

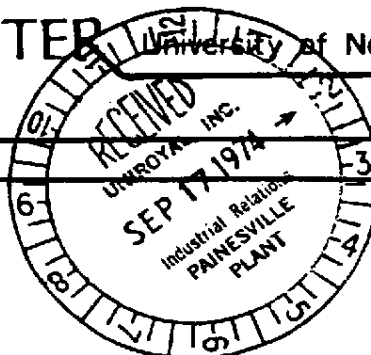
occupational health studies

NEWS LETTER

University of North Carolina at Chapel Hill
School of Public Health

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INTRODUCTION

The Occupational Health Studies Group and the National Institute for Occupational Safety and Health are planning to conduct a joint study among vinyl chloride workers at Firestone's Pottstown plant. The plans for this study, which is expected to begin in late September, are discussed in this issue of the newsletter.

An investigation of health status among persons working with HR (Hexamethylene tetramine - Resorcinol) systems used in tire making has been undertaken. Initial tests are being conducted at Firestone's Plant I in Akron. Details are reviewed in this issue.

Industrial hygiene surveys have been done recently at General's Mayfield, Kentucky plant and at Goodyear's St. Marys, Ohio plant. These surveys are briefly described.

Mr. Stephen Rappaport, a doctoral candidate in industrial hygiene at the University of North Carolina, has completed an extensive research effort in the matter of emissions from rubber vulcanization. An abstract of his dissertation, "The Identification of Effluents from Rubber Vulcanization" is presented.

NIOSH AND THE OCCUPATIONAL HEALTH STUDIES GROUP TO CONDUCT JOINT STUDY

Over the past several months there has been serious concern for the health of workers exposed to vinyl chloride. The National Institute for Occupational Safety and Health (NIOSH), the government agency with primary responsibility for research on occupational health problems, selected the Firestone Pottstown plant as one of the sites at which it will carry out health examinations among vinyl chloride and polyvinyl chloride workers. The University of North Carolina's Occupational Health Studies Group had already initiated a health study at the Pottstown plant to include rubber, chemical, and plastic workers. It is to the advantage of the workers examined and the research teams to avoid duplication of effort and unnecessary repetition of tests, so arrangements were made between the University and NIOSH for a joint study.

In the latter part of September, the Occupational Health Studies Group and NIOSH will offer extensive physical examinations (blood, urine, liver, and breathing tests) to all vinyl chloride workers and to a sample of rubber workers not exposed to vinyl chloride. As a result of NIOSH working with the Occupational Health Studies Group, the workers will get free and comprehensive health examinations which will be more thorough and complete than would be possible if either research group worked alone.

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One purpose of these health examinations is to detect any health abnormalities which might be associated with work exposure. Another purpose is to identify tests which are early indicators of future disease. The use of such tests, which will show abnormalities before actual illness occurs, would have great value in the prevention of disease.

Following the vinyl chloride investigation, the Occupational Health Studies Group will continue health testing (primarily lung function, liver, and blood tests) on a sample of rubber workers not included in the vinyl chloride study. This will complete the original University of North Carolina Pottstown research plan to study the effects on certain health parameters of working in various jobs within a rubber plant. Many of the tests that will be used are very sensitive and can, for example, detect a decrease in lung function that is still repairable or reversible. The tests can indicate a decrease in ability to breathe that if continued could lead to a disease such as chronic bronchitis or emphysema, for which there is little available effective medical treatment. Early detection may permit preventive measures such as reducing exposure or giving up smoking to be taken, thus preventing disease.

HR (HEXAMETHYLENE TETRAMINE - RESORCINOL) INVESTIGATION

The Occupational Health Studies Group was asked by the URW and Firestone Tire and Rubber Company to examine the occupational health implications of the use of HR (Hexamethylene tetramine - Resorcinol) stock in the manufacture of tires. Use of HR stock is increasing generally throughout the tire manufacturing industry.

In the 1960's, there were episodes of what was reported to be a respiratory hypersensitivity reaction developing among workers exposed to an adhesive system containing resorcinol and a methylene donor. Use of the system was discontinued. Different systems are in use now. There have, however, been no comprehensive studies on the effects of any of these different systems on breathing capacity or lung function.

The Occupational Health Studies Group has designed a study to determine whether or not HR systems now used have an adverse effect on lung function. Its initial investigations involve testing lung function in exposed and unexposed workers at the Firestone Akron plant. The same tests will be offered later to similar groups in some other plants.

Some workers are tested before going to work and then again after six hours of work. They are also tested on the days when they are not exposed to the HR stock. The results of this testing will help determine whether or not there is an acute effect on lung function as a result of working with HR stock. Other workers are tested only once during the day and the results are compared with those from non-exposed workers. This testing is intended to show if exposure results in chronic or long-term decreases in lung function. In addition, environmental sampling is being carried out concomitantly with the health testing.

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INDUSTRIAL HYGIENE SURVEY - MAYFIELD, KENTUCKY
GENERAL TIRE AND RUBBER COMPANY

The General Tire and Rubber Company plant at Mayfield, Kentucky was the site of a preliminary industrial hygiene survey and field sampling experiment conducted by an Occupational Health Studies Group team in July.

