

Investigation on Occupational Disease Inductive Factors of Automobile Manufacturing Enterprises and Evaluation of Control Effect

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Abstract: The automobile manufacturing industry has a complex process and various processes, so it has buried many occupational-disease-related safety hazards and is the industry of high incidence of occupational diseases. Accurate identification and effective control of hazards in automobile manufacturing are an important guarantee for effective prevention of occupational disease. In order to investigate the types and status of occupational-disease-inductive factors of a car manufacturer, and evaluate the control effect, the general situation of the enterprise is collected from August 2016 to October 2017. And then the targeted treatment, including management measures, engineering protection and personal protection. The occupational-disease-inductive factors that are mainly produced in automobile manufacturing are productive dust, chemical substance and physical factors.

Keywords: Automobile manufacturing; The occupational disease; Hazard factors; The control effect

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1. Introduction

With the development of China's transportation industry and the continuous improvement of people's living standards, the automobile manufacturing industry is developing rapidly. According to the national automobile industry association of China in 2017, there are 15,856 enterprises in the automobile industry in China. Its main business revenue and profit volume are growing rapidly; in 2015, the number of car sales in China reached 24,597,583, compared to 2014, over the

same period, 4.68%, automobile manufacturing industry is one of the important pillar industries in China^[1]. Automobile manufacturing is mainly divided into vehicle manufacturing and automobile parts manufacturing. The vehicle assembly includes automobile assembly and body manufacturing. The parts and components are divided into engine system, braking system, electrical system, transmission system, suspension system, air conditioning system and interior decoration.^[2] The process of automobile manufacturing industry is complicated and the process is so many, so there are many occupational-disease-related

safety hazards. Moreover, it has the characteristics of wide distribution, easy contact and great harm. Physical factors (noise, high temperature), dust (metal dust, soot), chemical (carbon oxides, nitrogen oxides, heavy metals, benzene and benzene), etc., is an occupational disease high hair industry.^[3] Accurately identify and effectively control the hazards in automobile manufacturing process, it is an important guarantee for effective prevention of occupational diseases.^[4]

2. Investigation on the Status of Enterprise Occupational Health

From August 2016 to October 2017, the general situation of a company is collected. Such as nature, number of employees, institution setting, etc. Production process, product, production; The types of occupational-disease-inductive factors, workshops and stations; Personal hygiene protection measures for employees, the distribution and use of protective equipment; Health management protection facilities and emergency systems.

3. Occupational Health Protection Measures

3.1 Management Measures

Formulating the occupational-disease-prevention plan and implementation plan in line with the actual situation of the enterprise, set up a dedicated occupational health management department and responsible personnel, regular environmental monitoring, sampling and evaluation of the automobile manufacturing environment of our company, there is the danger of exceeding standard to undertake active management. Before work, the staff shall be trained and examined by occupational health. After work, the company also regularly arranges medical examinations for employees. And keep the physical examination files. Establish and improve the emergency response system and emergency plan of the factory. Regularly arrange full-time security personnel to inspect various workshops, investigating improper operations and personnel in violation of safety regulations, posting and warning signs or signs in conspicuous locations.

3.2 Engineering Protection

The plant has a large span in construction. The district arranges the workshop. Natural ventilation or air supply, under water, install the fan at the required station. The large dust production line of the production line is equipped with ventilation system and dust removal system. Special stations are segregated, welding, polishing and other more dust, the noise of a large work station to be isolated; The painting workshop also isolated operation, to implement

the closed production line, mainly using mechanical arm electrostatic spraying, hand in hand, the paint mist is discharged after treatment with waste gas. Set up the power station, boiler control room, sewage station and air compressor room.

3.3 Personal Protection

Regular occupational-disease-related risk factors and the training of health protection measures, strengthen employee's personal hygiene protection awareness. Configure basic labor protection supplies and protective equipment for each employee. Teaching them to use it correctly, regularly check and maintain the personal hygiene protective equipment of employees. Welding workers to distribute dust respirators, masks, goggles, fireproof sleeves and aprons; Coating workers with anti-gas mask, face mask, antistatic clothing and gloves; The stamping worker dispensed anti-cutting gloves and sleeves. The noise level is equipped with anti-dryness earplugs and earmuffs, and other workshops can be worn according to their own conditions. The working time is strictly according to the enterprise standard. In the morning and afternoon, employees can take a break of 10 ~ 20 minutes. Set up the dressing room and wash the bathroom.

4. Results

The automobile manufacturer is mainly engaged in mechanical operation and manual operation. The main production process is: Press: opening and cutting, forming stamping, processing and storage; Welding: white body assembly and partial assembly line, responsible for welding, adjustment, grinding, inspection and storage; Coating: finish pretreatment, electrophoresis primer, middle coat, surface paint, spray wax and protective material, sealant welding; General assembly and detection line: body assembly, indoor debugging, inspection, qualified warehousing, unqualified repair.

