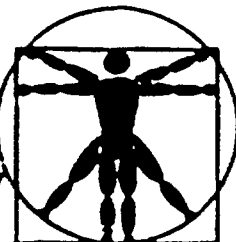


Health by Design



54th All-Ohio Safety Congress
& Exhibit, April 24, 25, 26, 1984

PLAINTIFF'S
EXHIBIT
BRK-3

Richard F. Celeste, Governor

Leonard T. Lancaster, Chairman, The Industrial Commission of Ohio
John A. Pompel, Superintendent, Division of Safety and Hygiene
Mary E. Horvath, Congress Coordinator

February 23, 1984

Legal Section
Industrial Commission of Ohio
246 North High Street
Columbus, Ohio 43215

RE: OD #18172-22
Robert Sabin
Inland Manufacturing
Dayton, Ohio

Attention: Ms Judy Spencer

Dear Ms Spencer:

On November 16, 1983, Glenn Davis, Industrial Hygienist, visited Inland Manufacturing, Division of General Motors, in Dayton, Ohio, to investigate this claim. The claimant alleges his upper respiratory allergy was caused by his exposure to many chemicals and dust from the model shop area in which he works and from three adjacent labs.

Mr. Sabin's occupation at Inland is a model builder. His work history there according to the attached facsimile file is as follows:

1964-1970	Department 86, Model Shop
1970-1978	Department 115, Tool Engineer
1978 - Present	Department 86, Model Builder

The claimant states symptoms of burning eyes and throat and itching face began in mid-March, 1981. He visited his family doctor, Dr. Gabriel, and was referred to an eye, ear, and nose specialist, Dr. Welton. On March 31, 1981, he reported complaints of chest pains, tightness in throat and chest, and difficulty in breathing to Inland's Medical Department. He then returned to Dr. Welton who felt he had a toxic reaction to chemicals and diagnosed an upper respiratory allergy and possible chemical allergy. After receiving a physical from Dr. Gabriel, he began treatment with Dr. Welton which included medication for asthma. He was off work for two weeks during this period. Company medical records indicate he had reported symptoms of chest pain and respiratory problems as early as 1965, not long after he began employment with Inland.

The claimant submitted a partial list of products and processes that he worked with and around in the Experimental Engineering Model

Shop. This list in the facsimile file primarily covers the period 1978 to 1981 when he worked in the Model Shop. This shop is located in the basement in an open area which is similar to a tool room in which tools, jigs, and fixtures for experimental engineering are built. Local exhaust systems have been installed throughout the area. The labs which surround the Model Shop also have local exhaust systems, many of which are closed systems. There is no direct employee exposure to the chemicals in the closed systems.

During the November 16, 1983, visit, Mr. David Swafford, Worker's Compensation Supervisor for Inland, was requested to provide air sampling data collected in the Model Shop. This request was repeated January 3, 1984, and specific questions concerning Mr. Sabin's potential exposure to chemicals was forwarded in our letter dated January 4, 1984. Attached is the response that we received from Mr. Tom Jelenek, Senior Industrial Hygienist at Inland, along with a copy of his memorandum to Mr. Swafford.

The following discussion of the items listed by the claimant as contributing to his problem are based on observations made during the site visit, information provided by Inland and literature references. With the exception of direct readings taken for carbon monoxide, air sampling was not conducted due to the intermittent use of chemicals in the Model Shop.

1. Solvents -- Items 7, 8, 12, 13, 15, 16, 19

The solvents listed by the claimant included methyl ethyl ketone (MEK), isopropyl alcohol, acetone, lacquer thinner, safety solvents, toluene, and benzene. Solvents are used in the Model Shop on a limited basis to clean metals. According to Mr. Jelenek, air sampling with detector tubes in this area in the past has not indicated any employee exposures above the permissible exposure limits, or concentrations above one-tenth of these limits.

Mr. Jelenek estimated exposure to MEK and other solvents would be limited to about five minutes at a time and stated that they are not used every day. Local exhaust ventilation systems were observed in the Model Shop area where solvents are used.

MEK is widely used in industry with relatively few serious health effects reported. Its odor is the source of frequent worker complaints and the threshold limit value of 200 parts per million (ppm) was established to minimize such complaints to prevent injury and irritation.¹

Isopropyl alcohol has a low toxicity by any route of exposure. The TLV of 400 ppm was established to prevent eye, nose, and throat irritation. Acetone also has a low toxicity (TLV = 750 ppm). Inhalation of small quantities can cause respiratory irritation, coughing, and headaches, but serious ill-effects have not been reported from its widespread use.¹

Lacquer thinners commonly contain petroleum distillates and can contain aromatic hydrocarbons. As with the other solvents used to clean metals in the Model Shop, the use of lacquer thinner is limited and intermittent with exhaust ventilation supplied.

