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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH  
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION  
REPORT NO. 73-68-187

McCALL PRINTING COMPANY  
DAYTON, OHIO  
APRIL 1975

I. TOXICITY DETERMINATION

An evaluation of employee exposures to air contaminants found in the Letterpress Room of the McCall Printing Company in Dayton, Ohio has been conducted. The following determinations have been made:

(1) Based on observations of exposure (duration and frequency) and quantity of trichloroethylene used, it has been determined that trichloroethylene vapor as encountered in the paper splicing operation are not toxic to employees.

(2) Based on the short duration and infrequent nature of exposure to the measured paper dust concentrations generated during the "blow down" of presses, it has been determined that paper dust exposures are not toxic to employees but are more an occupational nuisance. Employees with allergic respiratory disorders may experience mild, transient, irritation from exposure to the dust.

(3) Based on identification and measurement of major constituents of "press oven Smoke" and on medical interviews with and examination of a sample of Letterpress Room employees, it has been determined that employee exposures to "press oven Smoke" result in episodes of minor, transient, irritative symptoms. The long term significance of these symptoms, if any, would be extremely difficult to separate from the effects expected from the smoking habits of the men examined. In general, the men examined were found to be of average health for their age and smoking habits.

Recommendations to facilitate reduction of employee exposures to paper dust and "press oven Smoke" have been made in the body of the report.

II. DISTRIBUTION AND AVAILABILITY OF THE DETERMINATION REPORT

Copies of this Determination Report are available upon request from the Hazard Evaluation Services Branch, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

- a) McCall Printing Company - Dayton, Ohio
- b) Authorized Representative of Employees
- c) U.S. Department of Labor - Region V
- d) NIOSH - Region V

For the purposes of informing the approximately 950 "affected employees", the employer will promptly "post" the Determination Report in prominent places near where affected employees work for a period of 30 calendar days.

### III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees regarding exposure to dust, solvent vapors and smoke associated with printing operations at the McCall Printing Company in Dayton, Ohio. The request was precipitated by recurrent symptoms of dizziness, headache, and burning eyes among several employees at the plant.

### IV. HEALTH HAZARD EVALUATION

#### A. Evaluation Progress

The McCall Printing Company in Dayton, Ohio was initially visited on August 29, 1973 by NIOSH investigators Messrs. Robert Vandervort and Henry Ramos. Messrs. Vandervort and Ramos were accompanied by two industrial hygienists from Spain (Luis Ribot and Eugeno Arques) who were observing occupational health programs in the U.S. A preliminary conference was held with representatives of labor and management to obtain background information regarding process equipment and materials, and occupational health problems within the plant.

Following the preliminary conference, a walk-through survey of the Letterpress Room was made. Particular attention was given to use of solvents, smoke emissions from press ovens, and paper dust generation and accumulations. Several employees were privately interviewed in a non-directed manner regarding work related health problems.

A follow-up survey was conducted by Messrs. R. Vandervort and H. Ramos, and Drs. T. Thoburn and R. Ligo on January 23 and 24, 1974. During this visit environmental sampling was performed coincident with press "blow-down" operations, and air samples for "oven smoke" were collected. Ventilation equipment was examined both within and outside the plant. Employees were interviewed by NIOSH physicians to determine whether any acute or chronic health effects were being manifested.

#### B. Description of Process - Conditions of Use

The McCall Printing Company is engaged in the printing of over 30 magazines which results in the production of several million copies from the Dayton plant per week. Magazines are printed on rotary and multi-color printing

presses. Newsprint and a variety of higher quality papers are utilized. Printing inks are composed of hydrocarbon vehicle with both organic and inorganic pigments. Kerosine and Ottoson No. 9 solvent are used to clean press rollers, ink wells, etc. Trichloroethylene is used to soften the glue used in splicing paper.

