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OBSERVATIONS ON UFFI, FUNGI and INDOOR AIR QUALITY WORK in the NETHERLANDS, WEST GERMANY and ISRAEL

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Authorized for Release: Date: 1 bace-ber 1986 File number: 10/70-1



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INTRODUCTION

Air tightening of buildings, development in polymer based materials and their increased usage in building materials and in consumer products resulted in the introduction of a greater variety of organic compounds in the indoor air. One of which was Urea formaldehyde Foam Insulation (UFFI). Health complaints from homeowners who insulated their homes with UFFI, and the increased awareness of the adverse health effects associated with exposure to formaldehyde, resulted in banning UFFI in 1980. The UFFI Information and Coordination Centre was established to provide technical and financial assistance to homeowners who insulated their homes with UFFI in June 1981.

Canadian research into UFFI revealed that UFFI homeowners are only a sub group of people complaining of symptoms that could be related to poor indoor air quality.

In August 1986, representatives of the UFFI Centre met with scientists and government officials from The Netherlands, West Germany and Israel. The purpose of the meetings was to exchange research information on UFFI and indoor air quality in general.

This report highlights UFFI research activities in these countries, and their approach to the indoor air quality issue.

The Netherlands

UFFI was introduced to The Netherlands in the seventies by a Following the crisis. Danish company. energy widespread installations were undertaken by numerous Dutch companies. At that time, government inspectors found that one year old foam crumbled to dust, and thus imposed thermal and physical standards on the manufacturers (note: majority of homes are owned by the government and corporations). By 1978, 180,000 homes were insulated with UFFI and 48 health complaints were registered with the Dutch Ministry of Health. Formaldehyde was identified as the probable contaminant. Subsequent measurements revealed average formaldehyde concentrations of 0.25 ppm in the living space air of these 48 homes. Investigators found that high formaldehyde readings were associated with either a urea formaldehyde resin that had been stored for a long period in fluctuating climatic conditions, or, resulted from improper installation where the foam penetrated through the inner surfaces of the walls.

Regulations and Control of UFFI Installation

The Ministry (1) in charge of regulating and quality assurance of UFFI installation, has wide responsibilities. Ranging from regulating water drainage across the country, to health issues associated with housing and the environment, to indoor and outdoor pollutants, to living habits and consumer product safety.

Manufacturers of UFFI are producing to two specifications; one that specify thermal properties. physical-chemical standards stability, composition and water absorption. The other, specifies formaldehyde emission rate in a test chamber. This emission rate is to be lower than 120 ug formaldehyde per cubic meter of air. The foam is tested on a batch by batch basis at the manufacturers' plant. installation must be registered with Furthermore. each the Field inspectors collect foam samples randomly from government. houses, and the samples are tested by a registered laboratory (2). A manufacturing license requires renewal each year. Installers require licensing, their proficiency tested, and approval of their equipment. Manufacturers and installers are responsible for any corrective measures.

Health Issues and Corrective Measures

The Dutch experience indicates that sustained health complaints are associated with exposure to high formaldehyde concentrations. Furthermore. following their regulatory measures on UFFT manufacturing and installation, their major concern is with formaldehyde emission from particle board. Schools, thus, are of Over 200 were built after the Second World War, special concern. using low grade building material and particle board. Formaldehyde concentration in these structures varied from 0.1 to 0.7 ppm. Corrective measures included increased ventilation and coating of particle boards. Because of the difficulties in painting existing crevices, attics, and cavities they have experimented with ammonia One school was selected for the experiment. The school was gas. fumigated for one week, and formaldehyde concentration monitored for Results were encouraging as concentrations remained three years. stable below 0.1 ppm. Following this project, the Dutch treated successfully fifty additional schools. (note: a similar experiment in the U.K. involving a UFFI insulated school, resulted in fungal growth and increased health complaints.)

Other Indoor Air Quality Issues

The Dutch consider indoor air quality a major issue. They are initiating a 20 million dollar project to identify pollutants, refine methodology techniques, and provide remedial measures. Of special interest are fungi. A preliminary health study done on occupants of six homes in Amsterdam established a direct relationship between health complaints and the presence of fungi in the home. The Centre for Fungal Research (3) is planning to conduct a 20 home survey to evaluate measurement techniques and correlate data with a parallel clinical health study.

The government issued a pamphlet called "The Netherlands a Cleaner Country", established an invetigating network to report and enforce standards, and is pursuing joint research efforts with other countries (including Canada).

West Germany

The West Germans do not consider UFFI as a health hazard. This polymer was actually developed by German scientists in the thirties. It has been used as a building insulating material since the mid fifties. The Institute for Biotechnology (4), which is responsible for the certification of building material manufacturers, states there is a minimal usage of UFFI.

Regulation and Control of UFFI

Acting through three testing laboratories, UFFI is tested for all physical and chemical characteristics, as well as for formaldehyde emission. The latter is carried out in a test chamber (similar to the one used by the Dutch). Emission rate is not to exceed 0.1 ppm in the test chamber (1 cubic meter chamber).

Like the Dutch, the West Germans control product quality through the manufacturer. UFFI is tested at the manufacturer's plant. Similar tests are carried out on randomly selected samples from the field. Test results are then compared. It is the responsibility of the manufacturer to correct any improper installation. Otherwise the annual license will not be renewed.

Health Issue and Other Air Quality Parameters

The Institute for Water, Soil and Air Hygiene (5) is a government organization that was set up in 1901. This institute is reponsible for research in environmental hygiene, human ecology, sanitary engineering, water hygiene, waste water and pollution control. Their experience indicates that health complaints associated with UFFI are few, and are generally confined to the first three weeks after installation. UFFI thus, is not considered as a health hazard. However exposure to formaldehyde concentrations of fungi and dust mites are of major concern. above 0.1 ppm, Formaldehyde concentrations as high as 15 ppm were measured in baby incubators following sterilization. Vacuum cleaning was found to remove only 10% of the dust mites from the carpets. New hospital sterilization procedures are currently employed and carpets are being removed from schools.

These scientists, like the Dutch, stressed the hazards associated with poor indoor air quality, and the need for international multi-discipline research efforts.

Israel

The Israeli experience with UFFI is limited to its application as an agriculture fertilizer. However, indoor air quality in general and fungi are considered to be major health hazards. Israel was using whitewash as the main wall covering until the late seventies. At that time, polymer paints (latex) were substituted and scientists observed an increase of fungal growth on wall surfaces. In a national survey the Institute for Technology (6) and the Institute for Food Microbiology (7) tested some 200 homes. Their findings revealed that 20% of the homes are infested with substantial fungal growth, and 55% of the homeowners (of these homes) had higher than average health complaints. Consequent studies identified a direct relationship between the porosity and chemical composition of the paint to susceptability for fungal growth. They are currently testing various remedial measures including new paint formulation containing fungicides.

ORGANIZATIONS

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