

Job Rotation System

Report to XYZ Co.



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1993

Introduction

There are many reasons for implementing a job rotation system including the potential for increased product quality, employee satisfaction and lower cumulative trauma disorder rates. However, the difficulties of changing the organizational structure of an entire facility can prove difficult. It is important that the program start slowly at first so that the program can be further refined before being implemented elsewhere. This report contains recommendations for making job rotation as beneficial and as straight forward as possible. Contained within this document are:

Background Information

- Pros and Cons of Job Rotation
- Practical Implications of Job Rotation
- OSHA Guidelines

The Program

- Program Goals
- Steps of the Program

Detailed Guidance

- Who Decides Job Rotations
- How are Jobs Matched for Rotation
- How Often are Jobs Rotated
- Implementation

The background information is based on a review of the current knowledge base related to job rotation. The detailed guidance is based on both that review and the experience of the authors. This guidance should be viewed as a starting point for further discussion by plant personnel.

Establishing a rotation system which properly determines job rotations and monitors their safe use is not a simple task. There are many issues to consider and no official protocol or methodology to call upon. The successful implementation of such a program requires

teamwork from all parts of the organization including: management, union, nurses, ergonomics monitors, and especially line employees.

Background Information

Pros and Cons of Job Rotation

A number of studies address the positive impact of variation and pauses during work, but few studies have dealt with actual job rotation ¹. However, several job rotation case studies were found in the literature. These studies came from the United States, Japan, and Sweden and covered a variety of industries. The following benefits were noted among them:

- Reduced boredom
- Reduced work stress
- Increased innovation
- Increased free time activity
- Reduced CTDs
- Increased production
- Reduced absenteeism
- Reduced turnover

Several of the same case studies noted difficulties in implementing job rotation. Most of these difficulties came from the challenge of changing the work structure and not from the job rotation itself. The following problems were noted:

- Experienced workers not wanting to learn new types of work
- Machine operators not wanting to "lend" their machines to others
- Practical problems of physically getting from one job to the next
- Unsuitable wage forms
- Education and training of workers for new jobs
- Difficulties in finding appropriate jobs to rotate to
- Inappropriate use of job rotation by management

There was also one paper that offered evidence against job rotation. It stated that through a learning process, individuals are likely to have developed a behavioral strategy that protects them from the apparent hazards of the job. Thus, rotation of unskilled workers into a biomechanically stressful job increases the risk of injury with each rotation ².

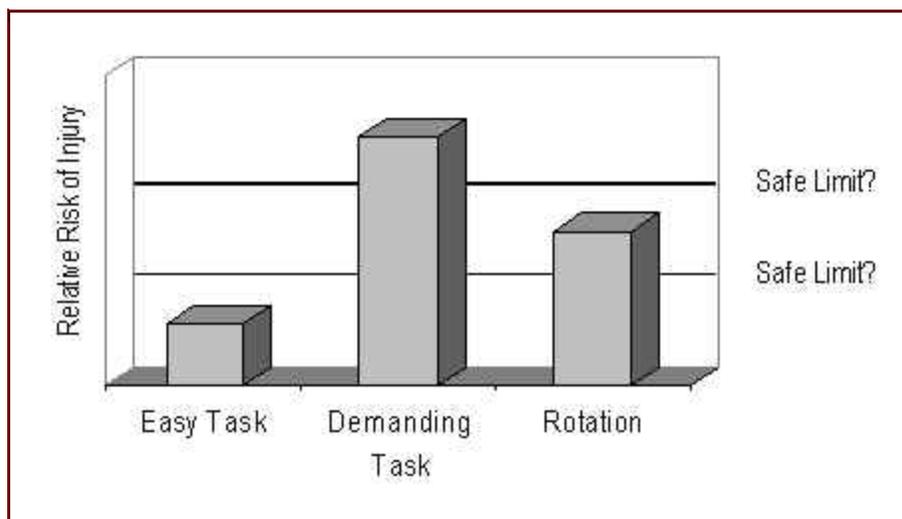
This highlights the importance for complete training and break-in periods before an employer begins a job rotation program. The training and break-in period enables the employee to develop those behavioral strategies needed to limit the risk factors. This also suggests that the number of jobs included in a particular rotation should be kept to a minimum, perhaps two or three, allowing the employees to become "experts" at each task.

