

FILE NAME: Industrial Hygiene Foundation (IHF)

DATE: 1982

DOC#: IHF112

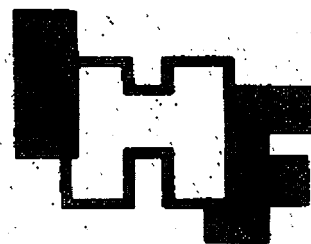
DOCUMENT DESCRIPTION: Industrial Hygiene Digest - 1982 Issues - Covers, TOCs & Abstracts

January 1982  
Volume 46, No. 1

# INDUSTRIAL HYGIENE DIGEST

LITERATURE  
ABSTRACTS

ENVIRONMENTAL  
AND  
OCCUPATIONAL  
HEALTH AND  
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.  
5231 CENTRE AVENUE      PITTSBURGH, PA. 15232

# INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.  
 Abstractor: Jean L. Collins, B.A.  
 Production: Joy H. Henning, Ola B. Owens

January 1982  
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## TABLE OF CONTENTS

This Issue Contains Abstracts 1/82x--110/82

|                                                      |    |
|------------------------------------------------------|----|
| News Items . . . . .                                 | 1  |
| Coming Events . . . . .                              | 3  |
| Legal Developments . . . . .                         | 4  |
| Books and Pamphlets . . . . .                        | 6  |
| Industrial Medicine . . . . .                        | 7  |
| Skin Diseases and Burns . . . . .                    | 9  |
| Chemical Hazards . . . . .                           | 9  |
| Industrial Dusts and Inhalants . . . . .             | 15 |
| Physical Hazards . . . . .                           | 19 |
| Radiation . . . . .                                  | 19 |
| Environmental Problems . . . . .                     | 20 |
| Industrial Hygiene, Preventive Engineering . . . . . | 22 |
| Occupational Health Management . . . . .             | 24 |
| Safety, Accident Prevention . . . . .                | 25 |
| Analytical Methods, Miscellaneous . . . . .          | 26 |
| Index . . . . .                                      | 27 |
| Addresses of Journals Abstracted . . . . .           | 29 |

## FEATURES

|                                                                                                                                                       |                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| An Ultrastructural Reevaluation of Lead-Induced Pathology in the Kidney.                                                                              | Abst. -- 32/82 |
| <i>In Vivo</i> Measurement of Liver and Kidney Cadmium in Workers Exposed to This Metal: Its Significance with Respect to Cadmium in Blood and Urine. | Abst. -- 35/82 |
| Respiratory Cancer Among Copper Smelter Workers: Recent Mortality Statistics.                                                                         | Abst. -- 39/82 |
| Neurological Problems Arising in a Plant Manufacturing Tri-aryl Phosphates.                                                                           | Abst. -- 41/82 |
| Survey of Industrial Workers for Antibodies to Toluene Diisocyanate.                                                                                  | Abst. -- 43/82 |
| The Uncertain Consequences of Formaldehyde Toxicity.                                                                                                  | Abst. -- 47/82 |
| A Model for Aerosol Deposition in the Human Tracheobronchial Region.                                                                                  | Abst. -- 51/82 |
| Retinal Injury Due to Industrial Laser Burns.                                                                                                         | Abst. -- 72/82 |

INDUSTRIAL DUSTS AND INHALANTS

51/82 A Model for Aerosol Deposition in the Human Tracheobronchial Region. Y.-S. Cheng and H.-C. Yeh. *Am. Ind. Hyg. J.* 42: 771-776, Nov. 1981. 30 refs.

An aerosol deposition model in the human tracheobronchial tree based on impaction and sedimentation is proposed. Using this model, a mean deposition radius of conducting airways can be obtained from *in vivo* T-B deposition data or from physical dimensions of human lung casts. Agreement was found between the model and deposition data for three normal healthy subjects in the literature. Contributions of sedimentation to T-B deposition is estimated to be 42-78% at 250 cm<sup>3</sup>/sec average inspiration flow rate, and decreased to 8-29% at 750 cm<sup>3</sup>/sec average inspiration flow rate. Mean deposition radii are estimated to be 0.33 to 0.43 cm and correlate with pulmonary functional residual capacities.

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52/82x Proceedings of the Fifth International Symposium on Occupational Health in the Production of Artificial Fibres, Belgirate (Italy), 16-20, September 1980. A. Cavalleri, ed. *G. Ital. Med. Lav.* 3: 47-167, Mar.-May 1981..

This entire issue is devoted to the papers given at the Symposium. They appear under the following headings: Epidemiology of CS<sub>2</sub> Poisoning; Neurotoxicity of CS<sub>2</sub> Poisoning; Toxicology of CS<sub>2</sub> Poisoning; Toxicology of Other Fibers; Exposure Monitoring. The papers are printed in English. Further information may be obtained by writing: Fondazione Clinica del Lavoro, Via Severino Boezio, 26-27100 Pavia, Italy.

--JFB

53/82 Manifestations of Cellular Immunity in the Rat After Prolonged Asbestos Inhalation. II. Alveolar Macrophage-Induced Splenic Lymphocyte Proliferation. K. Miller and E. Kagan. *Environ. Res.* 26: 182-194, Oct. 1981. 43 refs..

The present study has shown that alveolar macrophages from asbestos-exposed rats (dusted macrophages) can induce the proliferation of autologous splenic lymphocytes (dusted lymphocytes) as well as the proliferation of syngeneic lymphocytes from control nonexposed rats (control lymphocytes). Significant lymphoproliferation did not occur when alveolar macrophages from control rats (control macrophages) were cocultured with control or dusted splenic lymphocytes for similar periods of time (72 or 96 hrs). The activation of control lymphocytes by dusted macrophages was similar, in some respects, to the lymphoproliferative response evoked by sodium periodate-treated control macrophages, since both these reactions peaked

at 72 hr and were abolished by treatment of the macrophages with the reducing agent, L-cysteine. This periodate-like response produced by dusted macrophages appears to result from aldehyde-like modifications on the macrophage cell membrane. L-Cysteine treatment did not, however, affect the blastogenic response induced by dusted macrophages on dusted lymphocytes, which peaked at 96 hr. Since the *in vitro* addition of crocidolite to cell cultures did not trigger lymphoproliferation, these collective findings suggest the expression of asbestos-related antigen-like determinants on the surface of dusted macrophages. The authors conclude that the proliferative reactions induced in splenic lymphocytes by dusted macrophages were a consequence of two different phenomena: a periodate-like effect (noted in control lymphocytes) and an effect produced by a putative asbestos-related, macrophage-associated antigen (observed in dusted lymphocytes).

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54/82 A Comparative Study of the Prevalence of Pleural Thickening Related to Asbestos Exposures. S. Ohyagi, et al. *Jpn. J. Ind. Health* 23: 366-376, July 1981. 26 refs. (Japanese)

Using miniature films for mass tuberculosis examination of inhabitants, a comparison was made of the prevalence of pleural thickening between urban and rural districts in Japan. The classification of pleural thickening mostly followed the criteria of Askergren and Szamosi. Age adjusted prevalences for male adults were 2.7% (Ys city) and 5.3% (Yk city) in urban districts, and 0.7% (Hokuriku district) in rural districts. In addition to the survey of these inhabitants, workers of a ship building factory in the urban district were examined. Age adjusted prevalence in this case was 7.3%. On the other hand, the prevalence for female adults were 0.2% (Ys city) and 0.4% (Yk city) in the urban districts, and 0.09% in the rural districts. The prevalence of pleural thickening showed a sharp increase after 60 years of age in male adults but not in female adults. It was confirmed that pleural calcification was a better diagnostic feature for distinguishing the difference of prevalence by areas.

--Authors' abstract in English

55/82 Coagulation of Human Plasma by Asbestos Fibers. J. Hamilton, et al. *Environ. Res.* 26: 119-124, Oct. 1981. 19 refs.

Negatively and positively charged asbestos fibers shorten the partial thromboplastin time of human plasma, indicating coagulation of the plasma. A sample containing short (<5 µm in length) chrysotile fibers is ineffective. Only the negatively charged amphiboles (crocidolite and amosite) are able to activate factor XII (Hageman factor). This particular effect of the amphiboles is enhanced by high-molecular-

weight kininogen and leads to kinin formation.  
 --Authors' abstract reprinted  
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56/82 Mortality of Flax Workers. P.C. Elwood,  
 et al. *Lancet* 2: 747-748, Oct. 3, 1981.  
 4 refs.

In 1962, 2528 flax workers (856 men, 1672 women) aged over 35 years were examined in Northern Ireland. The authors have traced 97% of this population up to the end of 1977. The standardised mortality ratios (SMRs), based on age and sex specific death rates for Northern Ireland, were 78 and 80 for male and female workers respectively (95% confidence limits 68-88 and 70-90). The SMRs for workers in the dusty preparing stages were 83 (65-101) for men and 89 (72-106) for women. Workers in the less dusty processes had marginally lower SMRs; 75 (64-86) in men and 74 (61-87) in women. Taken together, these low SMRs, although due in part to the "healthy worker effect" do not suggest an increased mortality risk from work in the flax industry. The effect of byssinosis on mortality is more difficult to assess because cigarette smoking was found to be confounded with byssinosis.  
 --Condensed from text

57/82x Survey of Air Contaminants From Welding.  
 U. Ulfvarson. *Scan. J. Work Environ. Health*  
 7: 28 p. 1981. (Suppl. 2) 25 refs.

During the period 1974 to 1976 a total of almost 500 welding stations were investigated at some 70 industrial undertakings and at 21 track sections of the Swedish State Railways. These sites exhibited several different processes and materials and a variety of production conditions. Concentrations of air contaminants were measured in the breathing zone of the welders and at the work site. In this report, results from several earlier publications are summarized and compared over the whole investigation. Due to the extent of the investigation the concentration ranges found for air contaminants in various processes may be considered representative. The highest mean values of dust concentrations were found with MIG welding on aluminum and metal-arc welding on steel, about 10 mg/m<sup>3</sup> during a workday. The lowest mean values were found with TIG welding on aluminum and stainless steel, about 1-2 mg/m<sup>3</sup> during a workday. About 5 mg/m<sup>3</sup>, as a daily average, is the figure that emerged for metal-arc welding on stainless steel and MAG welding on steel. The exposure during the actual welding while the arc is passing, defined as the immission index, was considerably greater, several hundred milligrams per cubic meter. The differences that appear to exist among the welding methods may, in some cases, be almost entirely due to differences in the arc-time factor. In the study of the gas-shielded arc welding of aluminum and the welding of

stainless steel, it could not be shown that the size of the welding current affects the dust content in the breathing zone, nor the contents of ozone or nitrogen oxides. Alternating current gave a lower dust concentration than direct current. In the gas-shielded arc welding of nonalloy steel there was a significant relationship between high amperage and high dust content in the breathing zone. The fact that the relationship could not be detected in several field studies may be due to the great variations that occur in both observed and unobserved production parameters. Statistical comparisons were made between average dust contents in the breathing zone of welders using and not using local exhaust ventilation. The effect of local exhaust ventilation on the dust content was not so good in the gas-shielded arc processes. The best result was found in a study of the MAG welding of steel in which the local exhaust ventilation had a definite effect, reducing the average dust contents to 65% of what they were without local exhaust ventilation. In a study of the metal-arc welding of steel, local exhaust ventilation reduced the average dust contents to 42% of what they were without local exhaust ventilation. It was established that the oxides of nitrogen are markedly reduced in metal-arc welding. Local exhaust ventilation did not have any measurable effect on ozone exposure. A comparison between the field measurements and laboratory results with local exhaust ventilation suggested that, in practice, the exhaust nozzles are not used in the best possible way. Copies of this Supplement may be obtained from: Ms. M.-B. Vaariskoski, Scandinavian Journal of Work, Environment & Health, Haartmaninkatu 1, SF-00290 Helsinki 29, Finland for 30 Finnish Marks per copy.  
 --Condensed from Summary

58/82 Pneumoconiosis Among Workers After Leaving Dusty Occupations. K. Suda and Y. Yamazaki. *Jpn. J. Ind. Health* 23: 475-484, Sept. 1981. 17 refs. (Japanese)

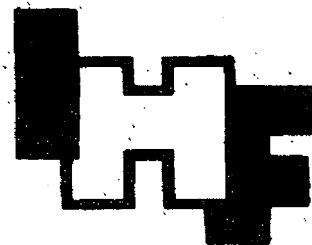
In Japan, there were about 12,000 workers awarded compensations for total disability due to pneumoconiosis in December 1977. The number of new cases showed an increase year by year, especially from the year 1971 onward. The purpose of this study was to interpret more accurately characteristics and factors of the incidence of pneumoconiosis. Questionnaires were mailed to 3,400 cases awarded compensations for total disability due to pneumoconiosis out of which 2,991 were completed and returned. The results were as follows: 1) of the 2,991 cases, 47% were certified at some time after having left dusty occupations. Percentage of the cases by succeeding periods of year certified showed an increase - 17% from September 1955 to March 1960; 52% from April 1960 to March 1978; 52% from April 1960 to March 1978; 69% from April 1978 to June 1979. 2) The length of the period after the separation from dusty

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Volume 46, No. 2

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## TABLE OF CONTENTS

This Issue Contains Abstracts 113/82x--230/82

|                                                      |    |
|------------------------------------------------------|----|
| News Items . . . . .                                 | 1  |
| Coming Events . . . . .                              | 4  |
| Legal Developments . . . . .                         | 6  |
| Books and Pamphlets . . . . .                        | 6  |
| Industrial Medicine . . . . .                        | 8  |
| Skin Diseases and Burns . . . . .                    | 12 |
| Chemical Hazards . . . . .                           | 13 |
| Industrial Dusts and Inhalants . . . . .             | 18 |
| Physical Hazards . . . . .                           | 21 |
| Environmental Problems . . . . .                     | 22 |
| Industrial Hygiene, Preventive Engineering . . . . . | 22 |
| Occupational Health Management . . . . .             | 24 |
| Safety, Accident Prevention . . . . .                | 25 |
| Analytical Methods, Miscellaneous . . . . .          | 26 |
| Index . . . . .                                      | 28 |
| Addresses of Journals Abstracted . . . . .           | 30 |

## FEATURES

|                                                                                    |                 |
|------------------------------------------------------------------------------------|-----------------|
| Mortality Among Rubber Workers. IV. General Mortality Patterns.                    | Abst. -- 135/82 |
| Lung Cancer Among Welders.                                                         | Abst. -- 136/82 |
| Epidemiological Study of Workers Engaged in the Manufacture of Chromium Compounds. | Abst. -- 159/82 |
| Respiratory Cancer in a Cohort of Nickel Sinter Plant Workers.                     | Abst. -- 160/82 |
| Acute Behavioural Effects of Styrene Exposure: A Further Analysis.                 | Abst. -- 168/82 |
| Some Observations on Workers Exposed to Methylene Chloride.                        | Abst. -- 177/82 |
| Occupational Exposure to Asbestos Fibers Resulting from Use of Asbestos Cloves.    | Abst. -- 194/82 |
| Attenuation of Hearing Protectors and the NRR Factors.                             | Abst. -- 199/82 |

INDUSTRIAL HYGIENE DIGEST

NEWS ITEMS

113/82x Use of Personal Sampling Devices During Inspection. Occupational Safety and Health Administration (OSHA). Fed. Reg. 47: 6530, February 12, 1982.

Action: This interpretation of 29 CFR 1903.7(b) clarifies the existing regulation concerning sampling of employee exposures during inspection and investigation of workplaces subject to the Occupational Safety and Health act of 1970. Specifically, the interpretation makes clear that the term "employ other reasonable investigative techniques" includes the attachment of personal sampling devices to employees in order to monitor their exposures. In addition, in this same issue of Federal Register, OSHA is proposing and inviting public comment on an amendment to §1903.7(b) which would adopt this interpretation as a legislative rule. See: Notice of Proposed Rulemaking (Docket No. W-360) in Abstract 114/82x below. This interpretation is effective February 12, 1982.

--Summary

114/82x Use of Personal Sampling Devices During Inspection. Occupational Safety and Health Administration (OSHA). Fed. Reg. 47: 5634, February 12, 1982.

Action: Notice of proposed rulemaking, in this issue of Federal Register (see Abstract 113/82x above), OSHA revises 29 CFR 1903.7(b) by adding an interpretative note to make clear that the term "employ other reasonable investigative techniques" as used in this regulation includes but is not limited to the attachment of personal sampling devices to employees in order to monitor their exposures. In this document, OSHA proposes to amend §1903.7 by issuing a legislative rule to expressly authorize its compliance officers to use personal sampling devices and to attach such devices to employees during the conduct of workplace inspections. The proposed rule would remove any questions concerning the agency's authority to use personal sampling devices as an aid in its workplace inspection. Comments on the issues raised by the use of personal sampling devices must be postmarked by April 13, 1982.

--Summary

115/82x Voluntary Programs Would Revamp Job Safety Enforcement. Alert p. 7, January 27, 1982.

The Occupational Safety and Health Administration has outlined six voluntary programs that would allow employers and employees to self-police worksite safety conditions. By fostering such cooperative efforts, OSHA hopes to cut down on agency inspections of relatively safe worksites. The agency would focus its enforcement efforts on the most hazardous companies. First, of the six proposed programs, PRAISE (Positive Results Achieved in Safe Employment) is aimed at small to mid-sized employers. These firms must be in low-hazard industries, have good safety records and operate safety programs. The PRAISE Program would cover only safety problems, and not health dangers. Run primarily by the employer, PRAISE would also involve an OSHA Resource Liaison to aid in abating hazards. Safety complaints by employees would be referred to the company's internal complaint system that would allow for worker anonymity. A worker, however, could still register a formal complaint with OSHA. The agency would also continue to investigate fatalities and serious accidents. The other proposed programs are: ...The STAR (Sharing the Accountability for Regulation) Workplace Program, geared for general industry firms with experienced labor-management committees and good safety records, ...Project Build, similar to STAR, but designed for the construction industry; ...Operation Try, an experimental program designed to explore cooperative methods other than the labor-management committee; ...The PRISE (Positive Results Through Intensive Management Efforts) Initiative, a management program for employers with sophisticated health and safety systems who have low injury rates compared to their industry.

--Condensed from Text

116/82x Even Low Exposures (Asbestos) May Result in Health Problems, Researcher Says. Occup. Safety & Health Reporter 11: 695-696, January 28, 1982.

Exposure to even relatively low concentrations of asbestos may cause adverse health effects, a Jan. 19 field hearing by the House Energy and Commerce Subcommittee on Commerce, Transportation, and Tourism was told. Persons subject to such exposures can include employees

living adjacent to primary asbestos exposure areas, asbestos workers' families, and students in schools with friable asbestos, according to Marvin C. Holstein, of the Environmental Sciences Laboratory, Mt. Sinai School of Medicine, New York, N.Y. Holstein cited a study of workers exposed to varied levels of asbestos which indicated "a prevalence of X-ray abnormalities consistent with asbestosis," even in cases of low concentration exposure. Irving J. Selikoff, director of the laboratory, told the hearing that, due to such findings, the Occupational Safety and Health Administration should reduce its asbestos standard to a level of 0.1 fiber per cubic centimeter of air, as proposed in 1980 by a task force of OSHA and National Institute for Occupational Safety and Health researchers. The current OSHA standard is two fibers per cubic centimeter of air. "There is no known safe level of exposure to asbestos, but it is understood that risk decreases with decreasing intensity of exposure," Selikoff stated.

--Text reprinted

7/82x Asbestos Pipe Producers Cite Study Showing No Excess Mortality from Asbestos.  
Occup. Safety & Health Report 12: 12, January 1, 1982.

The A/C Pipe Producers Association has called attention to a study by two British scientists to conclude that "the evidence from animal experiments, occupational exposure, and epidemiology is beginning to point strongly away from any association" between asbestos fibers and an excess mortality from gastrointestinal tumors. The study relied on two animal experiments which "confirmed the absence of asbestos-related gut tumors in a large-scale study in rats monitored for their whole lifespan." The pipe producers also noted that U.S. studies now under way did not detect any adverse effects on the test animals from asbestos in the diet, a preliminary conclusion drawn by Environmental Protection Agency. The two British researchers also concluded that among heavily exposed workers, no excess of gastrointestinal cancers has been found.

--Text reprinted

18/82x OSHA Improves Complaint Procedures to Focus Most Inspections on Alleged Violations Likely to Result in Physical Harm. News. U.S. Dept. of Labor p. 1-2, February 1, 1982.

The Department of Labor's Occupational Safety and Health Administration has improved instructions to its inspectors on the handling of complaints alleging workplace safety and health violations. The revised instructions are effective February 1. "OSHA will continue to act on every employee complaint; however, with only 1,200 inspectors to cover 3 million workplaces, OSHA needs to concentrate its

limited resources on answering first those complaints of employees who face the greatest, most immediate risk of injury or illness," Thorne G. Auchter, who heads OSHA, said. "During the first half of its existence, OSHA substantially responded to all employee complaints with inspections. However, subsequent experience found that this practice led to a large backlog of complaints, many of which did not deal with serious hazards. This backlog also diverted OSHA resources from inspecting workplaces with truly serious hazards. In 1979, OSHA revised its policy, allowing response to an employee complaint of alleged workplace hazards to take a variety of forms, ranging from a full OSHA inspection to a written response to the complaint by an employer. Although this complaint program has been generally successful, budgetary limitations, an agency field staff request for additional response time to properly handle employee complaints, and the Oct. 1 implementation of a new agency plan to 'target' inspections in the most hazardous industries have prompted me to revise again OSHA's complaint policy. This improved complaint policy will ensure that OSHA inspections will reach the most hazardous workplaces and provide the greatest amount of protection for employees," Auchter added. He said that OSHA's complaint policy had undergone review by and incorporated suggestions from both labor and management groups.

--Condensed from text

11/9/82 Films Withdrawn by OSHA Last Year Are Made Available Through AFL-CIO. Occup. Safety & Health Reporter 11: 695, January 28, 1982.

To insure that two controversial Occupational Safety and Health Administration films on job safety and health are actually "released" to the public, the AFL-CIO Industrial Union Department announced that the films are being offered to public television stations as a two-part series. Last March, Assistant Labor Secretary Thorne G. Auchter suspended distribution of the two films, "Worker to Worker" and "Can't Take No More," along with other OSHA public-information material, on the ground that they no longer represented agency policy. Auchter said that he believed that "proper government public information products should be as neutral in content, tone, and approach as is consistent with the subject matter." While the films were withdrawn by OSHA regional offices, they continued to be available through various film producers. An OSHA spokesman told BNA Jan. 26 that the agency last fall did once again make the films available to the public from its national office in Washington, but that they still cannot be obtained from the agency's regional offices. The Public Interest Video Network (PIVN) now is offering the films to public

relationship could be discerned between the fall in workers' ventilatory capacity and the concentration of airborne dust or microbes to which they were exposed. Bronchodilators could reverse the fall in FEV<sub>1</sub>.

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185/82 Immunological Responses to Inhaled Organic Dusts and Chemicals. G.W. Cambridge. *Ann. Occup. Hyg.* 24: (4), 363-366, 1981. 51 refs.

Evidence for immunological and other mechanisms involved in the asthmatic response to inhaled organic dusts or chemicals is reviewed with particular reference to the seven classes of agents listed by the Industrial Injuries Advisory Council (U.K.) as giving rise to occupational asthma.

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186/82 The Etiology of Byssinosis - Comparison of Prostaglandin F<sub>2α</sub> Synthesis by Alveolar Macrophages Stimulated with Extracts from Glanded and Glandless Cotton Cultivars. R.L. Ziprin, et al. *Am. Ind. Hyg. Assoc. J.* 42: 876-879, December 1981. 10 refs.

Alveolar macrophages produce prostaglandin F<sub>2α</sub> when exposed to extracts of cotton bract. Bract extracts from glandless cotton cultivars are not as effective stimulators of prostaglandin production as bract extracts from glanded cotton cultivars. This result is consonant with a previously published observation that bract extracts from some glandless cultivars do not cause high levels of histamine release from whole blood.

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187/82 Effects of Aqueous Extracts of Cotton Bract on Isolated Mast Cells: A Bioassay for Byssinosis. M.H. Elissalde, et al. *Am. Ind. Hyg. Assoc. J.* 42: 893-896, December 1981. 34 refs.

Mast cell degranulation, with its release of histamine and other bioreactive compounds, has been strongly implicated in the acute symptoms noted in mill workers following inspiration of cotton or flax textile dusts. This paper describes a method for the isolation and stimulation of these cells and methods for the quantitation of their degranulation.

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188/82 A Study of Heart and Blood of Rodents Inhaling Diesel Engine Exhaust Particulates.

D.G. Penney, et al. *Environ. Res.* 26: 453-462, December 1981. 16 refs.

The *in vivo* effects of inhalation of diesel engine exhaust (DEE) were evaluated in 128 rats and 146 guinea pigs. They were exposed in special chambers to three different dose levels of DEE particulates; 250, 750, and 1500 µg/m<sup>3</sup>, for 20 hr/day and 5.5 days/week. Rats were sacrificed after 13, 16.7, 25.7, 42, 52, and 78 weeks exposure, while guinea pigs were sacrificed after 6, 13, 17, 26, 42, 52, and 78 weeks exposure. Each group of each species was compared to its own age-matched control group. Morphometric analysis of the heart revealed no significant alterations in mass which could be assigned to inhalation of DEE at any dosage level or duration of exposure in either species. This included an assessment of the relative wet weights of the right ventricle, left ventricle, combined ventricles, combined atria, and ratio of right to left ventricle weights. Likewise, hematology was not changed in either species at any dosage level or duration of exposure by inhalation of DEE.

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189/82 Diesel Fume - A Note from the BCHS Hygiene Standards Committee. British Occupational Hygiene Society, Sub-committee on Diesel Fume. *Ann. Occup. Hyg.* 24: (3) 263-265, 1981. 2 refs.

The Sub-Committee of the British Occupational Hygiene Society has tried to formulate standards for 'acceptable' pollution of working environments by the exhaust products of diesel-powered vehicles. They had in mind the need to distinguish between the nuisance created and the possibility that the exhausts may constitute long-term hazards. At the outset it recognized that the terms of reference it accepted posed problems which were difficult, if not insoluble, since diesel 'fumes' are not only complex chemically and physically, but their nature varies widely according to the mode of operation of the engine.