Employees are exposed to paper dust during the "blow-down" of presses. Paper dust generated by paper cutting (slitter knives) and by page folding in the printing operation accumulates on press machinery. Periodically (approximately once per week for rotary presses and once per month for multicolor presses) air hoses are used to dislodge dust accumulations. Blow-down is started at the upper level of a press and proceeds to ground level. Dust which eventually settles to the floor is swept up and discarded. This procedure requires approximately 20 to 30 minutes to complete. The employees (usually two) handling the air hoses wear gauze-type respirators during this operation.

Employees are exposed to varying concentrations of "press oven smoke" throughout the Letterpress Room. The printing presses utilize oven dryers to evaporate excess ink vehicle or solvent from printed paper prior to folding, etc. The hydrocarbon ink vehicle driven off by the drying ovens is present in oven effluents in the form of vapor or smoke. Ovens are hooded and exhausted to the outdoors, however, incomplete enclosure, leaks in enclosures, and recirculation of exhausted contaminated air results in variable concentrations of press oven smoke within Letterpress Room work areas. In general, smoke concentrations are highest above presses in the vicinity of ceiling structural members.

Press rollers, ink wells, etc. are cleaned using kerosine and Ottoson No. 9 solvent. These solvents are used by hand application and are also applied to the "web" (paper) in small quantities which is then cycled through the press. Employees are primarily exposed to these solvents via direct skin contact.

As new rolls of paper are fed into a press, a 1 or 2 second spray of trichloroethylene is applied to the glue coated starter of the new roll. The trichloroethylene softens the glue so that a strong paper splice is achieved. One employee working on each press utilizing this splice procedure is exposed to a transient odor of trichloroethylene for less than 1 minute every 35 minutes throughout the workshift.

## C. Evaluation Methods

### 1. Airborne Dust Measurements

Employee exposures to airborne paper dust were evaluated using personal air sampling equipment and stationary high volume samplers. Samples were collected on preweighed 37 millimeter PVC filters. Filters were analyzed for total mass collected, and for lead. Lead analyses were performed since inks with lead containing pigments were being used. Lead determinations were performed by wet ashing the filters with a mixture of nitric and perchloric acids. The resulting solution was aspirated into the air-acetylene flame of an atomic absorption spectrophotometer and the presence of lead quantitated.



## 2. "Oven Smoke" Sampling

Samples of concentrated oven smoke were collected above Press Nos. 1255, 173, and 764. Four sampling techniques were employed in an attempt to characterize smoke constituents. Smoke samples were collected (1) in air sampling tubes containing charcoal, (2) on PVC filters, and (3) in impingers containing hexane and analyzed by gas chromatography-mass spectrometry to identify specific contaminants. Smoke samples collected (4) in impingers containing distilled water were analyzed for formaldehyde and total aldehydes.

Additionally, gas detector tubes were utilized to measure air concentrations of carbon monoxide and oxides of nitrogen from forklift trucks and possible oven effluent recirculation.

## 3. Medical Evaluation

During the initial survey, NIOSH industrial hygienists privately interviewed a sample of Letterpress Room employees. Non-directed questions were asked with regard to occupationally related health problems. Results of these interviews were reviewed by NIOSH physicians in Cincinnati.

Detailed medical evaluations of Letterpress Room employees were performed by NIOSH physicians during the second visit to the plant. A sample of employees from the first and second workshifts assigned to press Nos. 173, 1255, and 1455 were studied. Occupational and medical histories were obtained. The conjunctiva, nasal mucosa, throat, and skin of the hands of each worker were examined. Where indicated the chest was auscultated.

In addition to examining and questioning employees, the company's personnel records were examined and medical staff interviewed to obtain information regarding employee turnover, disability retirements, absenteeism, etc.

## D. Criteria for Assessing Workroom Concentrations of Air Contaminants

The three primary sources of criteria used to assess workroom concentrations of air contaminants in this evaluation are: (1) NIOSH criteria for recommended standards for occupational exposure to substances (Criteria Documents); (2) recommended and proposed threshold limit values (TLV's) and their supporting documentation as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH) (1974); and (3) occupational health standards as promulgated by the U.S. Department of Labor (Federal Register, June 27, 1974, Title 29, Chapter XVII, Subpart G, Tables G-1, G-2, and G-3).

In the following tabulation of criteria, the most appropriate value (in the opinion of the authors) is presented with its reference and other information footnoted.

Substance	Permissible Exposure 8-hour Time-Weighted-Average Basis	
<sup>1</sup> Carbon Monoxide	35	ppm <sup>a</sup>
<sup>2</sup> Lead and its inorganic compds.	0.15	mg/M <sup>3</sup> <sup>b</sup>
<sup>3</sup> Nitric Oxide	25	ppm
<sup>4</sup> Nitrogen Dioxide	C <sup>c</sup> 5	ppm
<sup>5</sup> Nuisance Particulate Total Airborne Mass	10	mg/M <sup>3</sup>
<sup>6</sup> Petroleum Distillates (Naptha)	500	ppm
<sup>7</sup> 1,1,1-Trichloroethane (Methyl Chloroform)	350	ppm
<sup>8</sup> Trichloroethylene	100	ppm

<sup>a</sup>ppm = parts of vapor or gas per million parts of contaminated air.

<sup>b</sup>mg/M<sup>3</sup> = approximate milligrams of substance per cubic meter of air.

C<sup>c</sup> = Ceiling Value: Exposures should not exceed this level.

<sup>1</sup>Reference: NIOSH Criteria Document (1972). The Federal occupational health standard and ACGIH TLV (1974) for carbon monoxide are presently 50 ppm for 8-hour time-weighted-average exposure. NIOSH additionally recommends that no exposure should occur to concentrations in excess of 200 ppm.

<sup>2</sup>Reference: NIOSH Criteria Document (1972) and ACGIH TLV (1974). The Federal occupational health standard for lead is presently 0.2 mg/M<sup>3</sup> for 8-hour time-weighted-average exposure.

<sup>3</sup>Reference: Federal occupational health standard (1974) and ACGIH TLV (1974).

<sup>4</sup>Reference: Federal occupational health standard (1974) and ACGIH TLV (1974).

<sup>5</sup>Reference: ACGIH TLV (1974). The 8-hour time-weighted-average Federal occupational health exposure standard for nuisance particulate is presently 15 mg/M<sup>3</sup> for total airborne particulate and 10 mg/M<sup>3</sup> for respirable airborne mass.

<sup>6</sup>Reference: Federal occupational health standard (1974). The ACGIH (1974) has proposed an equation for calculating TLV's for petroleum distillates based on their aromatic/aliphatic content and boiling range. In the case of kerosene, which is of importance in this evaluation, the Federal standard will suffice since the kerosene in use was found to be free of toxic aromatic components.

<sup>7</sup>Reference: Federal occupational health standard (1974) and ACGIH TLV (1974).

<sup>8</sup>Reference: NIOSH Criteria Document (1973), ACGIH TLV (1974), and Federal occupational health standard (1974). The NIOSH recommendation also stipulates that exposure should not exceed 150 ppm averaged over any 10 minute period. The present Federal occupational health standard allows variation in exposure up to 200 ppm routinely but not more than 300 ppm for 5 minutes in any 2 hour period.

Standards for 1,1,1-trichloroethane (methyl chloroform) and petroleum distillates (naptha) are included here because Ottoson No. 9 solvent was found to be comprised of these materials.

In some situations, paper dust would be considered a nuisance dust and would be controlled to the extent reflected by the Nuisance Dust standard. In this plant, the paper dust encountered may contain varying amounts of lead and other metals from ink pigments. Evaluation of employee exposures to dust should, therefore, be accompanied by concurrent evaluation of the dust for toxic constituents.