To realize the beneficial aspects of job rotation it is necessary to establish definitive guidelines which insure consistency of application and at the same time allow for restricting employees from rotating into jobs they can not perform ⁵. To ensure that all job rotations meet basic ergonomics requirements a consistent and systematic approach is required ⁶.

Practical Implications of Job Rotation

Job rotation alone does not change the risk factors present in a facility. It only distributes the risk factors more evenly across a larger group of people. Thus, the risk for some individuals will be reduced, while the risk for others will be increased. However, there will be no net change in risk factors present. This can be thought of as described in the following example.

Figure 1



This graph depicts the "averaging" effect of job rotation. Note that the resulting rotation job, which is the average of the light and demanding job, may be safe or it may be dangerous depending on where the actual safe limit is. At this point, science does not know this answer.

When employees rotate between two jobs the risk exposure can be thought of as being "averaged". Job rotation may drop the average to within a safe level, or raise the whole group in excess of safe limits. Unfortunately, it is not possible with current knowledge to determine what the safe limit is. For this reason it is critical to select job rotations which minimize the exposure level.

In this example, the two jobs being rotated have very different total risks; if the jobs had similar risk then the benefit of CTD risk reduction would be lost. Thus, rotation among jobs that are similar is not appropriate. Jobs best able to benefit from job rotation are those of a dynamic character, which require more real variation in muscular load ³.

Caution must be taken in the design of job rotation programs since poorly designed job rotation may increase worker stress levels ^{4,7}. It is possible that rotating employees through a stressful position may, given enough time, produce disorders in the entire group ⁴. Thus, the choice of jobs to be rotated between is extremely important.

Job rotation does not improve the job itself. Thus, it is vital to continue efforts at changing the physical make-up of the jobs. Although job rotation may have beneficial effects of stress reduction and muscle/tendon group variation, engineering changes should remain the goal of the ergonomics program.

OSHA Guidelines

The following is excerpted from the OSHA *Ergonomics Program Management Guidelines for Meatpacking Plants*:

Job rotation should be used with caution and as a preventive measure, not as a response to symptoms. The principle of job rotation is to alleviate physical fatigue and stress of a particular set of muscles and tendons by rotating employees among other jobs that use different muscle-tendon groups. If rotation is utilized, the job analyses must be reviewed by a qualified person to ensure that the same muscle-tendon groups are not used.

A "qualified person" is one who has thorough training and experience sufficient to identify ergonomic hazards in the workplace and recommend an effective means of correction; for example, a plant engineer fully trained in ergonomics - not necessarily an ergonomist. In analyzing jobs for rotation, the qualified person must have sufficient expertise to identify the ergonomic stresses each job presents and which muscles and tendons are used.

Job rotation can mean that a worker performs two or more different tasks in different parts of the day (i.e., switching between task "A" and task "B" at 2-hour or 4-hour intervals). The important consideration is to ensure that the different tasks do not present the same ergonomic stressors to the same parts of the body (muscle-tendon groups). There is no single work-rest regimen that OSHA recommends; it must be determined by the nature of the task.

These excerpts indicate the importance of establishing a formal, documented job rotation system which carefully matches jobs. This matching system should ensure that different muscle-tendon groups are emphasized.

The Program

Program Goals

The goals of the program are to:

- Reduce the number of cumulative trauma disorders
- Reduce boredom and work stress of involved employees
- Prevent job rotations that increase stress
- Increase productivity of involved departments
- Reduce absenteeism and turnover of involved departments
- Involve and further educate employees
- Increase innovation in the design of jobs, workload balance, and department boundaries

Steps of Rotation

To ensure that all of the following steps of the process are completed and documented a *Job Rotation Checklist* has been included in Appendix 1.