Safety solvent is a term used to denote the relative nonflammability of certain solvents including the chlorinated hydrocarbons used for degreasing such as 1,1,1-trichloroethane. Mr. Jelenek replied that the safety solvents in use in the Model Shop includes Stoddard solvent which is a mixture of paraffins, naphthenes, and aromatic hydrocarbons. The TLV of 100 ppm for Stoddard solvent was established to prevent irritative and narcotic effects of the vapors.¹

Benzene was widely used in the rubber industry prior to the discovery of its relationship to aplastic anemia and its subsequent stricter regulation. Benzene use for processes such as rubber manufacture has now been widely replaced by toluene. Mr. Jelenek states there is no benzene in use in this Division.

Symptoms of exposure to toluene primarily involve central nervous system depression. Respiratory irritation is also listed as an effect of exposure.² However, use of toluene in the rubber laboratory would not constitute a significant exposure to the claimant.

Given the intermittent use of solvents in the Model Shop, the local exhaust ventilation provided, and exposures stated by Mr. Jelenek to be below the permissible exposure limits, it is not expected that such solvent exposure would cause an occupational disease in a healthy worker. The American Conference of Governmental Industrial Hygienists includes the following explanation in the definition of the threshold limit values.

Threshold Limit Values refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect. Because of wide variations in individual susceptibility, however, a small percentage of workers may experience discomfort from some substances at concentrations at or below the threshold limit; a smaller percentage may be affected more seriously by aggravation of a pre-existing condition or by development of an occupational illness.

2. Carbon Monoxide -- Item 14

The claimant stated that he was exposed to carbon monoxide from automobiles parked in the executive parking garage. Exhausted air was reported to be 45,550 cfm (cubic feet per minute) in the basement area during the survey and air supplied was reported to be 13,050 cfm. The difference indicates a significant negative pressure in this area. Negative pressure can prevent exhaust systems from operating at design efficiency, but company air sampling in this area for carbon monoxide has not indicated a problem exists.

Carbon monoxide levels were found to be insignificant--3 ppm-- during the survey conducted by Mr. Davis. Measurements were taken with a calibrated Model 210 Ecolyzer in mid-afternoon. Seven cars were present in the parking garage. The toxicity of carbon monoxide is related to its affinity for hemoglobin in the blood making less oxygen available to the tissues.³ It is not known to be a sensitizer.

3. Rubber, Plastic and Related Compounds -- Items 1, 3, 6, 9, 11, 17, 18, 21

These items include vinyl chloride, isocyanates, chlorine, plasticizers, amine, urethane foam, rubber compounds, styrene, ABS plastic, and fiberglass.

Upon review it is apparent that the claimant did not have direct contact with most of these items. The claimant lists vinyl chloride from plastics and rubber processing. Vinyl chloride is a monomer used in the manufacture of polyvinyl chloride (PVC) plastic. If vinyl chloride is used at all in the labs, its use would be limited to closed systems since it is a regulated carcinogen.

Vinyl chloride is a different material than PVC. Polyvinyl chloride parts reinforced with fiberglass are handled in the Model Shop on occasion; Mr. Jeleneck recalled the handling of this material on a limited basis during work on a Corvette.

Machining or sawing fiberglass-containing materials could result in symptoms of itching. Fiberglass dust has been reported to cause asthma and respiratory irritation.⁴ However, it is not known if the claimant was working with this material immediately prior to his symptoms.

Machining PVC is not expected to release the monomer. Overheating PVC can cause its degradation with the byproducts produced dependent on the temperature. Hydrogen chloride will be released at temperatures between 225° C and 475° C.⁵ Above 300° C, carbon monoxide, carbon dioxide, benzene, and the vinyl chloride monomer will be released. According to a 1973 EPA-sponsored study, benzene forms during the same temperature range as HCl and before other hydrocarbons. Toluene and benzyl chloride could also occasionally be found in this temperature range.⁶ Many additional products may be released from PVC additives upon overheating.

Meatwrapper's asthma, associated with the heat-sealing of PVC film, had been attributed to the irritative effects of hydrogen chloride, phosgene, chlorine and the degradation products of PVC additives.⁵ It is not known whether the work with PVC reinforced plastic in the Model Shop involved heating the material.