--Condensed from text

190/82 Mesothelioma in a Factory Using Amosite and Chrysotile Asbestos. E.D. Acheson, et al. *Lancet* 2: 1403-1405, December 19/26, 1981. 19 refs.

Five deaths have been certified as due to mesothelioma (4 pleural and 1 peritoneal) in men who worked at a London factory where insulation board has been manufactured since 1946 from a mixture of amosite and chrysotile asbestos. It seems reasonable to relate 4 of these cases to work at the factory. Amosite has been the fibre predominantly in use and seems likely to be the cause of the tumours.

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191/82 Exercise Performance and Functional Impairment in Asbestos-exposed Workers.  
J. Pearle. Chest 80: 701-705, December 1981. 13 refs.

Eighty-eight shipyard workers with extensive asbestos exposure were evaluated in terms of dyspnea, smoking history, x-ray film abnormalities, static pulmonary function, and exercise performance. Pulmonary function abnormalities and roentgenographic pleuropulmonary disease were more frequent in smokers. Significant dyspnea was present in 41 percent of the workers and did not correlate with smoking history, pulmonary function, or exercise performance. Despite this high frequency of dyspnea, 70 percent of all workers had normal exercise tolerance by history or exercise testing. Of the 26 workers with exercise impairment, only nine had pulmonary mechanical or gas exchange limitation. Two of these workers had asbestosis, while the other seven had airways obstruction without asbestosis. The prevalence of both asbestosis and asbestos-related exercise impairment in this population was 2.3 percent.

--Author's abstract reprinted  
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192/82 Early Lung Events Following Low-Dose Asbestos Exposure. R. Begin, et al.  
Environ. Res. 26: 392-401, December 1981.  
36 refs.

A conscious sheep model recently developed to study sequentially the bronchoalveolar milieu was applied to the investigation of the early lung events following very low dose asbestos exposure. UICC Canadian chrysotile fibers were administered in three monthly intratracheal injections of a suspension of 0 (controls), 1, 2, 4, 8, and 16 mg of asbestos in 50 ml saline. Three sheep per dose were repeatedly exposed to the same monthly doses and all were studied by serial pulmonary function (PF) tests, transbronchial lung biopsies (LB), and bronchoalveolar lavages (BAL). These low-dose exposures did not change the PF tests; routine lung histopathology was not altered except for the observation of occasional fibers in the alveoli, but there was a significantly higher yield in the total BAL cellular due to a marked increase in the macrophage and a small rise in the lymphocyte populations. These changes in the BAL cells occurred without significant changes in the biochemical analyses of the BAL supernatant. These data establish that very low dose asbestos exposure induces migration of macrophages and lymphocytes into the bronchoalveolar milieu. These cells have a major role in the lung defense and have been implicated in the development of asbestos-related diseases.

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193/82 Biological Effects of Ingested Amosite Asbestos, Taconite Tailings, Diatomaceous Earth and Lake Superior Water in Rats. A. C. Hilding, et al. Arch. Environ. Health 36: 298-303, November/December 1981. 50 refs.

Because amphibole fibers were found in Lake Superior and in Duluth municipal water, this study was initiated to evaluate the carcinogenicity of ingested asbestos. Groups of 22-30 Sprague-Dawley rats were fed asbestos and related materials during their lifetime and were examined at autopsy after spontaneous death. Test materials were unfiltered Duluth city tap water, municipal water reservoir sediment suspension, taconite plant tailings, amosite asbestos (a "low-dose" group at 20 mg/rat/day and a high-dose group at 300 mg/rat/day) and diatomaceous earth; a control group drank fiber-free well water or filtered city tap water. Autopsy studies revealed no significant increase in the incidence of malignant tumors in any experimental group compared with that in the control group.

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194/82 Occupational Exposure to Asbestos Fibers Resulting from Use of Asbestos Gloves.  
B.S. Samimi and A.M. Williams. Am. Ind. Hyg. Assoc. J. 42: 870-875, December 1981. 12 refs.

To assess the magnitude of fiber emission from asbestos gloves, 10 pairs were compared in an isolation chamber during simulation of a sterilization procedure; 176 air samples were collected. Means of time weighted average (TWA) concentrations ranged from 0.95 to 11.74 fibers ( $>5 \mu\text{m}$ )/ $\text{cm}^3$  of air. Well-worn/clean gloves emitted significantly more fibers than did brand new gloves, but fiber emission decreased with increased surface soiling. Eighty air samples were collected during simulation of the sterilization procedure in a well-ventilated room. The range of mean TWA concentrations was 0.07-0.99 fiber/ $\text{cm}^3$  for breathing zone samples and 0.06-0.60 fiber/ $\text{cm}^3$  for area samples. Thirteen samples were collected at actual workplaces; the range of TWA concentrations was 0.07-2.93 fibers/ $\text{cm}^3$  for breathing zone samples and 0.04-0.74 fiber/ $\text{cm}^3$  for area samples. Five of seven breathing zone samples from workplaces exceeded the proposed TWA concentration limit of 0.1 asbestos fiber/ $\text{cm}^3$ . Hand contamination also was assessed. Four samples collected after touching the worktable ranged from 9953 to 13,108 fibers ( $>5 \mu\text{m}$ )/ $\text{cm}^2$  of hand surface area; seven samples collected immediately after taking off gloves ranged from 741 to 3860 fibers/ $\text{cm}^2$ . Available substitutes for asbestos gloves are discussed, and adoption of these substitutes is recommended strongly.

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ANALYTICAL METHODS, MISCELLANEOUS

- 223/82 Cotton Bacterial Endotoxin Assessed by Electron Microscopy. I. Helander and K. Lounatmaa. *Brit. J. Ind. Med.* 38: 394-396, November 1981. 13 refs.

A piece of bale cotton was incubated in nutrient broth. Electron microscopic inspection of the cotton and the broth showed Gram-negative bacteria with long flagella, loosely attached to the cotton fibres. Large amounts of endotoxin liberating from these bacteria were visible in the growth medium.

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- 224/82 In Situ Identification of Asbestos Fibres Collected on Membrane Filters for Counting. N.P. Vaughan, et al. *Ann. Occup. Hyg.* 24: (3) 281-290, 1981. 11 refs.

Methods are described whereby asbestos fibres can be counted by the standard phase contrast technique and identified on the same membrane filter by optical or scanning electron microscopy (SEM) techniques. The airborne concentrations of different asbestos types in mixed clouds can therefore be estimated. Specific details are given for three commercial types of membrane filter. The lower fibre diameter limits for identification by polarised light microscopy of amosite, chrysotile and crocidolite respectively are 0.8, 1.5 and 1.25  $\mu\text{m}$ . The pleochroism test, applicable only to crocidolite, is sensitive down to fibre diameters of 0.6  $\mu\text{m}$ .

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- 225/82 Clearing and Mounting Techniques for the Evaluation of Asbestos Fibres by the Membrane Filter Method. J.M.M. Le Guen, and S. Galvin. *Ann. Occup. Hyg.* 24: (3) 273-280, 1981. 11 refs.

This paper describes three clearing and mounting techniques used in the evaluation of fibres by the membrane filter method and puts forward new methods for clearing membrane filters made of mixed esters of cellulose. The paper also sets out criteria for assessing the relative merits of clearing and mounting techniques and shows that, judged by these criteria, one of the new methods offers considerable advantages over the other methods described.

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- 226/82 Reference Material for the Quantitation of  $\alpha$ -Quartz in Respirable Dust by X-ray Diffraction. S. Altree-Williams, et al. *Ann. Occup. Hyg.* 24: (4) 347-356, 1981. 22 refs.

Two specifications are given for an  $\alpha$ -quartz reference material suitable for use by the international occupational hygiene community in

the quantitation of  $\alpha$ -quartz in respirable dust by the X-ray diffraction method. The specifications are based on results obtained in a detailed investigation of the properties of respirable-size  $\alpha$ -quartz samples from 12 different geological and commercial sources. The properties investigated were amorphous surface content, crystallinity index, preferred orientation, and particle size distribution.

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- 227/82 Determination of Thio Compounds in Urine of Workers Exposed to Carbon Disulfide. R. van Doorn, et al. *Arch. Environ. Health* 36: 289-297, November/December 1981. 32 refs.

Metabolites of carbon disulfide excreted into the urine of viscose workers are detectable by application of a nonselective assay for the determination of thio compounds. Enhanced secretion of thio compounds occurred especially at the end of the workday in exposed workers. A classification of urine samples according to the degree of exposure gave evidence for a relation between exposure to carbon disulfide and excretion of thio compounds in urine. The presence of 2-thiothiazolidine-4-carboxylic acid in urine of viscose workers was indicated by TLC, UV-spectrometry, and HPLC.

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- 228/82 Determination of Total Arsenic in Biological Samples by Arsine Generation and Atomic Absorption Spectrometry. E.O. Uthus, et al. *Anal. Chem.* 53: 2221-2224, December 1981. 9 refs.

Arsine generated from dry combusted biological samples was measured by using an atomic absorption spectrophotometer equipped with a graphite furnace. Innovations of the method included the introduction of arsine into the interior of the graphite tube via one internal purge gas port only, the use of three traps to remove water from the generated arsine, and the use of Erlenmeyer flasks in the generation of arsine. EDTA was added to the sample mixture to prevent interference from copper, iron, and nickel cations. With the described procedure, the arsenic found in various NBS standards was as follows (in  $\mu\text{g/g}$  dry material): bovine liver, 0.056; pine needles, 0.215; orchard leaves, 10.51; oyster tissue, 13.17. Sensitivity and absolute detection limits (IUPAC) of the method were 0.11 ng and 0.14 ng, respectively.

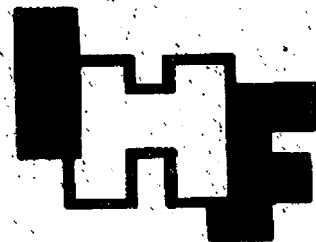
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April 1982  
Volume 46, No. 4

# INDUSTRIAL HYGIENE DIGEST

LITERATURE  
ABSTRACTS

•  
ENVIRONMENTAL  
AND  
OCCUPATIONAL  
HEALTH AND  
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.  
5231 CENTRE AVENUE • PITTSBURGH, PA. 15232

# INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.  
 Abstractor: Jean L. Collins, B.A.  
 Production: Joy H. Henning, Ola B. Owens

April 1982  
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## TABLE OF CONTENTS

This Issue Contains Abstracts 358/82x---464/82

|                                                      |    |
|------------------------------------------------------|----|
| News Items . . . . .                                 | 1  |
| Coming Events . . . . .                              | 4  |
| Legal Developments . . . . .                         | 4  |
| Books and Pamphlets . . . . .                        | 6  |
| Industrial Medicine . . . . .                        | 7  |
| Skin Diseases and Burns . . . . .                    | 10 |
| Chemical Hazards . . . . .                           | 11 |
| Industrial Dusts and Inhalants . . . . .             | 19 |
| Physical Hazards . . . . .                           | 22 |
| Radiation . . . . .                                  | 23 |
| Environmental Problems . . . . .                     | 23 |
| Industrial Hygiene, Preventive Engineering . . . . . | 24 |
| Occupational Health Management . . . . .             | 24 |
| Safety, Accident Prevention . . . . .                | 25 |
| Analytical Methods, Miscellaneous . . . . .          | 25 |
| Index . . . . .                                      | 27 |
| Addresses of Journals Abstracted . . . . .           | 29 |

## FEATURES

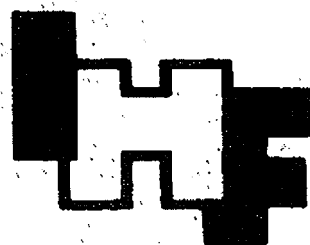
|                                                                                                                                   |                    |
|-----------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Epidemiologic Study of Refinery and Chemical Plant Workers.                                                                       | Abst. - No. 383/82 |
| A Hematology Survey of Workers at a Styrene-Butadiene Synthetic Rubber Manufacturing Plant.                                       | Abst. No. - 387/82 |
| Origins of the Standards for Control of Beryllium Disease (1947-1949).                                                            | Abst. No. - 397/82 |
| Cancer Mortality in a Pigment Plant Utilizing Lead and Zinc Chromates.                                                            | Abst. No. - 399/82 |
| Polychlorinated Biphenyl Exposure in Transformer Maintenance Operations.                                                          | Abst. No. - 427/82 |
| Smoking and Duration of Asbestos Exposure in the Production of Functional and Roentgenographic Abnormalities in Shipyard Workers. | Abst. No. - 438/82 |
| Mortality Patterns of Rock and Slag Mineral Wool Production Workers: An Epidemiological and Environmental Study.                  | Abst. No. - 441/82 |
| Permeation of Protective Garment Material by Liquid Benzene and by Tritiated Water.                                               | Abst. No. - 463/82 |

March 1982  
Volume 46, No. 3

# INDUSTRIAL HYGIENE DIGEST

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## TABLE OF CONTENTS

This Issue Contains Abstracts 231/82x-357/82

|                                                      |    |
|------------------------------------------------------|----|
| News Items . . . . .                                 | 1  |
| Coming Events . . . . .                              | 4  |
| Legal Developments . . . . .                         | 5  |
| Books and Pamphlets . . . . .                        | 7  |
| Industrial Medicine . . . . .                        | 8  |
| Skin Diseases and Burns . . . . .                    | 11 |
| Chemical Hazards . . . . .                           | 11 |
| Industrial Dusts and Inhalants . . . . .             | 19 |
| Physical Hazards . . . . .                           | 22 |
| Radiation . . . . .                                  | 23 |
| Environmental Problems . . . . .                     | 24 |
| Industrial Hygiene, Preventive Engineering . . . . . | 25 |
| Occupational Health Management . . . . .             | 26 |
| Safety, Accident Prevention . . . . .                | 26 |
| Analytical Methods, Miscellaneous . . . . .          | 27 |
| Index . . . . .                                      | 30 |
| Addresses of Journals Abstracted . . . . .           | 33 |

## FEATURES

|                                                                                                                                   |                 |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Mortality Patterns Among Workers in Three Texas Oil Refineries.                                                                   | Abst. -- 252/82 |
| Chromium in Welding Fumes.                                                                                                        | Abst. -- 268/82 |
| Subclinical Effects of Chronic Increased Lead Absorption --A<br>Prospective Study. Part IV. Evaluation of Heme Synthesis Effects. | Abst. -- 271/82 |
| On the Interaction Between Occupational Arsenic Exposure and Smoking<br>and Its Relationship to Lung Cancer.                      | Abst. -- 280/82 |
| Exposure to Isophorone and Other Organic Solvents in a Screen Printing<br>Plant.                                                  | Abst. -- 290/82 |
| Quantitated Effects of Carbon Disulfide Exposure, Elevated Blood Pressure<br>and Aging on Coronary Mortality.                     | Abst. -- 292/82 |
| Increased Risk of Lung Cancer in Pesticide-Exposed Male Agricultural<br>Workers.                                                  | Abst. -- 299/82 |
| Pulmonary Reaction to Durum Wheat, a Constituent of Grain Dust.                                                                   | Abst. -- 317/82 |

311/82 Effects of 28 Days Exposure to Diesel Engine Emissions in Rats. W.E. Pepelko. *Environ. Res.* 27: 16-23, February 1982. 16 refs.

Groups of 15 rats each were exposed 20 hr/day, 7 days/week for 28 days to a 1:14 dilution of either raw or irradiated exhaust using a six-cylinder Nissan diesel engine. Body weight gains were significantly ( $P < 0.05$ ) reduced during exposure to diesel exhaust with a greater decrease during exposure to irradiated compared with raw exhaust. Arterial blood gases and standard bicarbonate remained unchanged. Arterial blood pH was slightly but significantly ( $P < 0.05$ ) decreased in the animals previously exposed to irradiated exhaust. Residual volume (RV) and wet lung weight were unchanged after exposure to either condition, while vital capacity (VC) and total lung capacity (TLC) were increased ( $P < 0.05$ ) following exposure to raw exhaust. The shape of the deflation PV curves were nearly identical among the three groups. It was concluded that 28 days exposure to a 1:14 dilution of diesel exhaust emissions resulted in only minor functional changes in the lungs.

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312/82 Comparative Damage to Alveolar Macrophages After Phagocytosis of Respirable Particles. J.O. Hill, et al. *Environ. Res.* 27: 95-109, February 1982. 22 refs.

Backscatter electron and secondary electron imaging were used in a scanning electron microscope study of the *in vitro* toxic effects of particles ingested by alveolar macrophages. Relatively nontoxic aluminosilicate fly ash particles from the Mount St. Helens' eruption and from a coal-fired power plant as well as toxic quartz particles from the Westphalia (Germany) mine deposits were readily taken up by macrophages. The presence of fly ash particles inside the cells was not associated with any changes in surface morphology. The presence of intracellular quartz particles, on the other hand, was correlated with damage to the cell membrane as determined by alterations in surface morphology, uptake of trypan blue, and release of the cytoplasmic enzyme, lactate dehydrogenase. The use of backscatter electron imaging is useful in scanning electron microscope studies which attempt to establish cause and effect relationships between exposure to respirable particles and the morphological and cytotoxic response.

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313/82 Comparative Effects of Fibrous and Nonfibrous Minerals on Cells and Liposomes. C.D. Woodworth, et al. *Environ. Res.* 27: 190-205, February 1982. 36 refs.

The comparative effects of chrysotile asbestos, silica, talc, kaolinite, and montmorillonite on cellular and artificial membranes were examined using three test systems -- monolayer cultures of

tracheal epithelial cells, suspensions of sheep erythrocytes (RBC), and preparations of phospholipid -- cholesterol vesicles. The four minerals caused perturbations in each system, although to varying degrees. Membrane alterations induced by chrysotile asbestos and the clay mineral montmorillonite were more striking than those caused by other dusts. The results obtained with the three test systems were consistent. Electron microscopic observations indicated that the particles were phagocytized by cultured epithelial cells of hamster tracheal origin and developed intimate associations with the RBC plasma membrane. These interactions are discussed with regard to possible mechanisms of cellular injury and their relevance to pulmonary disease.

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314/82 Malignant Alpha Chain Disease and Exposure to Asbestos. D. Rouhier, et al. *Environ. Res.* 27: 222-225, February 1982. 10 refs.

One patient with malignant alpha chain disease is reported. She was born in France to Spanish parents and had lived all her life in France. She had worked for 30 years in the same factory as her brother, who developed a pleural mesothelioma due to asbestos. Asbestos exposure can induce abnormalities of the immune response. Thus it is likely that her disease was related to chronic exposure to asbestos.

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315/82 A Rare Form of Biological Response to the Exposure to Asbestos Dust (Multiple Lung Asbestomas). J. Mesic, et al. *Arhiv. Hig. Rada Toksikol.* 32: (3) 279-285, 1981. 11 refs. (Yugoslav)

A case of an unusual biological response to the exposure to asbestos dust in the form of large, multiple, round, homogenous and well-defined opacities in a 35-year old asbestos-cement worker without evidence of rheumatoid arthritis is described. A histological examination revealed hyalinized connective tissue with numerous tiny calcifications and connective tissue with lymphocyte infiltrates. The authors compare the reaction with the features of Caplan's syndrome.

--Summary in English

316/82 Ozone Inhibition of Tissue Cholinesterase in Guinea Pigs. T. Gordon, et al. *Arch. Environ. Health* 36: 284-288, November/December 1981. 23 refs.

This study sought to determine if ozone at levels known to induce bronchial hyperactivity in guinea pigs would inhibit tissue cholinesterase activity. Male, Hartley guinea pigs were exposed to filtered air,

position during the design phase, based on the amount of resistance that must be added to a given branch. Application of this technique indicates it to be both accurate and reliable and significantly reduces the time required to balance a system.

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#### OCCUPATIONAL HEALTH MANAGEMENT

337/82 Insurance and Confidentiality. AOMA Committee on Occupational Medical Practice. J. Occup. Med. 24: 89, February 1982.

Question: Could the Committee provide guidelines regarding the confidentiality of employee diagnoses on insurance forms? Committee Reply: The members of the Occupational Medical Practice Committee believe that the key issue to be observed in handling, processing and disseminating this type of information is informed employee consent. This should be obtained in writing. In summary, upon written request by the employee, information may be provided via discussion or via copies to appropriate individuals who have a need to know while processing confidential insurance information.

--Condensed from text

338/82 Reporting Asbestosis to OSHA. AOMA Committee on Occupational Medical Practice. J. Occup. Med. 24: 88-89, February 1982.

Question: When should a case of asbestosis be reported on the OSHA (Occupational Safety and Health Administration) Log 200 as an occupational illness? Committee Reply: A uniform practice does not exist; however, the consensus would indicate that employees must show evidence of illness together with definite evidence of parenchymal fibrosis or a documented positive microscopic diagnosis of asbestos bodies in tissue or sputum in order to be considered ill and reportable as having asbestosis.

--Condensed from text

339/82 Legal Trends in Occupational Health. G.J. Provost. J. Occup. Med. 24: 115-119, February 1982. 13 refs.

The author reviews the effects of the Carter and Reagan Administrations on the operations of OSHA and NIOSH. He says that with the present pro-business conservative administration workers will turn increasingly to private litigation for relief in cases of work related injury. He states that, in most cases, workers' compensation benefits are far too meager. He describes third-party litigation citing a few illustrative cases.

--JFB

340/82 Reciprocal Effects of Health and Labor Force Participation Among Women: Evidence from Two Longitudinal Studies. I. Waldron, et al. J. Occup. Med. 24: 126-132, February 1982. 15 refs.

Longitudinal data were analyzed to provide information concerning the effects of health on women's labor force participation and the effects of labor force participation on women's health. The data were from a representative national sample of middle-aged women and a representative sample of women from Alameda County, California. Significant relationships were observed between self-reported health and subsequent changes in labor force participation. Women who reported poorer health were more likely to leave the labor force and less likely to join the labor force. In contrast, no significant relationships were observed between labor force participation and subsequent self-reported change in health. (These latter relationships could be tested only for married women in the national sample.) In conclusion, the authors' analyses provide substantial evidence that health affects women's labor force participation (the healthy worker effect). In contrast, they did not find evidence that, on the average, labor force participation has either harmful or beneficial effects on the general health of middle-aged married women in the United States.

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341/82x Twenty-first Annual Product Dataguide. Occupational Hazards. Occup. Hazards 44: 61-193, January 1982.

An alphabetical list with addresses of firms which manufacture equipment or offer services for industrial safety and health, fire protection, and security. The products and services are given under various subject headings.

--JFB

#### SAFETY, ACCIDENT PREVENTION

342/82 Protecting Workers Who Clean Up Hazardous Waste Sites. R.J. Costello and M.V. King. Am. Ind. Hyg. Assn. J. 43: 12-17, January 1982. 15 refs.

On April 21, 1980, an explosion and fire among the 40,000 drums of unlabeled chemical wastes at the former site of Chemical Control Corporation in Elizabeth, New Jersey, attracted national attention and raised serious concern about the health and safety of workers who would be called upon to clean up the disaster site. Evaluation of workers' exposure during clean up operations and an assessment of the level of respiratory protection needed were necessary. NIOSH conducted 8 days of air monitoring. The chemicals of concern were

organic vapors, metals, pesticides, polychlorinated biphenyls, cyanide compounds, and dioxins (TCDD). No excessive exposure to chemical substances by inhalation was found. However, continuous use of respiratory protective equipment and other personal protective devices was necessary because of frequent drum ruptures.

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343/82 Penetration of > 5- $\mu$ m Chrysotile Fibers Through DuPont Tyvek 1422A and Kimberly-Clark CPF Fabrics. R.W. Weeks, Jr. and M.J. McLeod. Am. Ind. Hyg. Assn. J. 43: 84-88, February 1982. 22 refs.

Aerosols of 4.1- $\mu$ m mass median aerodynamic diameter chrysotile fibers were generated and passed through stitched (seamed) and unstitched (unseamed) DuPont Tyvek 1422A and Kimberly-Clark composite polypropylene fabric (CPF) spunbonded fabrics. The two unstitched fabrics and the two stitched fabrics were penetrated by amounts of chrysotile, which did not allow a statistically significant difference in penetration to be observed. Both Tyvek and the CPF allowed approximately a 1% penetration through the unstitched material and approximately a 30% penetration through the stitched material. These values refer to the suit materials per se and not to the entire garment. As such, they should not be considered as representative of the entire suit as worn by personnel.

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344/82 Involvement--Key to a Safety Training Program. L.C. Smith. Natl. Safety News 125: 48-51, January 1982. 4 refs.

Making safety meaningful and relevant to employees can be accomplished by using proven techniques of behavioral psychology. These are described as applied to safety management.

--Author's abstract

345/82 Plant Fire Protection Utilizes Manpower, Equipment. R.A. Harris. Natl. Safety News 125: 52-54, January 1982.

The burden of how to protect employees and company assets best from fire danger still rests with the employer. A detailed examination of one employer's emergency fire plan, plus an overview of recent federal regulations dealing with fire protection for industry are presented.

--Condensed from text

346/82 Working Safely in Confined Spaces... Evaluating the Hazards. G.L. Morse and R.L. Swift. Plant Eng. 36: 139-142, January 21, 1982.

In this first of two articles, the dangers of confined spaces are reviewed and the testing procedures a worker should follow before entering

a space are outlined. A subsequent article will discuss procedures to follow while working within the confined space.

--Condensed from text

#### ANALYTICAL METHODS, MISCELLANEOUS

347/82 Characterization of Polycyclic Ketones and Quinones in Diesel Emission Particulates by Gas Chromatography/Mass Spectrometry. D.R. Choudhury. Environ. Sci. Technol. 16: 102-106, February 1982. 18 refs.

The chemical composition of two neutral, mutagenic subfractions of a diesel particulate extract sample was examined by capillary gas chromatography/mass spectrometry. Most compounds identified were polar derivatives of three- to five-ring polynuclear aromatic hydrocarbons. Ketone, quinone, carboxaldehyde, and hydroxy derivatives and their alkyl homologues were characterized. 9-Fluorenone and its C<sub>1</sub>-C<sub>4</sub> alkyl homologues were the single largest family of compounds detected. Some of the compounds characterized are bacterial mutagens; the mutagenicity of others is not known at this time.