Step 1:

Hold an employee meeting to determine interest and gain involvement and input. During this meeting it would be appropriate to have a short presentation on ergonomics and job rotation. The purpose here is to build upon the ergonomics training already received and further it by discussing the relationship between it and job rotation. At this time it would be appropriate to issue a Base Line Questionnaire such as found in Appendix 2.

Step 2:

Insure that the Physical Job Requirement worksheets (PJAs) are accurate and up-to-date for all jobs being considered for rotation. After this is complete, enter the PJAs into the Job Rotation Spread Sheet and generate the appropriate risk factor rankings. Match the jobs for rotation using the method described in the detailed guidance section.

Step 3:

Verification by the entire employee group within each department affected. For job rotations determined in step 2, apply a common sense review of logistics and compatibility to ensure that:

- That the logistics of the proposed rotation are suitable
- That the job rotation seems reasonable

The list of job rotations determined to this point should be reviewed by affected employees. The employee concerns and insights should be taken into account. If necessary, changes to the list should be made, and final approval for the list obtained.

Step 4:

Provide employees with any training that is required for any new tasks performed or equipment handled. For instance, employees that have not used a straight knife or whizard before would need specific training.

Step 5:

Provide employees with adequate break-in time to ensure that they are fully qualified and physically conditioned to perform their new tasks.

Step 6:

Begin job rotation.

Step 7:

Monitor the new rotation to ensure flexibility and consideration for individuals that are having difficulty performing new tasks. Assess if further training, break-in, and/or accommodations can be made for these individuals.

Step 8:

Hold follow-up meetings with employees to evaluate the job rotation. Again, survey employees using the job rotation questionnaire. Compare results to the initial survey. If results are favorable than continue rotation. If results indicate a problem then decide if corrective action is needed or if rotation should be discontinued.

Step 9:

Track other measures such as injury rates, turnover, employee satisfaction, or workers compensation to determine effects of the job rotation.

Detailed Guidance

The objective is to provide the ergonomics committee with a consistent and systematic method of developing formal job rotations that are based on the requirements of the jobs being rotated. Since, job requirements have already been documented on Physical Job Requirement worksheets (PJAs), these will be used in the systematic analysis.

In order to facilitate the smoothest possible transition into a job rotation system the following issues must be addressed. Items listed should be viewed as options and starting points for further discussion by the site ergonomics team and other interested personnel.

Who Decides Job Rotations

Anyone should be able to suggest job rotations, including supervisors, management, ergonomics monitors, production employees, union officials. However, job rotations should be approved by the ergonomics committee and the employees affected before being implemented.

How Jobs are Matched for Rotation

First, the PJAs for each job should be reviewed to ensure that they are accurate and up to date. If they are not, then the appropriate corrections should be made. Second, the PJAs should be entered into the Job Rotation Spread Sheet*. Doing this automatically calculates job rotation scores for each individual entry, section averages (for backs, arms, hands/wrists), and the overall job difficulty.

**I have an Excel spreadsheet and set of worksheets that can be used to evaluate job rotation schedules (plus fit employees with restrictions to jobs, and several other uses). This spreadsheet is functional and in use in several companies.*

Unfortunately, it is not yet polished for sale to the general market. However, if you are interested, please contact me at dan@danmacleod.com or (570) 296-9651 and I can discuss licensing these materials to you.

From the section and total scores the spread sheet generates a ranking (Red, Yellow, or Green). These rankings will be used in matching job rotation candidates and are determined by:

Green if score is 0 to 30

Yellow if score is 31 to 45

Red if score is 46 to 100

These cut-offs were determined through experience with sample jobs from the site and are based on the judgment of the author (they may be updated as our experience dictates). These cut-offs might not be appropriate in all industries and are based on information from pork slaughter.

After the PJAs have been entered and the appropriate scores and rankings computed then the job rotation worksheets should be manually compared and discussed by the ergonomics committee. In general, decisions about the appropriateness of a particular job rotation should be based on the following:

Job A Rank & Job B Rank = