

A Case Study on Evaluations of Improvements Implemented by WISE Projects in the Philippines

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Abstract: The aim of this study is to evaluate the effects of work improvements in small enterprises (WISE) on workloads and productivity, and managers' satisfaction with those projects. Participating in this study from 1994 to 1996 were 9 small enterprises, 3 metal industries, 1 car parts manufacturing, 1 garment manufacturing, 1 food processing, and a few others. Upon visiting these worksites, we carried out interviews on the implemented WISE improvements and made objective evaluations of their effect on workloads and productivity. Reductions in physical workloads were found in 4 of 6 enterprises where that factor was estimated. Productivity in most of the enterprises increased after WISE improvements. Managers' subjective satisfaction with WISE activity ranged between 50–80% on each technical item. More than 50 percent of managers came to understand the necessity of workers' involvement and understanding of the activities in order to sustain activity for improvement. WISE activity can exert a beneficial influence on workload and productivity. Most of the managers were satisfied with the results. It is presumed that follow-up visits with objective estimation will provide both managers and workers with encouragement to maintain their efforts.

Key words: Small enterprises, Work improvement, Participatory activities

Introduction

Action-oriented and participatory programs for improving working conditions have spread to various countries. Work improvement in small enterprises (WISE) developed by International Labor Organization (ILO) is one such project¹. Characteristics of the WISE approach are participatory activities, low-cost solutions, productivity- and quality-enhancing solutions, focusing on achievement, learning by doing and using examples of local practices². The WISE training course consisted of surveying workplaces using an action-checklist, learning locally achieved improvements, group work for planning and prioritizing improvements, and implementation of those improvements. The WISE methodology has been recognized as an effective tool to motivate workers and managers and to maintain improved working conditions. In the Philippines, the WISE project was carried out between 1994 and 1996, receiving United

Nation Development Programme (UNDP) financial support and ILO technical support. WISE activity has been further supported as a flagship project of the Philippines Department of Labour and Employment. From 1994 to 1996, 1,724 WISE improvements were implemented through WISE activities in the Philippines³. WISE projects have been carried out in other countries beside the Philippines. Furthermore, participatory approaches similar to those in the WISE methodology have been used in several projects such as POSITIVE (Participation Oriented Safety Improvement by Trade Union Initiative) for trade union members, and WIND (Work Improvement in Neighborhood Development) program for farmers. Recently, such participatory approaches have spread to construction worksites and home industries. However, the effects of those activities on occupational workloads and on managers' satisfaction with those activities in the workplace have not yet been evaluated. The aim of this study is to evaluate the effects of WISE improvements on both workloads and productivity as well as on managers' satisfaction with them.

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Methods

Basic procedures of the WISE approach are shown in Fig. 1. The WISE training course is for managers at small enterprises. Factory visits using an action checklist to identify local good examples and to assess those areas in need of improvement are carried out at the beginning of the training program. The items focus on suggestions for action rather than checking for possible problems. The items address the following 8 technical areas: 1) Material storage and handling, 2) Workstation design, 3) Productive machine safety, 4) Control of hazardous substance, 5) Lighting, 6) Welfare facilities, 7) Premises, and 8) Work organization. Small group discussions have proven to be among the most effective techniques for identifying and prioritizing points to be improved, and for motivating participants to take effective actions. Participants are given an introduction to the basic aims of the WISE methodology, and hints for work improvement in each technical area. They then devise an action plan for improvements in each enterprise and ideas for implementing them. A total number of 2,060 such plans were devised for small enterprises in the Philippines from 1994 to 1996, 1724 (83.7%) of which were successfully carried out³⁾.

In this study, our subjects were 9 small enterprises in Cebu and Dabao, for which we completed physiological measurements, and productivity estimates both before and after improvements. Those enterprises were 3 in the metal industry, 1 in car parts manufacturing, 1 in garment manufacturing, 1 in food processing, and a few others. We visited those enterprises from 1998 to 1999. Using questionnaires we carried out interviews on the implementation of WISE improvements and subjective evaluations of their effect on workloads and productivity.