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348/82 Anodic Stripping Voltammetry as an Analytical Tool. J. Wang. Environ. Sci. Technol. 16: 104A-109A, February 1982. 56 refs.

Heavy metals are one class of contaminants that can produce undesirable effects even if they are present in extremely minute quantities. For instance, unlike many other pollutants, they are not biodegradable, and may persist for long time periods. Therefore, techniques are being devised to measure them at very low concentration levels. Anodic stripping voltammetry (ASV) is a sensitive, precise, and economical electroanalytical technique for detecting trace metals. Consequently, ASV has become one of the popular approaches to environmental analysis.

--Condensed from text

349/82 Chemosorption Sampling and Analysis of Formaldehyde in Air. K. Andersson, et al. Scand. J. Work Environ. Health 7: 282-289, December 1981. 32 refs.

A method based on trapping formaldehyde on a 2,4-dinitrophenylhydrazine-coated porous polymer (Amberlite XAD-2) was evaluated for air sampling in occupational environments. The aldehyde is converted to its 2,4-dinitrophenylhydrazone on the adsorbent. The influence of some organic compounds which often occur together with formaldehyde - furfural, phenol and furfuryl alcohol - was studied. The results show that the method allows the

urines containing 1-20 ppb of DCB had a relative standard deviation of 4.6%. The mean extraction recovery over this concentration range was 68%. Spectrophotometric scanning of the solution containing the color reaction product from urine concentrations as low as 1-2 ppb yielded spectra with distinguishable characteristic maxima. Such spectra potentially minimize the false-positive detection of DCB.

--Authors' abstract reprinted  
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354/82 Improvement in the Atomic Absorption Determination of Lead in Blood. I. Karai, et al. J. Appl. Toxicol. 1: 295-296, December 1981. 4 refs.

A simple, precise and accurate analysis for lead in blood and tissue was developed using spectrophotometry after extraction with HCl, H<sub>3</sub>PO<sub>4</sub>, KI and methyl isobutyl ketone. The results were similar to those obtained by anodic stripping voltammetry. The method is simple, requires only four reagents, does not need pH adjustment for lead extraction, saves time and is suitable for analyzing a large number of specimens.

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355/82 Determination of Vinyl Acetate in Air by Gas Chromatography. K.S. Sidhu. J. Appl. Toxicol. 1: 300-302, December 1981. 17 refs.

A gas chromatographic analysis for vinyl acetate is presented. Vinyl acetate was sampled by adsorbing on activated carbon. It was desorbed with carbon disulfide with a mean efficiency of 83.0%. The analytical column was packed with 10% free fatty acid phase on acid-washed Chromosorb-P. Gas chromatographic identification was also conducted on another column packed with 0.4% Carbowax-1500 on Carbopack A. Analysis was performed on a chromatograph equipped with a flame ionization detector. The precision (coefficient of variation) for the analytical procedure using a free fatty acid phase column was 4.0%. Based on a 10 litre air sample, the calculated limit of detection by this procedure was 0.1 parts per million.

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356/82 A Technique to Prepare Asbestos Air Samples for Light and Electron Microscopy. T.W.S. Pang and A.E. Robinson. Brit. J. Ind. Med. 38: 389-396, November 1981. 13 refs.

The direct transfer technique used in preparing waterborne asbestos for analysis by transmission electron microscopy is also suitable for preparing airborne asbestos collected on polycarbonate filters for light microscopy, scanning, and transmission electron microscopy. The same area and even the same fibre may be examined by the three microscopic methods and individual fibres identified by optical and electron-optical techniques and by x-ray microanalysis.

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357/82 Wet Ashing of Organic Matter for the Determination of Antimony. S. Bajo and U. Suter. Anal. Chem. 54: 49-51, January 1982. 27 refs.

The wet ashing of organic matter for Sb determination was investigated by using a radioactive tracer technique. Wet ashing with HNO<sub>3</sub> + HClO<sub>4</sub> mixtures leads to the formation of insoluble Sb compounds. All the Sb remains in solution when an HNO<sub>3</sub> + HClO<sub>4</sub> + H<sub>2</sub>SO<sub>4</sub> mixture is used. The influence of the ashing vessel (glass and Teflon) and the oxidation state of Sb were also studied.

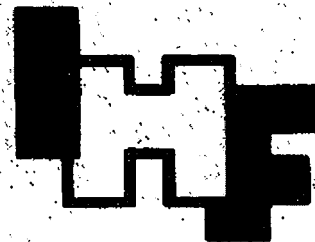
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431/82 Nonrespiratory Metabolic Function and Morphology of Lung Following Exposure to Polybrominated Biphenyls in Rats. K.M. McCormack, et al. *J. Toxicol. Environ. Health* 9: 27-39, January 1982. 47 refs.

Exposure to polybrominated biphenyls (PBBs) resulted in increased activity of microsomal arylhydrocarbon hydroxylase and ethoxyresorufin-O-deethylase in rat lung. Clearance of 5-hydroxytryptamine (5-HT) and angiotensin I by perfused lungs was decreased by PBBs. However, PBBs had no effect on the activity of epoxide hydrolase, monoamine oxidase, or angiotensin-converting enzyme in lung. The only histopathologic change detected in lungs from PBB-treated rats was an increase in alveolar type II cell lamellar bodies. Selective accumulation of certain PBB congeners by lung was not observed in this investigation.

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432/82 Changes in Serum Hexachlorocyclohexane Residues in Malaria Spraymen After Short-Term Occupational Exposure. S.K. Gupta, et al. *Arch. Environ. Health* 37: 41-44, January/February 1982. 15 refs.

The use of organochlorine insecticides for public health programs is indisputably necessary in developing countries. Thus, there is a need to evaluate human response to these chemicals under local field conditions. The effects of a short-term, 16-wk exposure to hexachlorocyclohexane has been evaluated and compared in malaria spraymen with and without any previous occupational exposure to this insecticide by measuring the pre- and post-exposure serum hexachlorocyclohexane concentration. A significant increase in original serum hexachlorocyclohexane concentration was observed in subjects on their first occupational exposure (5X), compared to those with previous exposure (3X). All workers reached approximately the same serum levels within 16 wk, regardless of their history of previous exposure.

--Authors' abstract

433/83 Acute and Subacute Symptoms Among Workers in the Printing Industry. J. Baelum, et al. *Brit. J. Ind. Med.* 39: 70-75, February 1982. 10 refs.

The study population comprised 52 male printers and 52 controls. Each person was interviewed about job history, general health, and work-related symptoms. Symptoms from eyes and airways, neurological symptoms, and general symptoms were recorded. A lung function test and a measurement of the sense of smell were also carried out. The printers had significantly more eye, airway, and neurological symptoms than the controls; the main complaints being irritation of eyes, nose, throat, and a reduced sense of taste. The neurological symptoms were disorders of vision, vertigo, feeling of intoxication, and headache. Furthermore, abdominal pain and flatulence occurred more often among the printers. The symptoms showed no

relation to age or job seniority, but neurological and general symptoms were related to shift work. No difference in lung function was found between the two groups. The printers had a slightly lower threshold of smell than the controls. Although the total load due to organic solvents and dust in the air was far below legal limits, the number and magnitude of symptoms experienced by the printers exceeded what is supposed when norms for workroom exposure are set. It is suggested that either the irritative effects of solvents are underestimated or the assumption of additive effects when great numbers of solvents are found does not hold true. A reduction of the number of solvents by eliminating the most toxic solvents or by using dyes without solvents is suggested.

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#### INDUSTRIAL DUSTS AND INHALANTS

434/82 Prevalence and Incidence of Benign Asbestos Pleural Effusion in a Working Population. G.R. Epler, et al. *J. Am. Med. Assn.* 247: 617-622, February 5, 1982. 24 refs.

Benign asbestos effusion was defined by (1) exposure to asbestos, (2) confirmation by roentgenograms or thoracenteses, (3) no other disease related to pleural effusion, and (4) no malignant tumor within three years. There were 34 benign effusions among 1,135 exposed workers compared with no otherwise unexplained effusions among 717 control subjects. Prevalence was dose related with 7.0%, 3.7%, and 0.2% effusions with severe (III), indirect (II), and peripheral (I) exposure, respectively. The latency period was shorter than for other asbestos-related disorders. Benign effusion was the most common asbestos-related abnormality during the first 20 years after exposure. Incidence studies showed 9.2 effusions per 1,000 person-years for level III exposure, 3.9 for level II, and 0.7 for level I. Most effusions were small; 28.6% recurred, and 66% were asymptomatic. There was one mesothelioma six years after effusion. Asbestos exposure should be carefully searched for in patients with "idiopathic" pleural effusion.

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435/82 Development of Radiological and Clinical Evidence of Parenchymal Fibrosis in Men with Non-malignant Asbestos-related Pleural Lesions. G.H.C. McMillan and C.E. Rossiter. *Brit. J. Ind. Med.* 39: 54-59, February 1982. 16 refs.

After assessment of radiographs taken in 1966, 201 men employed at HM Dockyard, Devonport, were judged to have pleural abnormalities due to exposure to asbestos but to be free from small opacities (ILO U/C 1971 category 1/1 or more), mesothelioma, or bronchial carcinoma.

By 1976, 32 of these men had died. Of the survivors, 155 were re-examined to determine the attack rates of parenchymal fibrosis or malignant disease, or both. In 1976, 16 (10.3%) of the survivors had radiographs showing small opacities of category 1/1 or more. When additional clinical criteria had to be satisfied before a diagnosis of parenchymal fibrosis was made the attack rate in the survivors was 4.5%. These attack rates were substantially higher than those observed in a sample of men with no initial pleural abnormality but were unrelated to age, smoking habit, occupation, duration of exposure to asbestos, or type of pleural abnormality. The number of cases of malignant disease was too small to allow any reliable conclusions.

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436/82 Comparison of Independent Randomised Reading of Radiographs with Direct Progression Scoring for Assessing Change in Asbestos-Related Pulmonary and Pleural Lesions.

C.H.G. McMillan, et al. Brit. J. Ind. Med. 39: 60-61, February 1982. 3 refs.

Direct scoring of progression of pleural and parenchymal lesions was compared with change assessed by independent readings to the ILO classification among 155 men from HM Dockyard, Devonport, followed-up for 10 years. For pleural calcification the two methods agreed closely, whereas direct scoring yielded relatively too little progression of small opacities and too much progression of pleural thickening. The choice of method for assessing progression should depend on objectives.

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437/82 Concentrations and Characteristics of Amphibole Fibres in the Lungs of Workers Exposed to Crocidolite in the British Gas-mask Factories, and Elsewhere, During the Second World War. A. Morgan and A. Holmes. Brit. J. Ind. Med. 39: 62-69, February 1982. 16 refs.

Concentrations and length distributions of uncoated and coated amphibole fibres in the lungs of 27 workers at the Leyland, Nottingham, and Blackburn gas-mask factories were measured after death with the light microscope using the membrane filter technique. Measurements were also made on a worker exposed to crocidolite at the Chemical Defence Experimental Establishment, Porton, and on three miners from the Wittenoom mine in Western Australia where the crocidolite used in the manufacture of military respirators is reputed to have originated. In selected cases, fibre concentrations and dimensions were also measured with the electron microscope. All but two subjects died with a mesothelial tumour. Fibre concentrations ranged from  $7 \times 10^4$  to almost  $10^9$  fibres/g dry weight. There appeared to be no relation between latent period and fibre concentration. The significance of the

wide range of fibre concentrations which was associated with the development of mesothelial tumours is discussed and also the relation between the relative frequency and dimensions of uncoated and coated fibres.

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438/82 Smoking and Duration of Asbestos Exposure in the Production of Functional and Roentgenographic Abnormalities in Shipyard Workers. J.L. Pearle. J. Occup. Med. 24: 37-40, January 1982. 11 refs.

Functional and roentgenographic abnormalities in 131 asbestos-exposed shipyard workers were assessed in terms of duration of asbestos exposure and smoking history to determine the relative contributions of these factors. Both exposure and smoking contributed to the frequency of abnormalities in FEV<sub>1</sub> and FVC. In contrast, airways obstruction (FEV<sub>1</sub>/FVC < 70%) was unrelated to exposure but correlated closely with smoking. Abnormalities in DLCO were minimally associated with asbestos exposure, but were strongly related to smoking history, suggesting that diffusion impairment in these workers is more likely to be related to smoking and emphysema than to interstitial disease. Significant roentgenographic pleural abnormalities were associated with both duration of exposure and smoking. Interstitial disease did not correlate with exposure and was only mildly associated with smoking. Smoking contributes to many of the functional and roentgenographic abnormalities in asbestos-exposed workers.

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439/82 Mortality of Female Gas Mask Assemblers. B.K. Wignall and A.J. Fox. Brit. J. Ind. Med. 39: 34-38, February 1982. 6 refs.

A 30-year follow-up study of the mortality of 500 women employed in manufacturing gas masks during the second world war showed a pronounced excess of deaths from mesothelioma and lung cancer. Although these women were subject only to short periods of exposure, greater excesses were found for those exposed for between one and five years than for those exposed for under one year. Even in the latter group, however, five deaths from lung cancer and four deaths from mesothelioma were recorded compared with 1.5 deaths and 0.1 deaths expected ( $p = 0.02$ ). An excess of deaths from cancer of the ovary was also found, and this appeared to be related to exposure to asbestos.

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By 1976, 32 of these men had died. Of the survivors, 155 were re-examined to determine the attack rates of parenchymal fibrosis or malignant disease, or both. In 1976, 16 (10.3%) of the survivors had radiographs showing small opacities of category 1/1 or more. When additional clinical criteria had to be satisfied before a diagnosis of parenchymal fibrosis was made the attack rate in the survivors was 4.5%. These attack rates were substantially higher than those observed in a sample of men with no initial pleural abnormality but were unrelated to age, smoking habit, occupation, duration of exposure to asbestos, or type of pleural abnormality. The number of cases of malignant disease was too small to allow any reliable conclusions.

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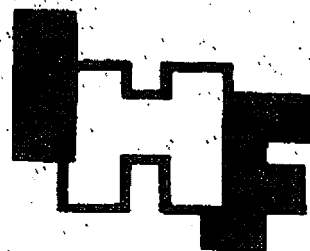
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May 1982  
Volume 46, No. 5

# INDUSTRIAL HYGIENE DIGEST

LITERATURE  
ABSTRACTS

ENVIRONMENTAL  
AND  
OCCUPATIONAL  
HEALTH AND  
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.  
5231 CENTRE AVENUE  
PITTSBURGH, PA 15232

# INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.  
Abstractor: Jean L. Collins, B.A.  
Production: Joy H. Henning, Ola B. Owens

May 1982  
Volume 46, No. 5

## TABLE OF CONTENTS

This Issue Contains Abstracts 465/82x---569/82

|                                                      |    |
|------------------------------------------------------|----|
| News Items . . . . .                                 | 1  |
| Coming Events . . . . .                              | 4  |
| Legal Developments . . . . .                         | 4  |
| Books and Pamphlets . . . . .                        | 6  |
| Industrial Medicine . . . . .                        | 9  |
| Skin Diseases and Burns . . . . .                    | 13 |
| Chemical Hazards . . . . .                           | 13 |
| Industrial Dusts and Inhalants . . . . .             | 17 |
| Radiation . . . . .                                  | 18 |
| Environmental Problems . . . . .                     | 18 |
| Industrial Hygiene, Preventive Engineering . . . . . | 20 |
| Safety, Accident Prevention . . . . .                | 22 |
| Analytical Methods, Miscellaneous . . . . .          | 23 |
| Index . . . . .                                      | 25 |
| Addresses of Journals Abstracted . . . . .           | 27 |

## FEATURES

|                                                                                                                                           |                    |
|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Genetic Risks and Environmental Surveillance: Epidemiological Aspects<br>of Monitoring Industrial Populations for Environmental Mutagens. | Abst. - No. 491/82 |
| Cancer Morbidity Among Woodworkers in the U.S. Automotive Industry.                                                                       | Abst. - No. 495/82 |
| Chronic Respiratory Disease Among Workers in a Pulp Mill.                                                                                 | Abst. - No. 496/82 |
| Preemployment, Routine Low-Back X-Ray Films.                                                                                              | Abst. - No. 504/82 |
| Disulfiram Treatment of Three Patients with Nickel Dermatitis.                                                                            | Abst. - No. 508/82 |
| Blood as a Matrix for Biological Monitoring.                                                                                              | Abst. - No. 514/82 |
| Lung Cancer Risk from Formaldehyde.                                                                                                       | Abst. - No. 521/82 |
| Pulmonary Fibrosis in an Aluminum Arc Welder.                                                                                             | Abst. - No. 534/82 |

529/82 Primary Standard for Perfluoroisobutylene Analysis at the Picogram Level. R.P. Menichelli. Am. Ind. Hyg. Assoc. J. 43: 286-289, April 1982. 8 refs.

Perfluoroisobutylene is a highly toxic compound which is evolved from the decomposition of the fluorocarbon used in the condensation reflow soldering process. Accurate analysis for this material has been hampered by the inability to secure reliable standards. This paper describes the use of a wafer permeation device as a primary standard. The percent error for the permeation rates was calculated from the linear regression analyses of the weight lost versus time data and was 1.1% for a 113 ng/min device and 2.3% for a 62 ng/min device. The relative standard deviation for generating and analyzing standards prepared from these permeation devices was found to range from 0.4% at the 40 parts per billion (ppb) level to 7.3% at the 1 ppb level.

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530/82 Benzidine Content in the Urine of Rats After Administration of Benzidine-Based Dyes. V.M. Zhdan and L.N. Pylev. Gig. Trud. Prof. Zabol. (1): 32-35, 1982. 7 refs. (Russian)

A total of 17 dyes manufactured in USSR and 10 Polish dyes without benzidine admixture were given to rats orally and intraperitoneally. Benzidine was determined in 72 h urine by thin layer chromatography and low temperature fluorescent spectral analysis. Benzidine was found in experiments with 19 dyes in amounts from 0.1 to 6.7%.

--Authors' abstract in English

531/82 Changes in the Cardiovascular System of Workers Engaged in the Manufacture of Toluene Diisocyanate. Z.V. Sharonova, et al. Gig. Trud. Prof. Zabol. (1): 16-19, 1982. 6 refs. (Russian)

Based on the examination of 240 workers engaged in two processes of isocyanate manufacture, the authors conclude that toluene diisocyanate (TDI) contributes to the development of cardiovascular pathology. In persons working in relatively adverse conditions cardiovascular disturbances, increased arterial pressure, and changes in the end portion of the ventricular ECG complex are revealed. The incidence of these shifts grows with the length of work in contact with TDI.

--Authors' abstract in English

# INDUSTRIAL DUSTS AND INHALANTS

537/82 Asbestos-Related Pulmonary Disorders in Japan. I. Ebihara. J. Science Lab. 58: 1-11, March 1982 (Pt. 2) 10 refs.

Asbestosis, and other evidence of asbestos exposure, is known to be frequently associated with abnormalities of the pleura. Pleural plaque may be the only detectable radiographical evidence of past asbestos exposure and those with such radiographical evidence belong to the high-risk group of malignant tumors of respiratory organs or malignant mesotheliomas. Compared with European and American countries, problems of asbestos-related health hazards in Japan have not yet been clarified. The investigation of the occurrence and extent of asbestos-related pulmonary disorders in Japan was recently undertaken by means of examining many chest radiographs taken for the purpose of health checks of old persons in Japanese main metropolitan areas. Before the investigation, a diagnostic standard for pleural plaque on the postero-anterior chest radiograph was set up. The present paper describes the diagnostic standard and the findings of this study.

--Author's abstract reprinted

533/82 Acute Exposure to Cotton Dust...A Case of Mill Fever. D.L. Holmes, et al. J. Am. Med. Assn. 247: 1602-1603, March 19, 1982. 7 refs.

This report documents the effects of an acute exposure to cotton dust. The authors believe it is important to document these effects especially in that they occurred in a perfectly healthy, nonsmoking subject whose exposures were on an intermittent basis. They do not know whether such a subject would have progression to classic byssinosis should the exposures be continued or more frequent. They suggest that further study is necessary to investigate the association between mill fever and byssinosis, especially to ascertain whether there is any predictive value in knowing whether a subject reacts to cotton dust at an early stage. They think that any person who has occasion to be exposed to high levels of low-grade cotton dust may be at risk of experiencing the flu-like symptoms of mill fever and airway obstruction and should thus use respiratory protection to try to prevent this occurrence.

--Condensed from text

534/82 Pulmonary Fibrosis in an Aluminum Arc Welder. V. Vallyathan, et al. Chest 81: 372-374, March 1982. 21 refs.

Pulmonary fibrosis consequent to the inhalation of vaporized aluminum in an arc welder is described. Analytical studies on the lung tissues are recorded.

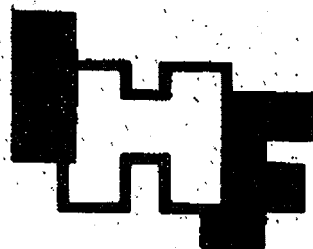
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June 1982  
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# INDUSTRIAL HYGIENE DIGEST

LITERATURE  
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## TABLE OF CONTENTS

This Issue Contains Abstracts 570/82x---684/82

|                                                      |    |
|------------------------------------------------------|----|
| News Items . . . . .                                 | 1  |
| Coming Events . . . . .                              | 5  |
| Legal Developments . . . . .                         | 6  |
| Books and Pamphlets . . . . .                        | 7  |
| Industrial Medicine . . . . .                        | 9  |
| Skin Diseases and Burns . . . . .                    | 12 |
| Chemical Hazards . . . . .                           | 12 |
| Industrial Dusts and Inhalants . . . . .             | 18 |
| Physical Hazards . . . . .                           | 21 |
| Radiation . . . . .                                  | 22 |
| Environmental Problems . . . . .                     | 23 |
| Industrial Hygiene, Preventive Engineering . . . . . | 23 |
| Occupational Health Management . . . . .             | 25 |
| Safety, Accident Prevention . . . . .                | 25 |
| Analytical Methods, Miscellaneous . . . . .          | 26 |
| Index . . . . .                                      | 29 |
| Addresses of Journals Abstracted . . . . .           | 32 |

## FEATURES

|                                                                                                                                                                             |    |       |     |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------|-----|--------|
| Occupational Asthma: A Spectrum of Acute Respiratory Disorders.                                                                                                             | -- | Abst. | No. | 597/82 |
| Informing Those With a Need to Know.                                                                                                                                        | -- | Abst. | No. | 603/82 |
| Exposure to Toluene. Uptake, Distribution and Elimination in Man.                                                                                                           | -- | Abst. | No. | 616/82 |
| Obstetric Histories of Women Occupationally Exposed to Styrene.                                                                                                             | -- | Abst. | No. | 618/82 |
| The Carcinogenic Effect of Aromatic Amines: An Epidemiological Study on the Role of o-Toluidine and 4,4'-Methylene bis (2-Methylaniline) in Inducing Bladder Cancer in Man. | -- | Abst. | No. | 623/82 |
| The Hazards of Cadmium in Man and Animals.                                                                                                                                  | -- | Abst. | No. | 628/82 |
| A Historical Prospective Mortality Study of Workers in Copper and Zinc Refineries.                                                                                          | -- | Abst. | No. | 633/82 |
| Computation of Permissible Noise Exposure.                                                                                                                                  | -- | Abst. | No. | 658/82 |

636/82 Role of Morpho-Functional Changes in Red Blood Cells in the Pathogenesis of "Lead" Anemia. I.A. Gribova and R.A. Gabulgalimova. Gig. Trud. Prof. Zabol. (2): 21-24, 1982. 9 refs. (Russian)

Morphology and function of red blood cells were studied in 27 workers of a printing house exposed to lead in concentrations approaching the maximum allowable ones and in 31 subjects of the control group. Increased osmotic and acid resistance and mechanic friability of red blood cells was recorded in the workers exposed to lead, as well as decreased lactate dehydrogenase, glucose-6-phosphate, and acid phosphatase activity, and shortening of the red blood cell life-span. Cytometric parameters and the content of free SH-groups in the red blood cells were unchanged. It is shown that hemolysis manifesting in shortened red blood cells life-span develops during exposure to lead in rather low concentrations. These changes are easily compensated for at the expense of increased red blood cell production and do not lead to health disturbances.

--Authors' abstract in English

637/82 Variation of Lead-Induced Lethality in Estradiol-Treated Mice. G.R. Hogan. J. Toxicol. Environ. Health 9: 353-357, March 1982. 13 refs.

Studies were undertaken to test the female sex hormone  $\beta$ -estradiol for its ability to modify lethality in young adult female and male mice exposed to lead acetate. Mice were injected with  $\beta$ -estradiol on d -1 and 0, and immediately after the second injection lead acetate was administered at four subgroup dosages ranging from 75 to 600 mg/kg body weight. Control mice were injected with only lead acetate. On d 4, 6, and 8 after Pb, the median lethal dosages (LD50s) were calculated from the observed mortality ratios by a method of moving averages. LD50 values were considerably lower for the Pb- and  $\beta$ -estradiol-injected groups than for the controls. Data from these experiments indicate that the  $\beta$ -estradiol treatments render both female and male mice more vulnerable to the lethal effects of lead acetate.

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638/82 The Effect of Ferrites Dust on the Body and Hygienic Standardization of Its Content in the Air of Workplaces. V.A. Prilipko. Gig. Trud. Prof. Zabol. (4): 23-26, 1982. 4 refs. (Russian)

Exposure to ferrites dust was found to produce fibrogenous effects on experimental animals, as well as to cause chronic poisoning manifested by nucleic and protein metabolism disturbances, changes in the liver function and morphologic shifts in the internal organs. The toxic action of ferrites dust depends on their physicochemical properties determined by the content of metal

ions of varying valency. On the basis of the results, MACs for the ferrites were derived and approved.