E. Evaluation Results

1. Environmental Evaluation

a. Airborne Dust Evaluation

On January 24, 1974 the blowing down of Press No. 1455 was evaluated. Personal breathing zone, total mass air samples were collected on each of the two employees performing the blow-down procedure. Additionally, a pair of total and respirable mass samples were collected at ground level to obtain some information regarding the potential respirability of the dust. Table I presents the results of this sampling.

Table I: Results of Airborne Dust Sampling - Blow-Down of Press No. 1455 - January 24, 1974

Sample No.	Type	Total Time (Min)	Volume (M <sup>3</sup> )	Paper Dust Concentration mg/M <sup>3</sup> *	Lead Concentration mg/M <sup>3</sup>
PVC 43	BZ**	38	.057	17	.049
PVC 46	BZ	39	.059	6.9	.047
PVC 54	Area-T***	35	.32	3.1	.017
PVC 55	Area-R****	35	.32	1.0	.009

\*mg/M<sup>3</sup> = approximate milligrams of substance per cubic meter of air.

\*\*BZ = total mass sample collected in breathing zone of worker using air hose to blow-down press.

\*\*\*Area-T = total mass sample collected at floor level using vacuum pump and 9 liter per minute critical orifice.

\*\*\*\*Area-R = respirable mass sample collected at floor level using vacuum pump, cyclone presampler, and 9 liter per minute critical orifice.

As can be seen from the data, lead contamination does not appear to present a significant hazard to health. Paper dust concentrations in the workers breathing zones are significant and may exhibit high variability between successive blow-down procedures. The information obtained by the area samplers suggests that approximately one-third of the paper dust is potentially respirable.

Although relatively high dust concentrations are encountered during the blow-down procedure by the workmen operating the air hoses, this exposure is probably more of a nuisance than a real hazard to health. This opinion is based on the fact that the exposure occurs at a maximum of one time per week and lasts for approximately 30 minutes. Refer to Section V for recommendations regarding reduction of dust accumulations and subsequent employee exposure.

b. "Oven Smoke" Evaluation

In an attempt to characterize the major components and possibly toxic constituents of press oven smoke, several concentrated smoke samples were collected above Press Nos. 1255, 173, and 764. Samples were collected in plumes of smoke emanating from press machinery.

Twelve smoke samples collected on charcoal and qualitatively analyzed by gas chromatography-mass spectrometry showed the smoke to be a complex mixture of hydrocarbons. Over fifty resolved and unresolved gas chromatogram peaks were observed. Those compounds present in sufficient quantity to permit identification were: toluene, 2,2,3,3-tetramethylpentane, 5-ethyl-2-nonanol, n-undecane, n-dodecane, trichloroethylene, xylene, n-decane, and 5-methyl-5-ethyldecane. Even though sampling times ranged from 1 to 2 hours with air volumes sampled of approximately 60 to 120 liters, less than 5 milligrams of volatile smoke materials (including all of the above compounds) were trapped in each sample. Quantitative determination of individual smoke component air concentrations was not performed. However, from the small amount of total material trapped in each sample, it can be concluded that very low concentrations of the above individual substances were present in undiluted smoke.

Six smoke samples collected in impingers containing hexane and analyzed by gas chromatography showed minor traces of smoke constituents found in charcoal samples. These results suggest that hexane was not as efficient as charcoal in trapping volatile smoke constituents.

Another six smoke samples collected in impingers containing distilled water and analyzed for aldehydes showed undiluted oven smoke to contain less than 0.7 mg/M<sup>3</sup> of aldehydes or less than 0.6 ppm of aldehydes as formaldehyde. Aldehydes are capable of inducing irritation and lacrimation even when present in low concentration. The irritant effects of these aldehydes may be potentiated in the presence of finely divided particulate such as smoke. Therefore, the low levels of aldehydes found in press oven smoke may be significant in terms of irritative effects.