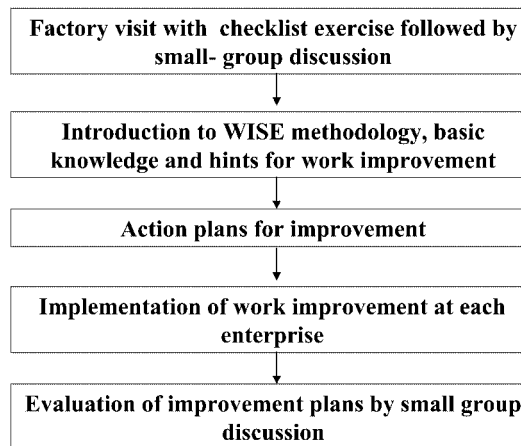


Fig. 1. Basic WISE approach.

The questionnaire items were designed to elicit the level of satisfaction after completing the WISE activities compared to the conditions existing before. In some cases, we conducted evaluations of productivity, measurements of physical workload such as changing muscular workload, heart rate and oxygen consumption, and workplace environmental conditions such as noise before and after improvements were made.

Results

The results of objective evaluations and productivity by WISE activity at 12 technical areas are shown in Table 1. The improvements were implemented at 6 workstations, 5 material storage locations and 1 premise. Reductions in physical workloads were shown in four of the six enterprises

Table 1. Results of the objective evaluation of WISE activity

Type of Industry	Technical Area *	Improvement	Measured Items **	Evaluation ***
Metal	Premises	Sound barrier	N (+)	◎
Metal	MSH	Cart for carrying heavy items.	Ph(0) Pr(+)	○
Metal	WS	Guide bail for cutting	ML(-) Pr(+)	△
Car parts	WS	Fixture for assembling	Ph(+) LM(+) Pr(+)	◎
Car parts	MSH	Crane to lift heavy items.	Ph(+) Pr(+)	◎
Garment	MSH	Change of carrying method	Ph(+) Pr(+)	◎
Garment	WS	Guide for cutting rubber bands	LM(0) Pr(+)	○
Food	MSH	Crane to lift heavy items.	Ph(+) Pr(+)	◎
Food	WS	Funnel to pack noodles	LM(0) Pr(+)	○
Sign maker	WS	Work table	LM(+)	○
Shell work	WS	Fixed scissors	LM(0) Pr(+)	○
Pottery	MSH	Cart for carrying heavy items.	Ph(-) LM(0) Pr(-)	△

* MSH: Material Storage & handling, WS: Work Station.

** N: Noise, Ph: Physical workloads, LM: Local muscular workloads, Pr: Productivity.

(+): Improved, (0): little or no change, (-): Become worse.

*** Improved: ◎ much, ○ fairly, △ not.

where we estimated them. There were few enterprises that showed improvements of local muscular workloads, whereas after the WISE improvements, productivity increased in most enterprises.

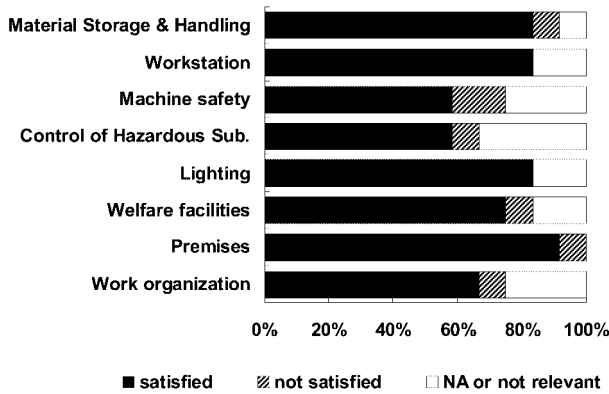


Fig. 2. Managers' subjective estimation of WISE activity.

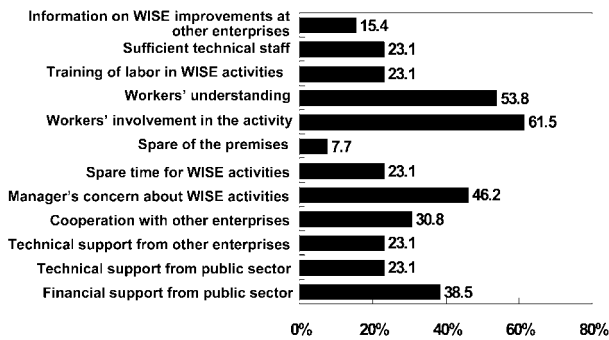


Fig. 3. Managers' opinions on vital items to sustain WISE activities.