--Author's abstract in English

639/82 Mutagenicity of Metal Salts in the L5178Y Mouse Lymphoma Assay. T.J. Oberly, et al. J. Toxicol. Environ. Health 9: 367-376, March 1982. 22 refs.

Eleven metals were examined for their potential to induce forward mutations at the thymidine kinase locus in L5178Y mouse lymphoma cells. The materials tested included  $AlCl_3$ ,  $CdSO_4$ ,  $HgCl_2$ ,  $K_2CrO_4$ ,  $K_2Cr_2O_7$ ,  $MgCl_2$ ,  $MnCl_2$ ,  $NaAsO_2$ ,  $Na_2HAsO_4$ ,  $NaCl$ , and  $Pb(NO_3)_2$ . Strong positive responses at survivals greater than 10% were observed with  $CdSO_4$ ,  $K_2CrO_4$ ,  $K_2Cr_2O_7$ , and  $MnCl_2$ . Weak positive responses, yielding 2- to 3-fold increases in mutation frequency above the solvent control at greater than 10% survival, were seen with  $HgCl_2$ ,  $NaAsO_2$ ,  $Na_2HAsO_4$ , and  $Pb(NO_3)_2$ . Negative responses were obtained with  $MgCl_2$ ,  $NaCl$ , and  $AlCl_3$ .

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640/82 Clinical and Experimental Data for Determination of the Fluorosis Pre-Osteal Stage. D.M. Zislin. Gig. Trud. Prof. Zabol. (3): 39-42, 1982. 46 refs. (Russian)

Clinical data are presented, showing that before specific manifestation of occupational osteal fluorosis polysystemic pathology occurs in all the examined organs of the cardiovascular, hepatobiliary, gastric, hypophyseal-adrenal, and central nervous systems. The phasic pattern of the disease was shown and its relation to the toxic load, as well as its clinical features and manifestations of soft tissue pathology. This makes it possible to consider the pre-osteal stage of occupational fluorosis as its initial (I) stage. The results are compared with the literature data and the evidence of the toxic agent content in biologic substrates.

--Author's abstract in English

#### INDUSTRIAL DUSTS AND INHALANTS

641/82 The Association of Asbestos-Induced Pleural Disease and Rounded Atelectasis. R.A. Mintzer and D.W. Cugell. Chest 81: 457-460, April 1982. 5 refs.

Rounded atelectasis, also known as folded lung or Blesovsky's syndrome, is a clinically innocuous entity. Its association with asbestos-induced pleural disease has been known since 1966. This complication of asbestos exposure is being recognized with increasing frequency. This unusual form of peripheral lobar collapse has sufficient characteristic radiologic findings to preclude thoracotomy for diagnosis.

--Author's abstract reprinted by permission

642/82 Translocation of Asbestos Dust Through the Bronchiolar Wall. P.F. Holt. Environ. Res. 27: 255-260, April 1982. 11 refs.

Inhaled chrysotile asbestos fibers that settle on the epithelium of the larger bronchioles are removed from the lung by cilia. Fibers that reach the pulmonary alveoli may be phagocytized by macrophages which move toward the periphery of the lung by passing through alveolar walls. Some of these cells aggregate in alveoli near larger bronchioles and may then penetrate the bronchiolar wall. They are shed in the bronchiolar lumen, where they are elevated by cilia to the trachea. Elimination of chrysotile from alveoli depends on macrophages; fibers persist if there are insufficient macrophages.

--Author's abstract reprinted by permission

643/82 Absence of Mutagenic Activity of Three Forms of Asbestos in Liver Epithelial Cells. B. Reiss, et al. Environ. Res. 27: 389-397, April 1982. 55 refs.

The amosite, crocidolite, and chrysotile forms of UICC asbestos were assayed for their ability to induce gene mutations at the hypoxanthine-guanine phosphoribosyl transferase locus. Using adult rat liver-derived (ARL-6 and ARL-18) cells in culture, no consistent or significant increase occurred in the number of mutants resistant to the purine analog, 6-thioguanine, after exposure to toxic levels of amosite, crocidolite, or chrysotile. These results support the concept that asbestos is an epigenetic carcinogen that does not alter DNA.

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644/82 The Effect of Dust on the Health of Workers Engaged in the Manufacture of Asbestos Cement Products. E.G. Kurova, et al. Gig. Trud. Prof. Zabol. (3): 17-20, 1982. 11 refs. (Russian)

The concentration of dust liberated during the manufacture of asbestos cement products exceeds the MAC by several times. Mortality due to lung and stomach cancer in workers engaged in this manufacture is relatively higher than in the population of the adjoining city.

--Authors' abstract in English

645/82 Endemic Pleural Disease Associated with Exposure to Mixed Fibrous Dust in Turkey. A.N. Rohl, et al. Science 216: 518-520, April 30, 1982. 14 refs.

Pleural mesothelioma, lung cancer, pleural calcification and fibrosis, and interstitial parenchymal fibrosis have been observed among inhabitants of several villages in south-central Turkey. Earlier reports have stated that environmental and lung tissue samples from this area contained the fibrous zeolite mineral erionite, and this mineral has generally been assumed to be the agent responsible for these endemic

pathological conditions in the absence of asbestos outcroppings and usage. Several different kinds of asbestos minerals in addition to erionite have now been found in environmental samples taken from the villages where these diseases occur. The lung tissues of mesothelioma patients from these villages contain both fibrous zeolites and asbestos minerals.

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646/82 Carcinogenic and Fibrogenic Effects of Zeolites: Preliminary Observations. Y. Suzuki. Environ. Res. 27: 433-445, April 1982. 19 refs.

Two natural zeolite minerals, erionite, a fibrous form, and mordenite, a mixture of fibrous and granular types, were injected intraperitoneally into 45 Swiss albino male mice with a single administration of 10 or 30 mg of zeolite suspended in 1 cc of saline solution. The erionite was 0.4-24  $\mu$ m in length (1  $\mu$ m average, 95% shorter than 8  $\mu$ m) and 0.01-2.5  $\mu$ m in width (0.1  $\mu$ m average, 94.4% smaller than 1  $\mu$ m). The granular mordenite was 0.33-5.7  $\mu$ m in the long axis and 0.27-1.67  $\mu$ m in the short axis. The fibrous mordenite was 0.4-6  $\mu$ m in length and 0.05-0.67  $\mu$ m in width. Thirteen untreated mice and five mice treated with 10 mg chrysotile (Calidria, 90% shorter than 1  $\mu$ m) were used as controls. Six of ten mice treated with 10 mg of erionite developed malignant peritoneal tumors between 8 and 22 months after the single administration. The neoplasms in four of the six animals were consistent with malignant mesothelioma. Two of four chrysotile-treated controls also developed malignant peritoneal mesotheliomas between 9 and 16 months. A fibrogenic effect was noted in both the erionite- and mordenite-treated mice, the effect being more pronounced in the former. Fibrotic lesions induced by these mineral fibers commonly presented in the primary site of these induced peritoneal tumors. Findings suggest that the carcinogenic and fibrogenic effects of the fibrous erionite are similar to those of asbestos.

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647/82 Effect of Some Characteristics of Coal Seams on the Morbidity of Miners. E.S. Vasilenko and A.S. Slutsker. Gig. Trud. Prof. Zabol. (2): 12-15, 1982. 4 refs. (Russian)

Pneumoconiosis incidence in miners of 93 mines of the Voroshilovgrad region during 5 years is analyzed. Correlation was established between the disease incidence and features of the dust formation and qualitative characteristics of coal dust, i.e., specific dust release, wetness of coal, and its genetic maturity. Data on the distinct influence of the genetic maturity of coal on pneumoconiosis incidence were obtained. Anthracite represents the latest stage of the coal substance metamorphosis; the

sample can yield both the formaldehyde and total aliphatic aldehyde contents of a sampled atmosphere they devised a combined method with improved techniques that streamlined laboratory analysis by maximizing procedural overlap.

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680/82 Industrial Trials with the Vickers M88 Rapid Asbestos Fibre Counter. A.D. Jones and R.W. Gale. *Ann. Occup. Hyg.* 25(1): 39-51, 1982. 9 refs.

The Vickers M88 rapid asbestos fibre counter was assessed by several laboratories each using a prototype of the instrument and with membrane filter samples provided from a variety of industrial situations. The M88 evaluations of fibre density showed a very good correlation with visual counts for textile samples (excluding weaving and some rejected samples) and good correlation for brake lining dust samples, although with a markedly different (ca. x 1/4) calibration factor.

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681/82 Visibility of Fine Fibres of Asbestos During Routine Electron Microscopical Analysis. A.P. Middleton. *Ann. Occup. Hyg.* 25(1): 53-62, 1982. 8 refs.

Most analyses for asbestos in samples from the non-occupational environment are carried out using techniques based upon either scanning (SEM) or transmission (TEM) electron microscopy. The mode of image formation and resolution obtainable differ between SEM and TEM and the present study was undertaken in order to provide some indication of the comparability of observations made by the two techniques, with particular reference to the visibility of fine, sub-micrometre fibres. The results indicate that, in general, at a given magnification finer fibres are visible when using TEM than when using SEM. When using SEM, fibre visibility is improved by the use of higher magnifications, by the use of slower raster speeds and by the use of gold rather than carbon for specimen coating. The use of photomicrographs leads to improved fibre visibility in both SEM and TEM images. The study suggests that comparable results can probably be obtained from the two techniques, although fibres  $< 0.1$   $\mu\text{m}$  dia may be close to the limit of visibility in the SEM. In order to facilitate inter-laboratory comparison of results it would seem appropriate for standard samples to be available so that optimum conditions can be determined for the observation of fine fibres.

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682/82 Liquid Chromatographic Determination of Dimethyl Formamide, Methylene Bisphenyl Isocyanate and Methylene Bisphenyl Amine in Air Samples. K. Lipski. *Ann. Occup. Hyg.* 25(1): 1-4, 1982. 15 refs.

The application of high-performance liquid chromatography on a silica gel phase has resulted in a method for analysis of dimethyl formamide (DMF), methylene bisphenyl isocyanate (MDI) and methylene bisphenyl amine (MDA) in air samples. The above mixture was used in the production of polyurethane fibres. For sampling purposes, silica gel coated with diethylamine was used. Since isocyanate is highly reactive, it must be rapidly converted into a stable derivative. This was achieved by reaction with diethylamine. After desorption of the mixture, compounds are separated by high-performance liquid chromatography. Spectrophotometric detection was used for quantitative determination of the mixture components.

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683/82 Charcoal Sampling and Gas Chromatographic Determination of N,N-dimethylformamide in Air Samples From a Polyurethane Plant. V. Rimatori and G. Carelli. *Scand. J. Work Environ. Health* 8: 20-23, March 1982. 12 refs.

A charcoal sampling method and a gas chromatographic determination of N,N-dimethylformamide in the air of a plant producing polyurethane lumps is described. The collection efficiency was checked by drawing standard N,N-dimethylformamide air mixtures through the sampling tube at 0.1 l/min and detecting the organic vapors spectrophotometrically at 215.4 nm. At 1,000  $\text{mg}/\text{m}^3$ , samplings could be carried out for 190 min with negligible N,N-dimethylformamide losses (lower than 1%). The analysis of N,N-dimethylformamide was performed by gas chromatography on Porapak Q and Tenax GC after extraction with 2 ml of acetone/100 mg of charcoal, with a mean recovery of 90 (SD 2)%, in the range of 0.05-0.5 mg of N,N-dimethylformamide/100 mg of charcoal. The relative standard deviation of the entire procedure was 3.5%. Because of the good adsorbing efficiency of the charcoal, short-term sampling could be carried out at a relatively high N,N-dimethylformamide concentration. Stationary and personal sampling resulted in mean values ranging between 1.26 and 1.60  $\text{mg}/\text{m}^3$ . The method is particularly suitable in instances where other pollutants are present, and therefore it can be used also for other work areas as well.

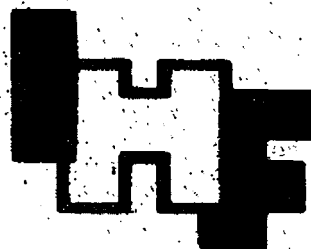
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July 1982  
Volume 46, No. 7

# INDUSTRIAL HYGIENE DIGEST

LITERATURE  
ABSTRACTS

ENVIRONMENTAL  
AND  
OCCUPATIONAL  
HEALTH AND  
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.  
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# INDUSTRIAL HYGIENE DIGEST

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July 1982  
Volume 46, No. 7

## TABLE OF CONTENTS

This Issue Contains Abstracts 686/82x---789/82

|                                                      |    |
|------------------------------------------------------|----|
| News Items . . . . .                                 | 1  |
| Coming Events . . . . .                              | 5  |
| Legal Developments . . . . .                         | 6  |
| Books and Pamphlets . . . . .                        | 8  |
| Industrial Medicine . . . . .                        | 9  |
| Skin Diseases and Burns . . . . .                    | 12 |
| Chemical Hazards . . . . .                           | 13 |
| Industrial Dusts and Inhalants . . . . .             | 17 |
| Physical Hazards . . . . .                           | 20 |
| Radiation . . . . .                                  | 21 |
| Environmental Problems . . . . .                     | 22 |
| Industrial Hygiene, Preventive Engineering . . . . . | 23 |
| Occupational Health Management . . . . .             | 24 |
| Safety, Accident Prevention . . . . .                | 25 |
| Analytical Methods, Miscellaneous . . . . .          | 25 |
| Index . . . . .                                      | 28 |
| Addresses of Journals Abstracted . . . . .           | 30 |

## FEATURES

|                                                                                                                                      |    |       |     |        |
|--------------------------------------------------------------------------------------------------------------------------------------|----|-------|-----|--------|
| Work, Stress, and Health: Four Major Conclusions.                                                                                    | -- | Abst. | No. | 711/82 |
| Health of Unemployed Middle-Aged Men in Great Britain.                                                                               | -- | Abst. | No. | 712/82 |
| Smoking and the Workplace: Tobacco Smoke Health Hazards to the Involuntary Smoker.                                                   | -- | Abst. | No. | 715/82 |
| Dermatological Findings in Capacitor Manufacturing Workers Exposed to Dielectric Fluids Containing Polychlorinated Biphenyls (PCBs). | -- | Abst. | No. | 723/82 |
| Dependence of Apparent Blood Lead Half-Life on the Length of Previous Lead Exposure in Humans.                                       | -- | Abst. | No. | 728/82 |
| Elemental Mercury Exposure: Peripheral Neurotoxicity.                                                                                | -- | Abst. | No. | 732/82 |
| Premature Delivery and Organochlorine Compounds: Polychlorinated Biphenyls and Some Organochlorine Insecticides.                     | -- | Abst. | No. | 739/82 |
| Tetrachlorodibenzodioxin: A Survey of Subjects Ten Years After Exposure.                                                             | -- | Abst. | No. | 741/82 |

INDUSTRIAL HYGIENE DIGEST

NEWS ITEMS

685/82x National Emission Standards for Hazardous Air Pollutants; Appendix B-Test Methods; Revisions and Addition. Environmental Protection Agency (EPA). Fed. Reg. 47: 24703-24716, June 8, 1982.

Action: Final rule. Revisions to Methods 101 and 102, "Determination of Particulate and Gaseous Mercury Emissions from Chlor-Alkali Plants--Air Streams," and "Determination of Particulate and Gaseous Mercury Emissions from Chlor-Alkali Plants--Hydrogen Streams," respectively, and a new Method 111, "Determination of Particulate and Gaseous Mercury Emissions from Sewage Sludge Incinerators," were proposed in the Federal Register on October 15, 1980 (45 FR 68514). This action promulgates the revisions and the new method, redesignated as Method 101A. The intended effect is to require all chlor-alkali plants and sewage sludge treatment plants specified to conduct emissions tests under Subparts A and E of 40 CFR Part 61 to hereafter (see effective date listed below) use these new and revised methods for determining compliance. In addition, amendments to Subparts A and E are made to include new Method 101A. Effective date: June 8, 1982.

--Summary

686/82x Studies on Polychlorinated Biphenyls, Paints to be Conducted in Fiscal 1982. Occup. Safety & Health Reporter 11: 1075-1076, May 27, 1982.

Field research projects on exposure to polychlorinated biphenyls and paints and coatings will be conducted by the National Institute for Occupational Safety and Health during fiscal 1982, the Institute announced May 18. According to the notice, the study on PCBs will examine the reproductive histories of women exposed to the substance in the workplace. Some 800 responses are expected to be collected, NIOSH indicated. The second project will be a case control study of painters and workers in the allied trades. The purpose of the study will be to determine if there are adverse health effects from exposure to paints, coatings, and associated substances, the Institute stated. Researchers will study some 1,000 construction and maintenance painters in the allied trades, according to the notice. Six weeks before beginning work on each study, NIOSH will publish a separate notice in the Federal Register giving more detailed information on the project, the announcement said.

--Condensed from text

687/82x Asbestos; Friable Asbestos-Containing Materials in Schools; Identification and Notification. Environmental Protection Agency (EPA). Fed. Reg. 47: 23360-23369, May 27, 1982.

Action: Final rule. EPA issues this rule to reduce risks to human health from exposure to asbestos-containing materials in school buildings. The rule requires public and private elementary and secondary schools in the United States to identify friable asbestos-containing building materials, maintain records and notify employees of the location of the friable materials which contain asbestos, provide the employees with instructions on reducing exposures to asbestos, and notify the School's parent-teacher association of the inspection results. School districts are encouraged to consult with EPA Regional Asbestos Coordinators when complying with the rule and, where asbestos-containing materials are found, to consult with EPA regarding corrective actions. A school that has already inspected, sampled, and analyzed the friable asbestos-containing material according to the procedures in this regulation need only comply with the recordkeeping and notification provisions of the rule. Schools that determined that they contain no friable asbestos-containing materials prior to the effective date of this rule, need only certify these results and retain the certification statement in their files. Schools need not repeat sampling and analysis under any circumstances. Dates: This rule became effective June 28, 1982. Local education agencies must comply with all portions of this rule by May 27, 1983.

--Summary

688/82x Asbestos: Data Regulatory Experience to Guide OSHA Review, Official Tells Symposium. Occup. Safety & Health Reporter 12: 5-6, June 3, 1982.

The Occupational Safety and Health Administration will reexamine prior regulatory decisions concerning asbestos in light of the developing body of scientific knowledge and technological advancement and its 10 years of enforcement experience, OSHA Deputy Health Standards Director John Martonik told the World Symposium on Asbestos May 25. In its review, Martonik said, OSHA will continue to require U.S. industry to fulfill its legal safety and health responsibilities. It will do so, however, "based on the best available data

in the most cost-effective way while providing the most adequate protection to workers," said. "To do this, OSHA will have to make policy and scientific judgments when uncertainty exists," Martonik continued. "Once the magnitude of the problem is identified and the areas of uncertainty are defined, OSHA will make its decisions based on policy considerations." One aspect of the review will require extrapolations of risk at low levels of exposure, Martonik said, adding that "relatively little is known about the magnitude of risk at the current exposure limit" of two fibers per cubic centimeter. Another issue likely to spur debate is the conversion of exposure levels measured in some studies by certain sampling methods to levels found in other studies using different sampling methods and measurements, he projected. Martonik said the agency is aware of and will review very carefully recent studies that show a prevalence of asbestosis or an excess mortality from lung cancer among workers exposed for a working lifetime at the two fiber limit. It will also consider, however, the following issues: The influence of fiber type on risk for asbestosis, lung cancer, and mesothelioma; The shape of the dose-response curve, with attention to type of operation and type of exposure; Sampling and analysis; Medical surveillance methods.

--Condensed from text

89/82x TSCA Chemical Substances Inventory; Proposed Actions on Synthetic Fuels and Related Substances. Environmental Protection Agency (EPA). Fed. Reg. 47: 25198-25203, June 10, 1982.

action: Notice. The EPA has completed a review of twenty synthetic fuels and related substances currently listed on the TSCA Chemical Substances Inventory. Two problems were identified. First, EPA believes that twelve substances had not left the research and development stage during the inventory reporting period and were, therefore, ineligible for inclusion on the inventory. EPA proposes to remove these ineligible substances from the inventory. Second, four of the twenty substances, though eligible for the inventory, were erroneously incorporated under the names of petroleum derived substances. EPA will establish a new inventory entry for each of these four substances. The remaining four substances were found to be both properly reported and correctly identified on the inventory; no action will be taken on these four substances. The Agency solicits public comments on its intent to remove the twelve ineligible substances. Comments should be received by August 9, 1982.

--Summary

690/82x Asbestos: Selikoff Calls for Wider Safeguards; Control Adequacy, Data Meaning Debated. Occup. Safety & Health Reporter 12: 33-34, June 16, 1982.

A ban on the use of asbestos will not be requested if "proper control" of exposure is achieved in the wide spectrum of workplaces where

fibers are found, according to Irving J. Selikoff, director of the Environmental Sciences Laboratory of the Mount Sinai School of Medicine. Selikoff made his remarks May 25 during the opening session of the World Symposium on Asbestos, a three-day meeting sponsored by the governments of Canada and Quebec and the Commission of the European Communities. Industry has "done what it can" to limit exposure in asbestos mines and mills but now must expand its efforts to control it in workplaces where asbestos products are used, Selikoff told the symposium. The remaining disease problems, he warned, will be found among construction workers and others who work where there are "virtually no controls, respirators, or instruction." Selikoff urged the asbestos industry to begin a surveillance and notification program of exposed workers. Noting that cessation of cigarette smoking has been found to contribute to a reversal of disease risk in previously exposed workers, he argued that companies have the responsibility to inform workers of past exposure and warn them of the effects of smoking. In addition, he said, "virtually no exposed workers are under surveillance," asserting that periodic medical examinations could make early cures possible. Epidemiologists have not made progress in helping society control the risks of asbestos exposure since the basic data were reported 20 years ago, according to John Corbett McDonald, head of the McGill University Institute of Occupational Health and Safety. Conclusions still must be reached concerning a dose-response relationship and variations between the effects of different asbestos fiber types, he told the session. Noting that only four cohorts of workers have been studied using individual exposure estimates - Quebec miners and millers, New Jersey factory pensioners, New Orleans cement workers, and South Carolina textile workers - McDonald contended that "it would still be very rash to say that we know what the dose-response relationship is for mesothelioma," the cancer of the pleural lining of the lung linked almost exclusively to asbestos exposure. Substantial differences have been found, he said, between the effects of amosite and crocidolite asbestos and the more widely used chrysotile type. While he has seen no evidence of crocidolite use without a hazard, "it is probably possible" to use chrysotile safely in such products as brake linings, McDonald maintained. He speculated that health effects "depend perhaps on the size and type of fiber." Remaining uncertainties also were stressed by John Hignam, until recently the director of the International Agency for Research on Cancer, and Hans Weill, professor of medicine at Laval University. Weill maintained that diagnosis of asbestos-related disease "continues to be a problem after nearly a century." He argued that four of the six indicators used to detect asbestos related disease are "non-specific" and commonly found in both patients with the disease and those without it. The medical researcher characterized diagnosis as a question of "weighing the probabilities based on the total picture, including exposure." He reported that a forthcoming

document prepared by the National Institute for Occupational Safety and Health and the College of American Pathologists will recommend that, when available, both lung fibrosis and a demonstrated finding of fibers in the lung are needed for adequate diagnosis from tissue samples. Weill also contended that no definitive mortality data have linked pleural plaques to mesothelioma. With some rare exceptions, he said, no functional consequences can be expected from benign plaques. Higginson, discussing science's limited understanding of the variables of cancer causation in general, predicted that research in the next decade into the mechanisms of carcinogenic action will aid regulators in determining what alternative preventive measures should be taken. Better comprehension of which factors initiate the formation of tumors and which promote or deter their growth may help scientists determine an "operational threshold," the conditions under which no effect can be found, he urged.

--Condensed from text

691/82x Proposed Revocation of Advisory and Repetitive Standards. Occupational Safety and Health Administration, Labor. Fed. Reg. 47: 23477-23482, May 28, 1982.

Action: Proposed Revocation. The Occupational Safety and Health Administration (OSHA) proposes to revoke nearly two hundred provisions of the General Industry Safety and Health Standards [Part 1910] in which the word "should" or other advisory language is used instead of the mandatory "shall". OSHA has determined that these provisions are unenforceable and proposes that they be deleted from Part 1910. Also proposed for revocation is one advisory paragraph which was improperly adopted as a mandatory provision by OSHA. It is also proposed to delete three sections whose requirements are repeated elsewhere in Part 1910. In addition, OSHA is proposing to amend § 1910.6 to clarify that only mandatory provisions of standards incorporated by reference are adopted as OSHA standards. The removal of advisory and repetitive provisions from the standards will facilitate OSHA's enforcement responsibilities regarding these provisions and also assist employers by improving the clarity of the standards. Dates: All comments on this notice should be received by July 27, 1982.

--Summary

692/82x Asbestos: Scientist Sees Future Possibility of Screening Workers for Resistance. Occup. Safety & Health Reporter 12: 35, June 10, 1982.

Recent advances in the field of immunology raise the possibility that blood tests can be used to determine how susceptible an exposed worker will be to asbestos-related disease, according to Elliot Kagan, an associate professor of pathology at Georgetown University. The researcher told a May 27 session of the World Symposium on Asbestos that scientists now possess the technology to apply techniques of immunological measurement to

humans in practical situations. Research in the next five years, he reported, may produce the definition of precise "susceptibility markers" in the cell functions of workers that would allow the use of screening and early disease detection as preventive measures. Kagan said early reports that an association between asbestos disease and certain deficiencies in resistance mechanisms had not withstood the test of time, but added that they were not performed with the superior technology now available. Sophisticated assays of immunological function in use today, he continued, make it possible to examine different groups of exposed workers and compare the susceptibility of those showing disease symptoms to the resistance of those showing no effects. Because the assays could be accomplished by means of the "non-invasive" procedure of taking blood tests, Kagan suggested, that they may be preferable to other scanning techniques, such as X-rays, that present hazards in themselves. Taking issue with Kagan's approach was Herbert Otto, director of the pathology department at the Municipal Hospital in Dortmund, West Germany. He stated that, if immunological susceptibility contributed to an asbestos-related death, he would expect to find lymphatic evidence in a postmortem. He has not observed any such signs, however, he added. In any case, he said, he believed scientists must look at the agent of disease to prevent it, not at its host.