Work area concentrations of carbon monoxide and oxides of nitrogen were measured at several locations within the Letterpress Room. Carbon monoxide concentrations were found to vary from 10 to 25 ppm. Less than 1 ppm of nitric oxide was found in any work area in the Letterpress Room.

c. Ventilation Evaluation

Although quantitative measurements of air flows, static pressures, etc. were not performed, several obvious ventilation deficiencies were discovered by inspection. Ventilation structures both within and outside the plant



were examined. NIOSH industrial hygienists were accompanied by the plant's manager of safety and security who recorded specific findings on a large blueprint of this facility. Thus, the discussion here will be confined to general rather than specific ventilation problems.

At the outset the plant is under negative pressure i.e. exhaust systems are trying to exhaust more air than is entering the building via makeup air supply systems or building leakage (windows, doors, cracks, etc.). In general, this condition results in reduced air flows through exhaust systems and may cause back flow through exhaust systems and exhaust fans. An example of this situation was observed above Press 273 where air was flowing in through a wall-mounted, propeller-type exhaust fan.

Negative pressure is only one of the factors adversely affecting the performance of ventilation systems. In many instances ventilation ductwork and hoods were observed to be heavily caked with a rosin-like material sometimes combined with paper dust. Deposits of this kind inside ventilation structures impede air flow by reducing cross sectional area and increasing friction. These deposits are also a potential source of fuel in the event of fire. Air flow is further impeded by the poorly designed weather caps that were present on all but a few exhaust stacks. These weather caps cause the exhausted air streams to sharply change direction, thus adding flow resistance which must be overcome by the exhaust fans. The weather



Examples of Weather Caps Observed

caps also direct the exhaust air streams in a downward direction, or significantly reduce their vertical velocity. This results in contaminated air being discharged basically at roof top level where it may be reintroduced into the working environment via makeup air systems or through skylights, etc. via the influence of plant negative pressure. Many exhaust weather caps were observed to be located in very close proximity (less than 3 feet) to makeup air inlets and at the same relative elevation.

## 2. Medical Evaluation

The potential acute and chronic health effects of exposure to "press oven smoke" were of primary interest to the medical evaluation. Review of the information collected via non-directed interviewing of twenty-four (24) employees by NIOSH industrial hygienists during the initial visit suggested



that press oven smoke was adversely affecting Letterpress Room employees. Nineteen (19) reported that the smoke caused their eyes to burn and three (3) related the occurrence of headaches to the smoke. Other complaints involved irritation of the skin, irritation from dust, and sinus problems which the interviewed employees attributed to the general working environment. Four (4) employees had no occupationally related complaints.

The above data together with the concern expressed in the Health Hazard Evaluation Request for possible chronic health effects from exposure to the oven smoke necessitated a medical follow-up investigation.

During the follow-up survey, Drs. T. Thoburn and R. Ligo interviewed and examined workers from Press Nos. 173, 1255, and 1455. In all, 32 of the 47 men who were assigned to these three machines during interviewing period were seen either by Dr. Ligo or Dr. Thoburn.

Press No. 173:	1st Shift	.....	6 out of 10
	2nd Shift	.....	8 out of 10
Press No. 1255:	1st Shift	.....	9 out of 9
	2nd Shift	.....	6 out of 9
Press No. 1455:	1st Shift	.....	3 out of 9

The machines run continuously with all three shifts having the same size crew assigned.

The workers seen were all males, 30 were Caucasian and 2 were Black. Their average age was 42.1 years (median 42.5). Their average service with the company was 21.4 years (median 23). By job title the group included:

- 3 Men-in-Charge
- 7 Pressmen ("1st Pressmen")
- 8 First Assistants ("2nd Pressmen" or "Head End Men")
- 3 Second Assistants ("White Roll Men")
- 2 Junior Assistants ("Inkmen")
- 9 Flymen

Several factors relating to the sample are noteworthy:

(1) Work and seniority rules are such that workers are not tied to any particular machine or to any particular shift. Thus, any findings except acute current findings would relate more to the general Letterpress Room working environment than to the particular work environment associated with the machine and shift the man was assigned to at the time of this evaluation.

