

Evaluation of Occupational Health Management in Small-Scale Enterprises using a Checklist for Organic Solvents

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Abstract: The aim of this research was to clarify improvements in the occupational health management of small-scale enterprises by introducing the use of a checklist for organic solvents. We studied 25 small-scale enterprises producing lacquerware in Wakayama Prefecture, Japan. We specifically designed a manual for checking the occupational health management that included a checklist for self-evaluation. The survey using the manual led us to find that the median of workers was 4. All workshops were equipped with local exhaust ventilators for spraying work. Overall recognition of a need for the occupational safety and health by managers was not particularly high. The need was found for producing a documented work standard, properly dealing with or controlling organic solvents, thus preventing workers from exposure to organic solvents. Eighteen small-scale enterprises answered yes to more than 50 percent of items on the checklist. The results of the checklist exercise revealed some problems in spraying workshops, such as no documented work standard, no inspection of tools or local exhaust ventilators before work, no prevention against exposure to organic solvents, and insufficient measures taken for occupational health education. The results in this research pointed out some need to improvements in the occupational health management.

Key words: Occupational health management, Small-scale enterprises, Checklist, Organic solvents, Lacquerware

Introduction

The importance of establishing effective occupational health management for small-scale enterprises (SSEs) has long been emphasized. This is because 62 percent of workers are working in the SSEs where less than 50 workers are employed in Japan¹. In the SSEs the occupational health management for health care and control of working environment is not sufficient¹. Large-scale enterprises adopting an advanced chemical management system in Japan have a certain policy about detailed level of collected hazard and exposure information, and also have an efficient risk management system to ensure workers' health². In such

enterprises, occupational health specialists play major role in developing tools for risk assessment and control. However, autonomous establishment of occupational health management for chemicals is required in the SSEs, because no specialist is working there. It is necessary for the person in charge, such as an entrepreneur, to know fundamental steps for developing the occupational health management that is feasible in his/her own enterprise. Instructive questionnaires for screening the occupational health management in SSEs would support him.

The aim of this research was to clarify improvements in the occupational health management of the SSEs by introducing the use of a checklist for organic solvents.

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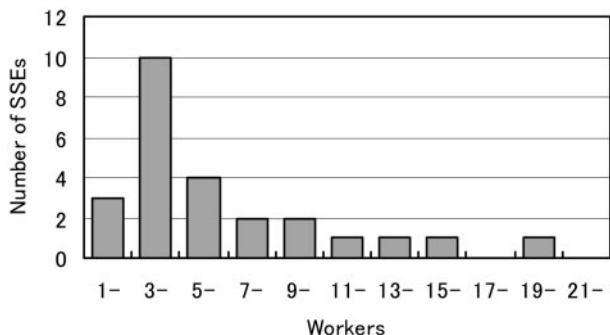
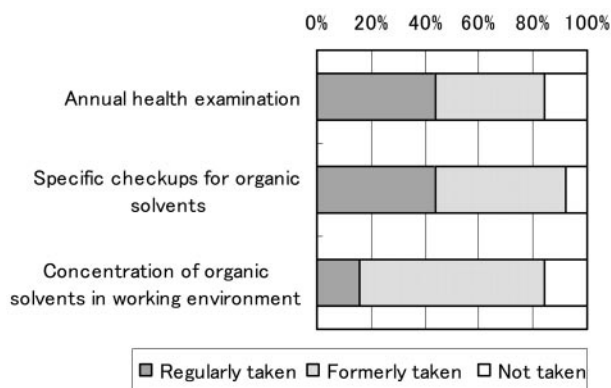


Fig.1. Distribution of workers in the SSEs studied.



Regularly: once a year for annual health examination and once within 6 months for specific checkups for organic solvents and concentration of organic solvents in the working environment

Fig. 2. Conditions of performing annual examinations regulated by Japanese Industrial Safety and Health Law.

Materials and Methods

We studied 25 SSEs producing lacquerware in Wakayama Prefecture, Japan. We specifically designed a manual for checking the occupational health management that included a checklist for self-evaluation (Appendix Table 1 and 2). The manual was intended to help those responsible for occupational safety and health in the SSEs using organic solvents. The checklist for self-evaluation is composed of 36 items covering 4 phases: preparation before working, procedures during the work, cheking after working, and health education and administration. This checklist is useful for health supervisors, safety and health promoters and others in SSEs to voluntarily evaluate the occupational health management.

Some published checklists^{3,4)} were referred to design the manual and the checklist.