--Text reprinted

693/82x Polychlorinated Biphenyls (PCBs); Manufacture, Processing, Distribution, and Use in Closed and Controlled Waste Manufacturing Processes. Environmental Protection Agency (EPA). Fed. Reg. 47: 24976-24984, June 8, 1982.

Action: Proposed rule. On April 13, 1981, the U.S. Court of Appeals for the District of Columbia Circuit issued an order requiring the Environmental Protection Agency (EPA) to undertake a rulemaking for certain chemical manufacturing processes that generate PCBs in low concentrations. In response to the court's order, EPA is proposing to exclude the production of PCBs in closed and controlled waste manufacturing processes from the provisions of section 6(e) of the Toxic Substances Control Act (TSCA), 15 U.S.C. 2605(e). Section 6(e) prohibits the manufacture, processing, distribution in commerce, and use of polychlorinated biphenyls (PCBs). Dates: An informal hearing, if requested, will be held on August 6, 1982, in Washington, D.C. The exact time and location of the hearing will be available through the Industry Assistance Office, which can be reached by calling toll free 800-424-9065 or, in Washington, D.C., by calling 554-1404. Comments on this proposed rule and requests to participate in the informal hearing must be submitted by July 23, 1982.

--Summary

47/82 Exposure to Asbestos and Human Disease. R. Becklake. New Eng. J. Med. 306: 1480-482, June 17, 1982. 19 refs.

What is the clinical importance of the issues raised by the review by Craighead and Mossman? (see Abstract 748/82). Perhaps the most important is that health risks in relation to exposure to asbestos vary according to environmental factors. Some of these factors (such as exposure dose, particle size, and fiber type) are known, but there are undoubtedly others that are not yet recognized. Host characteristics probably also influence the response to exposure. Thus, in considering the individual patient with a disease known to be related to asbestos exposure, the wise clinician should avoid regarding any particular exposure as too short, too remote, or at too low a level (even if environmental counts are in compliance with the present regulations) to have accounted for the disease. Assessment of the importance of particular environmental exposures is often outside the clinician's expertise; it should be referred to appropriate consultants in industrial hygiene, engineering, or physics. In lung cancer the statistical probability that a given case is attributable to asbestos exposure may be estimated from exposure-response data, which for practical purposes can probably be assumed to be linear, provided that the data available are applicable to the industry in which the subject was employed. Finally, the unpredictable clinical course of these diseases demands vigilance by the clinician with respect to past exposures, and the most powerful indicator remains the careful, complete, and precise occupational history.

--Condensed from text

48/82 The Pathogenesis of Asbestos-Associated Diseases. J.E. Craighead and B.T. Mossman. New Eng. J. Med. 306: 1446-1455, June 17, 1982. 26 refs.

This review summarizes our current knowledge of the adverse effects of asbestos on health and provides a perspective on the pathogenetic mechanisms of the diseases associated with exposure. Since there are several different mineralogic types of asbestos, the authors attempt to assess the extent to which findings with one type can be applied to another. Detailed analyses of the issues addressed in this paper have been published elsewhere.

--Condensed from text

49/82 Effects of Cigarette Smoking on Pulmonary Function in Asymptomatic Asbestos Workers With Normal Chest Radiographs. S.K. Hall and J.H. Jansik. Am. Ind. Hyg. Assn. J. 43: 381-386, June 1982. 29 refs.

A comprehensive health screening program consisting of standardized health and occupational history questionnaire, blood chemistry profile, complete blood count, urinalysis, chest radiograph, and pulmonary function testing was organized for the Asbestos Workers Union Local Number

1 in St. Louis, Missouri. The program was available on a voluntary basis to all the workers in the Union. One hundred and thirty-five male Caucasian workers or 44% of the membership volunteered to participate and all the data were used in this study. All blood chemistry profiles and urinalysis results were within normal limits. Twenty-two of the asbestos workers had radiologic pulmonary abnormalities as well as severe pulmonary function impairment. The remaining 113 workers were divided into subgroups based on the number of years of exposure to asbestos and their smoking history. Although asymptomatic, workers with more than 20 years exposure to asbestos had significantly decreased pulmonary functions compared to those with less than 20 years exposure. When smokers and nonsmokers were compared, an additive effect between smoking and asbestosis was observed. This study also discovered that significant decreases in pulmonary functions occur early in the exposure to asbestos.

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750/82 Analysis of Cores of Ferruginous Bodies from Former Asbestos Workers. R.F. Dodson, et al. Environ. Res. 28: 171-178, June 1982. 18 refs.

The coating was removed from 442 isolated ferruginous bodies which had been collected from tissues of occupationally exposed individuals. The core material was determined to be amosite asbestos, consistent with that used in their previous industrial setting. While length has been reported to play a determining role regarding which fibers become coated, the process used in this study allowed characterization of other distinguishing traits of the cores. These included surface irregularities, consisting of etching, fractures, fraying, and complexities involving multifibers or fibrillar composition. The majority of the uncoated fibers were short in length, but they also had much smoother surface features with fewer irregularities than the coated fibers.

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751/82 Asbestos Ceiling Panels. R.H. Wheeler. J. Am. Med. Assn. 247: 2716, May 21, 1982.

**Question:** A kitchen designed to serve several hundred people at each meal has a suspended asbestos ceiling that was installed ten years ago. It is not a part of any ventilation system. No cases of asbestosis have been found in kitchen workers since installation, but the question arises: Should the asbestos ceiling panels be replaced with asbestos-free material? **Answer:** What is the existing level of airborne fibers produced from the panels? Can these panels be removed in a competent manner without producing undue contamination to the environs, the workmen involved, and the future inhabitants? There is no assurance or safety in the notion that "no cases of asbestosis" have developed in the kitchen workers during the last ten years.

Asbestosis is notoriously difficult to diagnose in its early stages, and the latency period for this disease can be much longer than ten years. Depending on the level of exposure, it may take 15 to 20 years to develop, or it may progress from first exposure to death within ten years. There have even been instances among asbestos insulation sprayers where the disease developed within three years; inasmuch as most kitchen workers are apt to be transient, there is some question as to how one could assess their total exposure. If you can be assured that the job of removal, clean-up, and disposal can be conducted in a safe, approved manner, then by all means replace the present panels with a safe substitute.

--Condensed from text

752/82 Cancer Morbidity Among Polishers.  
B. Jarvholm, et al. *Brit. J. Ind. Med.*  
39: 196-197, May 1982. 8 refs.

The mortality pattern among 86 men was determined to investigate the possible hazards of polishing steel. The men had polished steel with polishing paste for at least five years. The polishing pastes had contained tallow, beeswax, carnauba wax, alundum, carborundum, ferric oxide, and chalk. A total of 18 men had died compared with 13.3 expected. Four had died of stomach cancer compared with 0.44 expected ( $p < 0.005$ ). The mortality for other causes of death was not increased. The study does not permit any definite conclusion but indicates a possible cancer hazard among polishers.

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753/82 The Mortality Experience of Upstate New York Talc Workers. W.T. Scille and I.R. Tabershaw.  
*J. Occup. Med.* 24: 480-484, June 1982. 10 refs.

Deaths for a 31-year period (1948 to 1978) were analyzed in a historical prospective cohort study of 655 white male talc workers. Death rates from all causes, from cancer of the respiratory system, and from nonmalignant respiratory disease were not significantly different from those of the U.S. white male population. However, significant differences for these causes of death were found among workers who had previous occupational histories. An analysis of the latency periods of the observed lung cancer suggests that exposure to an etiologic agent during previous work experience may play a role in the development of lung cancer.

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754/82 Halogenated Hydrocarbon Environmental Pollution: The Special Case of Halogenated Anesthetics. J.R. Marier. *Environ. Res.*  
28: 212-239, June 1982. 73 refs.

For several years, there has been concern about the adverse environmental consequences accruing from the use of chlorinated hydrocarbon compounds, although information regarding effects on humans has been relatively sparse. However,

there are several similarities between chlorinated hydrocarbon pollutants (e.g., DDT or PCBs, etc.) and modern-day halogenated hydrocarbon anesthetics; the similarities include their respective chemical structure, their bioaccumulation in adipose tissue, and their dependence on the liver for metabolic transformation and partial excretion. Moreover, several halogenated hydrocarbon anesthetics have been in widespread clinical use during the past three-or-so decades, and this has led to a substantial accumulation of knowledge bearing on the toxicological cause/effect aspects in humans. Aside from the likelihood that the various halogenated hydrocarbon compounds in the human environment may have similar metabolic effects, there is also the very real possibility that diverse exposures to a variety of these compounds might lead to "cross-sensitization" phenomena among susceptible humans. Studies on the physiological effects of halogenated anesthetics are described.

--Author's introduction

755/82 Effects of Large (0.9  $\mu$ m) Sulfuric Acid Aerosols on Human Pulmonary Function. S.M. Horvath, et al. *Environ. Res.* 28: 123-130, June 1982. 22 refs.

The effects of sulfuric acid particle concentration (mass/volume) and ambient temperatures on pulmonary function of young male nonsmokers were examined. Subjects ( $n = 11$ ) thrice repeated a sequence of 20-min exercise (ventilation approximately 30 liters/min) and 20-min sitting rest. Pre- and postexposure pulmonary function tests (forced vital capacity maneuvers, lung volumes, maximum voluntary ventilation,  $R_{aw}$ , TGV, and helium-oxygen FVC) were measured. During the exposure and at 2 min after cessation of each exercise period, forced vital capacity tests (air and helium-oxygen) were performed. Each subject was exposed in random order to filtered air or 233, 418, or 939  $\mu\text{g}/\text{m}^3$  particulate sulfuric acid. Mass median diameter (MMD) was 0.90-0.93  $\mu\text{m}$ , and geometric SD was 1.66-1.73. No major changes in pulmonary function related to sulfate were observed in these subjects. The only measurement to show a significant interaction across time (pre-post) and sulfate concentration was  $\text{FEV}_{1.0}$ , which was significantly decreased with exposure to 939  $\mu\text{g}/\text{m}^3$  sulfate. The magnitude of the decrease was not considered to be of physiological significance. These results indicate that, even with the added stress of the increased depth and volume of exercise ventilation, exposure to as much as 1  $\text{mg}/\text{m}^3$  of 1  $\mu\text{m}$  sulfuric acid aerosol for 2 hr has little if any effect on standard tests of lung function.

--Authors' abstract reprinted  
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the authors have modified a technique described by Geilmann, and by Geilmann and Neeb. The elements are ultimately determined by flameless atomic absorption spectrometry.

--Condensed from text

784/82 Sodium Biphenyl Method for Determination of Covalently Bound Fluorine in Organic Compounds and Biological Materials. P. Venkateswarlu. Anal. Chem. 54: 1132-1137, June 1982. 21 refs.

Sodium biphenyl reagent is used to cleave the covalent fluorine bonds in organic compounds. The fluoride ions so released are extracted into a small volume of water and determined spectrophotometrically or with the fluoride ion electrode. Procedures for micro and macro analyses have been developed. Recoveries of 0.03-500 µg of fluorine from organic compounds are quantitative. These methods are simpler, more rapid, and more economical than the previously published sodium biphenyl methods for the determination of fluorine in organic compounds. The present method for determination of organic fluorine in biological materials has been validated by recovery studies and by corroborative results of analyses based on (a) an oxygen bomb/GC technique and (b) an approach involving radioanalytical techniques, whereby the difficulties, uncertainties, and inaccuracies of chemical determination of organic fluorine in a reference method are avoided.

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785/82 Determination of Trace Elements in 13 Organic Solvents by Instrumental Neutron Activation Analysis. F.S. Jacobs, et al. Anal. Chem. 54: 1240-1243, June 1982. 18 refs.

The data reported here should assist the analysts in evaluating the solvent blank when organic solvents are used in extraction or separation of materials subjected to trace element analysis. Care and judgment need to be exercised using these data; it should be emphasized that the values apply only to the individual bottles analyzed. It is likely that different lots of a given solvent would show different trace element contents but the data should provide estimations of the reagent blank. On the other hand, the values obtained in this study agree well with those reported by Russian and Rumanian workers in spite of differences in solvent manufacture.

--Authors' conclusion

786/82 Analysis of Fibres in Human Lung Tissue. B. Glyseth, et al. Brit. J. Ind. Med. 39: 191-195, May 1982. 10 refs.

Standard UICC crocidolite fibres and fibres extracted from occupationally exposed human lung tissue have been analysed by scanning electron microscopy after different preparation procedures. A significant fibre loss has been shown due to the adhesion of fibres to the beakers. Fibres are also discarded during the washing and ex-

traction of the lung tissue samples. The recovery was found to be 30 to 40% both for UICC standard specimens and for lung tissue samples.

--Authors' abstract reprinted  
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787/82 Quality-Control Testing for Asbestos Analysis with Synthetic Bulk Samples. J.S. Webber, et al. Am. Ind. Hyg. Assn. J. 43: 427-431, June 1982. 7 refs.

Asbestos-containing bulk samples which are routinely synthesized in the laboratory from known masses of readily available materials are part of an internal quality-control testing program. Quantitative analysis of asbestos in these samples by a laboratory's standard procedure yields precision and accuracy of that procedure. Permanent microscope-slide preparations of these samples are used specifically to assess polarized-light microscopic (PLM) analyses. Archives of these samples become references for field samples and allow determination of long-term precision and accuracy. The reliability of a two-step PLM method is determined by the above method.

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788/82 Determination of Chrysotile Asbestos in Building Materials by X-ray Diffractometry. H.W. Dunn and J.H. Stewart, Jr. Anal. Chem. 54: 1122-1125, June 1982. 17 refs.

An X-ray diffractometry technique using an internal standard has been developed for the quantitative measurement of the chrysotile asbestos content of a wide variety of construction materials. This technique is simple and cost effective compared with the usual need for combined X-ray powder diffraction patterns and optical or transmission electron microscopy to determine the asbestos content of materials. The diffractometry method is designed to differentiate between construction materials which are not asbestos contaminated and those which require costly special handling to ensure employee safety. The asbestos concentration range between 0.5 and 5.0% was initially investigated to meet the 1.0% asbestos Environmental Protection Agency National Emission Standards regulation and has now been extended to determine as much as 50% chrysotile.

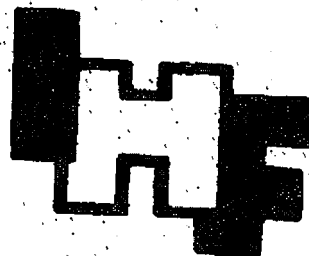
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August 1982  
Volume 46, No. 8

# INDUSTRIAL HYGIENE DIGEST

LITERATURE  
ABSTRACTS

ENVIRONMENTAL  
AND  
OCCUPATIONAL  
HEALTH AND  
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.  
34 PENN CIRCLE WEST • PITTSBURGH, PA. 15206

# INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.  
 Abstractor: Jean L. Collins, B.A.  
 Production: Joy H. Henning, Ola B. Owens

August 1982  
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## TABLE OF CONTENTS

This Issue Contains Abstracts 790/82x---890/82

|                                                      |    |
|------------------------------------------------------|----|
| News Items . . . . .                                 | 1  |
| Coming Events . . . . .                              | 7  |
| Legal Developments . . . . .                         | 8  |
| Books and Pamphlets . . . . .                        | 9  |
| Industrial Medicine . . . . .                        | 10 |
| Skin Diseases and Burns . . . . .                    | 11 |
| Chemical Hazards . . . . .                           | 13 |
| Industrial Dusts and Inhalants . . . . .             | 16 |
| Physical Hazards . . . . .                           | 17 |
| Radiation . . . . .                                  | 18 |
| Environmental Problems . . . . .                     | 19 |
| Industrial Hygiene, Preventive Engineering . . . . . | 22 |
| Occupational Health Management . . . . .             | 23 |
| Safety, Accident Prevention . . . . .                | 23 |
| Analytical Methods, Miscellaneous . . . . .          | 24 |
| Index . . . . .                                      | 26 |
| Addresses of Journals Abstracted . . . . .           | 28 |

## FEATURES

|                                                                                                                             |    |       |     |        |
|-----------------------------------------------------------------------------------------------------------------------------|----|-------|-----|--------|
| Normality and Reliability in the Clinical Assessment of Backache.                                                           | -- | Abst. | No. | 818/82 |
| Allergic Contact Dermatitis from Diazo Paper.                                                                               | -- | Abst. | No. | 827/82 |
| Free Erythrocyte Protoporphyrin Zinc Protoporphyrin and Blood Lead in Newly Reexposed Smelter Workers: A Prospective Study. | -- | Abst. | No. | 833/82 |
| Increase in Urinary Porphyrin Excretion in Workers Exposed to Polychlorinated Biphenyls.                                    | -- | Abst. | No. | 840/82 |
| Coalworkers' Pneumoconiosis in Britain Today and Tomorrow.                                                                  | -- | Abst. | No. | 846/82 |
| How to Control Noise at Its Source.                                                                                         | -- | Abst. | No. | 854/82 |
| Indoor-Outdoor Air Quality Relationships: A Critical Review.                                                                | -- | Abst. | No. | 859/82 |
| Job Medical Records -- Who Can See Them?                                                                                    | -- | Abst. | No. | 874/82 |

801/82x Few Firms Use Genetic Screening.  
Chem. & Eng. News 60: 19, June 28, 1982.

Congress' Office of Technology Assessment surveyed the Fortune 500 firms and 50 largest U.S. utilities to determine how many use or plan to use genetic screening of their employees to determine which ones might be most susceptible to work-related diseases. Of the 366 firms that replied to the survey, only six said that they currently conduct such tests, but another 59 companies said they were considering using such tests sometime within the next five years. The survey was requested by Rep. Albert Gore Jr., chairman of the House Science Committee's Oversight & Investigation Subcommittee, who at hearings on the report expressed concern about the test's potential to harm as well as to help. "If we learn to predict which individuals are most likely to be harmed by exposure to certain substances, it has potential to serve as a marvelous tool to protect the health of workers, or as a terrible vehicle for invidious discrimination," Gore said.

--Text reprinted

802/82x Chemical Information Rules; Manufacturers Reporting; Preliminary Assessment Information.  
Environmental Protection Agency Fed. Reg. 47: 26992-27018, June 22, 1982.

Action: Final rule. Summary: This final Preliminary Assessment Information rule requires chemical manufacturers (including certain producers and importers) to submit information on approximately 250 chemicals. The information sought from manufacturers includes data on the quantities of chemicals manufactured, the amounts directed to certain classes of uses, and the potential exposures and environmental releases associated with the manufacturer's own and his immediate customers' processing of the chemicals. The information collected under this rule will answer a critical need for basic data that can be used in setting priorities for testing chemicals and for assessing risks associated with chemicals. Effective date: This regulation becomes effective on July 22, 1982.

--Summary

803/82x Asbestos: DOL Study Estimates 200,000 Deaths from Asbestos-Related Cancer by 1999.  
Occup. Safety & Health Reporter 12: 84, June 24, 1982.

Some 8,200 to 9,700 excess deaths from asbestos-associated cancer will occur each year for the next 20 years, totaling over 200,000 deaths by the end of the century, according to a Labor Department study released June 18. The study, "Disability Compensation for Asbestos-Associated Diseases in the U.S." was prepared by Irving J. Selikoff, director of the Environmental Sciences Laboratory of the Mount Sinai School of Medicine and a team of medical scientists and economists, and took almost four years to prepare, DOL said. It was completed in November 1981 and was then reviewed by the department, which contracted for it in 1978. According to the report, there are

approximately 8,200 excess deaths per year among workers who were exposed to asbestos during the 1940s and 1950s, when the risks of asbestos exposure were not fully understood. The study identified lung cancer and mesothelioma as the two major asbestos-related cancers. Because asbestos-induced lung cancer progresses even after exposure is terminated, and the latency period before initial clinical problems emerge averages between 15 and 40 years, DOL estimates that deaths from asbestos exposure will not reach a peak until 1990, when it said an expected 9,700 excess deaths may occur. According to the department, this figure represents approximately 2 percent of the total cancer deaths in this country in any given year, falling within the consensus of current estimates ranging from 1 to 3 percent. The DOL mortality projections also did not include asbestos-related cancer deaths that may be expected to appear among family contacts of asbestos workers, among consumers exposed to asbestos products, and from environmental exposure or exposure while in the U.S. military. DOL stated that it is too early to predict the number of deaths that will result from more recent exposures but said asbestos-related diseases among workers exposed in the past two decades will appear between 1980 and 2010 or later. Examining the relationship between asbestos-related cancer and smoking, the study found that the risk of lung cancer among asbestos-exposed workers who smoke is 50 times greater than among non-smokers not exposed to asbestos, and five times that of other smokers. Asbestos exposure increased by four to five times the risk of lung cancer in heavily exposed, non-smoking workers, according to the report, but no synergistic relationship was noted between other cancers, such as mesothelioma, and smoking habits among workers. An examination also was made of worker compensation benefits and other income sources available to the survivors of approximately 1,150 asbestos insulation workers who died of asbestos-associated diseases between 1967 and 1975. Some 1,000 of these workers died from cancer, primarily lung cancer and mesothelioma. The study found that the average period of disability before death from an asbestos-associated disease was 20.5 months. Length of disability, however, varied significantly depending on the specific disease. Workers who died from mesothelioma showed the shortest average length of disability before death at less than one year, followed by workers with lung cancer, who averaged one-and-a-half years, and three-and-a-half years for workers who died of asbestosis. The average age at death from asbestos-related diseases was found to be 51.8 years. While the study found that three out of 10 workers, or their survivors, applied for compensation disability benefits, and that nearly all who did eventually received some form of compensation, it also concluded that almost half of the claims were initially contested by insurers, primarily over whether the illness was work-related. Two-thirds of the claims took more than a year to resolve,

the report said. Only 15 percent of all asbestos-disabled workers received compensation benefits before death, according to the study, although most received old-age or disability benefits from Social Security during some part of their illness.

--Condensed from text

804/82x Progress in Dust Control Methods Used in Asbestos Industry. Ind. Hyg. News Rep. 25: 3-4, July 1982.

With the many sophisticated dust collection and dust suppression systems now available, there are few reasons why an asbestos mine, mill, or manufacturing plant is operated at fiber levels significantly higher than 2 f/cc, according to William B. Reitze of the Health, Safety and Environment Department of Manville Service Corporation (Ken Caryl Ranch, Denver, CO 80217). Speaking at the World Symposium on Asbestos held in Montreal, May 25-27, Mr. Reitze described progress in methods of dust control used in the asbestos industry. Some observations follow: The overall effectiveness of any collection system is dependent on the shrouding used for dust pick-up at the point source. Hood design has been greatly improved over the years. At an asbestos fiber feed charging station, for example, the bag is opened under negative pressure and even the bag folding and disposal is conducted under negative pressure. Totally enclosed automatic bag opening devices have met with varying degrees of success depending on types of bags fed through the machine. Many improvements have been made in packaging and shipping methods. Pressure packed poly bags have replaced the old jute bags. Individual handling of bags was replaced by palletizing and shrink wrapping of asbestos bags. In the case of frequently bumped railroad cars, inflatable dunnage reduces bag damage. For large users of asbestos fiber that can handle the fiber in bulk, special cars have been devised so that the material can be conveyed pneumatically to a mix, thereby eliminating the several dust creating steps. Another method used to reduce the dust created in shipping and handling is to change the form of the product. Asbestos fibers have been pelletized and blocked (a slight amount of moisture is added and a very hard, virtually dust-free block is made), and special pulpable bags have been designed so that the bag and contents could be introduced into certain processes.

--Text reprinted

805/82x Occupational Exposure to Lead; Deferral of Effective Date. Occupational Safety and Health Administration. Fed. Reg. 47: 26557, June 18, 1982.

Action: Notice of deferral of effective date.  
Summary: This notice defers the effective date of paragraphs (c)(3)(ii)(B) and (E) of the lead standard (§ 1910.1025) for the primary and secondary lead smelting industries and the

battery manufacturing industry, until August 30, 1982. The action is necessary to provide the additional time needed by the Agency to consider the appropriateness of the proposed administrative stay of these provisions pending the reconsideration of the lead standard. The proposed administrative stay appears in the June 18, 1982 Federal Register. Dates: The effective date is deferred until August 30, 1982.

--Summary

806/82x Carcinogens: NTP Panel Approves Cancer Findings for Trichloroethylene, Other Substances. Occup. Safety & Health Reporter 12: 89-90, June 24, 1982.

Trichloroethylene and three other chemicals tested by the National Toxicology Program were found to cause cancer in rodents, according to draft test reports approved June 16 by a program advisory panel. Four of the six reports reviewed by the NTP Board of Scientific Counselors Technical Reports Review Subcommittee showed positive results from two-year bioassays. The draft reports revealed evidence of carcinogenicity for the following: Trichloroethylene, a widely-used solvent; Benzyl acetate, a solvent and perfuming agent commonly used in soap and other consumer products; Melamine, an important chemical intermediate and monomer; 4,4'-methylenedianiline dihydrochloride, a chemical intermediate. Diallyl phthalate, a plasticizer, produced non-cancerous tumors in test mice, but was not proven to be carcinogenic, according to a draft report.

--Condensed from text

807/82x RCRA Rewrite Irks Industry Group. Chem. & Eng. News 60: 13, July 5, 1982.

A spokesman for the Chemical Manufacturers Association told the Senate Environmental Pollution Subcommittee that the House Energy & Commerce Committee's version of an amended Resource Conservation & Recovery Act actually could deter the chemical industry from conserving and reusing hazardous waste. William P. Moore, an environmental specialist for Rohm & Haas, said industry is concerned about a section in the bill that would force EPA to regulate the use, reuse, and recycling of hazardous wastes. Moore contends that EPA should govern only practices that might threaten health or the environment, and that it should not interfere with other industrial processes. Moore also told the Senators that CMA disagrees with provisions that require notifying EPA whenever hazardous wastes are burned as fuel and with the establishment of a federally mandated program of inspections of hazardous waste treatment facilities.