Figure 2 shows the result of managers' subjective estimations of the effect of those improvements in different technical areas. Managerial satisfaction with the WISE activity reached 50-80% for each technical item. Some technical areas were not relevant to some enterprises. For example, some enterprises did not use hazardous substances. If such enterprises are taken into account, it can be said that most of the managers were satisfied with the results of WISE improvement. Figure 3 shows the results of managers' opinions concerning the steps needed for sustaining WISE activities. More than 50 percent of managers felt the necessity of workers' involvement in and understanding of those activities in order to sustain them.

Case 1: Material handling and storage at a garment factory

Prior to improvements in one garment factory, workers had to carry unfinished products manually to the first floor (Fig. 4). After improvements, a hopper was introduced to accomplish that task. In order to estimate the effect of workload improvements, we simulated a task of carrying 30 windbreakers weighing (20.25 kg) each and involving 7 round trips downstairs to a packing room. During that task, conducted under both the old and improved methods, oxygen intakes (VO₂) were continuously monitored (Fig. 5). The total VO₂ during work before and after the improvements were 1,177l and 661l, respectively, and the time for carrying 210 windbreakers was shorter using the new method. Moreover under the old method, HR and oxygen intakes were higher than the highest values during the work needed to carry dropped windbreakers to a finishing table. This suggested the installation of a gravity chute between the hopper and the finishing table to avoid physical strain on the workers.



Before improvement

Semi-finished products were carried manually to the first floor.



After improvement

A hopper was introduced to convey semi-finished products to the first floor.

Fig. 4. Example of WISE improvement in a garment factory.

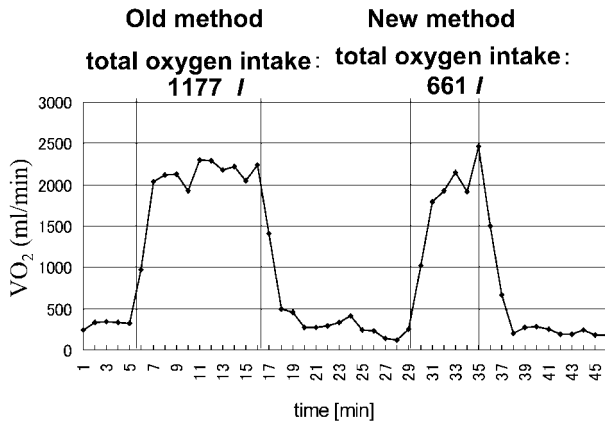


Fig. 5. Change of VO₂ during work before and after improvement.

Case 2: Workstation at a garment factory

The workers' job was to cut rubber strap into 31-inch segments at this factory (Fig. 6). Prior the improvements, the workers had to used a measuring tape before cutting the segments. An improvement was made to imprint guide marks to avoid having to manually measure the strap length. Variations in the product length and workers' EMG from the Extensor Carpi Radialis Brevis Muscle (ECRB) and Trapezius Muscle (TRAP) on both sides of the body were measured before and after that improvement. Productivity was subsequently found to be higher and the length of the products more precise (Fig. 7). However, no significant difference was found in muscle activity levels before or after.

Case 3: Workplace premises at a metal factory

In this factory, grinding operations were performed in a large room where other workers were exposed to the noise.



Before improvement

A tape was used to indicate length of the strip.



After improvement

Guide marks were introduced to measure the length.

Fig. 6. Example of WISE improvement in a garment factory.

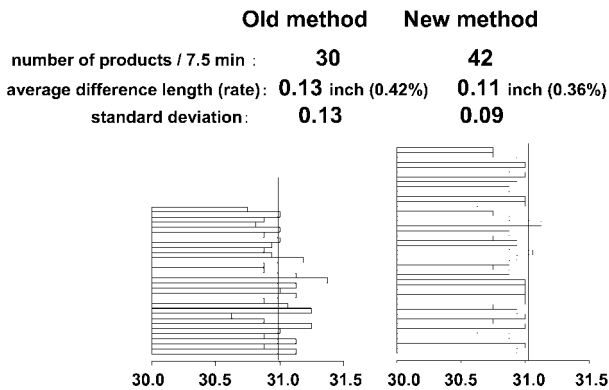


Fig. 7. Quantity and quality of products before and after improvement.

