WALK-THROUGH SURVEY REPORT
Contract #210-77-0096
Ford Motor Company
Los Angeles Assembly Plant
Pico Rivera, California 90660

DATE OF SURVEY
January 30, 1979

DATE OF REPORT
July 25, 1979

The Johns Hopkins University
Baltimore, Maryland

and

The National Institute for Occupational Safety and Health
Cincinnati, Ohio

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Ford Motor Company
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Pico Rivera, California 90660

PURPOSE

To develop preliminary information concerning the suitability of this plant for inclusion in the investigation of health hazards in the painting trades. This investigation is being carried out by The Johns Hopkins University School of Hygiene and Public Health and The Institute of Applied Technology under contract with The National Institute for Occupation Safety and Health (NIOSH).

PERSONS CONDUCTING SURVEY

Genevieve M. Matanoski, M.D., Dr.P.H., Epidemiologist, The Johns Hopkins University
Newton E. Whitman, M.S., Industrial Hygienist, The Johns Hopkins University
Shiro Tanaka, M.D., Physician, The National Institute for Occupational Safety and Health

PERSONS PREPARING REPORT

Dr. Genevieve M. Matanoski, The Johns Hopkins University
Mr. Newton E. Whitman, The Johns Hopkins University

CORPORATION AND PLANT CONTACTS

Mr. H. F. Hafer, Acting Industrial Relations Manager
Mr. A. L. Rousseau, Safety/Security Supervisor
Mr. C. E. Hoskin, Safety Engineer
Mr. G. H. Twisselmann, Plant Engineering Manager
Dr. Sherman L. Watson, Plant Physician
Mr. Ace R. Briscoe, Hourly Personnel
Mr. William J. Ward, Workers Compensation
Mr. Larry Ford, Paint Specialist
Mr. Paul Toth, Supervisor Industrial Hygiene Section
Ford Motor Company, Dearborn, Michigan

UNION REPRESENTATIVE

Mr. Norbert B. Cazenave, Union Safety Representative
United Auto Workers - CIO, Local 923

DESCRIPTION OF PLANT

The plant is located on a 200 acre site in the Pico Rivera section of Los Angeles, California. This section does not seem highly industrialized but there may be some air pollution from nearby heavily traveled highways. The layout of the plant is shown in Figure 1 (1st Floor) and Figure 2 (2nd Floor) in Appendix 1. The plant was built in 1958. Since then there have been two additions, one in 1967 to accommodate assembly of the Thunderbird car and one in 1971 for the Emission Test Lab. There is a total area of about two million square feet under roof including the second story. The building is in good repair and housekeeping is excellent. The upper story is devoted almost exclusively to painting and related activities. All locations where much painting is done are outlined on Figures 1 and 2.

There are presently about 2,500 employees of which 2,200 are production and maintenance employees, the balance being office workers. There is only one production shift, the second shift being assigned to maintenance work.

There is only one final assembly line and just two models of cars are produced, the LTD and the Thunderbird. About 52 cars are produced per hour. There are approximately 100 painters. There are also approximately 100 additional employees who may have some slight exposure to paint spray and vapor.

PROCESS DESCRIPTION

The starting materials, engines, body panels, frames, etc., enter the plant on the south side and progress along various short assembly lines to the final assembly line along the north side of the plant. This line moves from the west end of the building eastward to the final inspection and testing area. The assembly of an automobile involves some welding, largely fine wire welding but also including some spot welding. Most of fine wire welding is done in large well enclosed and well ventilated booths. Following the wire welding booths is a large booth where hot solder is applied to various joints of the auto body. The operators use torches to keep the solder warm and soft. No wearing of respirators was observed. The torches are somewhat noisy. Some of the operators wear ear plugs and all wore safety glasses. Next to the solder application booth in the approximate center of the first floor is the solder grinding booth. In this booth all the operators wear supplied air hoods. Both of those booths are well enclosed and ventilated. Following the solder grinding operation is another grinding location which is free of solder. However, there may be some accidental grinding on the solder. From these grinding operations the body parts go up to the painting operations on the second floor.

PROCESS DESCRIPTION

The painting operation will be described in some detail in the next section of the report.

