A STUDY OF WORK MANAGEMENT FOR FEMALE WORKERS AT A FOOD PROCESSING COMPANY

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Abstract: In order to contribute to the continued employment of female part-time workers at a food processing factory, we made a study of creation of a healthy, workplace which would be easy to work in and accommodate the needs of the changes of the female life cycle including housework. Questionnairing was conducted on employees for an appealing workplace. The use of the results in the various management aspects lowered the resignation rate of workers. Moreover, to accommodate the needs of the diversified female life cycle and utilize efficiently middle-aged or older female part-time workers whose work cycle is short, an electronic work manual with animated cartoons and a work standards book were made which made possible quick, precise work training.

1. INTRODUCTION

The target company of this study was a food manufacture whose main products were various kinds of noodles and box lunches.

Most of the employees were female part-time workers. Because many of their products were daily foods, a timely and flexible production system was demanded, and part-time workers with long experience played the most important role there.

However, because of both experienced middle-aged or older workers' diversified employment needs caused by the recent changes of the female life cycle and younger workers' higher resignation rate, the employment management of this company was not working well. In order to contribute to the continued employment of female part-time workers who had the key to the existence of the company, the author, et al. made a study of creation of a healthy workplace which would be easy to work in and accommodate the needs of the changes of the female life cycle including housework.

2. METHODS

The Ergoma Approach advocated by the author, et. al. was used as a method. (Fig.1) The target was 3 factories of the food processing company.

Questionnairing investigation concerning "health and work conditions” and questionnairing concerning "Heightening experiences while at work” were conducted at the three, and investigations concerning "IE and workload” at two factories where the company's main products were made.

3. RESULT AND DISCUSSION

3.1 The results of the investigation concerning "health and work conditions”(questionnairing)

This questionnairing was conducted about "workload (3 items)” and job satisfaction(30 items) form Step 6 of the Ergoma Approach.
The top physical complaint was backache. The causes, the workers mentioned, were "carrage of heavy objects", "heaping of heavy objects", "half-sitting postures" and "standing postures". About "workload reduction" were mentioned "rest problem", "work environment problem: temperature-humidity, noise and dust-humidity" and "frustration problem: bosses, machine breakdown and unfairness of tasks" in addition to the above four. About "management situation" they complained of many problems: "unclearness of work objectives", "unclearness of responsibility & authority and task allotment", "unthoroughness in education-training", "efficiency rating: knowledge-mastery, cooperativeness and attendance" and "lack of welfare". About "job satisfaction", all the items except "work substance" and "colleagues human relationship" were below the mean point. Especially the item "human relationship with bosses" showed a bad value compared with those of other kinds of companies. At the 1st factory with the head office many workers complained that their bosses neither gave counsel to them nor appreciated their work, and at the 2nd factory many complained that they could not express their opinions. In answer to the question "Are you free to go to the rest room?", some answered in the negative, saying that their bosses made sarcastic remarks. And also, many other problems about work management in the factories were pointed out. In answer to the question "Do you want to be a full-time worker?", 60.5% of the 1st factory workers answered in the negative. The main reasons were "That will reduce my free time"(42.3%), and "I cannot work full time for family reasons such as housework child care"(36.0%). At the 2nd factory 86.0% answered in the negative. The main reasons were "I cannot work full time for family reasons such as housework child care"(57.1%) and "That will reduce my free time"(18.4%). Considering today's diversed life cycle of women, for the stability of employment, the results of this questionnairing showed how important it was for the company to aim to create a workplace which was loved by customers, local people (the company had been unable to employ enough part-time workers from the neighboring areas) and employees (they had many complaints), that is to say, a uital company.

3.2 The practice of work management

3.2.1 Practice1

Examining the results of the questionnairing, We introduced a new part-time employment system - the personnel department in the head office controls part-time employment directly and decides who to employ after giving applicants a sufficient understanding of the company's policy and work substance. Each factory used to be in charge of part-time employment. In addition, one-by-one problem solving has lowered the resignation rate of workers.

3.2.2 Practice2

To accommodate the needs of the diversed female life cycle and utilize efficiently relatively-short-term part-time workers, quick introduction of clear, effective education-trainig was indispensible. So, we made electronics work manual with animated cartoons and a work standard book which would give a sufficient understanding of the substance of their work at the time of employment or orientation.
(1)Making of an electronic work manual
● How to make egg noodles.
● How to make soba noodles.
● How to make udon noodles.
(2)Making of a work standard book.
The factories had had virtually no precise work standard books to instruct part-time workers how to make their products and to support productivity and quality control. There upon, for the company's main product "Shiretoko Soba" was made a work standard book about devices like a mixer and carriage and packing - encasing work.