The objective of the field sampling experiment was to determine the precision of various air-borne particulate collection devices operated in a comparable atmosphere for different periods of time. A banbury loading area served as the experimental site, for the day and a half period of environmental monitoring. In total, 28 samples were taken measuring gross and respirable particulate matter. The results of this experiment answer questions about sampling periods used in the continuing environmental sampling studies. Based on the results of this experiment, we believe that 8 hour samples provide more precise measurements than the average of two 4 hour samples taken sequentially.

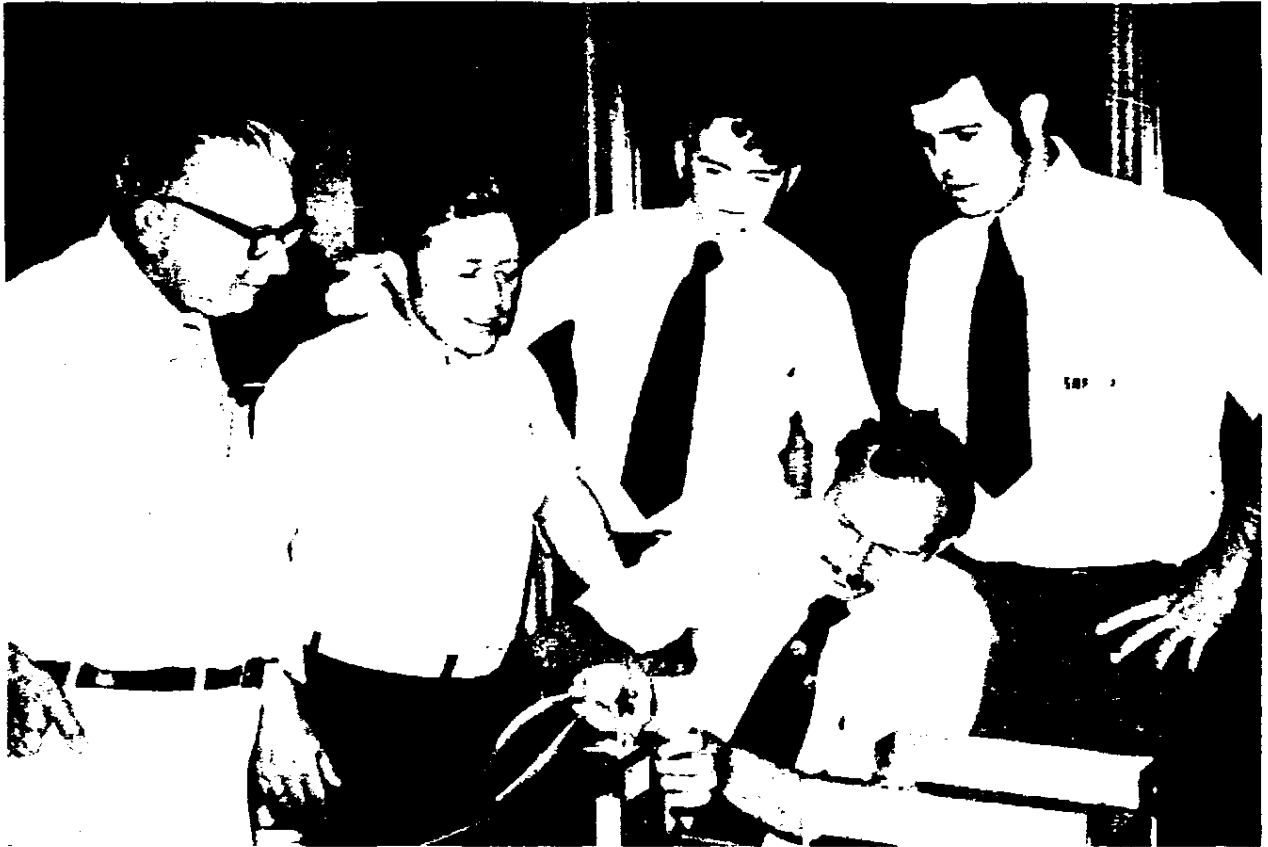
Members of the Local Union No. 665, plant management, and General Corporate personnel assisted the Occupational Health Studies Group staff with the preliminary industrial hygiene survey. Mr. Bruce, Mr. Rice, and Mr. Wilkins, members of the Joint Safety Committee, URW Local Union 665, joined the plant survey which was guided by Mr. Jim Arvin, plant Safety Engineer.



Mr. Jim Arvin, Mr. Hal Rice, Ms. Jennifer Minogue, and Mr. Danny Bruce (from left to right) inspect the apparatus used in the field sampling experiment.

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INDUSTRIAL HYGIENE SURVEY - ST. MARYS, OHIO
GOODYEAR TIRE AND RUBBER COMPANY



Mr. Ted Williams (seated) demonstrates a sampling technique. From left to right are Mr. Joe Alexander, Mr. Gene Hunsaker, Mr. Earl Arp, and Mr. Laurel Husband.