After the painting of the body and small parts (hood decks, front panels, etc.) is finished, these parts are delivered to the final assembly line and installed. After the installation of these parts is completed, the cars are started up and put through various tests and inspections. In this general area there is a small amount of painting done, mostly in the paint repair booth and the repair stalls. In addition, there are some areas where the auto engines must be operated such as the roll tests and emission test locations. In these places there is a potential exposure to carbon monoxide. However, the possible carbon monoxide exposures seem very well controlled.

PAINTING OPERATIONS

Painting operations are a very important part of the automobile assembly process. Paint is applied by about 45 painters all in the same department; there is one shift per day. Approximately 2,100 gallons of paint are used in this plant per day. In addition, about 350 gallons of solvent are added to the paints daily. There are 10 spray painting booths, most of which are located on the second floor. The areas outlined show the locations of the spray booths and also of the main paint mixing room (See Appendix 1). There are also some locations on the main floor where small amounts of touch-up painting and stripping are done in the open. These places are not outlined. The spray painting booths are all well enclosed and ventilated.

The four large body painting booths which are located on the south side of the second floor are down draft hoods with a water curtain under the floor. Most of the spraying is done with manually operated compressed air guns although some of the prime coating is done automatically but with conventional compressed air spray guns. In these booths two spray painters stand opposite each other. However, the downdraft ventilation seems very effective and little or no overspray seems to reach the painters. The four painting booths on the north side of the second floor are side draft booths used for small parts such as hood, fenders, etc. All the paint booths have water wall cleaning systems. Each booth is followed by an enclosed ventilated bake oven. In general, fumes from the ovens as well as the paint mist and vapor are well controlled. Painters are not required to wear respirators but respirators are available on request. Apparently respirators are not often worn. At the far south side of the second floor is an alkaline cleaning and phosphatizing booth where the auto bodies are cleaned and treated before painting. A similar line for small parts is located on the northern side of this floor. The painting operations are described in greater detail in

Appendix 2. Appendix 3, Spray Booth Design Air Flows, gives air supply and exhaust for nine spray booths. In addition to the operations discussed above there is also some wet and dry sanding carried out in the painting area. The dry sanders used manually are provided with local exhaust ventilation. The abrasive does not contain any free silica. In general these operations are well controlled as concerns any release of dust. There is a small paint mixing room located just east of the paint repair booth near the east end of the final assembly line. No employee is stationed here full-time. The room seems to be well ventilated but is somewhat noisy due to the type of paint mixers used. Almost all paint preparation is done in the large paint mixing room located on the south side of the plant beyond the railroad siding. There are 47 dual paint mixing tanks each of which has a capacity of about 60 gallons. There is no local exhaust ventilation. However, there are three air supply units near the ceiling and five exhaust units along the south wall of the room. According to the ventilation engineer, Larry Grainger, the total air supply to the room is 18,500 cfm and about 15,000 cfm is exhausted. Two men work here most of the time. Two employees and a supervisor spend part of their time here. The room seems somewhat noisy and the odor of solvent vapor was noticeable during the survey.

Based on the information supplied by the Ford Motor Company there does not appear to be anything in these paints which would be any more hazardous than the usual coatings applied in industry. The presence of some zinc chromate in the pigments used in some of the primers is noteworthy. Also it is noted that the enamels may contain fairly high concentrations of aliphatic and aromatic hydrocarbons.

DESCRIPTION OF WORKFORCE AND PERSONNEL RECORDS

The total employee population at this plant in production and maintenance is 2,220 individuals. There is one operating production shift with about 2,000 employees and a second shift of only about 200. The production shift lasts for 10 hours. They have 50% minority population including Negro, Oriental, and Hispanic. Eight percent of the hourly employees are women; there are no women spray painters. The turn-over rate is estimated to be less than 5% per year.

There are a total of 99 individuals who are directly involved in painting. They are classified as "sprayer" and "utility man" in the paint department which operates on one shift. A utility man is an expert sprayer who can do any job on demand. In addition, there are 16 repairmen and additional individuals who are in the paint room who are strippers who do brush touch-up on the final assembly line as well as a group of maintenance repair individuals for the paint lines. The plant could not give us an estimate of the number of this additional group of individuals.

