

INDUSTRIAL HYGIENE REPORT

Inland Manufacturing Division
Vandalia, Ohio

December 2-4, 1964

GENERAL MOTORS CORPORATION

PERSONNEL STAFF

Industrial Hygiene Department
Vincent J. Castrop—Director

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Industrial Hygiene

Inland Manufacturing Division
Vandalia, Ohio

An industrial hygiene survey was made in Building 31 of the Inland Manufacturing Division, Vandalia, Ohio, on December 2-4, 1964, at the request of S.A. Wright. Plans are to continue the survey in the other buildings at Dayton in the near future. Matters relating to the survey were discussed with J.H. Overwine, E.R. Nicholson, M.J. Smith and S.A. Wright. The Industrial Hygiene Department was represented by J.R. Vander Roest.

SUMMARY, CONCLUSIONS AND SUGGESTIONS

Toluene Diisocyanate (TDI)

TDI concentrations at crash pad and small parts production operations were far below the permissible limit. No changes are necessary.

Solvent Vapor

Trichloroethylene

Concentrations of trichloroethylene were well below the permissible limit where this material is used to flush the nozzles of foaming machines in the crash pad production department. The exhaust ventilation is adequate.

Lacquer Thinner

Borderline concentrations of solvent vapor were found in the Vinyl Paint Department 166. Elimination of some sources of solvent vapor such as open cans of paint and solvent would result in improvement. Full

DISCUSSION

Toluene Diisocyanate (TDI)

Crash pad and small parts production involving the use of polyurethane foam remains essentially as described in previous reports, except that increased production required the installation of additional foamers, ovens and associated equipment. Currently there are nine crash pad foamers and three conveyorized ovens, three small parts foamers and two ovens, and two foamers continuously pouring into arm rest molds on one conveyor that passes through an oven. All of these units have local exhaust ventilation. On the foamers this consists of slots behind the nozzle and at the rear lip of the waste box. Air flow face velocity into these slots exceeded 6000 lineal feet per minute

Toluene Diisocyanate (TDI) (Cont'd)

(fpm) with the exception of the nozzle and box slots on the No. 3 foamer and the box slot on the No. 8 foamer which had face velocities of 4000 fpm.

A tabulation of the face velocity of the air flow in fpm into the conveyor openings of the crash pad ovens follows:

	<u>Entrance</u>	<u>Exit</u>
West oven	300-400	200-250
Center oven	200-300	0-150
East oven	25-75	25-150

• While these velocities appear to be adequate a maintenance check could be made to determine if mechanical difficulties are causing the lower flows into the east oven and the exit of the center oven. An exhaust hood opposite the men on the arm rest line causes an air flow of 300 fpm at the parts.

Temperatures required that the building be operated under closed conditions. The partially recirculating air supply system was operating and a new tempered fresh air supply unit was installed just south of the line of crash pad foamers.

When mixing tanks are charged with Atomite Powder (calcium carbonate) to provide the proper viscosity, it was thought that TDI could be displaced from the tanks. Apparently the escape, if any, is insignificant.

All of the test results revealed concentrations that could not be chemically detected. No changes are necessary.

Permissible Limit for Toluene Diisocyanate (TDI)

The generally accepted permissible limit for TDI is 0.02 part per million parts of air by volume.

Results of Tests for TDI

Test

No.	TDI in ppm	Remarks
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All of the tests for TDI were made in Building 31, Department 176. All of the foamers were equipped with exhaust ventilation in the form of a slot at the nozzle and at the lip of the waste box.

1	None Detected	Breathing zone of operator of No. 1 foamer producing Oldsmobile "A" body crash pads. A second man assists in moving parts to the conveyor part of the time.
2	None Detected	Breathing zone of operator of No. 2 foamer making Buick Special crash pads. One man regularly assists operator.
3	None Detected	Breathing zone of one of three men operating the No. 3 foamer running Oldsmobile B and C body crash pads.
4	None Detected	Test taken in the breathing zone of one of four men removing pads from molds on conveyor at exit of east oven.
5	None Detected	Breathing zone of operator of No. 4 foamer making Buick crash pads and glove box door covers. A second man assists with the crash pads.
6	None Detected	Breathing zone of one of four men operating the No. 5 foamer producing Pontiac Bonneville crash pads at the rate of 140 units per hour.
7	None Detected	Breathing zone of operator of No. 6 foamer making Cadillac crash pads with the assistance of one other man.

Results of Tests for TDI (Cont'd)

Test No.	TDI in ppm	Remarks
8	None Detected	Sample taken in breathing zone of man using power tools to loosen clamps on molds on conveyor at center oven exit.
9	None Detected	Breathing zone of one of two men running Buick crash pads on the No. 7 foamer.
10	None Detected	Breathing zone of one of three men making Pontiac bezels on the No. 8 foamer.
11	None Detected	Breathing zone of operator of No. 9 foamer producing Pontiac Tempest crash pads and Buick glove box pads.
12	None Detected	Breathing zone of operator of west foamer in the small parts area making Corvette instrument panel pads.
13	None Detected	Breathing zone of operator of the center foamer in the small parts area running Cadillac belt trim parts.
14	None Detected	Breathing zone of one of three men at continuous pouring two nozzle arm rest foamer. Two men remove parts from molds and third man removes flashing and sprays wax on molds. In addition to the nozzle and waste box exhaust, a six foot long exhaust hood opposite the men causes a 300 feet per minute air flow at the parts in the mold conveyor.

Results of Tests for TDI (Cont'd)

Test No.	TDI in ppm	Remarks
15	None Detected	Breathing zone of man on platform while mixer No. 18614-C was being loaded with Atomite Powder by another man at a hopper on the floor level.