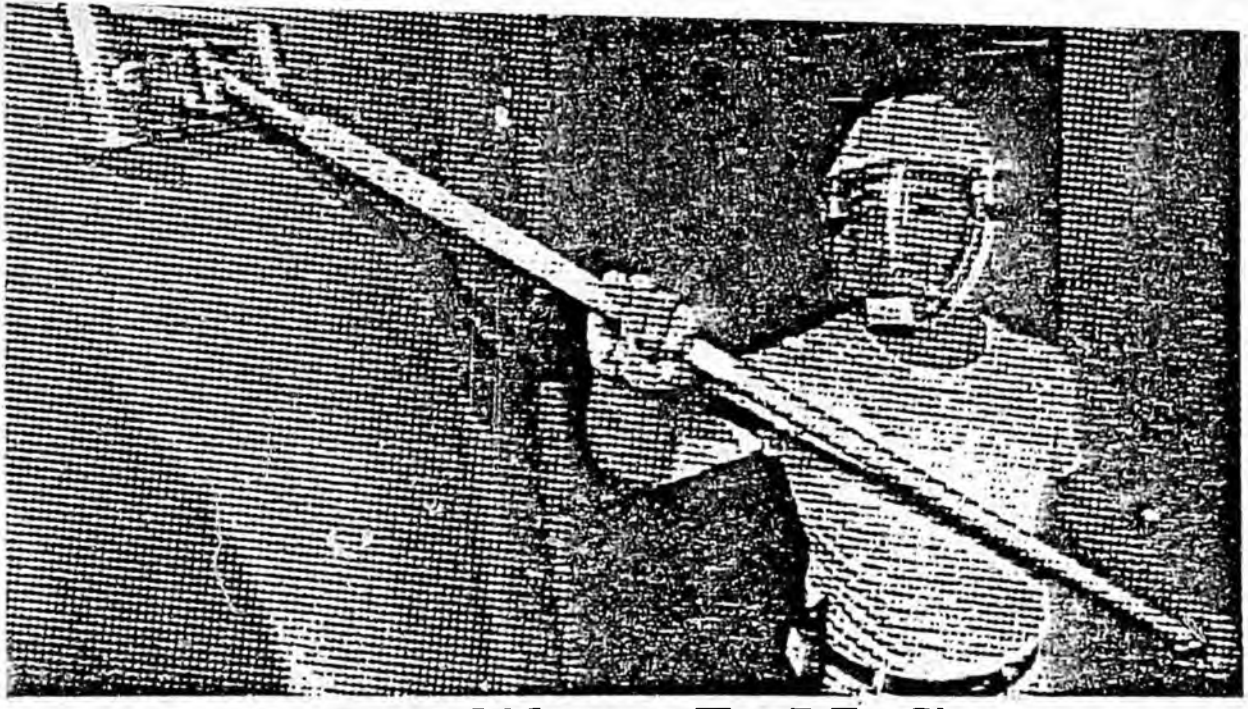


DRYWALL TAPERS' HEALTH HAZARDS

Health hazards in the drywall trade primarily affect the respiratory system. But all systems of the body may be harmed. Health hazards include exposure to drywall spackling compounds, carbon monoxide in the work area generated by various types of internal combustion engines and bystander exposure to the hazards of other trades.

SPACKLING COMPOUNDS

Drywall spackles contain a variety of substances. Mineral fibers or particles make up from 70 to 95 percent of a typical compound. These include: calcium carbonate, limestone, talc, quartz or silica, fiber glass and asbestos.

The remaining ingredients are gelling agents, thickeners, emulsions, dispersants, solvents and preservatives.

Spackling compounds are formulated for easy application, minimum shrinkage, good slump resistance, proper balance between adhesion and cohesion, and well-controlled drying characteristics.

With the well known exception of the removal of asbestos from drywall compounds in 1974 in response to nationwide complaints from IBPAT tapers, manufacturers are not always inclined to put tapers' health considerations at the top of their lists when they decide what goes into their products.

So drywall tapers must take care not to experience needless exposure to spackles used at work.

Exposure to spackle compounds can occur through INHALATION, when dusts are breathed; through SKIN ABSORPTION, when hands are

dipped in spackle or when spackle collects on the skin, and through INGESTION when inhaled spackle is coughed up and swallowed or when spackle accumulates on food, hands or cigarettes.

Mineral Dusts

Exposure to the mineral fibers or particles in spackles through inhalation usually occurs when dried spackle is sanded or later during sweeping up. Those tapers who still use dry-mix are exposed when pouring dry-mix from bags. Sanding, sweeping and pouring dry-mix generate visible and invisible "dust clouds" containing fine fibers or particles which are easily inhaled by the tapers.

The size of the inhaled particle or fiber determines how far it goes into your respiratory system. Your nasal hairs and wet mucous membranes trap some of the particles, especially the larger ones. Those not trapped continue into your lungs where tiny hairs called cilia try to move them up and back out into your throat—where they are swallowed or ingested. This is the extent of your respiratory system's first line defense against these contaminants. Not all particles which enter your lungs are ejected. Those that remain are there for the duration.

Particles in the lungs do not pass on into the bloodstream. They tend to settle in and, depending upon their natures, they cause a variety of responses—from obstructive ventilatory dysfunction to cancer.

Over 48 percent of the drywall tapers examined in the 1975 health study by the Mount Sinai School of Medicine showed abnormalities in their chest x-rays. The tapers were given pulmonary function tests, and results showed very high rates of obstructive ventilatory dysfunction. Even among tapers who had NEVER SMOKED, 27 percent showed obstructive ventilatory dysfunction.

Pulmonary function tests can reveal obstructive ventilatory dysfunction. Too many drywall tapers suffer this respiratory impairment.

Are more tapers wearing respirators now than in 1975? Has removal of asbestos from drywall compounds eliminated the hazard? Who is to say that a similar investigation today might not show the same high rates of respiratory disorders? The sad fact is that many tapers have probably developed respiratory conditions since Dr. Selikoff conducted his much publicized study.

Take fiber glass, for example. Fiber glass replaced asbestos in some spackling compounds. The chemical composi-

tion of fiber glass is different from asbestos, but its physical structure is similar. Most scientists agree that fiber glass is probably not a carcinogen—a substance that causes cancer. But its physical structure is similar to asbestos, and some scientists have found that fiber glass causes some of the same harmful effects, even though it does not cause cancer.

Fiber glass under an electron microscope. Fiber glass is similar in physical structure to asbestos.

The smallest fiber glass fibers penetrate deep into the lungs, where they remain embedded. These fibers are like tiny knives, which painlessly cut and scar the lungs, making them inelastic. The lung tissue becomes thickened which blocks the exchange of oxygen and carbon dioxide. In other words, breathing becomes very difficult.

When tissue is thickened or scarred in this way, it is known as fibrosis. Pulmonary (lung) fibrosis can be severe enough to be disabling. In addition, when the exchange of oxygen and carbon dioxide is blocked, the heart has to work harder to supply enough oxygen to the body. This extra burden on the heart leads to heart attacks. Many deaths from heart attacks are actually brought on by respiratory conditions such as pulmonary fibrosis.

Bronchitis may also result after fiber glass is inhaled. As a reaction to irritation caused by this foreign substance, the lungs increase mucous production. If excessive mucous production becomes chronic—that is, long-term and ongoing, it is known as bronchitis. Chronic bronchitis is bad enough in itself, but it can develop into conditions which are far worse. The excess mucous in the lungs is an excellent breeding ground for infectious diseases, such as tuberculosis.

Excessive mucous restricts the air flow through small air passages and builds up pressure in the air sacs of the lungs. When the air sacs overexpand or break, they restrict the exchange of oxygen and carbon dioxide. This condition is known as emphysema. Emphysema causes the heart to overwork in its effort to supply oxygen.

What about those other mineral fibers or particles that may be in your spackle? Silica, or quartz, is found in some drywall compounds, accounting for over 10 percent of the formulation. When these compounds are sanded or swept up, tiny particles of silica or quartz become airborne and hover in the taper's breathing zone.

Perhaps you have heard of silicosis. It is a form of pulmonary fibrosis caused by breathing silica dust. Silicosis occurs

Silica seen through the electron microscope. The smallest particles penetrate deep into the lungs—and stay there.

frequently in abrasive blasters who use silica sand without wearing air-fed hoods. But it can happen just as naturally in a drywall taper who sands silica-containing spackle.

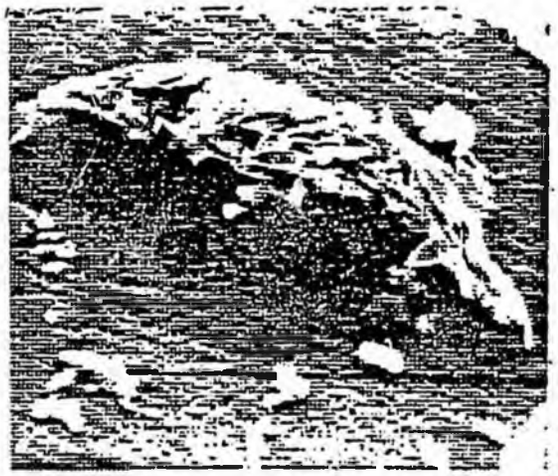
As with fiber glass, the tiniest silica particles penetrate deep into your lungs and stay there, scarring them and causing fibrosis, bronchitis or emphysema.

Then there is talc. Talc also causes a fibrosis known as talcosis, as well as bronchitis and emphysema. Talc may not be as common as fiber glass or silica. But talc poses a special problem. Talc can often be contaminated with asbestos fibers. An analysis of 50 commercial talcs by the Mount Sinai School of Medicine showed over 25 percent had asbestos contents greater than five percent. If asbestos-contaminated talc is sold as a raw material to a drywall compound manufacturer, the manufacturer may not be aware of the contamination.