The application forms for personnel of this plant include name, address, social security number, birthdate and sex. No racial indication is included on the application. There is also information about citizenship, education and previous jobs held. The personnel file also includes a complete work history of jobs. All records are retained in the plant for the years 1970 through 1978. From 1954 through 1970, they are in a nearby storage area and from 1954 backwards they are in a more remote storage facility. We did not view the records in either the plant or storage facility and therefore it is impossible to determine how simply the job histories may be obtained from the personnel file. We have determined that such a record is available within the files and that it goes back to a period before 1954.

From about 1974 on, the records from this plant have been on a computer facility. The facility carries the information from the personnel file and includes a job history. However, only nine entries for the job code are available and older jobs have been deleted if the individual's experience includes more than nine entries.

The employees have a life insurance and health insurance plan as well as a disability and retirement plan which are non-contributory for the hourly employees. Their life insurance and disability insurance plans are handled by John Hancock. The medical insurance is covered by either Kaiser Permanente or Blue Cross and Blue Shield of California. Their retirement plans and workmen's compensation plans are self insured.

The company is informed of the deaths of all employees and retirees but they do not keep copies of the death certificates. Those documents are sent to the insurance company. At present there are approximately 5 to 6 deaths per month so that follow-up of this population will yield a relatively large number of deaths over a 10 or 15 year period. At present there are approximately 700 to 800 living retirees and about 400 current employees who are in a category of 54 years and over with approximately 28 years of employment. The latter group are therefore eligible for retirement soon. In fact, about 25% of the population in this plant were initially employed at a Long Beach operation in the late forties and thus contribute to a relatively high age distribution in the population.

This plant represents a consolidation of the old Los Angeles plant and the old Long Beach Mercury plant. Records from these previous divisions may also be available.

DESCRIPTION OF MEDICAL RECORDS

The medical department consists of one full-time physician and two day nurses and one night nurse. They have their own ambulance. The medical program consists of a pre-employment examination for all

employees and a periodic examination on employees such as lead grinders and truck drivers. Audiometric screening is being done once a year on employees. There is no routine chest screening. Routine vision screening is done on employees. We reviewed records of logs for 1977. During that year occupational injuries equaled 27,566, non-occupational visits 15,318, pre-employment physicals 449, total examinations 1,845. For a single month they see approximately 2,000 individuals for illnesses excluding routine exams. All records on medical illnesses which are "significant" are put on the employee's card and these are retained with his record. If it is a simple treatment, it may be only recorded on a log sheet. These logs are retained only for a short period of time but the exact time is uncertain.

Anyone laid-off for two months or more has a repeat physical on return to work. If an individual is absent from work for any time period he is required to have a physician's slip for return to work but no physical examination is done in relation to these absences.

SAFETY AND INDUSTRIAL HYGIENE

Industrial hygiene and safety for the plant are under supervision of A. L. Rousseau, Safety/Security Supervisor. Industrial hygiene expertise and services are readily available from corporate headquarters. The Ford Motor Company has an excellent industrial hygiene section at the home office in Dearborn, Michigan. This plant was visited by the home office industrial hygienists as recently as October, 1978 and will be under study by them again in the near future.

In general, control of potentially hazardous exposures is good. Sound level studies have been made at the locations which seem noisy indicating that noise levels are within existing limits. Also, audiometric testing is carried out on employees so exposed. Air and blood samples for lead have been collected and analyzed routinely on the solder workers and others who may be exposed to lead aerosols. These data indicate exposures are within present limits. Solvent vapor exposures have been studied in the large paint mixing room and at other painting operations. According to plant representatives, the results indicate that solvent vapor levels are well within present limits. It is our understanding that solvent vapor exposures will be studied again in the near future, especially in the large paint mixing room.

Only one or two men wear 3-M disposable respirators for spray painting. Respirator cleaning and maintenance is done by an outside firm. In general both local exhaust and general ventilation are good. The clean tempered fresh air supply to each booth is adjusted so

that the booth is under a slight positive pressure yet solvent odors are rarely detected outside the booth. In addition, tempered fresh air is supplied to the plant generally through units located on columns within the plant. CAL OSHA inspected this plant in 1976 in response to an employee's complaint. That complaint of fume from the paint bake ovens was declared unfounded; no report was written. Moreover only three minor infractions were found in the entire plant.