Organic isocyanates are prominent industrial allergens.² TDI is a respiratory irritant and a potent sensitizer of the respiratory tract. It has been reported to cause asthmatic reactions in

sensitized individuals at very low concentrations.¹ The current TLV for TDI is 0.005 ppm. Sensitization can occur upon first exposure or symptoms may develop after exposure over a period of time. Sensitization has been reported among workers who do not have a prior history of allergy. Exposure to isocyanates may result in chronic impairment of pulmonary function.¹

According to Mr. Jeleneck, TDI has never been used in the Model Shop, the claimant never worked directly with TDI, and there have not been any cases of sensitization among Model Shop employees. A very small amount of TDI is reported to be used in the TDI lab on an infrequent basis. Continuous air monitoring in the Model Shop during lab operations has not shown any detectable levels according to Mr. Jeleneck who conducted the monitoring for periods up to a week.

Respiratory irritation and sensitization have been associated with other isocyanates, but the hazard depends upon their volatility. Hexamethylene diisocyanate (HDI) and TDI are more volatile and are therefore considered more hazardous than MDI, diphenyl methane diisocyanate, and PAPI, polymethylene polyphenylisocyanate.¹

Chemicals used in the production of polyurethane copolymer or polymer include TDI, HDI, MDI, PAPI, 4,4-methylene-bis-2-chloroaniline, organic tin compounds, hydrocarbon blowing agents, and polyglycols.⁷ According to a summary by Steve Ahrenholz of selected NIOSH health hazard evaluations involving plastics, the molded urethane foam process has been associated with exposure to TDI.⁸ Overexposure to noise, solvents and carbon monoxide were determined in another health hazard evaluation involving molded and cast plastic products which included polyurethane foam.⁹

Plasticizers are added to polymers to facilitate processing and to modify the characteristics of the final product. The more important plasticizers are nonvolatile liquids and low-melting solids.⁹ NIOSH lists several chemicals used as intermediates in the manufacture of plasticizers some of which are respiratory irritants²; however, the use of plasticizers would be confined to the laboratories and would not be a significant source of exposure to the claimant.

Other additives in both rubber and plastic compounding include stabilizers and antioxidants. There are literally hundreds of chemicals that can be used for these purposes, but again it must be emphasized that the claimant was not directly involved in the compounding of rubber or plastic materials which is done on a small scale under controlled conditions in the laboratories. Chlorine use in the rubber lab was not investigated specifically but it would be expected to be used in a closed system. It is a chemical with good warning properties which can be smelled at concentrations well below the permissible exposure limit.¹⁰

Amine refers to a large class of organic compounds of nitrogen similar in structure to ammonia but with substituted alkyl groups for

one or more of the hydrogen atoms.⁹ Amine compounds used in rubber and plastic manufacture seem to cause numerous allergic responses among workers. Epoxy curing agents include the sensitizers diethylenetriamine and triethylenetetramine. It is not known to which chemicals the claimant is referring.

4. Adhesives and Epoxies -- Items 2, 10

According to Mr. Jelenek, the Model Shop employees work with epoxy systems intermittently using very small quantities. There are a great number of epoxy compounds with a wide variety of applications including their use as adhesives. In general, significant health problems are not likely to occur as the result of epoxy resin use.⁷ The most common reaction to contact with epoxy compounds is irritation of the skin, nasal passages and respiratory tract.

Sensitization reactions can be caused by repeated exposure to epoxy compounds resulting in skin reactions or an asthma-like reaction of the respiratory tract at concentrations lower than what causes direct irritation.

The resin itself usually does not present an airborne hazard due to low vapor pressure. The curing agents, however, frequently cause dermatitis and sensitization. It is possible that the claimant became sensitized to a component of one of the epoxy systems in use in the Model Shop, but, according to Patty's Industrial Hygiene and Toxicology, proof of such sensitization is difficult to obtain, "particularly in the case of the resins where determination of the active constituents may prove impossible."⁷

5. Other Contaminants Including Dusts and Fumes -- Items 20, 22

The claimant listed welding and cutting torch operations on painted and leaded fiberglass auto bodies; painting parts; the machining, grinding and sawing of many products including rubber, plastics, fiberglass, urethane foam, styrafoam, wood products, brake linings, steel, brass, iron, and aluminum; and exposure to asbestos and Hypolon.