Sometimes it seems we just can't escape from asbestos! But drywall tapers can avoid exposure to asbestos-contaminated drywall compound by avoiding inhalation of ANY drywall compound.

Finally, there is still asbestos itself. No one knows exactly how many drywall tapers have asbestos in their lungs as a result of inhaling spackling compounds. But informed scientists estimate that a very large number of those who worked with asbestos-containing spackle for up to 10 years or more are very likely to have developed an asbestos-related condition.

Asbestosis is one condition which results when asbestos embedded in the lungs cuts and scars the lung tissue. Asbestosis is a form of fibrosis. But asbestosis is not the most serious complication of asbestos ex-



Talc causes talcosis. It may also be contaminated with asbestos.

posure. Asbestos also causes cancer of the lung, cancer of the lining of the lung (mesothelioma), cancer of the stomach and cancer of the colon. Cigarette

smoking greatly increases the probability of asbestos-caused lung cancer. Cancers caused by asbestos are irreversible; they do not go away.

Asbestos seems to be ubiquitous—that is, it's everywhere. If you don't inhale ANY spackle, you won't inhale spackle containing asbestos.

IBPAT recently surveyed affiliated drywall taper local unions to find out whether abestos-containing spackle is still in use. The survey uncovered no use of spackles with "CONTAINS ASBESTOS" on the labels. But there is always a small chance that asbestos will sneak back into these products.

The most important lesson drywall tapers can learn from the episode involving asbestos is that you can never assume someone else has tested and approved a product to ensure your personal health and safety when you use it.

Even if your spackle only contains calcium carbonate, a relatively harmless substance, you must avoid exposure to it. Again, the very small particles of calcium carbonate will stay in your lungs. So why let them get there in the first place? Foreign substances like these have no place in your lungs. Most Americans already pull enough undesirable substances into their lungs each day. Drywall tapers don't need to add to the burden by unnecessarily inhaling their spackling compounds.

Vapors and Liquids

Besides the mineral fibers or particles that make up most of any spackle's contents, there are smaller amounts of other substances—some of them mysterious.

A small amount of solvent—from 1 to 3 percent—aids the drying of applied spackle. Mineral spirits is used in one formulation, but the solvent may vary from product to product.

Drywall tapers do not think of themselves as using solvents in their work, unless for clean up. Yet five percent of the tapers examined by Dr. Selikoff exhibited some sort of neurological symptom associated with solvent exposure, such as the "pre-narcotic" symptoms of headache, dizziness, nausea or drowsiness. Perhaps those tapers also painted from time to time. But it may also be that there is enough solvent in spackle to produce these effects.

If a drywall taper applies 1.5 gallons of spackle in one hour and the spackle contains 3 percent mineral spirits, it would be possible to "liberate" about three-fourths of a pound of mineral spirits per hour into the air. Also, tapers frequently dip bare hands and arms into containers of compound. Many solvents are absorbed through the

skin and circulated throughout the body in the bloodstream.

Skin absorption is a common route of exposure to many substances. Many people do not realize that substances can be absorbed through the skin.

The skin absorption potential also exists for the remaining ingredients, especially the preservatives or antimicrobials. For example, one spackle formulate includes 0.01 percent Dowicide (A) antimicrobial. This is a very small amount of a product which is 97 percent sodium o-phenylphenate tetrahydrate. Dow's material safety data sheet cautions that this substance will cause skin burns and should be flushed from the skin immediately. The tiny amount in the spackle may not be enough to burn your skin, but it may be enough to irritate your skin, eyes and mucous membranes.

Dow's material safety data sheet also states that Dowicide (A) antimicrobial is "not likely to be absorbed through the skin in ACUTELY toxic amounts" (emphasis added). This leaves the question of long-term absorption of small amounts unanswered. You can answer it for yourself in your own way by keeping your bare hands out of the spackle.

Remember: if something is irritating to your eyes, nose, throat or skin, it could be an indication that it is harmful if your exposure to it is ongoing.

What Is in the Product?

How do you find out what your spackle contains? Try the label, but do not be surprised if the ingredients do not appear there. If you feel you can, you should ask your employer to write for a material safety data sheet for the product. If not, you can write for it yourself. Write to the manufacturer and enclose a copy of the label. If you get no results or if you have questions about the material safety data sheet when you get it, you can write to: IBPAT/OSH, 1750 New York Avenue, N.W., Washington, D.C. 20006.

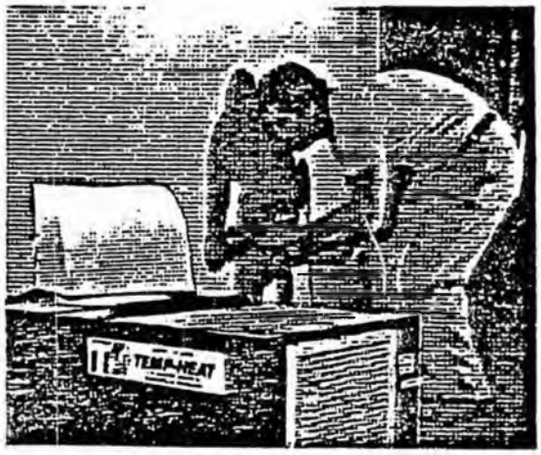
To learn the contents of a product, you can try reading its label. But do not be surprised if the ingredients do not appear there.

CARBON MONOXIDE

Carbon monoxide is another health hazard for drywall tapers. Carbon monoxide is released during the incomplete burning of fuels. Internal combustion engines, such as compressors and space heaters, re-

lease carbon monoxide. Many tapers are exposed to carbon monoxide when using space heaters to keep warm on cold winter days.

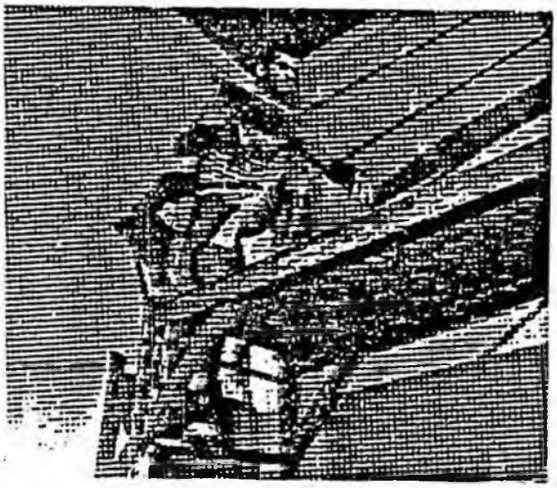
Carbon monoxide causes headaches, dizziness and drowsiness. Repeated and long-term exposure can increase blood pressure and cause heart problems. You cannot detect carbon monoxide with your senses. It is tasteless, colorless and odorless. If you are working with an acoustical spray rig and compressor, keep it tuned. A well-tuned compressor releases less carbon monoxide than a poorly tuned one. If you use a space heater to keep warm, you might crack a window to ventilate the work area. Also, you can either work without a heater or wear an air-fed respirator.



Carbon monoxide from space heaters can be a health hazard for drywall tapers.

BYSTANDER EXPOSURES

The workers around you may create health hazards by using certain materials. For instance, nearby painters can expose a taper to organic solvent vapors or harmful mists of paints. This is known as "bystander exposure." Bystander exposure is a common problem in the construction trades. In fact, the construction industry is a veritable smorgasboard of ever changing health and safety hazards. If nearby workers from another trade are wearing personal protective equipment, that's a sure sign they are generating health hazards—and you are certainly not immune.



The construction industry is a veritable smorgasboard of health and safety hazards.

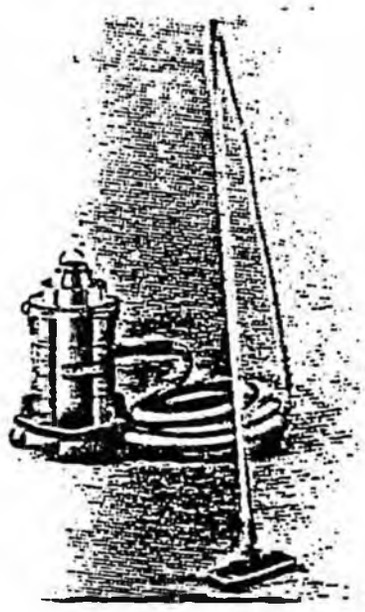
As you learned in the "Health Hazards" chapter, products used in the workplace can contain harmful substances. Do not assume that the contents of your products have been tested and stamped "safe" by some government agency. Most of the time this is simply not true.

HAZARD CONTROL

The only way to ensure your own personal protection is to avoid exposure to products in the workplace through the use of hazard control measures like substitution, engineering controls, administrative procedures and personal protective equipment.

The replacement of asbestos in drywall compounds with fiber glass or other substances is a good example of substitution as a hazard control measure. Likewise, if a compound is irritating to you or your co-workers, perhaps your employer can be persuaded to find another product which is not. This too would be substitution.

Engineering controls are rarely used in the construction trades. A primary engineering control is ventilation — using portable fans and ducts. Wet-sweeping during clean up is a good engineering control for drywall tapers. And pre-mixed spackle is a form of engineering control that reduces exposures to dusts formerly generated during pouring. Another example of an engineering control is a pole sander with a vacuum attachment developed by one company. The motive for this invention was to avoid making messes in certain areas, but its function can just as well be to vacuum up that airborne dust and keep it out of the drywall taper's breathing zone.



A pole sander with a vacuum attachment is an engineering control which can reduce exposure to dusts.

Administrative procedures in the drywall trade would include rotating tapers among various jobs as well as ensuring that tapers are not working while other trades—such as painters—are generating hazards nearby. Another good administrative procedure would be adequate product labels giving the product's contents and the protective measures necessary for safe handling of the product.