REPRESENTATIVE COATING COMPONENTS

The composition of the various paints and solvents used here is discussed briefly in Appendix 3: Painting Operations. Information on the composition of the various paints and solvents is supplied in Appendix 4, a letter from L. M. Roslinski, Ph.D., Industrial Toxicologist, Ford Motor Company, 2/15/79. At the time of the survey Material Safety Data Sheets were requested for the paints and solvents most commonly used at the plant. It was explained that the plant did not have Material Safety Data Sheets for any paints or solvents and that Mr. Paul Toth, Supervisor, Industrial Hygiene Section at the corporation headquarters should be consulted. Mr. Toth was contacted by phone shortly after the survey. He explained that they were reluctant to give out Material Safety Data Sheets because of possible difficulty with their suppliers over release of confidential information concerning composition of coating materials. He offered to supply essentially the same information in a less formal way. Subsequently the letter of L. M. Roslinski of his staff was received.

CONCLUSIONS

From an industrial hygiene standpoint this plant would be worth studying as an example of an industrial operation where possible hazards due to large scale painting activities are well controlled.

The Ford Assembly Plant in Los Angeles would be appropriate for epidemiological studies of painters in the automobile manufacturing industry. The number of painters are large and the total volume of paint to which they are potentially exposed is also sizable. Without further industrial hygiene study it is impossible to know the extent of exposure which they are currently getting, however.

RECOMMENDATION

Consider this plant for in-depth study.