As part of the continuing industrial hygiene surveys of the Occupational Health Studies Group, Mr. Ted Williams and Mr. Earl Arp, industrial hygienists, visited the Goodyear industrial products plant at St. Marys, Ohio, to sample for vinyl chloride and other vapors.

Mr. Williams and Mr. Arp met with plant and union officials to discuss the survey and demonstrated the sampling techniques that would be used. Procedures for the survey were discussed with Mr. Joe Alexander, Personnel Manager; Mr. Laurel Husband, Safety Director; and Mr. Gene Hunsaker, President of the URW Local Union #200. In addition, Mr. Dick Uhlenhake, Union Chairman of the cast-film division, and Mr. Harold Chrisman, General Foreman of the cast-film division, were very helpful to the industrial hygienists during the environmental monitoring.

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Approximately thirty-five samples were collected during the visit and were returned to the laboratory for analysis.

"THE IDENTIFICATION OF EFFLUENTS FROM RUBBER VULCANIZATION", STEPHEN M. RAPPAPORT, August, 1974

From the viewpoint of occupational health, the vulcanization of rubber presents an unknown factor. During the process, workers may be exposed to mixtures of organic vapors which have been neither qualitatively nor quantitatively investigated. This project was designed to provide insight by supplying exposure data for compounds which are abundant in the effluent vapors from vulcanization of a rubber stock.

Modern vulcanization technology is complex, involving a variety of stocks, ingredients, and chemical interactions. Because of this variability it is difficult to generalize or to predict the nature of emissions released from individual operations.

For vulcanization processes specifically, very little toxicological and epidemiological data have been developed. Since exposures are poorly defined, toxic responses are difficult to predict on the basis of either acute or chronic effects. Likewise, the few published mortality and morbidity studies indicate only possible problems, with attention usually directed toward carcinogenesis.

This investigation supplies qualitative and quantitative analysis of the moderate to high molecular weight organic fraction discharged from an actual stock during cure. Initially, vapors are generated and collected in the laboratory whereupon the combined techniques of gas chromatography and mass spectrometry are used to identify more than 30 individual compounds. Then, environmental sampling and analysis establish the airborne concentrations of these substances in the manufacturing area.

Identified in the vulcanization effluent is an unusual assortment of compounds, including styrene, butadiene oligomers, alkyl benzenes and naphthalenes, and several specific nitrogen and sulfur containing substances. Most of these are traced to individual formulation ingredients, i.e., the polymers, an aromatic oil, the antiozonant, and the accelerator. Air concentrations for compounds confirmed in the curing area (a passenger tire press room) ranged from a high of 1.5 ppm to 5 ppm, and vary inversely with boiling point; thus the more abundant substances are in the C₅ to C₈ boiling range.

PERSONNEL NOTES

Dr. Robert Harris, who has been Deputy Director of the Occupational Health Studies Group, will assume the position of Director starting September 1, 1974.

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Dr. David Fraser, as Project Director, has completed the initial stages of organization and development of the project. He will continue to serve the Occupational Health Studies Group as a special advisor and a key member of the Policy Board. With relief from some of the day to day tasks of project direction, Dr. Fraser will be able to devote more time to his heavy schedule of academic and research activities as a senior faculty member of the School of Public Health's industrial hygiene program.

We are pleased to announce that Mr. Ted Williams and Mr. Earl Arp have joined the industrial hygiene staff. Mr. Williams has a master's degree in industrial hygiene and Mr. Arp, who holds the master's degree as well, is a doctoral candidate in industrial hygiene at UNC.



Mr. Ted Williams

Ms. Pam Wolf and Ms. Nancy Elish have also joined the staff as biostatisticians. Both Ms. Wolf and Ms. Elish received master's degrees in biostatistics from UNC in May.

In addition, Professor Roamless Hudson, who is acting chairman of the Department of Chemistry at St. Augustine's College in Raleigh, North Carolina, has been spending the summer working in the industrial hygiene laboratory.

We regret to announce the departure of several staff members of the Occupational Health Studies Group. At the same time, we wish to congratulate these individuals on their accomplishments and professional recognition as evidenced by the positions for which they were selected. Mr. Grover Wrenn has accepted an appointment with the Occupational Safety and Health Administration in Washington, D.C. as chief of the industrial hygiene section in the Office of Standards. Ms. Berenice Goelzer has accepted a position as occupational health hygienist with the World Health Organization in Geneva, Switzerland. Dr. Felix Gruber has accepted a faculty appointment in the Department of Preventive Medicine at Texas Technical University in Lubbock, Texas, and Mr. Ron Benton has accepted a position as corporate industrial hygienist with Reynolds Metal Company in Richmond, Virginia.

We also have a bride-to-be among our staff. Ms. Jennifer Minogue, a research assistant in the industrial hygiene laboratory, will be married in September and is moving to Canada.



Mr. Earl Arp

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Ms. Nancy Elish (left) and
Ms. Pam Wolf (right)



Professor Roamless Hudson

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The Occupational Health Studies Newsletter is published and distributed by the Occupational Health Studies Group. We welcome your suggestions and response. All correspondence should be addressed to:

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