Finally, you must wear personal protective equipment. To prevent inhalation of airborne dusts during drywall taping, you need a particulate-removing air-purifying respirator. A DOUBLE-strap dust mask is adequate in most cases. To prevent skin absorption, you can wear gloves and long-sleeved garments. Read the chapter on "Personal Protective Equipment."

The best advice is to handle all products with care and, most especially, avoid inhaling dusts or vapors.

IBPAT's Union-Industry Pension Fund is one of the largest and best managed in the United States. If you practice what you learn in this book, you will improve the odds of collecting your own pension and enjoying it with your loved ones in the best of health.

"SOLVENT NEUROTOXICITY"

"Paint Products and Your Nervous System"

Over 100,000 chemicals are used in American industry. Five hundred-seventy-five are officially considered dangerous in large doses by the U. S. Federal Government. But no class of chemicals is more subtle or treacherous in its effects than the neurotoxins. Neurotoxins can damage the human nervous system even in small doses and cause a variety of behavioral and emotional symptoms.

A neurotoxin is anything that is toxic or poisonous to the nervous system. The largest and most widely dispersed groups of neurotoxins are organic solvents. Solvents dissolve fats or greases and other organic materials. Some scientists speculate that solvents are somehow attracted to the fatty tissues of the nervous system.

Solvents are used heavily in many industries: electronics, film processing, plastics, textiles and petroleum. But one of the heaviest users of solvents is the painting industry.

Daniel Doe was paralyzed from the neck down after spraying lacquer for three days on a construction job. It was one of the 18-year old's first jobs.

Each year, an estimated 450,000 union and non-union painters apply 860 million gallons of paint composed of over 3,000 different chemical and mineral substances. Solvents make up a substantial portion of this paint -- some 290 million gallons.

NBC Nightly News presented a six-minute "Special Segment on Neurotoxins" in 1985. IBPAT was a primary resource for the report, which focused on painters.

Painters are particularly at risk of solvent exposure because they often have difficulty in controlling the amount of ventilation at the worksite. Many studies of painters in this country and abroad have identified significant evidence of toxicity to the brain.

Painters' Syndrome

In Sweden researchers first identified a condition they labeled "CHRONIC PAINTERS'

SYNDROME," in which prolonged and repeated exposures to solvents among housepainters was found to result in brain-size atrophy. In other words, the brains of the painters had actually decreased in volume as a result of their exposures to paint solvents.

Those who work with solvents know that they can easily make a person "high." Painters are often viewed as excessive imbibers of alcohol. Indeed, solvent intoxication and alcohol inebriation share many common characteristics. Unfortunately, some who use solvents find their effects exhilerating -- even pleasant -- perhaps without even realizing it.

In a sense, they may even become physically addicted to the vapors themselves, in much the same way that a person becomes addicted to alcohol or other drugs, according to Edward Baker, M. D., of the Harvard University School of Public Health.

Early Warning Signs

Your nervous system gives strong and clear signals when it is getting too much of a neurotoxic substance. A previously unexposed person who enters an atmosphere of solvent vapors will experience some strong initial reactions. These might include eye and nose irritation, light-headedness, dizziness, the sensation of floating or being "high," tingling in the hands and feet, and perhaps headache.

A leading researcher of solvent neurotoxicity is Edward Baker, M. D., of the Harvard School of Public Health. Dr. Baker uses computerized tests to assess solvent damage among painters and other workers.

You must carefully watch for those early symptoms to occur and do something about reducing your exposure then, rather than simply continuing to be re-exposed and having the symptoms go away -- which they certainly will after a period of time.

Chronic Symptoms

Over time -- often as long as years -- other chronic symptoms develop slowly if the solvent exposure continues: tremors, lack of coordination, paralysis, impotence, sensory damage, lowered alertness, loss of memory, decreased intellectual functioning, irritability, depression, hallucinations, vomiting, insomnia, narcosis, psychosis, unconsciousness and death.

Those who suffer chronic neurotoxic effects find it difficult to do simple everyday tasks. Failing memory leads some to make notes on everything they do. They may have trouble recalling common facts such as frequently dialed phone numbers. Chronic and repeated bouts of mental confusion and even brief blackouts can result in frequent errors in activities such as driving a car, for example. And sometimes the individual may actually find it impossible to perform "motor function tasks" such as buttoning and unbuttoning clothing.

IBPAT Member Tom Pasalaqua was disabled due to solvent exposure. His medical evaluation showed "decreased visual-motor speed and coordination, problems with verbal conceptualizing, anxiety, depression, and significant fall-off in cognitive ability." In daily life, this means that he could not go to the store for a quart of milk without getting lost and forgetting his errand.

Medical Diagnosis

If solvent neurotoxicity among painters and others is so widespread, why is more not being done to prevent it? One reason is the effects -- even when documented in scientific studies -- may be difficult to diagnose in an individual.

Other diseases or disorders, like emphysema, lung cancer or blood disease, can be more readily detected through specific medical tests designed for that purpose. The neurotoxic effects of solvents are much more insidious.

Neurotoxins interfere with at least four distinct aspects of central nervous system functions: memory, visual/motor performance, verbal concept formation, and mood. Different substances affect the nervous system differently, but most solvent neurotoxins alter several of these functions at once. Psychological tests have been adapted by medical doctors and neuropsychologists to detect subtle changes in the nervous system which frequently occur with solvent exposure. The Harvard School of Public Health has developed a standardized battery of these neurobehavioral tests to allow comparisons among groups and individuals. Harvard has computerized the tests so they can be given on micro computers. IBPAT members in several local unions have been given these tests in group health screenings.

Scientists say they do not completely understand how specific solvents affect the nervous system on a molecular level. But the fact that solvents routinely cause moderate to severe nervous system damage in those who use them is beyond dispute. Even low doses of certain solvents can have a profound impact on the individual.

David Friel, an IBPAT member for 16 years, has "no memory at all." Before physicians diagnosed his condition as "toxic organic brain syndrome," he received many misdiagnoses. His early symptoms included severe skin rashes. His solvent disorder destroyed his family and ruined him financially.

Premature Aging

Now more and more people are concerned that persistent exposure to solvents may lead to a variety of health problems down the road that may have significant impacts on people's lifestyles, their ability to perform their work and many other activities. One area of concern is that exposure to solvents may accelerate the aging process and cause the brain and other parts of the body to age at a more rapid rate. We certainly don't understand the aging process very well. But some of the manifestations of premature aging, like memory problems and difficulty concentrating that are associated with certain forms of dementia, are ones that are also associated with excessive exposure to solvents among various studies that have been done in this country as well as in other parts of the world.

Self-Evaluation

Painters must recognize the acute and chronic symptoms of solvent neurotoxicity.

Persistent self-evaluation of acute symptoms by the individual painter is important to prevent either significant overexposure while it's happening or cumulative damage to the brain in the long term. Even though the acute symptoms may go away, the chronic effects -- the damage to the brain and peripheral nervous system -- may occur and persist in the absence of those acute warning signals that occur early on. This really emphasizes the importance of detecting those early symptoms at a time when you are still sensitive to them rather than after the fact when you are starting to ignore those early signals and then may be developing more evidence of chronic, irreversible damage.

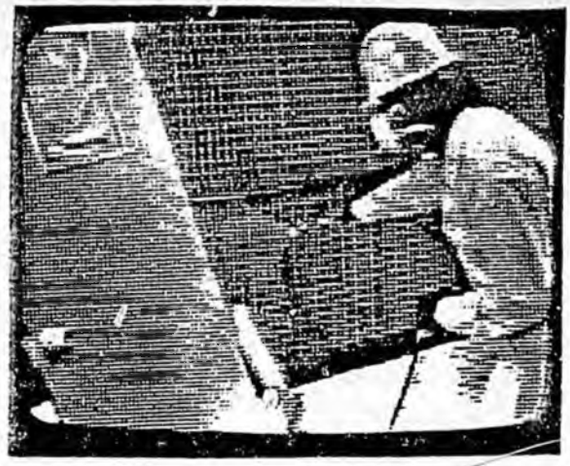
Kate Osborne was a perky 52-year old grandmother who visibly aged 30 years following a three-day exposure to paint stripper

containing methylene chloride and toluene. An IBPAT member for six years, Mrs. Obsorne loved painting but can no longer tolerate any exposure to paints or even household chemicals. Such exposures trigger a recurrence of her symptoms of "floating," numbness in the mouth, and severe disorientation. "It was just like I was in another world," she says. "It just wasn't real anymore." Mrs. Osborne recently settled a product liability suit against the manufacturer of the stripper. But she is disabled, her life "ruined." She says, "Sometimes I wish I had died."

Product Labeling

Scientific research and education of painters and consumers raise other issues such

as better testing of products before their introduction on the market and more complete product labeling. The National Paint and Coatings Association has recently issued new product labeling guidelines for its member paint manufacturing companies. The guidelines acknowledge the voluminous research on solvent neurotoxicity and the hazard education program of the International Brotherhood of Painters and Allied Trades.



The NPCA guidelines recommend two warnings of interest to IBPAT members:

> *Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.*

This warning is recommended for all solvent-containing products. For industrial solvent-containing products, this warning is added:

> *Wear appropriate, properly fitted respirator (NIOSH/MSHA approved) during and after application unless air monitoring demonstrates vapor/mist levels are below applicable limits.*

The new guidelines are voluntary, but the warnings should begin appearing on the products in your workplaces soon. Remember: your union played a key role in the release of these improved labeling guidelines. (For a free copy of the complete guidelines, write: IBPAT/OSH, 1750 New York Avenue, N. W., Washington, D. C. 20006.)

Unfortunately, the typical paint product label will continue to state, "Use with Adequate Ventilation." How does the product user know what is "adequate ventilation?"