The last two items listed by the claimant refer to alleged exposures during his 17-year history with Inland. It is not known whether the claimant was exposed to asbestos, but asbestos is not usually associated with respiratory irritation. It is known to cause restrictive pulmonary disease and cancer. The claimant was not thought to have worked with Hypolon, a silicon-based compound used in the rubber lab. For those processes which do occur in the Model shop, it should be pointed out again that these operations are not continuous. Although some dust and fume is expected to be generated from such operations, related health problems are generally associated with chronic exposures that occur over a period of years. Exceptions might include those agents which are associated with allergic responses, e.g. fiberglass, some hardwoods, hardeners, curing agents,

etc. It should be noted that exhaust systems are provided in the Model Shop for machining operations.

In summary, there are many factors associated with asthma, including dusts, molds, humidity, exercise, stress, temperature, and chemicals. It is nearly impossible to identify which factors present in the claimant's environment may be associated with his condition. Certainly, there would be some exposure to dusts, fumes, and vapors in his working environment, but from what we can determine, such exposures are not continual and do not include all the items which he listed.

The fact that NIOSH chose the Model Shop employees as the control group in the health hazard evaluation conducted at this facility in 1976 seems to indicate that this group was thought to have relatively less exposure than other groups studied. The references made to the claimant's allergies to mold, dust, and some foods in the facsimile file may indicate a condition of hypersensitivity which could be aggravated by his work environment. A direct cause-and-effect relationship between the claimant's employment at Inland and his allergic response remains a possibility, but it would be almost impossible to determine by collecting air sampling data.

Respectfully submitted,

Marilyn Priddy
Marilyn Priddy
Industrial Hygienist

Glenn Davis
Glenn Davis
Industrial Hygienist

MP/GD/klp

REFERENCES

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9. Condensed Chemical Dictionary, Tenth Edition, ed. by Gessner G. Hawley, Van Nostrand Reinhold Company, New York, 1981.
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Inland, Division of General Motors Corporation, P.O. Box 1224, Dayton, Ohio 45401

January 11, 1984

Marilyn Priddy
Industrial Hygienist
The Industrial Commission of Ohio
6500 Poe Avenue
Dayton, Ohio 45414

Re: Robert J. Sabin
OD 18172-22

Dear Ms. Priddy:

This is in response to your request dated January 1, 1984 concerning Robert Sabin:

Item (a): The claimant to my knowledge did not use MEK on a regular basis. It was used for cleaning metal and may have been in some other products. It is available at Inland. The safety solvents include Stoddard solvent. Here again there use is infrequent and limited to very small quantities. There may be days or weeks that these materials are not used.

Air sampling results included detector tube samples. We did not keep this type of data in the past. It was shared with the employee, his foreman, etc.

It is important to understand that even when the employee would use the solvents in question his exposure time would be less than five minutes, and under controlled conditions of exhaust ventilation.

Item (b): Yes, I suppose the claimant was involved with welding, cutting, and grinding. This was done on a short duration basis and is not a full time 8 hour, 40 hour a week job. It is more like five or ten minutes here and there while working on their assignment. Here again, all of the equipment which would be employed has mechanical exhaust ventilation and special locations to perform each operation. The materials involve metal, for the most part (steel, iron, etc.). I have no sampling results.

Item (c): Exposure to fiberglass, PVC, and epoxy systems in the model shop again are on an infrequent basis. I can remember the model shop people working on a Corvett auto. They removed parts etc. with limited exposure to plastic parts (PVC) reinforced with fiber glass. The employee's do work with epoxy stems using very small quantities. Some could work for a day or so or just a few minutes to an hour with application of the system. Then there would be the finishing.

Inland, Division of General Motors Corporation

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To: Marilyn Priddy

Date: 1-11-84

- Item (d): Hypolon is a type of trade name coating or rubber latex manufactured by DuPont. The claimant did not use this material to my knowledge. It is used in the rubber lab. It is a silicone based material. I have no sample results.
- Item (e): Toli-oil is I believe a rubber oil used in compounding. I do not believe the claimant had exposure to it.
- Item (f): There has been very few if any TDI spills in the TDI lab. This area operates on an infrequent and very small volume basis. When experimenting with new formulations they may pour two or three pads for evaluation. All under environmentally controlled conditions. I have not conducted routine monitoring. I have set up a "MDA scientific model 7000 TDI continuous monitor". It has run for periods of one week during lab operations. Its location was the model shop. It is equipped with an audible and visual alarm. The model used had a strip chart recorder. There were no detectable results.
- The model shop does not use nor have they ever used TDI. There has been no involvement of model shop employees in a spill situation. There has not been any case of a model shop employee being sensitized to TDI. The claimant has never worked directly with TDI.
- Item (g): The Health Hazard Evaluation did involve the model shop. Their evaluation has not been finalized. We have not received their final report. It was initiated in 1978 and is currently 6 years old. The model shop was used as a control group.
- Item (h): No other relevant sampling data is available.