--Text reprinted

816/82x Rapid Assessment of Sources of Air, Water, and Land Pollution. World Health Organization. Available from: WHO Publication Centre, USA 49 Sheridan Avenue, Albany, NY 12210. 113 p. (1982). Price: Sw. fr. 12.-

Wherever there are environmental problems, an inventory of the types of pollution and waste sources, including their location and emission levels, is mandatory. Very detailed and precise inventories can be very resource-intensive and involve sophisticated monitoring and data-processing systems, and the budgetary and personnel requirements for such programmes are often beyond the scope of many agencies. However, by using the limited existing information it is possible to make reasonably accurate emission inventories at a relatively low cost. This book describes a procedure for making such inventories. By following the procedure described here one or two properly qualified professionals, with the help of a few technicians and auxiliary workers, should be able to produce in a period of one to three months, depending on the size and complexity of the study area, a rather complete and reasonably accurate inventory of all pollution and waste sources. It should be pointed out, however, that such inventories do not obviate the need for more detailed studies, but provide a first integrated view of the magnitude of the air, water, and land pollution in the area; they also mark the beginning of effective and comprehensive environmental pollution control planning. This book is intended primarily for engineers or scientists involved in environmental planning and control. However, it also discusses how public health managers can use the results of rapid assessment studies in public health programmes aimed at pollution control. The rapid assessment procedure presented here has been selected from environmental assessment methodologies developed in the course of various UNEP, UNIDO, and WHO projects, and is especially adapted to conditions in developing countries.

--Condensed from Introduction

817/82x Noise Exposure Factfolder and Asbestos Exposure Factfolder. Dray Publications, Inc. Available from: Dray Publications, Inc. Deerfield MA 01342. (1982) Price: \$0.35 each.

Noise and Asbestos Exposures are the first two in a new series of occupational disease folders designed to help control health hazards and aid OSHA compliance. These illustrated, 8-page industrial hygiene factfolders simplify technical data and provide the basic communications/documentation for hazard control programs. Each folder "informs" employees and supervisors of: hazard causes, methods of monitoring exposures, methods of medical examinations, and basic engineering controls. "Training" is provided through an illustrated introduction to work procedures and the choice of personal protection equipment. Single copies are 35 cents. Sample copies and quantity prices are available from Dray Publications Inc., Route 5, Deerfield, MA, 01342.

--Publisher's release

## INDUSTRIAL MEDICINE

818/82 Normality and Reliability in the Clinical Assessment of Backache. G. Waddell, et al. Brit. Med. J. 284: 1519-1523, May 22, 1982. 18 refs.

Backache is common yet its routine medical assessment is imprecise, unreliable, and poorly interpreted. Reproducibility studies on 475 patients improved the reliability of clinical interview and examination in backache, while studies of 335 normal subjects defined the limits of normality. Assessment of nerve function was found to be reliable but assessment of the back itself had to be considerably modified and examination improved by incorporating actual measurements. The validity and clinical utility of the information were analysed to determine the minimum amount of information which should be collected to permit clear diagnosis and management.

--Authors' abstract reprinted by permission

819/82 Med Card Saves Time, Saves Lives. Anon. Natl. Safety News 125: 32-33, April 1982.

What makes the Medical Information Card unique is the single strip of microfilm embedded in the card, along with a special magnifying lens that enables rescuers to read it in an emergency. The microfilm strip is made from a form that carriers fill out, detailing their own medical histories. Space is provided on the application form for the position of a baseline EKG, the name of the holder's doctor, insurance company, next of kin, and more. And the person may also fill out and sign legal authorization for emergency surgery in case such a procedure is needed when the carrier is unconscious and family members cannot be contacted. To read the strip, rescuers need simply to bend the flexible card in half and hold it near a light source, such as a flashlight, headlight, or even a match. The laminated plastic card is durable and will not break, even with repeated use. It is water proof and heat-resistant up to 300 F. For more information write: National Health and Safety Awareness Center, Department NSN, 333 N. Michigan Ave., Chicago, IL 60601, or call 312-726-6499.

--Condensed from text

820/82 Contact Lens - To Keep Them In or to Keep Them Out, On the Job - That is the Question! G. Nejme, Jr. Natl. Safety News 125: 58-61, June 1982.

There has been a quiet change in views of the use of contact lenses in industry. Hazards in certain environments led to total prohibition. Now, however, reconsideration of that position is being urged. A National Safety Council survey brings the issue into focus and reminds companies to start or update contact lens policies. The results of the survey are summarized.

--Author's abstract

years, and smokers had an average of 24.4 pack-years of smoking at the time of death. An analysis of 239 cases of CWP showed that the disease was mild in 69%, moderate in 22.6% and severe in 17.1%.

--Condensed from text

848/82 The Flax Industry in Northern Ireland Twenty Years On. P.C. Elwood, et al. Lancet 1: 1112-1114, May 15, 1982. 26 refs.

In 1961-62 a survey of respiratory symptoms in 2528 workers in flax mills in Northern Ireland and of dust levels in the mills was conducted. The workers were followed up in 1978, because recent developments suggested that an upturn in the industry was likely. Flax dust has an acute, reversible effect on the respiratory system, and byssinosis is a prescribed disease under the Industrial Injuries Act (1965). However, the follow-up study found no evidence of an effect on survival of either exposure to dust or byssinosis. The number of applications to compensation panels for assessment and certification of byssinosis has increased greatly in Northern Ireland. Although certification is independent of any subsequent common law claim by a worker for compensation on the grounds of disablement consequent on negligence by his employer, it must weigh heavily in such a claim. About 50 common law claims have been settled out of court for large sums in Northern Ireland, and 950 claims are waiting to be heard. The future cost to the industry is estimated to be at least £ 16 million. Since byssinosis appears not to cause excess mortality, it is unlikely to cause serious long-term morbidity. Although workers should be compensated for disablement due to negligence, in the absence of unequivocal evidence of disablement caused by byssinosis the financial settlements being reached in Northern Ireland seem unreasonable.

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849/82 Mechanisms of Hypersecretion in Rodent Tracheal Explants After Exposure to Chrysotile Asbestos. Studies Using Lectins. B.T. Mossman, et al. Chest 81: 238-248, May 1982 Supplement. 12 refs.

These observations suggest that hypersecretion occurs when a positively charged component (presumably  $Mg^{++}$ ) of chrysotile interacts with a surface receptor comprised, either in whole or part, of  $\alpha$ -D-mannose and/or  $\alpha$ -D-glucose. Since increased secretion occurs also after exposure of the tracheal epithelium to montmorillonite, a clay mineral containing structural aluminum and trace amounts of sodium and magnesium, various cations might be involved in triggering of mineral-induced hypersecretion. The mechanisms of chrysotile-induced mucin secretion and cytotoxicity in a variety of cell types appear similar, but not identical. In this regard, the positive charge of the fiber is intrinsic to the stimulation of both responses. For example, chrysotile-induced hemolysis and necrosis of

epithelial cells are prevented when fibers are either leached with 1 N HCl or coated with serum proteins. However, whereas interaction of chrysotile with  $\alpha$ -D-mannose and/or  $\alpha$ -D-glucose residues appears important in the induction of hypersecretion, binding of fibers to sialic acids (ie, N-acetylneuraminic, N-glycolylneuraminic, N-O diacetylneuraminic and N-acetyl O-acetylneuraminic acids) is implicated in damage to cellular membranes. In these experiments, pretreatment of red blood cells before exposure to chrysotile with neuraminidase, an enzyme that cleaves sialic acids from the cell surface, prevents hemolysis. In glycoproteins, the sialic acid residue is linked usually to galactose or N-acetyl hexosamine; this bond is sensitive to neuraminidase.

--Condensed from text

850/82 Origin of Mutagenicity of Welding Fumes in *S. typhimurium*. R.M. Stern, et al. J. Appl. Toxicol. 2: 123-133, June 1982. 71 refs.

The origin of mutagenicity in *S. typhimurium* in response to exposure to welding fumes, a complex mixture of metallic oxides and other inorganic compounds, was studied through the quantitative use of the histidine revertant *Salmonella* microsome test of Ames. Dose-response experiments and factorial design studies independently showed the mutagenic activity to be due to the presence of soluble Cr(VI). A rate of  $65 \pm 15$  revertants per plate per  $\mu g$  Cr(VI) was found for all fumes produced by the metal inert gas welding of stainless steel. A significantly reduced rate was found for manual metal arc welding fumes. The presence of other metals in low oxidation states (e.g. Fe(0), Fe(II), Al(0)), results in a significant reduction of the Cr(VI), accompanied by a corresponding decrease of the absolute revertant rate per unit fume mass.

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#### PHYSICAL HAZARDS

851/82 The Effect of Cold Exposure on Diffusing Capacity in Patients with Raynaud's Phenomenon. R.A. Wise, et al. Chest 81: 695-698, June 1982. 17 refs.

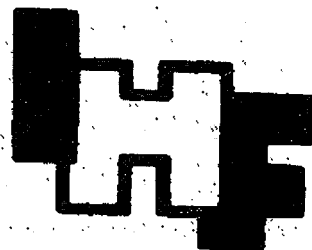
Pulmonary hypertension is common in progressive systemic sclerosis (PSS), and the presence of "pulmonary Raynaud's phenomenon" has been postulated from a variety of evidence. In this study, the effect of cold-induced Raynaud's phenomenon on carbon monoxide diffusing capacity (Dco), an indicator of pulmonary capillary blood volume, was determined in patients with Raynaud's phenomenon with and without PSS. Cold exposure caused an increase in Dco in patients without PSS, but no change in patients with PSS. The authors concluded that patients with systemic sclerosis have an altered

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## TABLE OF CONTENTS

THIS ISSUE CONTAINS ABSTRACTS 891/82x --- 1029/82

|                                                      |    |
|------------------------------------------------------|----|
| NEWS ITEMS . . . . .                                 | 1  |
| COMING EVENTS . . . . .                              | /  |
| LEGAL DEVELOPMENT . . . . .                          | 7  |
| BOOKS AND PAMPHLETS . . . . .                        | 8  |
| INDUSTRIAL MEDICINE . . . . .                        | 10 |
| SKIN DISEASES AND BURNS . . . . .                    | 13 |
| CHEMICAL HAZARDS . . . . .                           | 14 |
| INDUSTRIAL DUSTS, AND INHALANTS . . . . .            | 21 |
| PHYSICAL HAZARDS . . . . .                           | 26 |
| RADIATION . . . . .                                  | 27 |
| ENVIRONMENTAL PROBLEMS . . . . .                     | 28 |
| INDUSTRIAL HYGIENE, PREVENTIVE ENGINEERING . . . . . | 30 |
| OCCUPATIONAL HEALTH MANAGEMENT . . . . .             | 31 |
| SAFETY, ACCIDENT PREVENTION . . . . .                | 31 |
| ANALYTICAL METHODS, MISCELLANEOUS . . . . .          | 32 |
| INDEX . . . . .                                      | 34 |
| ADDRESSES OF JOURNALS ABSTRACTED . . . . .           | 37 |

## FEATURES

|                                                                                      |     |       |     |         |
|--------------------------------------------------------------------------------------|-----|-------|-----|---------|
| MORTALITY AMONG WORKERS: V. PROCESSING WORKERS.                                      | --  | Abst. | No. | 922/82  |
| NURSING DIRECTIVES FOR NURSING.                                                      | --- | Abst. | No. | 928/82  |
| A METHOD OF MONITORING REPRODUCTIVE OUTCOME FOR WORKPLACE<br>* REPRODUCTIVE HAZARDS. | --  | Abst. | No. | 931/82  |
| ANIMAL DATA IN HAZARD EVALUATION: PATHS AND PITFALLS.                                | --- | Abst. | No. | 946/82  |
| CARDIOPULMONARY TOXICITY OF TETRACHLOROETHYLENE.                                     | --  | Abst. | No. | 962/82  |
| MAN-MADE VITREOUS FIBERS: PRESENT STATUS OF RESEARCH ON<br>HEALTH EFFECTS.           | --- | Abst. | No. | 972/82  |
| INDOOR AIRBORNE ASBESTOS POLLUTION: FROM THE CEILING<br>AND THE FLOOR.               | --  | Abst. | No. | 973/82  |
| THE EFFECTS OF INDOOR POLLUTION ON ARIZONA CHILDREN.                                 | --- | Abst. | No. | 1002/82 |

/82x MONITORING THE WORKPLACE: INTERNATIONAL EFFORTS FOR STANDARDIZATION. Ind. News Report 25: 4, August 1982.

importance of reaching agreement on an international level regarding a Reference or Standard Method for monitoring asbestos fibre concentration in the workplace was emphasized Prof. Dr. Klaus Robock, Director, Asbestos Institute for Occupational and Environmental Health (Corlitzer Strabe 1, 4040 D-4000 Essen, Fed. Rep. of Germany), who spoke at the 1st Symposium on Asbestos held May 25-27, in Montreal, Canada. Dr. Robock noted that the membrane filter method in phase contrast by light microscope makes it possible to detect fibres down to 0.25 µm diameter, and that this technique is now the generally-used method to determine concentrations of respirable fibres in workplaces. To illustrate how important it is to fix certain influential parameters, he presented an example showing the influence of filter loading (increasing sampling time) on counting results from simultaneous sampling with two membrane filter personal dust samplers (S) at one workplace by measuring six times for 10 minutes versus measuring one time over 60 minutes.

--Condensed from text

/82x ASBESTOS REPORTING REQUIREMENTS. Environmental Protection Agency. Fed. Reg. 47: 33198-25, July 30, 1982.

Final rule. Summary: This final rule, under the authority of section 8(a) of the Toxic Substances Control Act (TSCA), 15 U.S.C. 2607(a), requires reporting to EPA by asbestos manufacturers, importers and processors. The information sought includes data on the quantities of asbestos used in making products, employee exposure data, and waste disposal and pollution control equipment data. Reported information will be utilized by EPA and other Federal agencies in considering the regulation of asbestos. Date: This regulation becomes effective on August 30, 1982.

--Summary

/82x COVERAGE OF COAL MINE CONSTRUCTION WORKERS RETURNED FROM OSHA TO MSHA. Occup. Health & Safety Letter 12: 2, July 22, 1982.

President Reagan has signed into law budget legislation which, among other things, includes provision returning occupational health and safety coverage of coal mine construction workers and sand and gravel employees from OSHA to the Mine Safety & Health Administration. Coverage of the workers had been shifted to MSHA last December. Under reduced funding, OSHA could have inspected coal construction and sand and gravel operations only once every 74.8 days, according to the United Mine Workers International safety division. "MSHA's effectiveness needs to be improved, but at least the agency should know the proper way to inspect these operations," said union president

Sam Church, Jr. "Given the anti-labor climate in Washington, this remedy is a major victory for the UMWA and these workers."

--Text reprinted

904/82x LIST OF HAZARDOUS WASTE SITES TO BE COMPILED. Chem. & Eng. News 60: 16, July 26, 1982.

EPA has issued its scheme for compiling a national priorities list of 400 hazardous waste sites eligible for cleanup funds from the \$1.6 billion Superfund program. Primary responsibility for nominating and scoring sites for inclusion on this list rests with the states, which will use EPA's hazard ranking system. More than 800 sites are expected to be evaluated, including the 115 priority sites listed by the agency last October. State submissions are expected at EPA beginning August 13, and the list is expected to reach 400 by the end of the year. The agency plans to publish the final proposed list in the Federal Register. Sites receiving highest priority for funding will be those for which the states have provided cost-sharing and other assurances, and for which enforcement actions are futile.

--Text reprinted

905/82x VALUE OF ANIMAL STUDIES IN PREDICTING A CARCINOGENIC HAZARD TO MAN. Ind. Hyg. News Report 25: 4, July 1982.

Despite the fact that the solvents that have produced tumors in animals have been in use for many years in industry, there have been no real indications, either from anecdotal or from epidemiological data, that they have induced cancer in man. This was pointed out by Dr. P. Grasso of the British Petroleum Research Center (Sudbury-on-Thames, Middlesex TW16 7LN, U.K.), who added that this should not, however, lead one to adopt a complacent attitude toward these solvents. At the International Conference on the Safe Use of Solvents held in Brighton, England, March 23-27, Dr. Grasso made the following observations: Interestingly, benzene, which has been associated with the development of leukemia in man, has not produced tumors in experimental animals. This exception serves to emphasize that species may differ considerably in the carcinogenic response to chemicals and that interpretation of results from animal studies in terms of human hazard must be carried out with great caution. Nevertheless, experience gained over the last two or three decades has indicated that the carcinogens which are likely to present a real hazard to man are those which produce the following results: (a) mutagenic activity in a number of systems which include mammalian cells or in vivo tests; (b) carcinogenic activity in more than one species of laboratory animal; (c) tumors in more than one target organ; (d) a wide spectrum of tumor severity -- from highly undifferentiated to benign; and (e) more than one affected cell-type in a target organ. Attention to these points will serve to

82x X-RAY CHANGES FOUND IN RAILROAD WORKERS  
SED TO ASBESTOS. Occup. Health & Safety  
er 12: 4-5, August 22, 1982.

It has found x-ray evidence of asbestosis in  
out of 266 current and former railroad  
ers in Conrail's shop facility in Reading,  
but suggested that a higher incidence of  
stos-related diseases might be found in a  
representative group of railway workers  
had been employed in the steam era prior to  
J. A volunteer population of 266 current  
former railroad workers underwent chest  
atgenograms and, in addition, gave an  
upational-smoking history. Seventy-five  
cent of the participants were over the age  
60, and 80 percent had fewer than 10 years  
railroad-related asbestos exposure. X-ray  
dence of asbestosis was found in only six  
kers, whereas 20 percent of the group had  
or more pleural changes, principally  
ckening. "While selection factors qualify  
results of this study, the findings support  
exposure, and suggest a past and future  
story of asbestos mortality and morbidity  
ng steam-era railway workers," said the  
vestigators, Drs. Martin-Jose Sepulveda and  
es A. Merchant. Dr. Merchant is currently  
airman of the Department of Preventive  
icine and Environmental Health, University  
Iowa. The larger study was prompted by a  
cent NIOSH investigation which found four  
ses of diffuse malignant pleural mesothelioma  
former workers of the Reading facility.  
eural abnormalities were the most common  
nding, and were observed in 20 percent of the  
rkers examined. Among workers with pleural  
anges, pleural thickening with calcification  
is more common than diffuse or localized  
eural thickening alone. Roentgenographic  
vidence of pneumoconiosis was found in eight  
rsons. Boilermakers and machinists had the  
ighest population of pleural abnormalities.  
he proportion of individuals with abnormal  
ilms appeared related to age and years from  
nset of railroad employment; the longer the  
nterval from first employment or the older the  
ge group, the higher the prevalence rate of  
leural abnormalities. No difference was found  
n the prevalence rate of x-ray abnormalities  
etween smokers and nonsmokers. In its report,  
IOSH acknowledged the limitations of the  
hort studied, and suggested that follow-up  
udies be conducted to reveal the true mag-  
nitude of disease.

--Condensed from text

911/82x HAZARDOUS WASTE MANAGEMENT SYSTEM;  
STANDARDS APPLICABLE TO OWNERS AND OPERATORS  
OF HAZARDOUS WASTE TREATMENT, STORAGE, AND  
DISPOSAL FACILITIES; AND EPA ADMINISTERED  
PERMIT PROGRAMS. Environmental Protection  
Agency. Fed. Reg. 47: 32274-32388, July  
26, 1982.

Action: Interim final rule with request for  
comments. Summary: The Environmental Pro-  
tection Agency (EPA) is required by the

Resource Conservation and Recovery Act (RCRA)  
to issue standards applicable to owners and  
operators of hazardous waste management facili-  
ties. These standards are to be used in issuing  
permits for facilities that treat, store, or  
dispose of hazardous waste. Accordingly, EPA  
is issuing interim final standards applicable  
to owners and operators of new and existing  
hazardous waste land disposal facilities and  
the corresponding procedures for permit appli-  
cations. EPA is also issuing conforming amend-  
ments to some existing hazardous waste regu-  
lations. Dates: Effective date: These interim  
final regulations become effective on January  
26, 1983, which is six months from the date of  
promulgation as RCRA Section 3010(b) requires.  
Comments must be submitted on or before November  
23, 1982.

\* --Summary

912/82x INDUSTRY DOCTORING OF BENZENE DATA  
CHARGED. Chem & Eng. News 60: 30, August  
23, 1982.

The controversy over regulation of benzene as a  
cancer-causing agent continues to boil. Earlier  
this month Rep. David R. Obey lashed out at  
Shell Oil Co. and the Chemical Manufacturers  
Association for allegedly pressuring the  
International Agency for Research of Cancer to  
water down its quantitative assessment of  
benzene's carcinogenic properties. IARC's  
scientific panel estimated that from 17 to 170  
persons per 1000 would be expected to contract  
cancer on exposure to 10 to 100 ppm over a  
working lifetime, in its final version, pre-  
pared by the IARC staff, the report eliminated  
mention of any dangers stemming from exposure  
to 10 ppm of the chemical, implying that the  
base level was exclusively 100 ppm. Obey says  
the new figures, if accepted as part of a  
standard, could endanger workers who might be  
protected otherwise, and threaten to affect  
adversely the hundreds of individuals currently  
involved in litigation against the companies  
they worked for.

--Text reprinted

913/82x A NEW SAMPLING PROCEDURE FOR TOLUENE-  
DIISOCYANATE (TDI). Ind. Hyg. News Report  
25: 1, July 1982.

A compromise method for monitoring toluenedi-  
isocyanate (TDI) that eliminates the inconve-  
niences of impinger sampling and the cost of  
high performance liquid chromatography (HPLC)  
equipment, but retains the simplicity of  
colorimetric analysis and tube sampling was  
described at the American Industrial Hygiene  
Conference in Cincinnati, June 6-11 by C. B.  
Westerhoff and M. Ozkan of Uniroyal, Inc. (P.O.  
Box 117, Waterbury, CT 06720). The collection  
medium for the proposed sampling method consists  
of a jumbo size silica gel tube which is prepared  
as follows: (a) break both ends of a jumbo  
silica gel tube (tube openings should be at  
least 5 mm); (b) remove the metal wire and the  
glass wool located in the front of the tube to

booklet was designed as a technical aid for specification writers, mechanics, inspectors, and designers who work on asbestos-related projects. The film, available on free loan, and the booklet are available from all OSHA and EPA regional offices. *Do It Right* also is available for purchase on 16mm film for \$137, (Order No. A04735), or 3/4-inch video cassette for \$55, (Order No. A04736), or for a three-day rental from: The National Archives Trust Fund Board, National Audiovisual Center, Washington, DC 20409, phone (301) 763-1896.

--Condensed from text

977/82 ENVIRONMENTAL FIBER-INDUCED PLEURO-PULMONARY DISEASES IN AN ANATOLIAN VILLAGE: AN EPIDEMIOLOGIC STUDY. M. Artvinli and Y.I. Baris. Arch. Environ. Health 37: 177-181, May/June 1982. 17 refs.

This study was designed to determine the prevalence of pleural mesothelioma and other malignancies in the Anatolian village of Tuzkoy, where neither asbestos nor any environmental carcinogen has been detected. Another village (Kizilkoy) located 12 km from Tuzkoy was selected as a control. Three hundred twelve subjects from Tuzkoy who were at least 25 yr of age and 95 subjects from Kizilkoy were studied. Analysis of X-rays of the Tuzkoy group revealed that subjects had calcified pleural plaques (17%), pleural thickening (10.5%), obscured costophrenic angles (15%), and diffuse interstitial pulmonary fibrosis (12.1%). Sixty-seven deaths were recorded in Tuzkoy during the previous 3 yr, 41 of which resulted from malignant diseases. There were no X-ray abnormalities or deaths resulting from malignancies in the control group. Because of the high incidence of mesothelioma and lung cancer which usually results from asbestos exposure, the presence of asbestos in Tuzkoy was investigated, but none was detected in spite of Tuzkoy's volcanic location. Nevertheless, zeolite, an asbestiform mineral, was detected in the stones of buildings and in the village soil, as well as in the lung and pleura of the patients during biopsy. Thus, this mineral was considered to be responsible for the fiber-induced pleuro-pulmonary diseases in Tuzkoy. No zeolite was found in the soil and stones of the control village.

--Authors' abstract

978/82 OCCUPATIONAL ASTHMA CAUSED BY CEDAR UREA FORMALDEHYDE PARTICLE BOARD. D.W. Cockcroft, et al. Chest 82: 49-53, July 1982. 20 refs.

Two carpenters developed asthma and rhinitis related to occupational exposure to a cedar urea formaldehyde (CUF) particle board. One patient developed nasal and chest symptoms and an equivocal early asthmatic response after CUF sawdust exposure, but not after spruce or western red cedar sawdust exposure; possible late asthmatic response may have been inhibited by beclomethasone treatment. The other patient

developed marked nasal and chest symptoms and a dual asthmatic response after CUF exposure, but not after spruce or cedar exposure. Both patients developed increased bronchial responsiveness to inhaled histamine, which persisted for at least six days in the first patient, and which was associated with increased asthmatic symptoms of days' to weeks' duration in both. A previously unexposed asthmatic patient, with more markedly hyperreactive bronchi, developed no symptoms, no change on spirometric testing, and no change in histamine response after CUF exposure. Specific IgE antibodies directed against formaldehyde-human serum albumin conjugate could not be demonstrated using the radioallergosorbent test. This investigation documents the occurrence of occupational asthma caused by urea formaldehyde used as a bonding agent in particle boards. Absence of a response in a previously unexposed, more severe asthmatic patient suggests specific sensitization to some component of the urea formaldehyde resin complex had developed.

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979/82 SCALING TOXICITY FROM LABORATORY ANIMALS TO PEOPLE: AN EXAMPLE WITH NITROGEN DIOXIDE. S.A. Book. J. Toxicol. Environ. Health 9: 719-725, May/June 1982. 12 refs.

Published data on the toxicity of nitrogen dioxide (as a model compound) from five laboratory animal species were utilized to scale the relationship of dose and toxic effect to the human species. A minute volume of inspired air was used as a metabolic scaling factor, predicting a median lethality during the time of exposure of 174 ppm NO<sub>2</sub> for a 1-h exposure for people. This work demonstrates a method of predicting effects in people when only data for laboratory animals exist. It also shows the value of planning toxicology studies that utilize several animal species, so that their data may be applied to forecasting the human condition.