The International Brotherhood of Painters and Allied Trades, IBPAT, has developed a computerized hazard index program and solvent data base for painters, contractors and others to use to calculate solvent concentrations before painting begins. IBPAT has developed one method to assign "ventilation requirements in cubic feet of air" which could appear on every paint product label. The program also computes fan sizes and flow rates -- and selects proper respirators, including specific model numbers, instantaneously.

Choosing Your Protection

To estimate your own exposure to solvents during painting, you may use the IBPAT/OSH Respirator Selection Tables for Painters. The Tables give you a mathematical formula for calculating solvent vapor concentration and show you how to select the respirator that will adequately protect you. Use of these Tables is taught in a video module called "Respirator

Selection for Painters." To see this tape, contact your local union representative or apprenticeship coordinator.

In considering protection from solvent exposure, do not forget skin absorption. Most painters know that solvents harm the skin by depleting the fats, causing drying and cracking. Did you also know that most solvents penetrate the skin, passing right through it into your bloodstream? One study showed that immersing your hands in xylene for only 15 minutes will produce a level of xylene in your blood equal to the level found after eight hours of inhaling the vapors during painting!

Think about that the next time you clean a surface with solvents. You must wear protective gloves. And never wash your hands in solvents. You wouldn't wash in acid, would you? Yet washing in solvent can be just as harmful in the long run. Wear gloves and use barrier creams, such as 'Protective Glove' or 'Liquid Glove.'

Anything you can do to reduce your exposure to solvents will be a benefit to the long-term health of your body and your mind.

We're now learning more about solvent neurotoxicity as a result of recent research. But if individuals who are regularly exposed to solvents ask their personal physicians what to do as a result of being exposed to solvents everyday, many physicians are hard-pressed to know what kinds of signs or symptoms to look for or how to evaluate them medically, given that knowledge. So for that reason, it's particularly important for individuals who are exposed to become familiar with some of the toxic manifestations of exposure to solvents.

You can obtain copies of scientific reports and other useful information for your physician and yourself by writing to: IBPAT/OSH, 1750 New York Avenue, N. W., Washington, D. C. 20006.

IBPAT Member Rick Rimmer developed a solvent-induced disorder after many years of spraying. He told local television reporters about an episode of acute neurotoxic poisoning in which, "I was numb, just felt like needles sticking in me. I couldn't hear. I couldn't speak. I couldn't get up. I couldn't do anything."

The brain and central nervous system are probably the single most precious part of the human organism. Our brains house most of our personalities and nearly all of our subjective experience. When the brain is affected by chemical neurotoxins, the very essence of the individual is severely altered.

Today's workers, employers, manufacturers and consumers face an increasing daily danger to health when over-exposure to solvents occurs. What each person decides to do about it, and how much importance is placed on the problem by all of us, ultimately will decide the fate of people just like you.

Rocky Mountain News Covers Painters' Health Problems

Painters' health disorders caused by toxics in paint products received widespread publicity recently in the Sunday edition of the *Rocky Mountain News*. The leading newspaper in the Rocky Mountain region, the *News*' Sunday circulation is 350,000. The article prompted TV-news reports by all major Denver stations.

This is the greatest publicity given to painters' neurological disorders since a *New York Times* Sunday feature sparked national media coverage of the problem in 1981.

The general public traditionally thinks of painting as a comfortable, risk-free occupation. This misconception is finally being attacked with informative reports such as those in the *News* and the *Times*. Publicity like this is waking people up to the truth—that hundreds of toxic chemicals used in the painting industry pose one of the most serious health threats among all occupations.

General President S. Frank Raftery told the *News* that toxic chemicals in paints are "a major health threat to painters that rivals or exceeds the better known health threats to asbestos workers."

The *Rocky Mountain News* article focuses on IBPAT Member David Friel's personal struggle with "toxic brain syndrome." The disease developed after 16 years' spray painting with oil, enamel, epoxies and other solvent-containing products. Some studies may indicate that up to 30 percent of professional painters could be affected to some degree by toxic brain syndrome. The disease is characterized by depression, anxiety, loss of memory, slowed speech, and other symptoms.

Brother Friel's wife Linda told the *News* that the family first noticed a change in his behavior in 1976. "He'd come home from work and just start hollering at me and the children for no reason. It was so unlike him. But we didn't know what was wrong then." Friel's condition deteriorated for the next two years. His memory began to fade and he suffered from unexplained depression. Linda Friel told the *News*, "He'd come home from work, sit on the couch and just start crying. We'd ask him what was the matter but he wouldn't answer. He just kept crying and crying." Aside from these disorders, Friel also suffered from bloody rashes on his feet, legs and torso. "His wife would have to follow him as he walked across the kitchen floor in his stocking feet, cleaning up the bloody footprints Friel left behind," said the *News*.

Brother Friel didn't stop painting until 1979 when a serious near-accident finally made him realize there really was something wrong with him. "That's the way people who have this disease react," Friel said. "They think everybody else is screwed up and not them." Linda Friel believes it is vitally important for painters' spouses to be aware and alert for signs of health problems their mates may be experiencing.

Brother Friel is aware now of what toxics in the paints he worked with were doing to him. As he told the *News:*

> "It's scary for something like that to happen to you. It's like me walking up to you and telling you that something you've been doing for 10 or 20 years is bad for you. You bought a house, raised a family and provided for them. Then one day somebody walks up to you, taps you on the shoulder and tells you that you've got to quit and go mow lawns or something."

David Friel still lives with the symptoms of toxic brain syndrome today, and doctors say he probably will for the rest of his life, according to the *News* article. "I guess the worst thing is that I can't depend on myself anymore. I have a big hang-up about whether I'm right or wrong when I make decisions. I just can't remember how to do things I used to do all the time," Friel said. A week before the *News* article was published, memory problems and the recurring numbness in Friel's hands forced his current employer to put him in a simpler and lower paying job in the company's packaging department. Friel's reduced earning capacity has placed tremendous financial strain on the family — making an already tragic situation worse.

David Friel

Many painters tend to ignore symptoms of toxic brain syndrome. IBPAT / OSH Project Director Marilyn Larson told the *News* that painters have difficulty finding doctors who know enough about the disease to diagnose the symptoms correctly. "The symptoms are often mistaken for signs of psychological illness," she told the *News*. "The whole area of occupational health is so new that many doctors just don't know what to look for.

IBPAT has dedicated the "Decade of Job Safety and Health" to warning its members of the health hazards of their trades and teaching them how to protect themselves from these

Rocky Mountain News

Weather
Warmer
Page 167

124th year, No. 339 Denver, Colo. March 27, 1983 50¢

Solvents as Intoxicants

A Florida jury recently found Brother Albert McAleer of Dallas Local 53, innocent of driving while intoxicated because he apparently was suffering from symptoms of inebriation caused by exposure to solvents.

Brother McAleer was arrested last March after police said his car was weaving on the road. But testimony at his trial indicated that a routine day of painting had made Brother McAleer's blood-alcohol reading go from a normal level of 0.01 on a Breathalyzer test to 0.11 by exposure to painting materials. Florida's legal level of intoxication is 0.10. But not all solvents register on a breathalyzer test.

In the April 1979 issue of The Painters and Allied Trades *Journal*, Dr. Edwin C. Holstein of New York's Mount Sinai School of Mediciue addressed this issue in his Ask The Doctor column. He said,

"In the Mount Sinai study of health hazard in the painting trades, we found that most painters have suffered light-headedness, dizziness or mental confusion from working with solvents and other materials.

"Some painters have even blacked out. Epoxy is one of the worst offenders.

"One whiskey is not going to make you black out. But liquor affects your brain the same way that the solvents do. So the two together are double trouble, and may be enough to put you out. Likewise sleeping pills, tranquilizers, 'nerve pills,' sedatives and even many nonprescription cold remedies do not mix well with solvents—or liquor!

"So here are some do's and don'ts if you are working with substances that make you light-headed:

"1) DO make every effort to provide good ventilation while you work. Perhaps fans ought to be a standard part of a painter's equipment.

"2) DO be double-certain that you use every safety measure possible on ladders, scaffolds and other dangerous places. Painters have a very high accident rate. We suspect, but have not yet proven, that this is because so many painters are 'drunk' from the solvents they breathe.

"I believe that a light-headed or 'high' painter on a scaffold is in danger. Learn to be conscious of safety every minute, and develop automatic work habits that will protect you from danger.

"3) DON'T get the solvents on your clothes or skin if at all possible. Many of them will go right through your skin and into your body. This will increase the light-headedness.

"4) DON'T drive until the 'high' feeling has worn off. For most painters this takes 10 to 30 minutes in fresh air.

"5) DON'T drink or take tranquilizers, sedatives or cold remedies until you are home.

"6) DO see your doctor if you black out. It could be due to heart trouble, epilepsy or other disorders."

PAGE 35
WEDNESDAY, NOVEMBER 13, 1985

THE WALL STREET JOURNAL.

Labels on Household Products Begin To Warn of Long-Term Health Threats

By Barry Meier
Staff Reporter of The Wall Street Journal

Warning: The warning labels on some household products may be inadequate to protect users' health from potential damage by insidious chemicals.

Almost all concerned—many manufacturers and marketers as well as consumer groups and regulators—now appear to agree with that judgment. So new types of labels are on the way for some paints, varnishes, lacquers and other do-it-yourself aids.

Conventional consumer-product labels warn only of immediate threats—of poisoning if a toxic substance is swallowed, for instance, or of fire if a flammable one is ignited. The exception has been cigarette packages. These have long stated that "smoking is dangerous to your health" and are beginning to be more specific about the risks involved.

Now the labels on more products will tell of so-called chronic (as opposed to acute) health hazards, some of which may result in severe illness or death 10 years or more after the initial exposure. Paint users, for example, will be told, in this or similar language, that "reports have associated repeated and prolonged occupational exposure to solvents with permanent brain and nervous-system damage."