Appendix 1

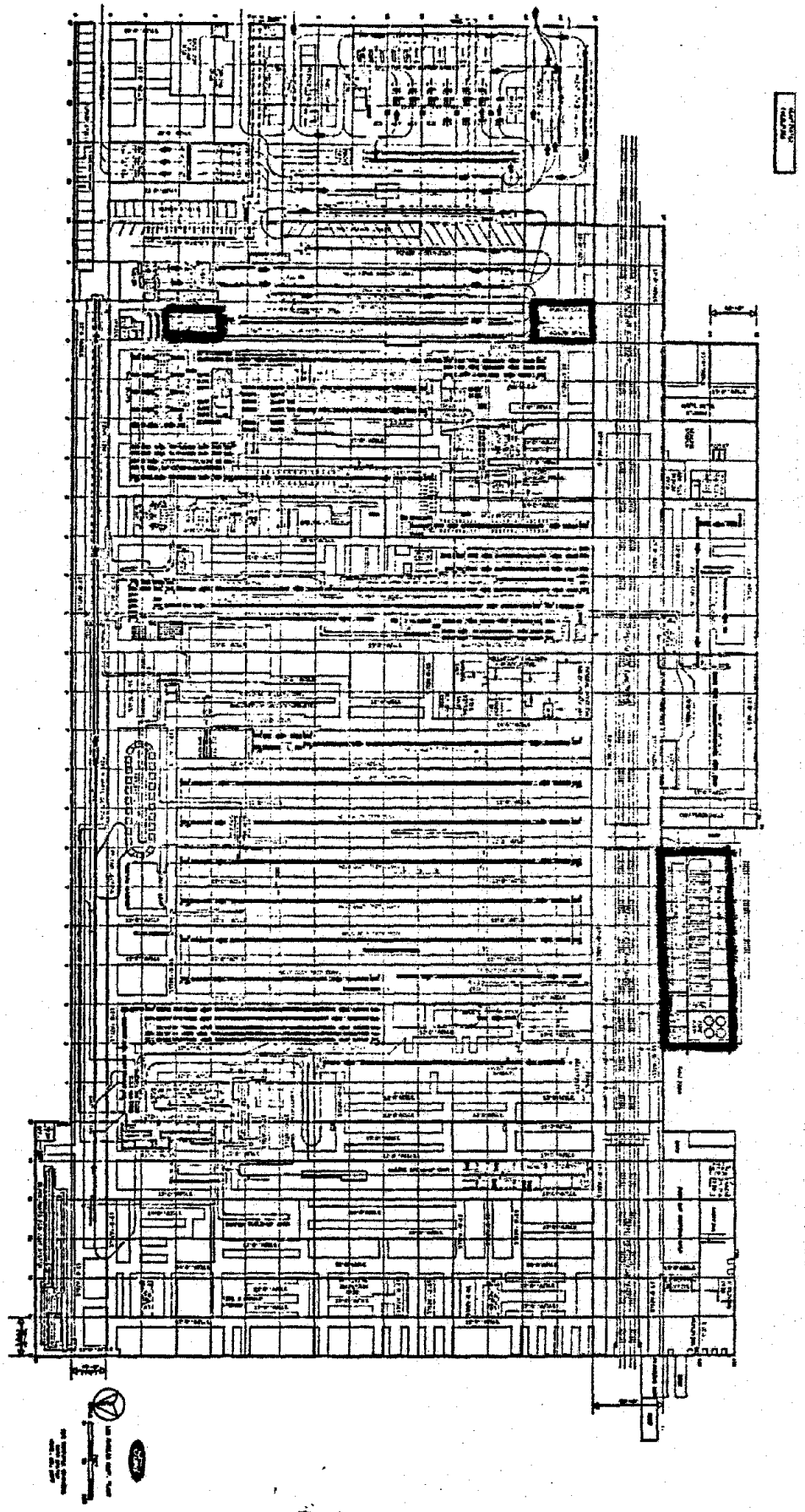

Fig. 1

1ST FLOOR

LOS ANGELES ASSEMBLY PLANT

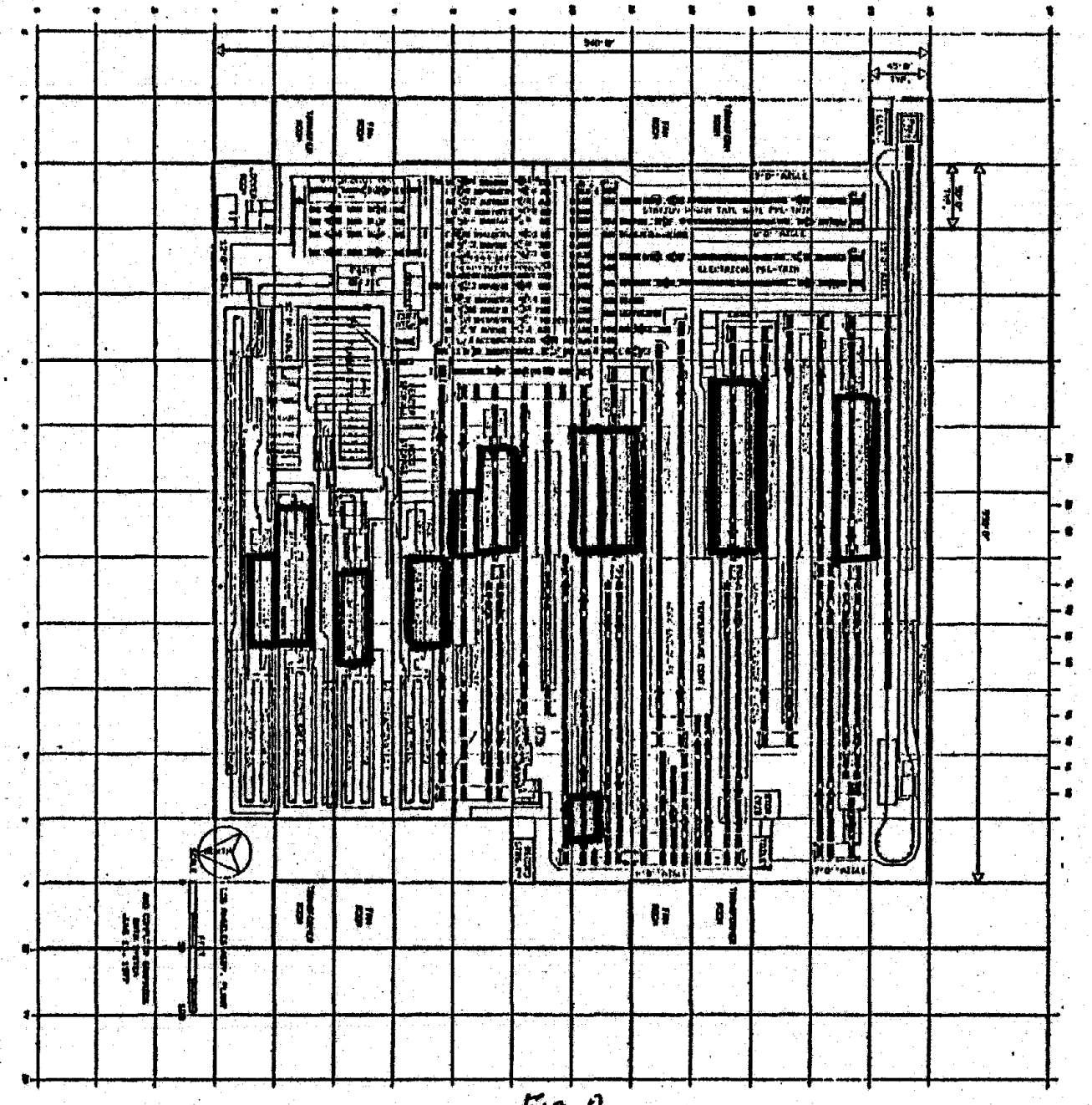

Fig. 2

2ND FLOOR

LOS ANGELES ASSEMBLY PLANT

Appendix 2

PAINTING OPERATIONS

PRIME APPLICATION

Units are painted through two systems, a down-draft booth for the body and a side-draft booth for the front end parts (i.e. small parts). In the body booth phosphated units receive two exterior coats of primer by automatic convential spray guns. One interior coat is applied manually by convential gun in between the automatic coats. Door openings and the deck compartment receive a manual one coat application after the second automatic coat, again using convential spray guns.

In the small parts booth two exterior and one interior coat of primer are manually applied with conventional spray guns.

The materials used in these booths are:

Epoxy Primer	ESBM 6J120c
Reducer Solvent	GROW 2865
Retarder Solvent	GROW 6100
HiViscosity Epoxy Primer	ESBM 6J120C2
Celsolv. Acetate	ESBM 14J201
Black Underbody Primer	ESBM 2J115BTM
Black Enamel - Scrap	ESBM 2J115ATM

ENAMEL APPLICATION

Enamel is applied in six spray booths, three downdraft booths for bodies and three side draft booths for small parts. The first body booth applied three exterior coats and two interior coats of enamel with manual conventional spray guns. The second body booth applies one exterior coat with manual conventional guns. The third body booth is a repair and tu-tone booth and only paints select panels on the unit with manual conventional spray guns.