(2) Although there are distinctive responsibilities for each work assignment or position; exposures are not too different as clean-up chores are shared by all; most time is spent at floor level for all men; and through the years most of the men have held other than their current positions (see point three).

(3) The company had experienced a decline in work orders, so that between the initial visit and the follow-up visit, many men had dropped up to three grades below their peak grade, and all flymen with four years service or less had been laid off. There had been only two men hired into the Letterpress Room in the year preceding the follow-up visit. This may have biased the employees against complaining.

Each man of the sample was administered a Questionnaire (see Appendix A) which included an occupational history, non-directed questions to elicit job-related and other health problems, a smoking history, and specific questions relating to symptoms from work exposure. This questionnaire was followed by examination of conjunctiva, nose, throat and hands. The chest was auscultated if there were complaints of cough or other respiratory symptoms.

Overall, 97 percent (31 of 32) of the workers were found on directed questioning to have some medical problems which might have been job related, but only 44 percent (14 of 32) gave positive response to the non-directed questions concerning job-related health problems. Twenty-two percent (7 of 32) complained of burning eyes, particularly when the smoke was bad. On more directed questioning, 56 percent (18 of 32) of the men had noted this symptom from to time. Some other complaints are shown in the table below:

(32 employees were interviewed and examined)

Number and percent of employees responding to either non-directed or non-directed + directed questions regarding possibly job-related health problems.

SYMPTOM	From non-directed questioning		From non-directed and directed questioning	
	No.	Percent	No.	Percent
Burning Eyes	7	22	18	56
Headaches (omitting definitely non-job-related by history)	2	6	10	31
Shortness of Breath	0	0	10	31
Skin Irritation	1	3	9	28
Complaints related to airborne dust	1	3	7	22
Sinus Problems	3	9	6	19

Of the 9 men with complaints of skin irritation, 5 noted drying of hands or occasional irritation by solvent exposure; one had noted occasional blistering during the summer which has improved during the last 3 or 4 years; and three have had distinct problems. One worker gets a rather severe reaction on exposure to the solvents which requires systemic medication; another has broken out in the past and now wears gloves; the third occasionally has noted irritation of his face from fumes from the paste used to attach one roll of paper to the next.

Of the seven men complaining of paper dust, two had complaints of aggravation of an underlying allergic problem. The other five reported that it caused them to sneeze, plugged up their nose with dust, or caused them to cough when the dust was particularly heavy.

Fifty-six percent (18 of 32) of the men had no physical findings; 25 percent (8 of 32) showed reddening of conjunctival and/or pharyngeal mucosa; two employees appeared to have a greater than expected chest size and one had decreased breath sounds; four employees had skin rash or chapped hands and three employees showed paper cuts or callouses on the wrists. The paper cuts

and wrist callouses were confined to Flymen. The chest changes were found in two heavy smokers (over 1 pkg/day) and in one ex-heavy smoker. Conjunctival and/or pharyngial reddening did not relate to any particular symptom but did seem related to current smoking habits as these findings were limited to current smokers. (Probability of this being due to chance is only 3.5% using the Chi square test.)

Several workers complained that the ink tended to splatter, but all uniformly felt that it cleaned off well with the Wisk cleaner supplied for that purpose without further problems. One worker noted that the ink currently in use has caused him throat irritation lasting about 15 minutes.

Some of the workers, including a hypertensive, identified frequent shift changes as being quite hard to accommodate. The current recommendation for the average person when dealing with "Jet Lag" is to allow one day to adjust for each hour change in time. If this is applied to shift changes, it could be expected that a man would need a week to adjust to any shift change which required major adjustment in sleeping habits.

One worker in response to the non-directed questioning said that the solvent fumes made him feel drunk. This occurred when he was cleaning the inside of the drying ovens, apparently without adequate ventilation for work with solvents in an enclosed space.