In this research the researchers checked the occupational

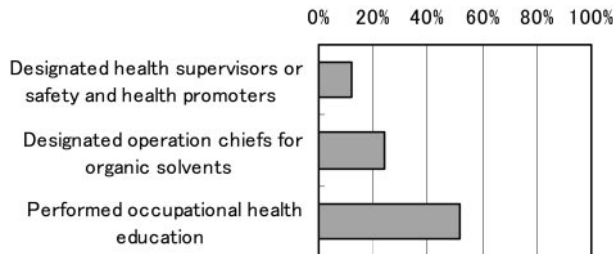


Fig. 3. Ratios of designated specialists and performed health education.

health management using the manual in the SSEs. Those who were responsible for occupational safety and health in the SSEs, for instance, managers, were asked to fill out the checklist for self-evaluation in their own workshops.

Results

Professional evaluations by the researchers

The distribution of workers in the SSEs studied is shown in Fig. 1. The median number of workers in the 25 SSEs was 4. All workshops were equipped with local exhaust ventilators for spraying work. The mean number of the ventilators was 2.8.

Conditions of performing annual examinations regulated by Japanese Industrial Safety and Health Law are shown in Fig. 2. Annual health examination, and specific checkups for organic solvents were regularly conducted in 11 SSEs (44%). The concentration of organic solvents in the working environment was regularly monitored in 4 (16%). Ratios of designated specialist, such as health supervisors, safety and health promoters, operation chiefs for organic solvents were low (Fig. 3). Occupational health education was performed in half of the SSEs.

The survey using the manual was used in 29 spraying workshops. Common problems revealed by using the results of the survey are shown in Fig. 4. There was no documented work standard in 26 (90%) workshops. Workers used no gas mask in 24 (83%). Used rags were not stored after use in a covered vessel in 26 (90%), and organic solvents were spilled on the floor in 24 (83%).

On the contrary, workers ate and drank at their working places only in 3 (10%) workshops. There was an air flow to disturb the efficacy of a local exhaustion system in 3 (10%). The lighting conditions were not enough in 4 (14%).

Self-evaluations by the managers

The checklist for self-evaluation was used in 20 SSEs. Eighteen SSEs answered yes to more than 18 items on the checklist (Fig. 5). The results, however, revealed some problems in spraying workshops (Fig. 6). There was no

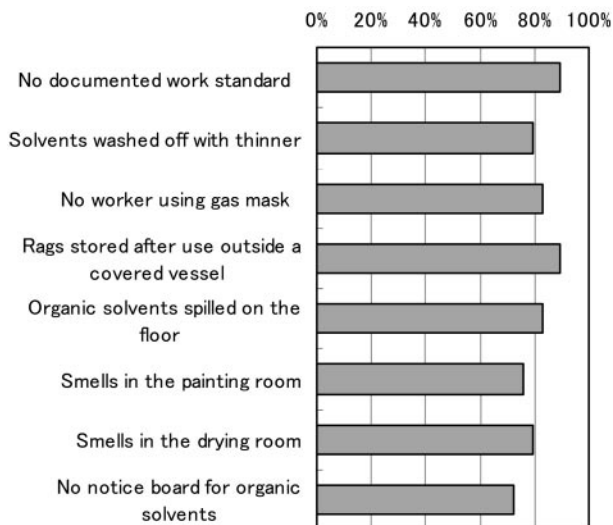


Fig. 4. Common problems from the results of survey using manual.

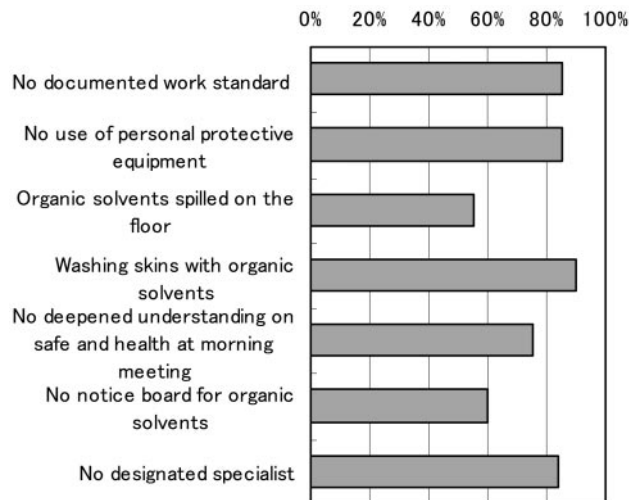


Fig. 6. Common problems from the checklist for self-evaluation.