Some States Act

The labeling so far is mostly voluntary, although at least four states have begun to require chronic-hazard labels on many arts-and-crafts supplies such as pottery glazes and printing inks. In the paint industry, the National Paint and Coatings Association last January urged its members to alert consumers to the neurotoxic risks posed by certain solvents. This followed Scandinavian studies that linked the solvents to brain damage in professional painters, not part-time do-it-yourselfers.

"This is the broadest step the industry has taken on chronic-hazard labeling on consumer products," says Patrick J. Hurd, an attorney for the trade group.

Propelling such labeling drives is increasing evidence that some chemicals pose chronic health risks. Also a factor is producers' fear of lawsuits. A new federal law requiring the disclosure of chemical hazards to workers is raising liability concerns among manufacturers who use the products. Liability lawyers have been known to base suits on claims "that a company told workers about a hazard but didn't tell consumers," says Steven R. Sides, the manager of health affairs for the paint association.

Of course, some people would like to see more-complete labels than the ones being volunteered. The anticipated paint labels, for example, are deemed wanting by Rodney D. Wolford, the health and safety director of the International Brotherhood of Painters and Allied Trades, a major labor union.

Some paint labels are expected to warn users to increase air circulation, wear a respiratory mask or leave the room if they experience "eye watering, headaches or dizziness." But, according to Mr. Wolford, the labels won't make it plain that such symptoms indicate overexposure of the sort that might, if it were repeated and prolonged enough, lead to nerve damage. Without more-direct labels, he says, users might miss the point entirely.

> **CALIFORNIA, Illinois, Oregon and Tennessee require chronic-hazard labels on many materials used by artists and craftsmen.**

But for consumers who wonder how to defuse a stated threat, the new labels may be less baffling than current ones. Some companies plan to expand use instructions such as "Use With Adequate Ventilation." Right now, many paint-can labels keep people guessing about what "adequate ventilation" is. "It's an open window at both ends of the room," suggests Alan Shefts, the operations manager at Pearl Paint Co., a New York retailer. Suggests Fred Hirsch, also of Pearl, "It means that people should use exhaust fans."

Some of the new labels will advise people to "open windows and doors or use other means to ensure fresh-air entry during application and drying."

Meanwhile, the government is being asked to require chronic-hazard labels on some products without voluntary ones. The Consumer Federation of America, a coalition claiming to represent some 200 consumer groups, seeks cancer-risk labels on paint strippers and spray paints made with a solvent called methylene chloride.

On the basis of animal studies, methylene chloride is deemed a potential cause of cancer in humans. And although the solvent isn't particularly potent as carcinogens go, at least in laboratory tests, staff scientists of the federal Consumer Product Safety Commission say the way people use products containing methylene chloride poses one of the highest cancer risks ever calculated for a consumer product.

The finding was made because many consumers magnify the potential risk by using paint strippers in basements and other rooms with little ventilation, says Sandra Eberle, a program manager with the commission.

The safety commission is considering what to do about methylene chloride.

While the agency ponders chronic-hazard labeling, California, Illinois, Oregon and Tennessee will soon require such labeling on many materials used by artists and craftsmen. "Artists were often getting exposed to the same level of toxics as workers—without any protection," says Michael McCann, the executive director of the New York-based Center for Occupational Hazards, a foundation-supported advocate of such state actions.

Amending Aerosol Spray Can

In Easton, Pa., the manufacturer Binney & Smith Inc., whose products include an aerosol spray used to coat artists' drawings, has amended the product's label to read: "Exposure may cause nervous system damage or kidney damage or harm to the developing fetus. . . . Avoid using if pregnant or contemplating pregnancy."

The more specific—and chilling—the labels, the more likely they are to be heeded, health activists argue. But almost everyone agrees that more than labels is required of industry if people are to be made aware of potential hazards. So last week the paint association, for example, set aside funds for a program to help retailers alert consumers about the hazards of solvents.

But how far will paint makers go? "When you look at paint advertisements everyone is having fun and smiling," says Mr. Wolford, the union official. "But it's awful hard to smile when you're wearing a respirator."

Modern Paint and Coatings

Formerly PAINT AND VARNISH PRODUCTION

OCTOBER 1985 VOL. 75, NO. 10

International Review

NPCA Leader Explains U.S. Paint Laws To British

By Derek Eddowes
European Correspondent

WE TRY IN THIS column, month by month, to cast a dragnet over the European surface coatings industry. From time to time, we manage to enmesh a reasonably-sized fish (for which please read: item of newsworthy information). At others, all we can offer are a few minnows which may, nevertheless, tickle the palate of our readers. Moreover, some of those minnows (for which please read: snippits of information) have a habit of growing out of all recognition—like lead and organic solvents.

This month, we have concocted a veritable bouillabaisse of items, some large and some small, with particular reference to the United Kingdom's paint industry, a microcosm of the larger European industry.

We promise not to refer to fish again but we may be excused for using that analogy, having just returned from Scotland where salmon and other aquatic delicacies are of some merit. We also attended the annual conference of the Paintmakers Association of Great Britain, held at Gleneagles, one of Britain's most prestigious hotels.

Association President John Myland, managing director of a small but highly-specialized paint company, suggested the conference was a forum where old friendships could be renewed and chief executives of fiercely competitive companies could find common ground. Many topics were aired and views expressed. It is possible that the annual meeting of the National Paint and Coatings Association might follow a similar pattern.

Keith Vander Hyde, NPCA president, was a welcome guest at Gleneagles. Others were Klaus Deinst, retiring [illegible] Association, and a number of chief executives of U.K. paint companies which now have European owners: Ben Sipila of Donald Macpherson, now a subsidiary of Tikkurilan Oy, Finland; Sten Skoog of Becker Paints; and Lars Reistam of Goodlass Wall and Co., the bride of AB Whilm. Becker of Sweden.

Vander Hyde warned the conference about certain ill winds currently besetting the American paint industry. Laws designed to enforce clean-up of chemical dumps, the rights of workers to have information about chemical hazards in the workplace, and similar requirements for people living near a chemical or paint plant were discussed. These difficulties were appreciated since Europe has similar legislation.

What came across strongly from Vander Hyde was that the U.S. paint industry was trying to get ahead of likely contentious issues, assuring lawmakers that the industry is perfectly willing to play by those rules. But it wants a voice in ensuring that the rules are equitable, cost effective and not burdening to the manufacturing sector.

Overall profitability in the U.K. paint industry in 1984 declined in actual terms by 3.6 percent compared with 1983. A major contributor to this decline is the rapid increases in the costs of raw materials faced by the industry.

The U.K. paint industry did not come out of the lead-in-paint issue with any credit, despite the fact that the voluntary guidelines it established years ago were a basis for EEC legislation. Now, with a vastly more sinister thundercloud on the horizon, a far more positive approach is being adopted. That thundercloud is, of course, the issue of neurotoxic effects of organic solvents, the so-called "chronic painter's syndrome."

Delegates were silenced by parts of the American video broadcast, prepared by the Brotherhood of Painters and Allied Trades, alleging neurotoxic effects of solvents. Similar claims have been made against organic solvents in Scandinavia and, more recently, in West Germany. "How long before it hits the headlines in the United Kingdom?" was the trenchant comment.

Government departments already are looking at the problem and it could be that, if no action is taken, either on a U.K. or European basis, events could rapidly overtake the industry which would be forced to put warning labels on products containing solvents in much the same way as is done in the United States. So seriously does the Paintmakers Association view this problem that, together with several major chemical companies, it is putting up funds to initiate a detailed case-referent study of the illness pre-senile dementia with reference to solvent exposure. Principal investigators will be Professor Elaine Murphy of the Department of Psychogeriatrics, Guy's Hospital, and Dr. H.A. Waldron of the Institute of Occupational Health, London School of Hygiene and Tropical Medicine.

Sales and Profitability

It was disclosed during the conference that in 1984, total sales of the U.K. paint industry showed a modest volume increase of one percent over the previous year. Sales value was three percent higher. Productivity was 12.8 percent higher in terms of value and 8.8 percent higher in volume, despite the fact that the industry's total workforce declined by 8.6 percent between 1984 and 1983, mainly in the general and administrative areas.

The unpalatable fact, however, was that overall profitability of the industry declined in actual terms by 3.6 percent compared with 1983. This works out to about seven percent as a percentage of sales and nine percent as a percentage of net assets. A significant contributor to this decline is, without doubt, the rapid increases in raw material costs faced by the industry. These increased by nearly 10 percent up to the end of 1984 but are rising ahead at an even greater rate presently. A main culprit is titanium pigments but other raw materials, including aromatic solvents, tall oil and

Another Work-Related Death? No—Murder!

Today, hazardous work exposures are playing a deciding role in the prosecution of "murderers" and other "criminals" in the United States. Following are three court cases that involve such legal decisions.

Landmark Corporate Convictions

In an unprecedented decision last year, three corporate officials were found guilty of murdering a worker who inhaled cyanide fumes at his jobsite. These convictions marked the first verdict for corporate homicide in U.S. history.

Stefan Golab, a 61-year-old Polish immigrant, inhaled cyanide fumes as he prepared to clean a large tank at Film Recover Systems, Inc., a company located outside of Chicago.

Judge Ronald J. P. Banks sentenced the Film Recovery Officials—including the company president, plant manager and plant foreman—to 25 years in prison and fined them $10,000 each. The convicted vice president remains free in Utah where the governor has twice refused to extradite him.

Judge Banks said Golab's death was "no accident, but murder." Banks held that the evidence presented throughout the two-month trial clearly demonstrated that Golab died from breathing in cyanide fumes under "totally unsafe" workplace conditions and that company officials were "totally knowledgeable" of the hazards.