In the first small parts spray booth units receive four exterior and one interior coat with manual conventional spray guns (Binks 62). In the second spray booth only parts requiring repairs are painted with two exterior coats applied with manual conventional spray guns. The third booth is for plastic nose pieces (GOP's) only. Three exterior coats are applied with manual conventional spray guns.

The materials used in this booth are:

Acrylic Enamel	ESBM 32J104A
Reducing Solvent	GROW 6106-ESBM 14J506
Retarding Solvent	GROW 6100
Cleaning Solvent	ESBM 14J14
Flash Primer	ESBM 6J111
Overbake Primer	Ditzler DL 1970
Cleaning Solvent	ESBM 14J14

BLACK-OUT BOOTH

The black-out booth is a downdraft, dry, spray booth in which anti-corrosion treatments and black-out paints are applied with manual airless spray guns.

The following materials are applied:

Aluminium Wax	ESBM 7C53A
Waterbase Air Dry Black	ESBM 62J12A
Cleaning Solvent	ESBM 14J14

REPAIR AREA - BUY OFF LINE

Minor interior paint defects are repaired with touch-up laquer using manual conventional suction spray guns in an open area.

The following materials are used in this area:

Clear Lacquer	Ditzler DCA 468
Lacquer	ESBM 4J54 B
Reducing Thinner Alt.	Ditzler DTL 876
Gloss Solvent Alt.	Ditzler DTL 105
Reducing Solvent	ESBM 14J521
Gloss Solvent	ESBM 14J20

PRE DELIVERY AREA (PDA)

After complete assembly of unit any in system damage is repaired through the PDA system. The PDA system consists of an interior touch-up area which is not in a spray booth and a downdraft spray booth for applying exterior catalyzed enamel. All material is applied using manuel conventional spray guns.