The enterprise includes stamping, body, coating, general assembly of 4 main workshops, the production processes involved are stamping, welding, coating and general assembly. The materials used are paint, steel, curing agent and thinner. Therefore, the main occupational-disease-inductive factors in automobile manufacturing are productive dust, chemical and physical factors. Dust mainly comes from welding dust and grinding wheel. Chemical substances are mainly toluene, xylene, manganese dioxide, butyl acetate, ethyl acetate, solvent gasoline, nitrogen oxides, ozone and hydrogen sulfide, etc. Noise, high temperature and ultraviolet (arc welding arc) are the main physical hazard factors. See Table 1 for details.

Table 1. Analysis table of occupational-disease-inductive factors of a car company

Workshop	Post	Hazard factors
Stamping workshop	Operator, mold repair	Noise and dust
	Maintenance	Dust and noise
The welding workshop	Welders	Dust, noise, arc welding arc, chemical products (carbon monoxide, carbon dioxide, ozone, manganese, etc.)
Coating workshop	Pre-skim	Noise, chemical products (phosphates)
	Input	Noise
	Before processing	Noise, chemical products (benzene and benzene)
	A sealant	Noise, chemical products (benzene and benzene)
	To prepare	Noise and dust
	Paint member	Noise, chemical products (benzene and benzene), organic solvents (ether, ester, ketone)
	Spraying	Noise, chemical products (benzene and benzene), organic solvents (ether, ester, ketone)
	polishing	Noise and dust
	Finishing	Noise, chemical products (benzene and benzene), organic solvents (ether, ester, ketone)
Assembly workshop	Assembler	Noise, chemical products (benzene and benzene series, methanol, formic acid, acetaldehyde), gasoline
Test line	Inspector	Noise, chemical products (carbon monoxide, sulfur dioxide and nitrogen oxides)
Joint power station	Power distribution, water treatment station, air pressure station, natural gas station	Noise, power plant, chemical products (methane, hydrogen sulfide)

Table 2. Abnormal physical examination results of employees

Check the project	The number of b.	Check out the abnormal number of results	Detection rate
Blood pressure	1880	71	3.78%
Electrocardiogram (ecg)	1880	82	4.36%
Ultrasound	924	30	3.25%
O.	1021	9	0.88%
Routine blood	1958	43	2.19%
Liver function	1021	22	2.15%
Lung function	1021	2	0.20%

Table 3. Dust operation and lung function, chest film; Whether benzene operation and blood routine examination situation

Check the project	The assignment	The number of b.	Abnormal number	Detection rate
O.	Dust homework	826	0	0
	Non-dust operation	195	9	4.62%
Lung function	Dust homework	826	0	0
	Non-dust operation	195	2	1.03%
Routine blood	Benzene homework	773	0	0
	Harmless operations	1185	43	3.63%

5. Discussion

The occupational-disease-inductive factors such as noise, chemical substances and physical factors seriously threaten the health of employees in automobile manufacturing enterprises. For example, noise causes deafness and tinnitus, long-term exposure to benzene can affect the blood system of the body. Too much dust can cause dust, people who have been engaged in manganese work for a long time have excessive urinary manganese.^[5] A number of studies have shown that the noise distribution is the most widely distributed among the risk factors in automobile manufacturers.^[6] The most contact noise is the most, therefore, the hearing loss caused by noise becomes one of the most serious occupational diseases of automobile manufacturers. Besides, the occupational diseases caused by noise to workers are multifaceted. The most common of these are hearing loss, such as deafness and tinnitus. It's also reported that noise affects the nervous system, the cardiovascular system, and the digestive system. Prolonged exposure to noise is an independent risk factor for hypertension and ecg. And there is dose-response relationship.^[7]

In order to effectively prevent the occupational-disease hazard of automobile manufacturers, providing protection for workers' physical health, promoting the healthy development of enterprises, the following measures can be taken in the position of key hazard factors: To improve relevant policy measures, to formulate and supervise the maintenance and management of the occupational-disease-prevention equipment; Preventive maintenance equipment, ensure the equipment is running normally. Improve production process technology, gradually implement fully automated technology, the opportunity to reduce the direct exposure of employees to harmful substances.^[8] Proper placement and debugging of sanitary protection equipment, improving the wind speed of the inlet of the mobile dedusting equipment, the distance between the dedusting equipment and the location of the operation, the dust, dust and dust of the resulting dust shall be inhaled. Improve dust removal effect.^[9] Reasonable layout of production process, under the premise of ensuring production, reduce the density of stamping and welding, install sound insulation in the workshop, avoid noise superposition.^[10] Regularly conducting training on occupational-disease-related risk factors and health protection measures, improve the workers' self-protection awareness and ability, promote protective measures to every employee. To strengthen occupational health management and supervision, regularly arrange full-time security personnel

to inspect the working environment of each workshop. Investigating improper operations and personnel in violation of safety regulations, timely find out the hidden dangers of occupational diseases. Take active and effective management measures.

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