Prosecutors at the trial presented compelling evidence indicating that workers were ordered to scrape the skull and crossbones warning off drums of cyanide. Testimony revealed that workers were allowed to wear cotton gloves around the corrosive chemicals.

Former employees also testified how workers experienced daily nausea, dizziness and vomiting at the plant, and how all of these symptoms were ignored by company officials. They also told how they were never warned of the deadly hazards associated with cyanide exposure.

In an interview with *Occupational Safety and Health Magazine*, Cook County State's Attorney Richard Daley described the Film Recovery plant as a "huge gas chamber". Daley sought the murder verdicts under a section of the Illinois murder statute that states that a prosecutor does not need to show a defendant had intention to kill but only that he or she "knowingly created a strong probability of death and great bodily harm."

Film Recovery prosecutor Jay C. Magnuson said: "Exposing workers to something as dangerous as cyanide gas is nothing less than firing a weapon into a crowd. You have created a strong probability of death. No intention is needed at that point."

Judge Banks also found the defendants guilty of 14 other counts of reckless conduct in connection with injuries suffered by other Film Recovery workers.

Legal experts on both sides of his decision agree the murder convictions represent a legal landmark. The Philadelphia Area Project on Occupational Safety and Health's Safer Times publication said that these convictions "are a welcome breakthrough in a legal system which historically protects management." The *Wall Street Journal* quoted attorney Daley saying that the verdicts "mean that employers who knowingly expose their workers to dangerous conditions leading to injury or even death can be held criminally responsible for the results of their actions."

The Film Recovery murder convictions send a clear warning to corporate management about its liability when putting workers lives at risk.

The incident also demonstrates the inadequacey of present inspection and monitoring procedures by the Occupational Safety and Health Administration.

OSHA had made a records or "paper" inspection of the Film Recovery plant four months before Stefan Golab's death. This means OSHA looked only at the company's own injury records, comparing them to the national average. Because the plant's injury record was not above that average, no inspection of jobsite conditions was made. Routine inspections of jobsite conditions and larger fines are the only way to enforce health and safety regulations.

D.A. Forms Special Unit

In the past, similar incidents have merely resulted in shockingly small corporate fines. However, the tide may now be turning.

In Los Angeles County last year, the District Attorney established an Occupational Safety and Health Unit as a special prosecuting force to work specifically on work-related deaths.

In a recent interview, the unit's director, Special Assistant District Attorney Jan Chatten-Brown explained: "Our commitment is to handle fatalities and serious injuries where there are repeated incidents—an employer doesn't seem to be responsible to what we consider to be grossly inadequate administrative process provided by CAL-OSHA."

Chatten-Brown delivered a clear warning to employers: "Jail and prison sentences will be imposed. Employers should be liable for their actions. You must raise your standard of care to employees."

Two Solvent Intoxication Cases

In a related case, a 27-year-old Florida painter was found innocent of driving while intoxicated after the defense proved that the defendant was at the time "high from paint" and not from drinking alcohol.

Testimony at the trial demonstrated that a routine day of exposure to painting materials had caused his blood-alcohol reading to go from a normal leval of 0.01 on a Breathalyzer test to 0.11. Florida's legal intoxication level is 0.10. Trial evidence—a paint can label—showed that 65 percent of the paint he used was pure alcohol.

In another chemical intoxication case, a 23-year-old lawnkeeper was convicted of first degree murder after strangling a customer in her yard, despite his claim that he was driven insane by pesticide poisoning. The lawnkeeper's attorney argued that organo-phosphates used in the lawn work had intoxicated his client, leaving him unable to distinguish right from wrong.

Despite compelling testimony relating the neurotoxic hazards of organo-phosphates, they lost the case.

Public Support

The public apparently approves of such criminal prosecutions as well. The *Detroit Free Press* conducted a poll the day after the Illinois convictions asking if murder is "too harsh a charge for negligent employers." Eighty percent of the respondents said no.

A Western Illinois University law professor who worked on the Film Recovery case notes that the "polls indicate a recognition of the seriousness of corporate and white-collar crime. The public's perception of acceptable risks may be changing, especially with the growing publicity over toxic substances."

Catastrophes such as Love Canal and the Bhopal disaster and increased news coverage of such incidents have dramatically increased the public's awareness of the dangers of toxic substances and procedures using them

A recent NBC Nightly News special on solvent neurotoxins focused attention on toxic chemicals associated with solvents used in the painting trades. That report featured IBPAT painters and demonstrated the potentially serious effects to the human nervous system that can be associated with exposure to solvents in paints and laquers.

National Public Radio also recently featured a special two-part series on neurotoxins in the paint trades and IBPAT Health and Safety Director Rod Wolford was interviewed on NBC's Today Show in October.

Making Headlines

Solvent poisoning is making headlines and becoming the central issue in court battles between employees and employers, employees and manufacturers, and employees and the general public. While the outcomes of these particular cases are after-the-fact decisions and don't solve the problem of removing workplace hazards, the accompanying publicity may help increase public awareness about the dangers of solvents—an area that has concerned our trades for more than two decades.

More importantly, these court cases—particularly the Film Recovery Case—may pressure management to take responsibility for providing a safe and healthful workplace and motivating workers to make and demand changes.

For instance, following a court decision, the DWI-accused painter vowed to purchase and use "the best chemical cartridge respirator available."

Chemical Plant Accused Of Concealing Deaths

A labor coalition in December accused Rohm and Haas, a chemical concern, of trying to cover up the cancer deaths of four employees, exposed to what some scientists have called the most potent carcinogen known.

The union group, the Philadelphia Area Project on Occupational Safety and Health, charged that there is undeniable evidence that leaks of the carcinogen, bis-chloremethyl ether or BCME, has endangered other employees at the plant in Bridesburg and people in its neighborhood in Northeast Philadelphia.

Unions participating in the coalition include the United Automobile-Workers, the Oil, Chemical and Atomic Workers, the American Federation of State, County and Municipal Employees and the Communications Workers of America.

The group's charges are based on an investigation by the federal Occupational Safety and Health Administration, which recently cited Rohm and Haas for six "serious" violations.

OSHA found that the company had failed to train employees adequately on personal protective equipment, and that its leak-detection system was deficient. The federal Environmental Protection Agency ordered the company to correct the hazards and proposed fines of $3,600.

The New York Times

—NEW YORK, SUNDAY, APRIL 12, 1981—

Toxic Paint Chemicals Raise Alarm as Threat To Health of Workers

By BEN A. FRANKLIN

WASHINGTON, April 11 — Three years ago, in response to an increasing number of its members who were reporting strange and debilitating illnesses, the International Brotherhood of Painters and Allied Trades started running an "Ask the Doctor" column in its journal. The letters poured in.

"I told the foreman I was getting numb around the mouth and in my hands," one painter wrote. "A stationary object would move as I walked toward it," wrote another. And according to another, "When we came in to work each day we had to haul dead rats out of the rooms we had painted the night before."

There are about 400,000 painters, paint makers, sign painters, silk screen printers and tile and carpet layers in the United States who work with coatings or adhesives made with aromatic hydrocarbons and other solvents, often in places without enough ventilation. Many of them have complained for years of dizziness or intoxication while on the job.

But recently, as paint manufacturers have incorporated new chemicals in their products and as the toxicity of some, such as toluene and benzene, have become more widely known, many industry, Government and union officials have come to share the conclusion of Frank Raftery, the painters' union president, who said:

"Toxic chemicals are a major threat to painters that rivals or exceeds the better-known health threats to asbestos workers and even to coal miners."

Dr. John Froines, a Government toxicologist who is acting director of the National Institute for Occupational Safety and Health, agreed that the chemical compounds in paint presented "new and serious problems."

"We are concerned about the hazards of painting to such an extent," he said, "that we are conducting extensive research into the carcinogenic and neurotoxic effects in the workplace. Obviously, further research is needed to evaluate these problems."

Neurotoxins are poisons that destroy nerves or nervous tissue, resulting in neuropathy, or a dysfunction of the way the nervous system usually works.

Major segments of organized labor have shown increased concern about the effects that these and other toxic substances have upon employees in the workplace. In the last year the painters' union, the United Automobile Workers and the American Federation of Labor and Congress of Industrial Organizations have set up special departments to investigate the problem.

Few Actions Against Makers

Relatively few negligence or product liability cases have been brought against the manufacturers of the chemicals, paints, lacquers, adhesives and plastics that contain potentially neurotoxic formulations with names like methyl-n-butyl ketone, toluene diisocyanate and dimethylaminopropionitrile. According to Rodney Wolford, an occupational safety official at the painters' union, the first symptom of neuropathy is depression, and "the poisoned workers find it very hard to write us about it, much less to bring lawsuits."

Among painters and others exposed to solvents for long periods in poorly ventilated areas, the symptoms of toxicity often begin with on-the-job dizziness, exhilaration, headache, blurred vision and slurred speech. Sometimes they progress to hallucination and permanent disorientation, paralysis and other symptoms of injury to the central nervous system.

A mortality study conducted for the painters' union among workers in New York found their life expectancy to be 11 years less than the average American's.

In 1975, a pioneering medical survey of 1,000 painters, paint makers, tile and carpet layers and wood finishers found that 71 percent of those studied reported some toxin-related disorientation on the job. As many as 4 percent said they had lost consciousness while working.

The study by Dr. Irving J. Selikoff of Mount Sinai Medical School found that painters exposed to solvents were more likely to have accidents, such as falls from scaffoldings, and that they had potentially dangerous difficulties driving home from work.

Study by Johns Hopkins

More recently, a study of paint hazards by the Johns Hopkins University School of Public Health found that there were "minimally, over 300 toxic materials and 150 carcinogens potentially present in paints." Fifty-seven percent of the paint solvents identified in the study are listed in the Registry of Toxic Substances compiled by the occupational safety institute.