On the first day of the visit an odor of solvents and slight eye irritation was noted by the NIOSH investigators on entering the plant. This was not noticeable the second day.

Besides the survey of workers a review was made of labor turnover (low at the time of this evaluation), disability retirement (no abnormal prevalence of specific health problems), and OSHA log (only injuries). Discussion with the medical staff at the plant failed to reveal any trends in absenteeism or illness.

In summary, the major complaints reported were burning eyes, particularly when the oven smoke was heavy, and headaches. About one third of the workers reported some shortness of breath, but it did not seem out of line for the ages and smoking habits of the men. The major physical findings were reddening of the conjunctiva or throat which was found in 25 percent of the men examined. These findings related more to smoking habits than to any history of symptoms said to be due to the oven smoke. The solvents did cause some of the expected symptomatology (skin irritation and one case of reported intoxication) when not handled properly. Paper dust aggravated pre-existing allergic respiratory problems in two men and was a nuisance to other workmen.

#### V. CONCLUSIONS AND RECOMMENDATIONS

Employee exposures to trichloroethylene associated with the splicing of paper have been evaluated by observing duration and frequency of exposure, and the quantity of trichloroethylene used. In the judgment of the investigators, trichloroethylene vapors encountered in the paper splicing operation do not constitute a hazard to employee health.



Employee exposures to paper dust in the "blowing down" of presses have been evaluated by observing work practices, exposure duration, and by measurement of breathing zone concentrations of airborne paper dust. No significant amount of lead was found in the paper dust collected in air samples. Although the magnitude of employee exposure to airborne paper dust can be significant, in judgment of the investigators, the short duration and infrequent nature of exposures reduce the significance of this potential health hazard to that of an occupational nuisance or mild irritant to persons with allergic respiratory disorders. In the interest of reducing dust accumulations and subsequent employee exposures the following recommendations are made:

(1) Local exhaust ventilation could be installed at press slitter knives (the major source of paper dust generation) to significantly reduce accumulations of dust by capturing dust as it is generated.

(2) During "blow down," air hoses should only be used to dislodge dust from press surfaces. Before proceeding to the next lower catwalk level, the majority of settled dust on catwalks should be swept or shovelled into refuse containers rather than blown successively from catwalk to catwalk and finally to ground level. This modification in procedure should significantly reduce exposure and also reduce transfer of dust to adjacent presses.

Employee exposures to "press oven smoke" were evaluated by identifying major smoke constituents and by interviewing and examining a sample of employees exposed to the smoke. Employees were found to experience mild irritative symptoms from exposure to "press oven smoke" which in the judgment of the investigators may be attributed to low concentrations of aldehydes found in the smoke.

Employee exposures to press oven smoke, especially episodic elevated exposures during adverse atmospheric conditions, could be significantly reduced by overhauling the plant's ventilation system. Negative pressure should be corrected by supplying additional makeup air. Ventilation structures should be repaired to seal leaks; cleaned to reduce air flow resistance and fire hazard; and modified to eliminate back flow and recirculation of contaminated air.

One employee gave a history compatible with toxic exposure to solvent fumes while cleaning the press ovens. Solvent use should be reviewed, particularly its use in confined spaces.

VI. AUTHORSHIP AND ACKNOWLEDGMENT

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APPENDIX A

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
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518 POST OFFICE BUILDING  
CINCINNATI, OHIO 45202

McCALL PRINTING COMPANY  
DAYTON, OHIO  
PRESSROOM HEALTH SURVEY

CONSENT

I hereby voluntarily agree to participate in a study of pressroom workers alleged to be exposed to noxious smoke, solvent fumes and paper dust in the pressrooms. I agree to answer questions about my health and habits which may have a bearing in this study.