The following materials are used in the open for interior touch-up:

Clear Lacquer	Ditzler DCA 468
Lacquer	ESBM 4J54B
Reducing Solvnet Alt.	Ditzler DTL 876
Gloss Solvent Alt.	Ditzler DTL 105
Reducing Solvent	ESBM 14J521
Gloss Solvent	ESBM 14J20
Primer	ESBM 6J20

The following materials are used in the catalyzed enamel spray booth:

Acrylic Enamel	ESBM 32J104A
Reducing Solvent	GROW 6106
Retarding Solvent	GROW 6100
Acid Catalyst	ESBM 99J228C
Cleaning Solvent	ESBM 14J14

Appendix 3

Spray Booth Design Air Flows
(SCFM)

Body Prime Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	= 104,785	No. East	= 42,500
Zone II	= 104,785	So. East	= 42,500
	209,570 CFM	No. West	= 54,000
		So. West	= 54,000
			193,000

Body 1st Color Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	= 90,000	No. East	= 59,500
Zone II	= 90,000	So. East	= 59,500
Zone III	= 95,000	No. West	= 42,500
Spot Prime	= 25000	So. West	= 42,500
	300,000	Spot Prime	= 20,000
			224,000

Body 2nd Color Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	= 81,500	No. East	= 34,500
Zone II	= 81,500	So. East	= 34,500
	163,000	No. West	= 42,500
		So. West	= 42,500
			159,000

Body 3rd Color Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	= 79,000	No. East	= 25,500
Zone II	= 79,000	So East	= 25,500
	158,000	No. West	= 38,250
		So. West	= 38,250
			127,500

Hood & Fender Prime Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	33,800	West	24,000
Zone II	49,800	Center	36,000
Zone III	24,000	East	36,000
	107,600		96,000

Hood & Fender 1st Color Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	45,200	No. East	36,000
Zone II	45,200	No. West	36,000
Zone III	25,000	No. Cntr	18,750
Zone IV	45,000	So. Cntr	36,000
	160,400		126,750

Hood & Fender 2nd Color Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	38,200	East	36,000
Zone II	38,200	West	36,000
	76,400		72,000

Misc. Parts Paint Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	38,200	East	36,000
Zone II	38,200	West	36,000
	76,400		72,000

Final Paint Repair Spray Booth

Fresh Make-up Air		Exhaust Air	
Zone I	45,300	North	38,250
Zone II	45,300	South	38,250
	90,600		76,500

Paint Mix Room Ventilation

Fresh Air Supply

East = 4656
Center = 6552
West = 7288
18,496

Exhaust Air

East = 2943
East Cntr = 2079
Center = 2997
West Cntr = 3588
West = 2970
14,868

Appendix 4

Ford Motor Company

The American Road
Dearborn, Michigan 48121

February 15, 1979

Mr. Newton Whitman
14 Marquis Drive
Gaithersburg, MD 20760

Dear Mr. Whitman:

Pursuant to our conversation of last week regarding compositional information on primers, solvents, and enamel top coats that might be used in Ford automotive painting facilities, we have the following comments.

The primer materials in question contain approximately 60% solids, of which approximately 20% may be combinations of epoxy resins and melamine resins. Pigments, usually present in concentrations greater than 40%, are generally made up of what could be combinations or single ingredients of barium sulfate, titanium oxide, iron oxide, and/or zinc chromate.

The solvent system or liquid phase of the primers are typically 2-8% alcohols, 0-20% acetate esters, 5-20% glycol ethers.

The enamel materials (top coats) generally contain 30-35% solids, consisting of less than 5% pigments in metallic colors and up to 20-25% pigments in non-metallic colors. The resins are generally acrylic, melamine, and/or epoxy, depending on suppliers of the systems. Solvent systems will be similar to those used in the primer systems addressed above. In the enamel systems, however, aliphatic hydrocarbons and some aromatic hydrocarbons (C_8 or greater) may be present in concentrations ranging from 10-35%.

The solvent systems in question contain aliphatic hydrocarbons up to 40%, fatty acid esters up to 70%, ethoxyethanol up to 20%, aromatic hydrocarbons (C_8 or greater) up to 20%; ethyl acetate may be present in concentrations up to 45% (again, depending on the specific solvent from any specific supplier in question).

I hope this information is helpful to you. Please feel free to call if you have any questions.

Sincerely,

L. M. Roslinski

L. M. Roslinski, Ph.D.
Industrial Toxicologist
Industrial Hygiene and
Toxicology Department
(313) 323-3182

LMR/kb

cc: P. E. Toth