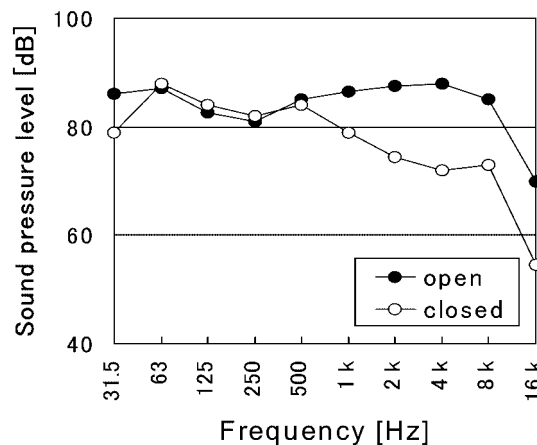


Fig. 8. Change of sound pressure level before and after improvement.

After improvements, the noisy work site was separated by partitions from the other workers, and workers were given personal protective equipment (PPE) for doing the grinding. Octave-band sound pressure level were measured outside a soundproof wall with the door open and closed. With the door closed, the A-weighted sound pressure level was reduced from 92 dB (A) to 86 dB (A). In particular, the high frequency noise (more hazardous to health than low frequency noise) was reduced (Fig. 8).

Discussion

This study was carried out to evaluate the effects of WISE improvements on workloads and productivity, as well as managerial satisfaction with the WISE projects. The present study indicated that WISE activities led to reduced physiological workloads, an improved physical environment (e.g. lower noise levels), as well higher product quality at most of the enterprises. Productivity in most enterprises also increased after WISE improvements. In case 2, although the improvements were very simple and low-cost, the quality and quantity of products were better than before. In many cases, smaller enterprises usually faced financial difficulties in improving working conditions. The WISE methodology is based on low-cost solutions. Once improvements are introduced, even if they were initially minor or low-cost ones, many of them are further implemented in a variety of ways. Managers and workers learn to pay attention to hitherto neglected problems in other technical areas, so that more expensive but necessary solutions are eventually implemented^{4,5}. Some studies have revealed that even low-cost solutions when applied in local practice facilitate sustainable actions and play an important role in motivating managers and workers to improve working conditions⁶⁻⁸.

This study suggested that the workers' understanding of and involvement in the WISE activity is important in sustaining that activity. Workers have a better grasp of working conditions and their attendant problems than managers or others lacking hands-on involvement in the actual work. Therefore, it is important that workers and managers cooperate in implementing WISE activity. During that initial phase, the use of action-checklists and small-group discussions plays a crucial role in facilitating WISE activities. An action checklist helps managers and workers identify existing good examples and points to be improved at their worksite. Small group discussions facilitate the exchange of different views of the group members so as to better prioritize appropriate actions. Action checklist exercises followed by group discussions involving both managers and workers are essential and important tools for the successful improvement of working conditions.

We have conducted follow-up visits to WISE program sites

in the Philippines since 1996 with the aim of estimating the effects of WISE improvements using objective measurements. Follow-up activities are considered effective in 1) encouraging managers and workers to sustain their activities to improve working conditions, 2) better understanding the effectiveness and problems of implemented improvements, 3) providing appropriate suggestions for further improvements, and 4) gathering successful example materials for demonstrating the effectiveness of WISE activities in improving work conditions and productivity to other managers and workers who have not yet participated in WISE projects. Follow-up visits in the study serve to provide managers and workers with information and realization of the effectiveness of their activities based on objective data. Our follow-up activities might stimulate their motivation to maintain such improvements in their working conditions.

Conclusion

WISE activity can exert a positive influence on workload and productivity. These results probably lead to manager satisfaction with the projects. Follow-up visits also provide both managers and workers with the motivation needed to continue their activities.

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