As part of the study I may have a limited examination of my person for physical evidence of complaints which may have a bearing in this study. This will primarily involve my eyes, nose and throat and hands and possible my chest. I am aware that medical information will be used for statistical purposes only unless I authorize otherwise. I am also aware that I may withdraw from the study at any time.

Date \_\_\_\_\_ Signature \_\_\_\_\_  
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AUTHORIZATION FOR RELEASE OF MEDICAL INFORMATION

I hereby request that the Public Health Service inform my personal physician

Dr. \_\_\_\_\_

Street \_\_\_\_\_ City \_\_\_\_\_

and the company physician of

Company Name: \_\_\_\_\_ City \_\_\_\_\_

of any significant medical findings from this study.

Date \_\_\_\_\_ Signature \_\_\_\_\_

Note: Strike out the words "and the company physician Company Name: \_\_\_\_\_ City \_\_\_\_\_", if the worker prefers that the significant medical findings from this study be sent \_\_\_\_\_ to his personal physician.

Information obtained in this study will be kept confidential in accordance with U.S. Public Health Service Regulation (42 CFR Part 1).



McCALL PRINTING COMPANY  
DAYTON, OHIO

PRESSROOM HEALTH SURVEY  
MEDICAL QUESTIONNAIRE

I. IDENTIFICATION

Name \_\_\_\_\_  
          First                          Middle                          Last

Address \_\_\_\_\_ City \_\_\_\_\_

Telephone \_\_\_\_\_ Social Security \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Age \_\_\_\_\_ Sex - Male \_\_\_\_\_ Female \_\_\_\_\_ Race \_\_\_\_\_

Shift \_\_\_\_\_

Length of employment with this company? \_\_\_\_\_

Length of time in present job \_\_\_\_\_

Past Job History (Question from present to past)

COMPANY	JOB	FROM	TO	REMARKS

II. HEALTH PROBLEMS

1. Do you have any health problems you feel might be related to your work? If you do, what are they and when do they bother you? How long have they bothered you? Do you have any idea what is causing the problem?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Are there any health problems related to your work which may not affect you, yourself, but are bothering your fellow workers? Why do you think you have been spared?

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3. Do you have any other health problems? If so, what are they, when do they bother you, how long have you had them, and what are you doing about them? Do you take any medicine regularly? What about aspirin or other "Over-the-counter" medicines?

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### III. PERSONAL HABITS

1. Do you smoke? \_\_\_\_\_. If so, how old were you when you started to smoke regularly? \_\_\_\_\_. How much do you smoke now (pkg/day, \_\_\_\_\_, cigars/day \_\_\_\_\_, pipefuls/day \_\_\_\_\_).

Is this typical of your past smoking habits, or did you used to smoke more or less, or smoke (non) filters? If you do not smoke now, did you ever smoke regularly in the past? How much and when?

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2. Do you do projects off the job which might expose you to dusts or solvents? Are you involved in a hobby? a do-it-yourself project? a garden or insecticides? mechanical work on cars? ==

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IV. SPECIFIC SURVEY QUESTIONS:

1. Job Exposures

At what levels on the presses do you work? \_\_\_\_\_

How much of your time do you spend at the various places? \_\_\_\_\_

How long are you exposed to the smoke from the print dryers? \_\_\_\_\_

How much contact do you have with the ink? \_\_\_\_\_

If you have to clean ink off your hands, what do you use? \_\_\_\_\_

Do you have any contact with the cleaning solvents? with their vapors?

\_\_\_\_\_

How much contact with the paper dust? When? \_\_\_\_\_

2. Symptoms And Findings

SYMPTOM	WHEN	FOR HOW LONG	FIRST ATTACK	WHAT IS DONE TO RELIEVE IT
Eye Irritation				
Nose - Throat Irritation				
Cough				
Short.of Breath				
Other Respiratory Complaints				
Skin Irritation				
Headaches				
EXAMINATION				
Conjunctiva				
Nose				
Throat				
Chest(if cough or respiratory symptoms)				
Hands				