3.2.3 Practice3

To make part-time workers efficient workers in a short time, reducing workload and anchoring the "KAIZEN" climate in the company are essential. Therefore, we formed an improvement project team whose chief members were in charge of work management, and practiced the following.
(1) Improvements to anchor the KAIZEN climate in the company

We investigated five processes of the two factories. By use of the analysis results of this industrial engineering investigation and the questionnairing about subjective feelings of fatigue and frightening experiences conducted in advance, we chose problems related to "unsafe work", "unsafe conditions", "uneasy work postures", "unsafe actions", "workload", "5S's Conditions (Classification, Clearness, Cleaning, Cleanliness and Commitment) and labor productivity from the viewpoints of the Ergoma Approach Step 6(Indicated matters and KAIZEN directions).

Next, the project team examined the problems, made improvement plans and decide who would be in charge and a time limit for each improvement. Table1 shows some of the contents. In this research 31 improvements were made.

- The soba noodle production process
  - 11 improvements about 26 problems
- The udon and egg noodle packing process
  - 2 improvements about 7 problems
- The steamed egg noodle weighing sterilizing process
  - 2 improvements about 9 problems
- The egg noodle inspection process
  - 2 improvements about 7 problems
- The freeze-dried egg noodle production process
  - 5 improvements about 5 problems
- Other
  - 6 improvements about 8 problems

(2) Support apparatus improvements

Improvements with support apparatuses are as follows:

- Work improvement in keeping and cleaning cutters
- Work improvement in vacuum refrigeration
- Work improvement in putting noodles dough in the refrigeration machine
- Work improvement in feeder cleaning
- Workload reduction of standing inspection work
- Environmental improvement of standing inspection work
- Improvement of the weighing machine for egg noodles
- Work improvement in checking the cleaning of the feeder
- Work improvement in checking the tanks
- Safety measure for the noodle roller safety bar
- Work improvement in producing deluxe egg noodles (Fig.2)

Questionnairing was conducted again after all these improvements were completed. Using its results and the work posture burden evaluation system developed by the author et al. for work posture improvements, the effectiveness of the improvements was evaluated.

4. CONCLUSION

Although this target company has many more problems, we are certain that we have been able to make it an appealing company from the viewpoint of part-time workers' continued employment, and form a basis for the continuous KAIZEN structure.

5. REFERENCES


**Step 1:** Aim  
Pick out long-or-short-term problems for the company to solve

**Step 2:** Whole-company-tackling  
Organize an improvement project team consisting of employers, managers, and workers

**Step 3:** Preparatory investigation  
Hold a hearing to listen to workers’ opinion, and conduct a preparatory observation in the workplace

**Step 4:** Discovery of problem worksites and items  
Seize target worksites or tasks awaiting solution, and clear up the causes

**Step 5:** Analysis of the present conditions  
Do research in the target worksites taking into account the indicated matters of Step 6 from the viewpoints of IE, Ergonomics, and industrial psychology. Choose approaches appropriate for the target sites. The following are the items the author et al. usually use.

- **[IE aspect]** Operation ratio, Analysis of flow, Analysis of rank, Analysis of layout etc.
- **[Ergonomics aspect]** Psycho-physiological function, Fatigue, Analysis of work posture etc.
- **[Industrial psychological aspect]** A survey of job consciousness, health and working conditions, Workers’ opinion about improvement of labor environment

**Step 6:** Indication matters  
Classify the results of the present conditions into the following items and indicate the direction of “KAIZEN”

<table>
<thead>
<tr>
<th>The influence of work on humans &amp; The influence of humans on work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Unsafe operations</td>
</tr>
<tr>
<td>2) Workload</td>
</tr>
<tr>
<td>3) Unsafe conditions</td>
</tr>
<tr>
<td>4) Work content</td>
</tr>
<tr>
<td>5) Uncomfortable working postures</td>
</tr>
<tr>
<td>6) Health</td>
</tr>
<tr>
<td>1) Labor productivity</td>
</tr>
<tr>
<td>2) Job satisfaction</td>
</tr>
<tr>
<td>3) Degree of concern for work</td>
</tr>
<tr>
<td>4) SS’s</td>
</tr>
<tr>
<td>5) Management conditions</td>
</tr>
<tr>
<td>6) Workers’ background</td>
</tr>
</tbody>
</table>

**Step 7:** Examination of “KAIZEN” plans  
The “KAIZEN” project team discovers the true cause from step 6, makes “KAIZEN” plans, and examines them. Support Information System for creating new ideas and Virtual Simulation enables effective improvement.