One of the first acts of the Reagan Administration was to table a proposal for more explicit labeling of all the hundreds of thousands of products containing chemicals that are known to cause symptoms of toxicity in high concentrations. The products are used by an estimated 25 million American workers, according to the Labor Department's Occupational Safety and Health Administration, which developed the proposed regulations in nearly five years of negotiation with the chemical industry.

Under the proposal, the labels would have listed the products' ingredients, given more specific directions for their use and described symptoms and treatment of toxic reactions.

A Labor Department spokesman said that, at the request of the Chemical Manufacturers Association, the proposed regulations were being reconsidered as part of the Administration's plan for a general reduction in regulations. It is not clear when regulations will be proposed again or, if they are, in what form.

State Action Sought on Rules

Since the proposed labeling regulations have been tabled, representatives of labor have been moving on state legislatures in an effort to enact all or part of the labeling rules on a state-by-state basis.

But if states adopted conflicting requirements for the labeling or the use of potentially toxic substances, one chemical trade association official said, "That would drive the industry right up the wall, and we might end up actually going for some Federal regulation."

Industry spokesmen differ on how hazardous the paint chemicals are as well as on the need for better labeling. Robert A. Roland, president of the chemical manufacturers' organization here, calls his industry, which makes other toxic substances in addition to solvents, "the second-safest in the country, next only to the dry goods and retail industry."

The association contends that the proposed Federal regulations were far too stringent.

But Patrick Hurd, an industrial hygienist at the National Paint and Coatings Association, which Mr. Roland ran until he moved to the chemical association a year ago, said that "from our standpoint, there is a need for some sort of further hazard warnings on paint products."

Most consumers who take a weekend to paint a bedroom or an apartment are relatively free from toxic risks because many of the most popular consumer products are water-soluble latex-based paints, which have not been proved harmful. If oil-based paints that contain solvents are used by do-it-yourself painters, exposure is usually for brief periods.

But risks to artists are often high because they repeatedly use the same kinds of solvents and chemicals as do workers for commercial painting companies, "with no more knowledge of the hazards than you see in industry," according to Michael McCann, an industrial hygienist at the Center for Occupational Hazards in New York. Those exposed to varying degrees of risk, he said, included artists, silk screeners, home jewelry makers and stained-glass makers.

Today, according to OSHA, a new chemical compound, potentially a new neurotoxin, mutagen or carcinogen, or all of the above, comes into the American workplace every 20 minutes of every working day.

The labels on most containers reveal little about the contents, with most bearing only trade names. And manufacturers who might otherwise list contents are confronted with "nested trade names," raw materials supplied to them by other manufacturers who decline to disclose the contents on the ground that they are trade secrets. The containers for some paint products for industrial use bear only code numbers.

Existing Federal regulations require the manufacturers of each potentially toxic substance to file with the agency a "material safety data sheet," theoretically available to workers exposed to toxic agents. But according to the Labor Department, the data sheets, if they are ever seen by those who could benefit from them, are often barely more informative than the labels.

Alarm Rises Over Paint Chemicals as Health Threat

The New York Times/Nik Kleinberg

A painter wearing a protective air mask spraying overhead pipes at a construction site on Long Island

Among the important information that safety advocates say is missing from most labels are instructions on the early symptoms of overexposure or emergency treatment.

"Remove to fresh air," is a commonly advised remedy on paint labels for toxic effects, such as intoxication or unconsciousness. But for many professional painters, long-term exposure brings either habituation or sensitization, a form of allergy.

"We don't hear about a lot of these solitary cases because the first symptom is depression," Mr. Wolford of the painters' union said in an interview. "The sick painters are out there, sitting at home depressed and unemployed.

Most Benefit Claims Are Denied

"Many painters don't go soon enough to a doctor," he continued. "Most doctors know very little about neurotoxic illness. Most of these people don't get workmen's compensation benefits because it is very hard to show that these exotic illnesses are work-related. There is often a long latency period before symptoms arise, so 98 percent of the claims are denied.

"In the end, their friends reject them because they act queer and they are pathetic. People are apt to say they are!

Even neurotoxic epidemics affecting large numbers of people have only recently attracted wide public or scientific attention in America. But in the Scandinavian countries, studies of spray painters in the 1930's revealed gross distortions among them in behavioral problems and neuropathy — slowness in nerve conduction, for example — and lower life expectancy. Strict labeling and protective equipment rules have been invoked since then.

Study by Soviets Cited

And a translation of Russian literature on industrial neurotoxins, published here in 1978 by the occupational safety institute, also showed a wider use by doctors there of "behavioral and neuro-physiological methods" in the early diagnosis of chemical toxicity.

One Soviet study of worker habituation to industrial poisons was cited by Mr. Wolford of the painters' union as explaining "why some of our people have 'the Monday blues' and can't wait to get back to the job that is killing them after a weekend." He added, "They say they actually feel better when they work every day with this stuff than when they're away from it because their bodies develop a craving for aromatic hydrocarbons."

The Journal of the American Medical Association, saying that it knew of no previous such case, reported in February 1980 that several humored workers making polyurethane foam in two unrelated plastics factories had suffered an unusual neuropathy: They had difficulty urinating and had painfully distended bladders. Some of the men were impotent.

Symptoms at Second Plant

A new compound called dimethylaminopropionitrile had come on the market, advertised as an improved catalyst in polyurethane foam production, and companies in Jessup, Md., and Marblehead, Mass., began using it. After two doctors in Baltimore reported neuropathic symptoms among workers at the Maryland plant, Rebecca Moreland, a public health nurse, was assigned to investigate the cases. She telephoned Dr. David Wegman at the Harvard School of Public Health for help in isolating a suspected neurotoxin. That was on a Friday.

The next Monday, Dr. Wegman called her back with the requested aid and with some news.

Over the weekend, he reported, 11 workers at the Marblehead polyurethane plant had discovered they had similar

THE NEW YORK TIMES

Sunday, April 12, 1981

symptoms. The workers went to a hospital emergency room in Massachusetts.

About two-thirds of the production line workers at each plant were found to have neuropathic urinary dysfunction. Others also had paresthesia, a loss of sensation in their hands and feet. The product was immediately withdrawn from the market.

Even as paint toxicity is being recognized as a problem, however, a technologically impelling factor is entering the picture, a recent trend toward a whole new generation of paint formulations that may be as revolutionary as the post-World War II development of water-soluble house paints.

Lower Use Tied to Rising Costs

Mr. Hurd of the National Paint and Coatings Association said in an interview that the industry was "beginning to move away from solvent-based finishes and solvent hazards." New systems of water-thinnable, oven-baked automotive paints have been installed so far in a few places, among them the General Motors automobile assembly plant in Los Angeles. Solvents are still being used in most plants, but in much lower concentrations.

"I would like to think that this trend is a result of hazard control," Mr. Hurd said, "but it is probably the result of the rising costs of solvents."

Because solvent products are made largely from petroleum, the cost of solvents rises with the price of oil. The cost of using solvents also is higher in states with strict controls on the emission of hydrocarbons.

The Southern California Air Quality District, for example, levies an inhibiting tax on the hydrocarbon emissions of large industrial users of solvents. To avoid the tax, G.M. was formerly required to incinerate the solvent-laden exhaust air from its assembly line spray booths in Los Angeles in a superheated afterburner that was costly to run and maintain. Now, using water-thinnable auto paint, the G.M. plant pays no solvent pollution tax and has no afterburner costs.

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Painters challenge OSHA on toxic hazards standard

The effectiveness of government standards in protecting workers against poisonous chemicals used in the workplace was questioned by the Painters at a House subcommittee hearing.

Rodney D. Wolford, director of the Painters' safety and health department, testified that hazard communication regarding toxic materials "must be a right for all workers—not just those in manufacturing."

The standard set by the Occupational Safety & Health Administration limits coverage to workers in certain industrial classifications developed by the Bureau of Labor Standards. Wolford stressed that workplace hazards are not limited to "artificial classifications" that do not reflect "when and where hazardous substances will be found and to what degree."

Testifying before the House Science & Technology Subcommittee on Investigations & Oversight, Wolford pointed out that the more than 450,000 painters in the U.S. workforce are exposed to paints that contain 150 known or suspected carcinogens and a greater number of other toxins that are capable of killing or maiming workers.

Overexposure symptoms

Citing a 1975 study of painters, Wolford noted that 74 percent were found to have experienced neurotoxic symptoms, such as nausea, dizziness or fatigue. Workers often are led to believe that the signs and symptoms of overexposure are a natural part of being a painter, he said.

Wolford told the subcommittee that an unpublished study by the union had found a "statistically significant relationship" between worker-reported neurotoxic symptoms and the gallons of paint applied per year.

He suggested that chemical exposures for a wide variety of workers can be significantly reduced "just by accepting that neurotoxins may cause 'temporary or permanent impairment or harm' and pose 'significant risk' which must be controlled by assuring no worker is exposed" in doses or for periods that cause symptoms to be manifested.

In noting the shortcomings of the federal hazard communication standard, Wolford said it fails to require any evaluation of labeling effectiveness. While labels may warn users to avoid prolonged contact or not to breathe the vapors, they do not say that acute neurotoxic effects such as headaches and dizziness are serious symptoms of overexposure.

Without evaluation of labeling, he said, all that is accomplished with certainty by OSHA's hazard communication standard is the reduction of liability for manufacturers.

Wolford suggested that the standard include an evaluation of label and training effectiveness and that manufacturers share the hazard training responsibilities and costs.

Further, he urged that both manufacturers and employers be subject to strict legal liability for failure to warn and train effectively, and scored a proposed Senate bill that would reduce manufacturer liability.