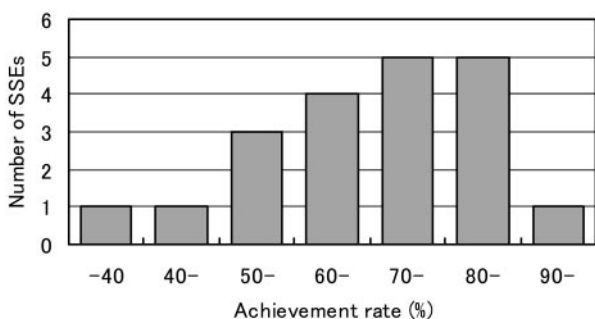


Fig. 5. Distribution of achievement rates from the checklist.

documented work standard in 17 (85%) SSEs. Workers used no personal protective equipment in 17 (85%). Workers washed their skin with organic solvents in 18 (90%). No specialist was designated in 16 (80%).

On the contrary, in all SSEs, a local exhaust system was used in the spraying workshops. Workers kept no combustible items in their pockets near a dangerous material. Workers neither drank nor smoked in the workshops.

Discussion

The manual and the checklist for the self-evaluation, both of which were newly designed in this research, pointed out some needed improvements in the occupational health management of the SSEs producing lacquerware.

A questionnaire survey on the health administration of the SSEs in a rural region in Japan⁵⁾ reported that the conducting rate of periodic health examination was 51.0% in the SSEs with less than 10 workers. The safety and health

promoter was working in 31.3% in the SSEs with less than 50 workers. Another research on 20 enterprises with 3 to 150 workers (mean 64 workers)⁶⁾ reported that the operation chief for organic solvents was designated in 16 SSEs. The health supervisor was designated in 12. The notice boards for the organic solvents were posted in 11. The concentration of organic solvents in the working environment was regularly monitored in 14. The annual health examination was regularly conducted in all SSEs, but specific checkups for organic solvents were regularly done in 16. The results of the survey showed the lower performing rate of annual examinations and the lower rate of designation of health supervisors than ones in such reports. This is partially because fewer workers were employed in our subjective SSEs.

Annual health examination, and specific checkups for organic solvents were not regularly conducted. The concentration of organic solvents in the working environment was not regularly monitored. Health supervisors, safety and health promoters or operation chiefs for organic solvents were designated in fewer SSEs. Occupational health education was given to workers in the half of the SSEs. Thus, overall recognition of a need for the occupational safety and health by the managers was not particularly high.

The results of the survey pointed out there no documented work standard, workers had not been using gas masks, used rags had been stored outside a covered vessel, and organic solvents spilled on the floor in many SSEs. These results showed the need for producing a documented work standard, properly dealing with or controlling organic solvents to prevent workers from being exposed to the organic solvents.

The checklist for self-evaluation revealed some problems in spraying workshops, such as no documented work standard, no inspection of tools or local exhaust ventilators

before work, no preventive measures against exposure to organic solvents, and insufficient measures taken for occupational health education.

Activities to establish the occupational health management in the SSEs are the positive support services and the given knowledge of know how to do so⁷⁾. The entrepreneurs in medium- and small-scale enterprises in Japan have high awareness for occupational health services, and are ready to use them⁸⁾.

Regional occupational health centers and the prefectural occupational health promotion centers would be helpful in Japan⁹⁾. Three hundred and forty seven regional occupational health centers are established to replenish occupational health services for the entrepreneurs and workers of SSEs with a work force of less than 50. They offer health counseling, occupational health guidance on separate visit and occupational health information. As core organizations to provide counseling and information on specialized technology and know how for smooth activities of occupational health specialists and for smooth operation of regional occupational health centers, 47 prefectural occupational health promotion centers are founded in each prefecture of Japan. One of their roles is professional counseling service on occupational health. Experts specialized in industrial medicine, occupational health engineering, etc., provide professional advice to occupational health specialists and other related personnel for solving problems arising from occupational health activities.

The occupational health management in Japan has been based on general health examination in the medium- and small-scale enterprises, compared with the Finnish system^{10, 11)}. Health questionnaires have been applied as screening device for health management of workers in the SSEs¹²⁾. However, the conventional health questionnaires were made and used for occupational health specialists or for managers. The manual and the checklist for self-evaluation devised in this research are for both of them, and then for work complementarily. Thereby, the manual including the checklist for self-evaluation will be useful for the participational and incessant improvements in the occupational health management of the SSEs. Consequently, the manual is recommended as a convenient method to assess the occupational health management in the SSEs where occupational health specialists are not available.