**Step 8:** Practice of “KAIZEN”  
Incorporate the improvement plans. Ensure that all the workers practice the improved work.

**Step 9:** After-improvement evaluation  
Measure the after-improvement effects. Especially hearing of workers is important for next “KAIZEN”.

Figure 1. The procedure of the Ergoma Approach
Table 1. Problems in the production field and improvement plans for them

<table>
<thead>
<tr>
<th>Problems</th>
<th>Improvement plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who is responsible for each line is not clear.</td>
<td>Define the role, responsibility and authority of full-time and part-time workers, and make inner rules. ---&gt; List all the tasks.</td>
</tr>
<tr>
<td>✓ Work instructions</td>
<td></td>
</tr>
<tr>
<td>✓ At the time of the stop of the line</td>
<td></td>
</tr>
<tr>
<td>✓ Inferior goods</td>
<td></td>
</tr>
<tr>
<td>The floor is dirty, the white lines are worn away, etc.</td>
<td>Practice by use of the results of the questionnairing about frightening experiences. Examine 5S’s rules.</td>
</tr>
<tr>
<td>Necessary to promote 5S’s activities.</td>
<td></td>
</tr>
<tr>
<td>Much defective equipment requiring maintenance.</td>
<td>Define who performs which improvement, and make inner rules for asking for outer repair.</td>
</tr>
<tr>
<td>Necessary to take quick steps for the unsafe places and parts pointed out in the inner questionnairing by the safety Hygienic Committee.</td>
<td>Decide improvement priority, responsible persons and time limits. Take emergency measures against the highest priority.</td>
</tr>
<tr>
<td>Measures against labor accidents related to the mixer require both perusal and mechanical measures.</td>
<td>Gather information on safety measures from the mixer company ---&gt; Drive home safety education for the time being because machine improvement is expensive.</td>
</tr>
<tr>
<td>Taking care is not enough. Accidents happen when the care is forgotten.</td>
<td></td>
</tr>
<tr>
<td>A sanitary problem about going into one factory through the outdoors from another.</td>
<td>Examine a passageway which saves workers outdoor walking. ---&gt; Alter the doors so that a buzzer rings at the time of opening.</td>
</tr>
<tr>
<td>Workers only clean around their machines. For example, there is dust on the window flames.</td>
<td>Examine how to forward 5S’s. Make a cleaning manual for the cleaning procedure and assignment.</td>
</tr>
<tr>
<td>The announcement over the in-house PA System such as paging is offensive to the ear Hard to hear.</td>
<td>Reduce the announcement frequency. Examine the purchase of a new system.</td>
</tr>
</tbody>
</table>

A: To be practiced at once, B: completed, C: To be examined
### Before improvement

- There were two noodle machines and no space between the machines and the wall, which lead to uneasy work postures at the time of cleaning and a heavy workload.
- The structure of the noodle machines caused uneasy work postures at the time of daily cleaning, which led to bad work efficiency and heavy workload. Because of the uncleanable parts and the superannuation of the machines themselves, there was a strong possibility that foreign substances got mixed in the noodle dough.
- Especially its five iron rollers were easy to get rusty, and the cleaning work was heavy, which led to a strong possibility that foreign substances got mixed. And also, the friction with the roller guides made loud noises.
- Inspection work to prevent foreign substances from getting mixed put a heavy burden on workers.

### After improvement

- The number of the machines was reduced to one, and enough space for cleaning and maintenance was created.
- The axis was shortened, and the device for catching the dough was strengthened and moved.
- The remodeling of the machine and the change of the roller material removed the possibility of the mixture of foreign substances, and the amounts of cleaning time for both the machine and the five rollers were shortened to 30 minutes respectively, that is, a total of 1-hour shortening.
- The burden index of the cleaning work posture was improved by 44 points from 142 to 98.
- The mental-physical burden of inspection workers was reduced.
- The change of the material of the roller guides reduced the noise and improved the working environment.
- The improvement of the safety bar increased safety and work efficiency.

Figure 2. Work improvement in producing deluxe egg noodles