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980/82 AGE-DEPENDENT PULMONARY RESPONSE OF RATS TO OZONE EXPOSURE. N.M. Elsayed, et al. J. Toxicol. Environ. Health 9: 835-848, May/June 1982. 31 refs.

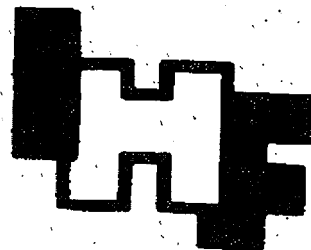
The influence of age on O<sub>3</sub> effects in the lung was studied in 8 groups of Sprague-Dawley rats: 7, 12, and 18 d of age (neonatal); 24, 30, and 45 d of age (infant); and 60 and 90 d of age (adult). Lung weight, total lung protein and DNA contents, and a series of marker enzyme activities in lung tissue were determined. After exposure of rats from each group to 3.8 ppm (1568 µg/m<sup>3</sup>) O<sub>3</sub> continuously for 3 d, a biphasic effect was noted. The biochemical parameters, expressed per lung, in O<sub>3</sub>-exposed rats relative to their corresponding controls decreased in the 7- and 12-d-old groups,

October 1982  
Volume 46, No. 10

# INDUSTRIAL HYGIENE DIGEST

LITERATURE  
ABSTRACTS

•  
ENVIRONMENTAL  
AND  
OCCUPATIONAL  
HEALTH AND  
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.  
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# INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.  
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 Production: Joy H. Henning, Ola B. Owens

October 1982  
 Volume 46, No. 10

## TABLE OF CONTENTS

THIS ISSUE CONTAINS ABSTRACTS 1030/82 -- 1160/82

|                                                      |    |
|------------------------------------------------------|----|
| NEWS ITEMS . . . . .                                 | 1  |
| COMING EVENTS . . . . .                              | 5  |
| LEGAL DEVELOPMENT . . . . .                          | 5  |
| BOOKS AND PAMPHLETS . . . . .                        | 7  |
| INDUSTRIAL MEDICINE . . . . .                        | 9  |
| SKIN DISEASES AND BURNS . . . . .                    | 12 |
| CHEMICAL HAZARDS . . . . .                           | 12 |
| INDUSTRIAL DUSTS AND INHALANTS . . . . .             | 19 |
| PHYSICAL HAZARDS . . . . .                           | 22 |
| RADIATION . . . . .                                  | 23 |
| ENVIRONMENTAL PROBLEMS . . . . .                     | 24 |
| INDUSTRIAL HYGIENE, PREVENTIVE ENGINEERING . . . . . | 25 |
| SAFETY, ACCIDENT PREVENTION . . . . .                | 27 |
| ANALYTICAL METHODS, MISCELLANEOUS . . . . .          | 29 |
| INDEX . . . . .                                      | 31 |
| ADDRESSES OF JOURNALS ABSTRACTED . . . . .           | 33 |

## FEATURES

|                                                                                                          |    |       |     |         |
|----------------------------------------------------------------------------------------------------------|----|-------|-----|---------|
| CANCER MORTALITY IN THE BRITISH RUBBER INDUSTRY.                                                         | -- | Abst. | No. | 1059/82 |
| PARENTAL OCCUPATIONS AND CANCER IN CHILDREN. A CASE CONTROL STUDY AND REVIEW OF THE METHODOLOGIC ISSUES. | -- | Abst. | No. | 1063/82 |
| SUPERVISORY CONCERN CAN PREVENT MASS PSYCHOGENIC ILLNESS.                                                | -- | Abst. | No. | 1066/82 |
| CAR PAINTER' EXPOSURE TO A MIXTURE OF ORGANIC SOLVENTS. SERUM ACTIVITIES OF LIVER ENZYMES.               | -- | Abst. | No. | 1093/82 |
| PROGRESSION OF VINYL CHLORIDE INDUCED HEPATIC FIBROSIS TO ANGIOSARCOMA OF THE LIVER.                     | -- | Abst. | No. | 1098/82 |
| CONGENITAL DEFECTS AND MISCARRIAGES AMONG NEW ZEALAND 2,4,5,-T SPRAYERS.                                 | -- | Abst. | No. | 1102/82 |
| EVALUATION OF RESPIRATORY EFFECTS IN MINERS AND MILLERS EXPOSED TO TALC FREE OF ASBESTOS AND SILICA.     | -- | Abst. | No. | 1108/82 |

INDUSTRIAL HYGIENE DIGEST

NEWS ITEMS

1030/82x OCCUPATIONAL EXPOSURE TO LEAD;  
TEMPORARY STAY OF COMPLIANCE DATE. Occupa-  
tional Safety and Health Administration.  
Fed. Reg. 47: 40410-40411, Sept. 14, 1982.

Action: Notice of temporary stay of compliance date. Summary: This notice temporarily stays the compliance date of paragraphs (e)(3)(ii) (B) and (E) of the lead standard (§1910.1025) for the primary and secondary lead smelting industries and the battery manufacturing industry, until November 15, 1982. The action is necessary to provide the additional time needed by the Agency to consider the appropriateness of the proposed administrative stay of these provisions pending the reconsideration of the lead standard. Date: The compliance date for §1910.1025(e)(3)(ii) (B) and (E) is stayed until November 15, 1982.

--Summary

1031/82x ASBESTOS: STANDARDIZATION OF CONTROL STRATEGIES, TECHNIQUES, IS FOCUS OF ILO DRAFT CODE. Occup. Safety & Health Reporter 12: 394, Oct. 14, 1982.

An international code intended to promote standardization of asbestos control procedures is being circulated in draft form to member governments of the International Labor Organization. The draft was written by an ILO committee following a meeting of asbestos experts in November 1981. When completed, most probably in early 1983, the code will be presented to the International Labor Conference for formal approval. While many countries already have prescribed occupational exposure limits for airborne asbestos fibers, these and other approaches to controlling the hazard need to be standardized internationally, according to a preliminary background document issued by the ILO. "One effective way of combatting asbestos hazards is to reduce the concentration of its airborne fiber particles at the workplace," the ILO said. For this purpose, many countries have prescribed occupational exposure limits with corresponding test measures. However, the ILO document said, threshold limits vary from country to country and so do methods of monitoring. The aim of the projected ILO code is to standardize various approaches in both strategy and technique, to ensure comparability in the establishment and implementation of basic protection measures.

--Condensed from text

1032/82x ASBESTOS; FRIABLE ASBESTOS-CONTAINING MATERIALS IN SCHOOLS: IDENTIFICATION AND NOTIFICATION; CORRECTION. Environmental Protection Agency. Fed. Reg. 47: 38535, Sept. 1, 1982.

Action: Rule; Correction. Summary: EPA issued a regulation (May 27, 1982) requiring the inspection of public and private elementary and secondary schools in the United States to identify friable asbestos-containing building materials. Each local education agency is required to inspect all areas of each school, take samples of each distinct type of friable material found, and have those samples analyzed for their asbestos content using polarized light microscopy (PLM) augmented by X-ray diffraction where necessary. This correction clarifies the rule to indicate that EPA will find it acceptable for laboratories analyzing samples under this rule to estimate the amount of asbestos in the bulk samples using methods equivalent to the point counting procedure contained in the "Interim Method for Determination of Asbestiform Minerals in Bulk Insulation Samples," published as Appendix A to the rule. Effective Date: Effective on June 28, 1982.

--Summary.

1033/82x METHYLENE CHLORIDE MAY CAUSE CANCER. Chem. & Eng. News 60: 13, Oct. 4, 1982.

Methylene chloride has been found to cause cancer in rats and mice, according to the National Toxicology Program. The preliminary assessment is that the solvent increases liver tumor formation about four times above the rate in untreated controls. Although the compound is used mostly as a paint remover and aerosol propellant, FDA may have to halt its use under the Delaney rule as a solvent to remove caffeine from coffee. This law requires FDA to ban any substance from use in food if it is found to cause cancer in humans or animals. The Halogenated Cleaning Solvents Association already has criticized the preliminary report for allegedly not taking into account the high rate of spontaneous tumors formed by the tested species and because the high doses used apparently killed some of the animals during treatment.

--Text reprinted

ischemia. He had further episodes of chest pains necessitating admission to hospital. These later symptoms were thought to be psychogenic in origin.

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#### INDUSTRIAL DUSTS AND INHALANTS

1106/82 ROLE OF INFECTIVE, IMMUNOLOGICAL, AND CHRONIC IRRITATIVE FACTORS IN THE DEVELOPMENT OF SILICOSIS. G. Chiappino and E.C. Vigliani. Brit. J. Ind. Med. 39: 253-258, Aug. 1982. 15 refs.

The effect of infective, immunological, and irritative factors on the onset and development of silicosis after intratracheal inoculation with 50 mg of tridymite was investigated on 220 specific pathogen free (SPF) female Sprague-Dawley rats. Even after 12 months the rats, always kept in SPF conditions after intratracheal injection of the dust, showed mainly granulomas with little tendency to confluence or to fibrohyalinosis. Chronic infective stimulation was obtained by keeping groups of SPF animals injected with tridymite for three, six, or 12 months in a conventional animal house, where they were exposed to the endemic bacterial flora. In these animals silicosis developed much more rapidly and produced much more severe confluent lesions than in rats always kept in SPF conditions. Horseradish peroxidase and ferritin given by intratracheal injection and by inhalation were histochemically shown mainly in the dust granulomas but did not accelerate the development of silicosis. Exposure to ozone increased the prevalence of lung infections and thus enhanced the silicosis in conventionally kept animals, without modifying the evolution of silicosis in SPF animals. These experiments showed that the presence of bacterial flora, and particularly bronchopulmonary infections, accelerated the development of silicosis and led to the suggestion that individuals subject to frequent bronchopulmonary infections are unfit for occupations necessitating exposure to silica dust.

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1107/82 ON THE DEFENSIVE ACTION OF GLUTAMATE AGAINST THE CYTOTOXICITY AND FIBROGENICITY OF QUARTZ DUST. K.I. Morosova, et al. Brit. J. Ind. Med. 39: 244-252, Aug. 1982. 32 refs.

The cytotoxic action of quartz (DQ<sub>12</sub>) particles on cultures of rat peritoneal macrophages, as estimated by the inhibition of the TTC-reductase activity, is considerably reduced by preincubation with glutamic acid and by adding sodium glutamate (15 mg/ml) to the drinking water of the rats donating the macrophages. This increase in macrophage resistance under the influence of

glutamate is the most probable cause of the delay in the development of silicotic fibrosis shown in several experiments on rats intratracheally injected with quartz and then treated by prolonged administration of glutamate. This effect is probably connected with the influence of glutamate on the stability of the macrophage membranes, which can in its turn be explained by different mechanisms, including the influence on the synthesis and phosphorylation of adenosine nucleotides. Such an influence was shown in rats receiving glutamate by the change of the ATP/ADP ratio in macrophages, but not in erythrocytes. The resistance of rat erythrocytes to the haemolytic action of quartz is also not influenced by the action of glutamate neither *in vitro* nor *in vivo*. Such differences in the influences of glutamate on two types of cells, equally susceptible to quartz cytotoxicity but considerably differing in the character of energy metabolism, is an indirect proof of the role of the latter in the realisation of the anticytotoxic, and thereby antifibrogenic, effect of glutamate.

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1108/82 EVALUATION OF RESPIRATORY EFFECTS IN MINERS AND MILLERS EXPOSED TO TALC FREE OF ASBESTOS AND SILICA. D.H. Wegman, et al. Brit. J. Ind. Med. 39: 233-238, Aug. 1982. 24 refs.

Miners and millers of talcore, free from asbestos and silica, were examined for respiratory effects. A study of 116 subjects included the modified British Medical Research Council respiratory symptom questionnaire, simple spirometry, chest radiography, and limited examination of the chest. A one-year follow-up evaluation was performed on 103 subjects. Of the 12 subjects whose chest radiographs showed small round or irregular opacities (perfusion 1/0 or greater), five had never smoked cigarettes. Pulmonary function values at the time of the initial study were less than predicted and the rates of loss of FEV<sub>1</sub> and FVC greater than expected. These differences were in part attributed to cigarette smoking but were greater than predicted from that source alone. There was evidence of an exposure effect after adjusting for cigarette smoking and the authors conclude that these workers have been affected by their exposures. No clear interaction between smoking and exposure could be identified. Populations such as this will need to be studied for longer periods to determine what current dust levels are safe.

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1109/82 FURTHER FOLLOW-UP STUDY OF WORKERS FROM AN ASBESTOS CEMENT FACTORY. H.F. Thomas, et al. Brit. J. Ind. Med. 39: 273-276, Aug. 1982. 15 refs.

A further follow-up traced 1970 workers employed at an asbestos cement factory for at least six months between 1936 and 1977. At the beginning of this period some crocidolite was used in the factory but by the end of 1936 chrysotile had become the only type of asbestos in use. Only 378 women were employed during the period concerned, and of the 30 who had died, none had a cause of death that is generally associated with exposure to asbestos. The mortality experience of the men was examined separately for all workers, all workers alive after 15 or more years after first exposure, and a smaller group of workers who were employed in 1935-6 and may have been exposed to crocidolite. In none of the three groups was there an appreciably raised standardised mortality ratio (SMR) for the causes of death investigated. These were: all causes, all neoplasms, cancers of the lung and pleura, and cancers of the gastrointestinal tract. An excess of lung cancers noted in the first follow-up study in 1964 was not found in this study. Two pleural mesotheliomas were identified but in both cases the men had worked at the factory before 1936 and therefore had been exposed to crocidolite. No cancers of the larynx were found.

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1110/82 MALIGNANT MESOTHELIOMA IN TURKISH IMMIGRANTS RESIDING IN SWEDEN. G. Boman, et al. Scand. J. Work Environ. Health 8: 108-112, June 1982. 12 refs.

Mesothelioma is a rare neoplasm in the general population, but it is strongly associated with previous asbestos exposure. The endemic occurrence of this disease in two villages in central Turkey has raised the question of whether the inhalation of naturally occurring zeolite dust may also be a factor in the development of mesothelioma. During the past few years a large portion of the inhabitants of one of the two villages of concern has immigrated to Sweden. This report presents three cases of malignant pleural mesothelioma and the results of a chest radiographic survey among these immigrants. Mineralogical analysis of lung tissue specimens from two of the cases revealed the presence of both zeolite and asbestos minerals and therefore suggested a synergistic effect involving both types of minerals. The importance of close medical surveillance of this high-risk population is emphasized, as is the possibility that similar cases appear in other countries because of increased migration.

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1111/82 APPLICATION OF THE K<sup>2</sup> ASBESTOS SCREENING TEST IN COLORADO SCHOOLS. C.A. Baldwin, et al. Am. Ind. Hyg. Assoc. J. 43: 602-604, Aug. 1982. 4 refs.

The K<sup>2</sup> Asbestos Screening Test was used to analyze 185 samples of material suspected of containing asbestos which were obtained from public schools in Colorado. The purpose was to determine if the test could feasibly be used by school districts conducting asbestos detection programs as a screening method to reduce analytical costs. Only 13.5% of the samples tested were negative, indicating that the samples did not contain asbestos. Of the large number (85.5%) of positive samples, 59% actually contained asbestos as determined by polarized light microscopy. Because of the low number of samples which were negative, there was not a significant reduction of analytical costs. Also, because of the hazardous nature of the reagents involved in the test, the uncertainties in interpretation of the results, and waste disposal problems, it is not recommended that this test be used by school district personnel. Bulk samples collected from schools should be sent directly to a laboratory experienced in identifying asbestos by polarized light microscopy or another acceptable technique.

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1112/82 THYMIDINE INCORPORATION BY LUNG FIBROBLASTS AS A SENSITIVE ASSAY FOR BIOLOGICAL ACTIVITY OF ASBESTOS. I. Lemaire, et al. Environ. Res. 28: 399-409, Aug. 1982. 40 refs.

Fibroblasts exposed to chrysotile B asbestos displayed an initial growth inhibition compared to controls during the first 24 hr of incubation. At 48 hr, however, there was resumption of cell proliferation as evidenced by elevated thymidine (TdR<sup>3</sup>H) incorporation. UICC samples of chrysotile A, chrysotile B, crocidolite, amosite, and anthophyllite all altered thymidine incorporation by lung fibroblasts in a dose-dependent manner and to different maximal levels. Amphibole asbestos was either equally or less active than chrysotile. Silica had the lowest activity. Various other particles, including latex, zymosan, titanium dioxide, magnetite, and Mt. St. Helens volcanic ash, had no effect. Chemically modified chrysotile samples which retained their fibrous structure were also tested for possible alterations of fibroblast thymidine incorporation. The DNA synthesis response of human lung fibroblasts to asbestos correlates with its *in vivo* fibrogenic and tumorigenic potential and may prove useful in determining the pathological effects of asbestos.

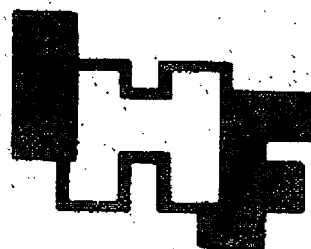
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November 1982  
Volume 46, No. 11

# INDUSTRIAL HYGIENE DIGEST

LITERATURE  
ABSTRACTS

ENVIRONMENTAL  
AND  
OCCUPATIONAL  
HEALTH AND  
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.  
34 PENN CIRCLE WEST • PITTSBURGH, PA. 15206

# INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.  
 Abstractor: Jean L. Collins, B.A.  
 Production: Joy H. Henning, Ola B. Owens

November 1982  
 Volume 46, No. 11

## TABLE OF CONTENTS

THIS ISSUE CONTAINS ABSTRACTS 1161/82x -- 1287/82

|                                                      |    |
|------------------------------------------------------|----|
| NEWS ITEMS . . . . .                                 | 1  |
| COMING EVENTS . . . . .                              | 4  |
| LEGAL DEVELOPMENTS . . . . .                         | 4  |
| BOOKS AND PAMPHLETS . . . . .                        | 5  |
| INDUSTRIAL MEDICINE . . . . .                        | 6  |
| SKIN DISEASES AND BURNS . . . . .                    | 10 |
| CHEMICAL HAZARDS . . . . .                           | 11 |
| INDUSTRIAL DUSTS AND INHALANTS . . . . .             | 18 |
| PHYSICAL HAZARDS . . . . .                           | 23 |
| ENVIRONMENTAL PROBLEMS . . . . .                     | 23 |
| INDUSTRIAL HYGIENE, PREVENTIVE ENGINEERING . . . . . | 23 |
| OCCUPATIONAL HEALTH MANAGEMENT . . . . .             | 24 |
| SAFETY, ACCIDENT PREVENTION . . . . .                | 26 |
| ANALYTICAL METHODS, MISCELLANEOUS . . . . .          | 27 |
| INDEX . . . . .                                      | 29 |
| ADDRESSES OF JOURNALS ABSTRACTED . . . . .           | 32 |

## FEATURES

|                                                                                              |    |       |     |         |
|----------------------------------------------------------------------------------------------|----|-------|-----|---------|
| RESPIRATORY MORBIDITY AMONG PROCESSING AND MILL WORKERS.                                     | -- | Abst. | No. | 1182/82 |
| <u>SALMONELLA</u> ELECTRODE FOR SCREENING MUTAGENS.                                          | -- | Abst. | No. | 1189/82 |
| PROCEDURES, TREATMENTS AND STAFF ROLES IN OCCUPATIONAL HEALTH.                               | -- | Abst. | No. | 1194/82 |
| ERYTHEMA MULTIFORME EXUDATIVUM LINKED TO THE MANUFACTURE OF PRINTED CIRCUIT BOARDS.          | -- | Abst. | No. | 1198/82 |
| NATIONAL ESTIMATES OF BLOOD LEVELS: UNITED STATES, 1976-1980.                                | -- | Abst. | No. | 1206/82 |
| MORTALITY AMONG MINERS RECEIVING WORKMEN'S COMPENSATION FOR SILICOSIS IN ONTARIO: 1940-1975. | -- | Abst. | No. | 1235/82 |
| MESOTHELIOMAS AND ASBESTOS TYPE IN ASBESTOS TEXTILE WORKERS: A STUDY OF LUNG CONTENTS.       | -- | Abst. | No. | 1242/82 |
| EFFECTIVE HEARING PROTECTION - A FOUR-PART PROGRAM.                                          | -- | Abst. | No. | 1259/82 |

1241/82x THE NATURE, HAZARDS AND ASSESSMENT OF OCCUPATIONAL EXPOSURE TO AIRBORNE ASBESTOS DUST: A REVIEW. W.H. Walton. Ann. Occup Hyg. 25:(2) 117-247, 1982. 8 p. refs.

Hygiene measurement parameters for airborne asbestos are discussed from mineralogical and biological standpoints. It is concluded that at present there is no practicable alternative to the membrane filter/phase contrast optical microscope (MF/OM) method for routine use, despite its many limitations, but that some features, including the fibre size limits, should be revised. On present evidence fibre counts appear to provide a better index of hazard than respirable mass concentration. Considerations of respirability and biological activity together suggest that the counts should be of fibres in the size range: length greater than 5-10  $\mu\text{m}$  but less than 100  $\mu\text{m}$ ; width less than 1.5-2  $\mu\text{m}$  (no minimum specified); aspect ratio greater than 5:1 to 10:1. Compared with present definitions ( $l > 5 \mu\text{m}$ ,  $d < 3 \mu\text{m}$ ,  $l/d > 3:1$ ) this reduces the maximum diameter and increases the minimum aspect ratio. The main drawback of the MF/OM method is that fibres thinner than ca. 0.4-0.2  $\mu\text{m}$  (depending on the microscope, method of mounting the sample and the observer's visual acuity) cannot be seen, although they contribute substantially to the number to an extent that varies with asbestos variety. This makes standardization of the method extremely difficult and is the main reason why different hygiene standards are needed for different asbestos varieties, especially between the amphiboles crocidolite and amosite. Further studies of the lung deposition of fibres thinner than 0.1-0.2  $\mu\text{m}$  are needed. In animal experiments chrysotile has generally been more damaging than the amphiboles, in contrast to human epidemiological experience. This is probably due to the lesser durability of chrysotile when retained in the body over long periods, as evidenced by the surprisingly small amounts of chrysotile compared with amphibole found in human lungs at autopsy despite the much greater industrial usage of chrysotile. Many non-asbestiform amphiboles and other minerals give rise to elongated dust particles of aspect ratio  $> 3:1$ . Discrimination between these and true asbestos particles is extremely difficult in individual cases, although overall size distributions differ. Recent codes for the MF/OM method indicate that discrimination is not to be attempted, but present practice in the U.K. is variable with marked effect on counting levels. Increasing the aspect ratio limit to  $> 5:1$  or preferably  $> 10:1$  would exclude many of the non-asbestiform particles but have relatively little effect on the true asbestos count. This supplements the biological evidence for a change from the present aspect ratio limit of 3:1 which was arbitrarily chosen by the ARC in 1958. Another problem for which there is little scientific guidance is the evaluation of clumps and other entities. The use of aerodynamic size selectors in sampling together with an upper size limit

of length+width  $> 100 \mu\text{m}$  for 'thistle-down' particles should help. Other technical changes to the MF/OM method are suggested. The novel suggestion is made that total fibre length per unit volume ( $\text{m}/\text{m}^3$ ) might reflect the hazard of asbestos exposure better than fibre number concentration and be easier to assess by man or machine --by counting crossing-points between fibres and a line drawn across the sample.  
--Author's abstract

1242/82 MESOTHELIOMAS AND ASBESTOS TYPE IN ASBESTOS TEXTILE WORKERS: A STUDY OF LUNG CONTENTS. J.C. Wagner, et al. Brit. Med. J. 285: 603-606, Aug. 28/Sept. 4, 1982. 14 refs.

The asbestos contents of the lungs of former employees of an asbestos textile factory were determined at necropsy using a transmission electron microscope. Those who had died of mesothelioma were compared with a matched sample of those who had died of other causes. The predominant fibre processed in the factory was chrysotile, but crocidolite had also been used. The lung content was consistent with the known exposure to chrysotile, but the crocidolite content was also high, being about 300 times that of the general population of the United Kingdom. The lungs of those with mesothelioma did not contain more of either chrysotile or crocidolite than the lungs of the controls, so no particular type of asbestos could be implicated in causing the mesotheliomas. The evidence of substantial exposure to crocidolite means that the mesotheliomas that occurred in this factory could not be attributed with any certainty to the exposure to chrysotile.

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1243/82 ROLE OF EXERCISE TESTING IN ASSESSING FUNCTIONAL RESPIRATORY IMPAIRMENT DUE TO ASBESTOS EXPOSURE. J. Howard, et al. J. Occup. Med. 24: 685-689, Sept. 1982. 25 refs.

To evaluate the complaint of exertional dyspnea in asbestos-exposed shipyard workers, pulmonary function tests were performed at rest and during exercise on 90 subjects with pleural plaques. The authors divided the subjects into four groups based on resting pulmonary function studies. Group I subjects (eight) had a restrictive defect; group II subjects (30) had an obstructive defect; group III subjects (six) had an isolated reduction in diffusing capacity; and group IV subjects (46) had a normal study. Subjects with a restrictive defect demonstrated minor physiologic abnormalities during exercise. Subjects with an obstructive defect demonstrated abnormalities consistent with their obstructive defect. Subjects in groups III and IV demonstrated an abnormally elevated wasted ventilation fraction, which may be an early indicator of interstitial disease due to asbestos exposure. The authors exercise testing was a useful tool in excluding the presence of significant functional exercise

limitation due to asbestos exposure in the majority of subjects and also in disclosing some physiologic abnormalities in some of the subjects in this study.

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1244/82 ENGINEERING CONTROL OF ASBESTOS.  
M.W. First and D. Love. Am. Ind. Hyg. Assoc.  
J. 43: 634-639, Sept. 1982. 5 refs.