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Appendix

Table 1. Checklist for painting workplace in the manual

Item	Evaluation	Evaluation
1 Work standards are documented.	Yes	No
2 The local exhaust system is periodically inspected once a year voluntarily.	Yes	No
3 The paints and solvents, attached to the skin, etc. are washed off with thinner.	No	Yes
4 The worker eats, drinks and/or smokes in the workplace.	No	Yes
5 Something has been improved recently.		
In concrete: When:		
What:		
How:		
6 More-than-necessary paints and/or solvents are brought into the workplace.	No	Yes
7 The cover of the solvent storing container is tightly closed.	Yes	No
8 The solvent storing place is neat and tidy.	Yes	No
9 A local exhaust system is provided in the painting area.	Yes	No
10 The paint mist leaks outside the hood of the local exhaust ventilator (visual check).	No	Yes
11 The suction flow of the local exhaust ventilator is disturbed by an air flow from fans, etc.	No	Yes
12 The worker puts his/her face in the hood of the local exhaust ventilator.	No	Yes
13 The worker uses the gas mask.	Yes	No
14 The worker wears rubber gloves.	Yes	No
15 Ventilation fans are provided in the painting room.	Yes	No
16 Ventilation fans are provided in the drying room.	Yes	No
17 The exhaust air of the dryer is directly exhausted outdoors.	Yes	No
18 The rags, after use, are stored in a covered vessel.	Yes	No
19 Spills on the floor.	No	Yes
20 It smells in the painting room.	No	Yes
21 It smells in the drying room.	No	Yes
22 Notice boards for organic solvents are displayed or posted.	Yes	No
23 The entire workplace is neat and tidy.	Yes	No
24 The entire workplace is sufficiently lighted.	Yes	No
25 Other comments		
In concrete:		

Table 2. Checklist for voluntary inspection and evaluation

Check Point	Evaluation	Evaluation
Preparation before working		
1 Work set-up and procedures are documented.	Yes	No
2 Harm of solvents to the body is correctly recognized.	Yes	No
3 More-than-necessary solvents are brought into the workplace.	No	Yes
4 The cover of the solvent storing container is tightly closed.	Yes	No
5 Tools and machines are checked before starting operation.	Yes	No
6 The local exhaust system is test-run before starting operation.	Yes	No
7 Personal protective equipment including gas masks for organic solvents is ready for use.	Yes	No
8 It is confirmed that no fire exists in and around the workplace.	Yes	No
Procedures during working		
9 A work table of a suitable height is used.	Yes	No
10 A local exhaust system is used in the spray painting room.	Yes	No
11 The operator brings his/her face close to the hood of the local exhaust ventilator.	No	Yes
12 Measures are taken to prevent the paint mist from the spray gun from reaching the assistant worker.	Yes	No
13 The worker uses the protective equipment (gas mask for organic solvents).	Yes	No
14 The worker wears rubber gloves, etc. to protect the skin.	Yes	No
15 The worker wears the uniform when working.	Yes	No
16 The uniform is always clean such as by cleaning.	Yes	No
17 The worker keeps combustible items in his/her pockets near a dangerous material.	No	Yes
18 The worker drinks and/or smokes in the workplace.	No	Yes
19 An appliance which may generate a spark is used in operation.	No	Yes
20 The worker walks with his/her hands in the pocket.	No	Yes
21 Safety is confirmed when transporting cargoes or walking on a passage.	Yes	No
22 The worker, when walking, steps on the materials, gas hoses or electric cords.	No	Yes
Verification after working		
23 The workplace is periodically arranged properly and cleaned.	Yes	No
24 Materials and equipment are stored in the specified place.	Yes	No
25 Discarded materials are stored in the specified place and properly disposed.	Yes	No
26 Rubbish bins are properly arranged.	Yes	No
27 Flammable and dangerous items are stored separately.	Yes	No
28 The cover of the solvent container is tightly closed after operation.	Yes	No
29 Paints are attached to the floor in the workplace.	No	Yes
30 The paints and solvents attached to the skin, etc. are washed off with thinner.	No	Yes
Health education and administration		
31 Understanding of industrial safety and health is deepened in the morning meeting.	Yes	No
32 Boards warning the harm of organic solvents are confirmed.	Yes	No
33 A health supervisor or a safety and health promoter is designated.	Yes	No
34 An operation chief for organic solvents is designated.	Yes	No
35 The workers periodically undergo a health examination.	Yes	No
36 The workers undergo a health examination for organic solvents.	Yes	No