The model shop is a very clean and well controlled department. Their use of chemical is minimal.

My involvement dates back to 1976 and commences in June, which is my seniority date. The information in this letter represents my knowledge of the department from June 1976 to the present.

If I can be of further help please call me.

Respectfully yours,

Tom Jelenak / *DIS*

T. F. Jelenak
Senior Industrial Hygienist

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Inland, Division of General Motors Corporation, P.O. Box 1224, Dayton, Ohio 45401

Date: January 6, 1984

Subject: Mr. Sabin - Re: I.C. #0018172-22

From: T. E. Jelenek - Sr. Industrial Hygienist

To: David L. Swafford - Workers Compensation Supervisor

Mr. Sabin's allegation of exposure to 22 plus chemicals, needs to be clarified.

There are several of these substances located in the Model Shop (ie. MEK, Isopropyl Alcohol, mineral spirits) which are used to clean metal parts. However, there is limited exposure (below - OSHA Standards) and not on a daily basis.

I have formed the opinion that because these materials are available for use in a department that Mr. Sabin has alleged exposure, that we must be realistic. There is no such thing as an exposure free environment. I can state that Mr. Sabin was not exposed to any material exceeding the OSHA Standards. I can further state that such exposure was less than one-tenth of these standards and included infrequent contact.

Mr. Sabin's own comments about air movement into the building should indicate it is away from his area because of the pressure differences. Therefore, the possible influence of the other laboratories is extremely insignificant.

I think we need to clarify the actual physical state of the chemicals Mr. Sabin states he worked with.

For example, he has indicated exposure to vinyl chloride, benzene and styrene. This contention is not true. These materials are finished products, polyvinyl chloride and styrene sheets and would not be considered a chemical exposure. Benzene is not used at our division in any manner. The actual cutting of these materials involves a few minutes a month.

Inland was involved in a NIOSH Health Hazard Evaluation. The Model Shop employees were selected as a control group. Phase I of the study required these employees to complete questionnaires and were given physical exams by NIOSH. Not one employee was selected for Phase II of the NIOSH study. Furthermore, it was Inland's suggestion that they participate in the evaluation.

A number of references made by Mr. Sabin are directed toward the NIOSH evaluation or other medical information we (Inland Safety Dept.) do not possess, they include:

1. A copy of the work place evaluation and questionnaire
2. Allergy test data
3. Food test allergy reports
4. Chemical sensitivity results

I have personally monitored for solvent vapors, carbon monoxide, and TDI in this laboratory area. I do not have copies of these results, because they were performed with general survey type instruments (Detector Tubes).

I did establish a monitoring point for TDI and used an MDA Scientific 7000 Monitor. It ran for 1 week in the lab. We did not detect any TDI. This particular unit is equipped with an audio and visual alarm. It was set up for all employees in this area to observe. It has been so many years ago that I can not find the record. (We have moved our offices three times over the course of these years).

I also used a carbon monoxide monitor and found no problem. As we know carbon monoxide is not a sensitizing agent.

The Department of Labor, OSHA has investigated this area on several occasions at the request of the employees and/or their representative. There have been no citations issued for violations of the chemical standards.

This laboratory area is very clean and visible. The ventilation control equipment is more than adequate.

Based on my knowledge of this area (1976-present), I feel the Model Shop is one of the better places to work at Inland.

It is difficult to assess a situation without knowing the full employment history etc. The fact that Mr. Sabin was a Tool Engineer and was involved in Model shop work in the early years from 1964 - 1967 helps isolate his employment history. He returned to the Model Shop in 1978 and since I am familiar with this area from (1976 - 1978) I do not feel it is a high risk area. I can find no basis or evidence to support Mr. Sabin's contentions.

Sincerely,



T. E. Jelenek
Sr. Industrial Hygienist

CERTIFICATE OF AUTHENTICITY

I certify that the microphotographics on this roll of film or microfiche are true and accurate productions of records generated by or received by the Ohio Bureau of Workers' Compensation, an agency of the State of Ohio, as required by Ohio Revised Code Section 4123.52 and Section 9.01 which require optimum protection from hazards of accidental destruction of records.

It is further certified that the photographic processes used for microfilming the above records were accomplished in a manner and on microfilm which meets the requirements of the National Bureau of Standards for permanent photographic copy.

William D. Kays
Supervisor, Microfilming Unit

Date Filmed: 1-3-85

By: John Frey
(Camera Operator)

BWC-6226 (11/82)
RS-25

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