A high asbestos content caulking compound (putty tape) is manufactured by kneading asbestos fibers into a mixture of mastic materials. Asbestos exposures are associated with receipt and storage of bagged asbestos, opening and dumping the bags of asbestos into a mechanical conveying system that feeds the putty mixing machines, and introducing asbestos into the mixing machines. Highly mechanized and exhaust ventilated conveying and transfer systems were designed to eliminate excessive asbestos exposures of plant workers, and effluent air filtration systems were employed to avoid emission of fibers to the atmosphere. Engineered dust controls for bag conveyors, bag breaking station, and loose fiber conveyors are described and illustrated. Fiber sampling results are included to indicate the degree of asbestos control that is being obtained in the plant and outside.

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1245/82 BIOCHEMICAL AND HISTOPATHOLOGICAL RESPONSE TO CHRYSOTILE INGESTION IN GUINEA PIGS. K.C. Saxena, et al. Ind. Health 20:(1) 19-25, 1982. 22 refs.

A periodic study of biochemical and histopathological changes in the stomach of guinea pigs, was carried out at 6, 12 and 24 hrs after oral administration of 500 mg of chrysotile dust. The gastric juice showed a significant increase in volume, free and total acidity and peptic activity. A marked reduction in mucin contents, most significantly at 12 hrs also occurred. Significant dissolution of nickel and a parallel rise in ATPase activity of gastric mucosa was also observed. Histopathologically mucosal injury was evident at 12 hrs but regressed by 24 hrs. The changes in acidity of gastric juice and dissolution of nickel are discussed with reference to their role in gastric ulceration or carcinoma by ingested asbestos.

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1246/82 CONCLUSIONS OBTAINED FROM MEDICAL EXAMINATIONS OF ASBESTOS WORKERS MADE AT THE CENTRAL DISPENSARY FOR OCCUPATIONAL DISEASES, MADRID. A. Viejo Fontela. Med. Seg. Trabajo 29: 102-104, July/Sept. 1982. (Spanish)

A group of 2,267 workers who had been exposed to asbestos were examined at the Central Dispensary for Occupational Diseases in Madrid. Seventy-eight percent were aged 41 to 65. Sixty-three percent were smokers. The incidence of permanent disability from asbestosis was 1.26%. The incidence of other diseases are tabulated.

--JFB

1247/82 ASBESTOS IN COLORADO SCHOOLS. C.A. Baldwin, et al. Pub. Health Rep. 97: 325-331, July/Aug. 1982. 18 refs.

Based on the results of this study it is estimated that as many as 1,124 (89 percent) of the 1,263 public schools in Colorado may have asbestos in friable form, and 380 (38 percent) may have asbestos sprayed on ceilings. If the potential exposure values for the small number of schools surveyed are typical of the values that might be found in other schools in the State, a serious problem exists that could result in adverse health effects in the future. The cost of dealing with asbestos-containing materials may be high, but this should not be an excuse for ignoring the problem. Simply identifying these materials is an enormous step in the right direction and one that should be taken in the remainder of the public schools in the State and in Colorado's private schools.

--Condensed from text

1248/82 CLASSIFICATION OF ASBESTOS-RELATED ALTERATIONS: PROPOSAL FOR REVISION. C. Cocucci. Med. Lavoro 73: 147-151, Mar./April 1982. 15 refs. (Italian)

A revision of the ILO/U/C Classification of Radiography regarding small irregular opacities is proposed. In point of fact, it has been experimentally shown that due to the physical phenomena of X-rays, such as "profusion" (i.e. number per surface unit), identifies itself with "type" (i.e. diameter of the opacities) of asbestos.

--Author's abstract in English

1249/82 EXPERIMENTAL STUDY OF FIBROGENOUS ACTIVITY OF SERPENTINITE DUST CONTAINING CHRYSOTILE ASBESTOS. V.B. Gorvich, et al. Gig. Trud. Prof. Zabol. (7) 28-31, 1982. (Russian)

Experimental study of fibrogenous activity of rocks containing asbestos showed that dust of various serpentinites is fibrogenous. Chrysotile serpentinite was found to cause the most manifest sclerotic lesions in the lungs of animals antigorite -- the least manifest ones. The

results support recommending that various types of serpentinite be taken into consideration along with asbestos fibers, while assessing the asbestos-containing dust in respect to the pneumoconiosis risk.

--Authors' abstract in English

1250/82 EFFECT OF BCG ON EXPERIMENTAL ASBESTOSIS. S.H. Zaidi, et al. Ind. Health 20:(2) 129-137, 1982. 18 refs.

Chrysotile inoculated intratracheally into normal and BCG immunised guinea pigs incited a macrophage response and reticulin fibrosis. The immunised animals showed a more rapid localisation of pulmonary lesions and disappearance of the chrysotile fibres leading to accelerated focal fibrosis. More rapid transport of chrysotile to the lymph nodes of immunised animals was also observed. These findings suggest that BCG vaccine can influence the development of pathological lesions of asbestosis in guinea pigs by inducing them earlier and more rapidly.

--Authors' abstract

1251/82 HEALTH EFFECTS OF WOOD DUST - RELEVANCE FOR AN OCCUPATIONAL STANDARD. L.W. Whitehead. Am. Ind. Hyg. Assoc. J. 43: 674-678, Sept. 1982. 35 refs.

Wood dust is coming under increasing scrutiny as an industrial exposure posing greater risk than that of a nuisance dust. In light of this increased interest, this paper reviews key reports of wood dust-related health effects, and summarizes the available information which relates exposure levels to effects. Numerous case reports exist of skin reactions and obstructive-pattern respiratory changes of either a hypersensitivity or irritant nature for various woods. Reports have also been published of apparently non-allergic obstructive respiratory effects including lung function test reductions and reduction of mucociliary clearance. Wood dust exposure also appears to be linked to the occurrence of adenocarcinoma of the nasal sinuses. Occasional reports link wood dust to other types of cancer, but these relationships are much less consistent than the association with nasal cancer. Various standards have been proposed for wood dust. Most are lower than the nuisance dust standard currently applicable in the U.S. This review of several key papers on wood dust permits some association of exposure data and effects, particularly with suppressed mucociliary clearance, from which it may be suggested from the available evidence that a standard of 2 mg/m<sup>3</sup> total suspended wood dust, not differentiated by type of wood, would protect against observed effects except for extreme allergic hypersensitivity.

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1252/82 RETENTION OF STAINLESS STEEL MANUAL METAL ARC WELDING FUMES IN RATS. P.-L. Kalliomäki et al. J. Toxicol. Environ. Health 10: 223-232, Aug. 1982. 13 refs.

Twenty male Wistar rats were exposed to MMA/SS welding fumes. The exposure situation of the study simulated the features of the actual environment as closely as possible. The lung retention of the elements of interest present in MMA/SS welding fumes as well as their distribution in other organs of the rats were investigated. The rats were intermittently exposed to MMA/SS welding fumes maximally for 10 h, the fume concentration being 43 mg/m<sup>3</sup>. Atomic absorption spectrometry was used for the analyses of Cr and Ni concentrations in the blood, whereas instrumental neutron activation analysis was applied in the multielement analysis of organ samples of the rats. Exogenous lung iron was determined by means of the magnetic measuring technique. The concentration of Cr, Ni, and exogenous Fe in the lungs and Cr in the blood, kidneys, and spleen increased linearly with increasing exposure time. The retention rates of these elements in the organs examined are also given. According to the lung retention and distribution model of Cr, the lungs constituted the target organ to the soluble, hexavalent chromates present in the MMA/SS welding fumes, although the Cr present in MMA/SS welding fumes has been proven to be in a water-soluble hexavalent form up to 95%, approximately 30% of the total inhaled Cr was soluble in the tissue. The distribution pattern of Cr in the organs differs from those obtained after single intravenous or intratracheal injections of alkaline chromates. The results show that the magnetic measuring method can be used to measure the retention of welding fumes by the lungs.

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1253/82 MUTAGENICITY OF DIESEL EXHAUST PARTICLE EXTRACTS: INFLUENCE OF DRIVING CYCLE AND ENVIRONMENTAL TEMPERATURE. C.R. Clark, et al. Fundam. Appl. Toxicol. 2: 153-157, July/Aug. 1982. 16 refs.

General Motors and Volkswagen diesel passenger cars (1980 and 1981 model year) were operated on a climate controlled chassis dynamometer and the particulate portion of the exhaust was collected on high volume filters. Dichloromethane extracts of the exhaust particles (soot) collected while the cars were operated under simulated highways, urban and congested urban driving cycles were assayed for mutagenicity in *Salmonella* strains TA-98 and TA-100. Driving pattern did not significantly influence the mutagenic potency of the exhaust particle extracts or estimates of the amount of mutagenicity emitted from the exhaust despite large differences in particle emission rates and extractable fraction of the particles. Mutagenicity of extracts of exhaust particles collected while the vehicles were

on heart rate were noted. These results suggest that prospective workers who must utilize respirators should be observed during exercise as well as at rest and that a respirator dead space and inspiratory resistance should not produce a significant heart rate change but should lead to adaptation of the inspiratory: expiratory time ratio. Workers who show atypical responses should be assessed particularly carefully.

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1282/82 CONFINED SPACE ENTRY: CAN THE DEATHS AND INJURIES BE ELIMINATED? S.P. Krivan. Prof. Safety 27: 15-19, Sept. 1982. 13 refs.

This paper has been written for the purpose of alerting safety personnel of the need for thorough and consistent confined space entry precautions, as well as to emphasize the frequent loss of lives that have been occurring from confined space entry activities. The limitations for a paper of reasonable length on this subject precludes further elaboration upon the desired control measures. While the key elements have been found to be successful within the author's experience, there are no doubt additional considerations that other safety and health professionals have found useful and may wish to share via professional publication for the benefits of all.

--Author's abstract

1283/82 FIRE SAFETY CONSIDERATIONS IN HIGH-RACKED STORAGE. H.J. Kolodner. Prof. Safety 27: 13-16, Aug. 1982.

It is not the intent of this paper to discuss fire prevention, fire detection, or fire protection of rack warehousing since these are now well documented in existing literature. However, an area that has not been addressed is overhaul and salvage operations once we are ready to "bring in the infantry" and complete our mop-up of the battle area. That is the area of concentration of this paper.

--Condensed from text

#### ANALYTICAL METHODS, MISCELLANEOUS

1284/82 ANALYSIS OF CHRYSOTILE ASBESTOS IN BULK MATERIALS. D.G. Bush and R.A. Schumacher. Anal. Chem. 54: 1792-1795, Sept. 1982. 16 refs.

A quantitative method for the analysis of chrysotile asbestos in bulk materials using thermal evolution analysis has been developed. The amount of chrysotile in a sample is determined by measuring the evolved water, using a DuPont moisture evolution analyzer, resulting from dehydration at about 640°C. The method uses 10-20 mg samples and is quantitative (+5%) for chrysotile in materials such as fireproofing,

insulation, and ceiling tile. By modification of the DuPont moisture analyzer a temperature program could be applied which yields a qualitatively significant water loss/temperature profile.

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1285/82 COMPARISON OF EXTRACTION METHODS FOR DETERMINATIONS OF POLYBROMINATED BIPHENYL RESIDUES IN ANIMAL TISSUE. J. Fawkes, et al. Anal. Chem. 54: 1866-1871, Sept. 1982. 14 refs.

Liver and renal adipose tissue from male Fischer rats previously given Firemaster FF-1 daily each work week for 180 days, by gavage in corn oil [1 and 10 (mg/kg)/day] and in rat chow [averaging 1 (mg/kg)/day], were analyzed by GLC for the major component 2,4,5,2',4',5'-hexabromobiphenyl (HxBB). The results from two extraction methods, hexane for both tissues and chloroform:methanol, 2:1 (C:M), for liver and methylene chloride (CH<sub>2</sub>Cl<sub>2</sub>) for adipose were compared. Total tissue bromine determined by neutron activation analysis (NAA) was included as an independent method to monitor the extraction methods. Hexane extracted tissues gave lower lipid and HxBB recoveries than those from C:M-CH<sub>2</sub>Cl<sub>2</sub> extraction. Lipid values were dose related being lower at the low doses than the high dose. The pattern was similar for HxBB but coefficient of variance values (CV) were about three times higher indicating poorer reproducibility for the hexane extraction method. The HxBB recoveries from C:M-CH<sub>2</sub>Cl<sub>2</sub> extracts were reproducible and quantitative when compared with total bromine for all dose levels. Similarly liver to adipose ratios of the HxBB expressed on lipid weight basis gave comparable means and CV's for the various treatment groups. Hexane extraction of HxBB however showed wide CV when compared with total bromine.

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1286/82 GAS CHROMATOGRAPHIC/FOURIER TRANSFORM INFRARED SPECTROMETRIC IDENTIFICATION OF HAZARDOUS WASTE EXTRACT COMPONENTS. D.F. Gurka and L.D. Belowski. Anal. Chem. 54: 1819-1824, Sept. 1982. 29 refs.

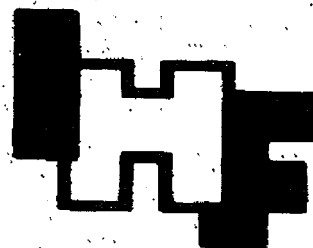
The Resource Conservation and Recovery Act of 1976 (RCRA) and its amendments require the U.S. Environmental Protection Agency to institute a program to control hazardous waste. Implementation of the RCRA will require reliable monitoring tools for the characterization of a broad spectrum of hazardous wastes. Accordingly, the capability of packed column gas chromatography/Fourier transform infrared spectrometry (GC/FT-IR) using the Gas Infrared Fourier Transform Software (GIFTS) to analyze complex hazardous waste extracts was tested. These extracts were also analyzed by gas chromatography/mass spectrometry (GC/MS) and the on-line library search results for both techniques were compared.

December 1982  
Volume 46, No. 12

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## TABLE OF CONTENTS

THIS ISSUE CONTAINS ABSTRACTS 1288/82x -- 1387/82

|                                                      |    |
|------------------------------------------------------|----|
| NEWS ITEMS . . . . .                                 | 1  |
| COMING EVENTS . . . . .                              | 4  |
| LEGAL DEVELOPMENTS . . . . .                         | 5  |
| BOOKS AND PAMPHLETS . . . . .                        | 6  |
| INDUSTRIAL MEDICINE . . . . .                        | 8  |
| SKIN DISEASES AND BURNS . . . . .                    | 10 |
| CHEMICAL HAZARDS . . . . .                           | 10 |
| INDUSTRIAL DUSTS AND INHALANTS . . . . .             | 18 |
| PHYSICAL HAZARDS . . . . .                           | 21 |
| RADIATION . . . . .                                  | 21 |
| ENVIRONMENTAL PROBLEMS . . . . .                     | 22 |
| INDUSTRIAL HYGIENE, PREVENTIVE ENGINEERING . . . . . | 23 |
| OCCUPATIONAL HEALTH MANAGEMENT . . . . .             | 24 |
| SAFETY, ACCIDENT PREVENTION . . . . .                | 24 |
| ANALYTICAL METHODS, MISCELLANEOUS . . . . .          | 25 |
| INDEX . . . . .                                      | 26 |
| ADDRESSES OF JOURNALS ABSTRACTED . . . . .           | 28 |

## FEATURES

|                                                                                                 |    |       |     |         |
|-------------------------------------------------------------------------------------------------|----|-------|-----|---------|
| OCCUPATIONAL MORTALITY STUDIES: PRINCIPLES OF VALIDITY.                                         | -- | Abst. | No. | 1309/82 |
| MORTALITY AMONG MALE RUBBER WORKERS IN FINLAND.                                                 | -- | Abst. | No. | 1310/82 |
| EVOLUTION OF CADMIUM-INDUCED RENAL DYSFUNCTION IN WORKERS<br>REMOVED FROM EXPOSURE.             | -- | Abst. | No. | 1321/82 |
| CUTANEOUS EFFECTS OF EXPOSURE TO POLYBROMINATED BIPHENYLS (PBBs):<br>THE MICHIGAN PBB INCIDENT. | -- | Abst. | No. | 1330/82 |
| EXPOSURE TO FORMALDEHYDE: EFFECTS ON PULMONARY FUNCTION.                                        | -- | Abst. | No. | 1335/82 |
| CANCER MORTALITY OF CANADIAN WORKERS EXPOSED TO VCM: A<br>THREE YEAR FOLLOW-UP.                 | -- | Abst. | No. | 1345/82 |
| ABSENCE OF RESPIRATORY EFFECTS IN SUBJECTS EXPOSED TO LOW<br>CONCENTRATIONS OF TDI AND MDI.     | -- | Abst. | No. | 1352/82 |
| A CHROMOSOME STUDY AMONG STAINLESS STEEL WELDERS.                                               | -- | Abst. | No. | 1363/82 |

diisocyanate were extensively monitored to provide accurate estimates of the upper-limits of exposure of the subjects. Current mean levels of FEV<sub>1</sub> in this population were higher than those predicted for healthy subjects. The five-year change in FEV<sub>1</sub> did not exceed that expected from aging. No acute change in FEV<sub>1</sub> could be demonstrated over the course of a Monday either before or after a two-week vacation. No improvement in ventilatory function was observed over the vacation period. The presence of cough or sputum was related to smoking but was not related to isocyanate exposure. The results indicate that exposure of workers to extremely low levels of isocyanates (time-weighted average concentrations of the order of 0.001 parts per million [ppm]) is not associated with chronic respiratory symptoms or effects on ventilatory capacity. The results suggest that isocyanates can be controlled to the point of eliminating effects as measured by these techniques.

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1353/82 AUSTRALIAN TDI WORKERS' SERA ASSAYED FOR IgE AGAINST A p-TOLYL-ISOCYANATE-HUMAN SERUM ALBUMIN CONJUGATE. C.J.A. Game. Am. Ind. Hyg. Assoc. J. 43: 759-763, Oct. 1982. 12 refs.

Sera of 91 people were assayed for IgE which bound to a p-tolyl-isocyanate-human serum albumin conjugate. The sera came from 20 blood donors, 70 factory workers, and 1 casualty patient. Three factory workers had abnormally high assay values in association with active TDI disease, as indicated by asthma or measurement showing chronic airway obstruction. One factory worker had an exceptionally high assay value without clinical evidence of TDI disease. Hapten inhibition studies are reported; they indicate possible heterogeneity of the IgE detected by the assay. Brief clinical histories of some cases of TDI disease are given, suggesting that TDI disease can include susceptibility to asthma triggered by events other than TDI exposure.

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#### INDUSTRIAL DUSTS AND INHALANTS

1354/82 PLEURAL MESOTHELIOMAS IN SPRAGUE-DAWLEY RATS BY ERIONITE: FIRST EXPERIMENTAL EVIDENCE. C. Maltoni, et al. Environ. Res. 29: 238-244, Oct. 1982. 1 ref.

Erionite and crocidolite fibers were tested for carcinogenicity by intrapleural and intraperitoneal injection (*via tantum*) in 40 Sprague-Dawley rats per route for each fiber type. Pleural mesotheliomas were found in nine of ten animals that died within a year after intrapleural injection with erionite fibres. No pleural

tumors were found among the animals treated at the same time and in the same way with crocidolite. Intraperitoneal injection of erionite did not produce mesotheliomas of the peritoneum, while a high incidence of these tumors was found among the animals treated by intraperitoneal injection of crocidolite. The studies are still in progress.

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1355/82 OPHTHALMOLOGIC EFFECTS OF MAN-MADE MINERAL FIBERS. J. Stockholm, et al. Scand. J. Work Environ. Health 8: 185-190, Sept. 1982. 17 refs.

The effect of man-made mineral fibers on the human eye was investigated in a cross-sectional study of 15 workers exposed to Rockwool and a matched reference group of 15 people. Eye symptoms, changes in the cellular and mucous content of the conjunctival fluid, break-up time of the precorneal film, the number of microepithelial defects, and the number of dead and degenerated cells on the cornea and bulbar conjunctiva were used as measures of effect. The number of fibers accumulated in the eye and conventional dust sampling methods were used as measures of dose. A significantly higher frequency of eye symptoms related to work conditions ( $p < 0.001$ ) was found among exposed workers. Similarly, the number of microepithelial defects on the medial bulbar conjunctiva increased significantly ( $p = 0.009$ ) after 4 d of exposure. Six exposed workers had a pathological increase in the neutrophil count of the conjunctival fluid after 4 d of exposure, and an increase was seen in only one worker after a weekend free from exposure. Significant correlation was found between microepithelial defects on the medial bulbar conjunctiva and measures of dose ( $p < 0.01$ ). The symptoms and cellular changes can be explained by the assumption that man-made mineral fibers have the same mechanical and reversible effect on the eye as on the skin. The described dose-effect relationship suggests that a much lower hygienic standard is needed for man-made mineral fibers than what has been recommended by the American Conference of Governmental Industrial Hygienists.

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1356/82 EFFECTS OF FLY ASH INHALATION ON MURINE IMMUNE FUNCTION: CHANGES IN MACROPHAGE-MEDIATED ACTIVITIES. A. Zarkower, et al. Environ. Res. 29: 83-89, Oct. 1982. 15 refs.

Mice were exposed to fly ash particles ( $< 2.1 \mu\text{m}$  diameter) by inhalation for variable amounts of time at concentrations ranging from 535 to 2221  $\mu\text{g}/\text{m}^3$ . This fine fraction was approximately 32% by weight of the total dust generated. The effects of these exposures were assessed on

macrophage-mediated functions. Phagocytosis of bacterial cells by the alveolar macrophages was depressed in the fly ash-exposed animals as was the ability to enhance T-cell mitogenesis. Fly ash exposure failed to produce a significant change in the cellular immune response (delayed-type hypersensitivity reaction) to antigenic challenge in the lungs of sensitized animals.

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1357/82 EXPERIMENTALLY INDUCED MESOTHELIOMA IN WHITE RATS IN RESPONSE TO INTRAPERITONEAL ADMINISTRATION OF AMORPHOUS CROCIDOLITE ASBESTOS: PRELIMINARY REPORT. K. Kolev. Environ. Res. 29: 123-133, Oct. 1982. 21 refs.

The experiment was performed on white rats that were administered intraperitoneally two types of crocidolite asbestos--fibrous and amorphous. The fibrous structure, with fiber length ranging between 3 and 5  $\mu$ m, and the amorphous state of the second type were proved by electron microscopy and infrared spectrophotometry. In the group treated with amorphous asbestos, at an average interval of 484 days after the administration, eight cases of mesothelioma were observed, while in the group treated with fibrous asbestos only three cases of mesothelioma were found, i.e., the results obtained show a statistically significant difference. The fibrous structure of asbestos as the predominant cause of peritoneal mesothelioma induction is questioned and a new explanation of the fact that amorphous asbestos induces approximately three times as many cases of mesothelioma than fibrous asbestos is considered.

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1358/82 THE PATHOLOGICAL EFFECTS OF PROLONGED ASBESTOS INGESTION IN RATS. R.E. Bolton, et al. Environ. Res. 29: 134-150, Oct. 1982. 3 p. refs.

The effects of prolonged ingestion of amosite, crocidolite, and chrysotile UICC standard reference asbestos samples were examined in groups of laboratory rats. Animals were given over 250 mg per week for periods up to 25 months and were monitored for the remainder of their life span. Animals were examined for evidence of pathological effects and gastrointestinal mucosal cytokinetic disturbances and for signs of penetration and dissemination of fiber. There was no excess of malignant tumors in the experimental groups when compared with control animals, and no gastrointestinal mucosal abnormalities were found. An examination of the cytokinetic status of a subgroup of animals exposed to asbestos similarly showed no evidence of any adverse effects of prolonged ingestion of amosite asbestos fiber. Detailed electron microscopic examination of various tissue residues for the

presence of asbestos fibers was also undertaken. No penetration and/or damage to any of the gut tissues was found. Although occasional fibers were found in a variety of tissue residues, there was no evidence of preferential retention of fibers within any specific tissue and no sign of higher fiber burdens in those animals with tumors. It was concluded that there were no significant adverse effects of prolonged asbestos ingestion in healthy laboratory rats. The implications of these findings are discussed in the light of other published work.

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1359/82 ASBESTOS BRAKE EMISSIONS. R.L. Williams and J.L. Muhlbaier. Environ. Res. 29: 70-82, Oct. 1982. 14 refs.

An enclosed brake-testing machine was built to determine the importance of asbestos emissions from automobile brakes. Higher emissions resulted from disc brakes than from drum brakes due to the smaller surface area contacting the wheel in the former case. Median emissions from one disc brake were 3.3 mg particulate/stop (55% airborne, 12% sedimentary, 34% brake-entrained), 0.6 mg C/stop as hydrocarbons, 0.7 mg C/stop as CO<sub>2</sub>, and 0.1 mg C/stop as CO. Higher emissions were observed with increases in velocity and deceleration rate. The mass median aerodynamic diameter of the emitted particles was 3.1  $\mu$ m. Although the original brake material was about 50% asbestos, the emitted particles averaged only 0.29% asbestos. Therefore, it appears that over 99.9% of the mass of original asbestos fibers was broken down into nonfibrous magnesium silicates. In addition, asbestos fibers which are on the order of millimeters in length in the brake had a median length of 0.5  $\mu$ m in the emitted debris. Based on the mass emission results and a stopping rate of 1.2 stops/km, it can be estimated that 2.6  $\mu$ g of asbestos/km/vehicle is emitted into the air, 0.76  $\mu$ g/km settles to the roadway, and 2.2  $\mu$ g/km is entrained in the wheel. Although brake emissions are responsible for a minor fraction of ambient asbestos levels, there may be a noticeable increase in asbestos levels near high-braking areas such as tollbooths.

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1360/82 ASBESTOS FIBRES RELEASED FROM HEAT CURTAINS: A TRUE OCCUPATIONAL HAZARD. A.M. Loi, et al. G. Ital. Med. Lav. 4: 117-120, May 1982. 6 refs.

The authors point out the possibility that asbestosis can be detected or suspected in workers exposed to asbestos fibres released from heat curtains or clothes in various industrial environments. They report the case of seven workers in a metallurgic plant; these workers had been exposed to such a risk and showed, from 10 to 23 years later, a radiological appearance of interstitial fibrosis with a slight or moderate respiratory impairment. --Authors' abstract