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EPIDEMIOLOGY BULLETIN

EPIDEMIOLOGY OFFICE
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RESPIRATORY AND NEUROLOGIC SEQUELAE FOLLOWING ASPHYXIATION IN A STORAGE TANK

March 30, 1983, nine men working at a Kenai Peninsula oil well drilling site were examined at Central Peninsula Hospital, Soldotna for illness after they were overcome in a petroleum storage tank that was connected to the well. Information concerning their illness was gathered by the Soldotna physician who was on call the night the patients presented at the emergency room, by an investigator from the Department of Labor, and several months after the incident, by the Epidemiology Office, Division of Public Health. Given the loss of consciousness in several patients and the hurried nature of their rescue, a consistent story of events surrounding the mishap and rescue could not be clearly ascertained.

At about 9:00 p.m. on March 31, two men entered the 500 barrel storage tank through its top hatch in order to inspect what was thought to be a leak in the tubing connecting the well-head to the tank. The well-head itself had recently been purged with gaseous nitrogen. One or both of the men who entered the tank fainted, and two co-workers crawled in through the top hatch in an attempted rescue; it appears only that one of the four made his way out of the tank. Other workers then unbolted a side door allowing direct access to their fellows who were lying unconscious on the floor of the tank. At least five and perhaps more workers participated in this phase of the rescue. Some or all of them soon began to feel faint or had difficulty breathing. It is estimated that ten minutes was the most time spent by any person in the tank, and that rescuers who entered through the side door spent no more than two minutes inside.

Nine patients, 20-38 years old, were seen at Central Peninsula Hospital between 10:30-12:00 p.m., after evacuation by helicopter and road ambulance. Symptoms recorded by the emergency room physican included conjunctival and respiratory mucosal irritation, as well as weakness, nausea, and headaches (Table 1). Arterial blood gas determinations on five patients were normal. Chest radiograms on seven were unremarkable.

TABLE 1: EMERGENCY ROOM COMPLAINTS OF NINE PATIENTS ASPHYXIATED IN A STORAGE TANK

Patient	NAUSEA	LIGHTHEADEDNESS	WEAKNESS	FAINTED	BLURRY VISION	LIMB PAIN	HEADACHE	CHEST PAIN	RAPID BREATHING	SORE THROAT	BURNING EYES	CONGESTION	WHEEZE	COUGH	ESTIMATED TIME IN TANK
1	X	X			X		X			X					2-5 min.
2	X			X	X		X			X					5-10
3	X	X			X		X	X		X					6-8
4	X	X				X		X				X			2
5		X	X			X	X		X	X	X				2
6		X	X												2
7										X	X	X	X	X	?
8	X	X		X	X		X			X					5-10
9				X			X	X	X						5
Total (9)	5	6	2	3	4	2	6	3	2	6	2	2	1	1	

The following day, six of the nine patients were still symptomatic. Three of the six complained of headache and trouble concentrating; new findings included postural hypotension and incoordination. Four of the six patients (including one of the above) complained of sore throat and congestion; findings included red eyes and pharyanges and basal crepitations. Of the six patients symptomatic the day following their asphyxiation in the tank, four remained ill for one to several months—two with memory loss and incoordination, and two with recurrent cough and bronchospasm.

With the cooperation of the petroleum company which was operating the exploratory well where this incident occurred, we were able to obtain information concerning the environment inside the tank to which the nine patients were exposed. The tank itself was about 7'x10'x39' in dimension. Before being connected to the well-head, the tank was used to mix "drilling mud", the constituents of which were soda ash, caustic soda, potassium chloride, various organic polymers, cellulose, and filler. Prior to being used at the drilling site, the tank was cleaned with steam and water. The atmosphere in the tank was sampled approximately one hour after the incident, during which time the side door was open and air exchange would have occurred. Toxic gases such as phosgene, oxides of nitrogen, and chlorinated hydrocarbons were not identified in the sample. It was inferred that during the incident, the tank contained a high concentration of nitrogen let off from the well-head, with a correspondingly low concentration of oxygen.

The "Fireman Syndrome" of multiple rescuers collapsing one after another on entering a confined space is well documented. This episode illustrates the consequences of entering a confined space in which illness is occurring without appropriate precautions and without knowledge of the atmosphere inside that space. The illness associated with entering this tank was unusual: while neurologic deficits might relate to transient hypoxia or breathing an atmosphere rich in nitrogen and correspondingly poor in oxygen, the acute and chronic respiratory findings observed have no satisfactory explanation. Simple exposure to nitrogen or to an oxygen poor atmosphere does not explain acute or chronic respiratory disease.

(Contributed by George Garnett, M.D., Soldotna; Eric Shortt, Occupational Health Section, Alaska Department of Labor)

Case Study 1: Confined Space Exposure--E. A. Rockholt

Contractor: Clark Painting Company

Job Location: Airwick Corp.; #4 Cermack Blvd.; St. Peters, Missouri.

Work Area in which Incident Occurred: 20' x 25' x 8' room. No windows, one door for entrance.

Job: Applying Glidden Gli d-Guard Epoxy on walls and floor of room.

Method of Application: 9" roller, 4" brush.

Rate of Application: 10 gallons per day; 1.25 gallons per hour.

Number of Workers in Room: 2--E. A. Rockholt and Co-worker.

PPE Provided: Dust mask; provided only on day of incident.

Engineering Control: 20" fan blowing into room; provided only on day of incident.

Hours of Work Before Incident: 2-3 hours morning of October 27, 1978(?).

Description of the Incident: Missouri Painter Ed Rockholt and his co-worker were applying epoxy to the floors and walls of a room 20' x 25' x 8'. They used a 9" roller and a 4" brush. The rate of application was about 1.25 gallons per hour. The paint weighed about 10 pounds to the gallon and contained by weight 20 percent Isopropanol, 7 percent Toluol and 10 percent Methyl Ethyl Ketone. The room had only one door, which was kept open, but no windows. This worker fell ill in the space while working and suffered cardiac arrythmia followed two days later by a heart attack. Using NIOSH's formula for calculating steady state exposure in the room, we find that our workers were exposed to as much as 450 times the TLV as they worked (Attachment 1-1).

Other Comments: Mr. Rockholt also stated that "I knew the solvents must be bad because when we came in to work each day we had to haul dead rats out of the rooms we had painted the night before." Apparently, the rats died of solvent exposures. As common as 20' x 25' x 8' rooms and smaller which need painting are, it is not difficult to see that painters are daily exposed to atmospheric conditions which require special knowledge or training to insure safe performance of work.

A T T A C H M E N T 1-1

Solvent (from Glidden MSDS)	Steady State Exposure ppm (NIOSH Formula) Max.	Min.	TLV ppm Federal Law OSHA	Excessive Exposure (Times TLV) Max.	Min.	PPE Required (OSHA Max.	NIOSH) Min.	PPE Provided (Clark Painting Co.)
MEK	45,000	900	100	450 X	9 X	Airline	Organic	Dust Mask
Toluene	28,500	570	200	140 X	3 X	Resp.	Cartridge	
Isopro-panol	100,000	2,000	400	2500 X	5 X	full hood	w/ full face piece	

Case Study 1: Confined Space Exposure--E. A. Rockholt

Case Study 2: Confined Space Exposure--Westvaco

Contractor: International Reinforced Plastics, Denmark, SC

Job Location: Westvaco, Covington, West Virginia.

Work Area in which Incident Occurred: 8' wide, 100' high tower.

Job: Spraying fiberglass epoxies.

Method of Application: Spray

Rate of Application: Unknown.

Number of Workers in Room: 7 - 4 men, 3 women.

PPE Provided: Unknown.

Engineering Control: Unknown.

Description of the Incident: Seven IRP painters were applying fiberglass resins to the walls of the 8' wide, 100' high tower. At 3:20 a.m. the tower exploded and burned to the ground. All seven workers were killed and seven others were injured fighting the blaze. While the case is still being investigated and two $15 million damage claims are pending, build up of fumes and/or oxidization of the fiberglass compound has been implicated.

Other Comments: The wives of two of the men who lost their lives in the fire at Westvaco said their husbands had escaped from other industrial fires in recent years. Mrs. Ernest Holman of Springfield S.C., said her husband had beer in accidents before in his nine years with International Reinforced Plastics, "but he'd always managed to escape them." One fire, Mrs. Holman said, left two of her husband's co-workers badly burned, but her husband and another worker had escaped. Mrs. Odell Crum, Sr., whose 47-year-old husband was also killed, said her husband had escaped injury while working for the company when a fire broke out in 1972.

Case Study 3: David Friel

Contractor: Various.

Job Location: Denver, Colorado

Work Area in which Incident Occurred: Various confined spaces.

Job: Spraying primer and finish coating.

Method of Application: Spray.

Rate of Application: Unknown.

Number of Workers in Room: Various.

PPE Provided: Organic Cartridge Vapor Respirator.

Engineering Control: Various, often none.

Description of the Incident: David Friel worked as a spray painter for 15 years for various contractors; he had completed apprenticeship training and was mindful of safety on the job. In late 1977 he began exhibiting symptoms that his doctor would later diagnose as toxic organic brain syndrome brought on by exposure to dangerous solvents, often in confined spaces. He developed a skin rash on his feet (which gradually spread to his legs, waist, hands, arm and chest); he suffered periods of mild depression; his sex drive diminished; he was moody and very often fell into lapses of memory (for example, he often could not remember driving home from work). As his illness progressed, Mr. Friel began having crying spells daily. He complained of insomnia and lack of appetite. Mr. Friel's coordination began to deteriate completely; he experienced a near fall from a 150 feet height. It was this event that convinved him he would not be able to paint again. He has not worked as a spraypainter for more than a year; although his symptoms have receded, they have not vanished; the rash still occurs.

Other Comments: Mr. Friel's experience is not an isolated one, and damage done is not limited to physical disability. He has had to adjust to a lower paying job; he fears that his painter's pension will be lost, and the trauma of undergoing the symptoms described above have taken their toll. Mr. Friel's condition's medical future is unknown.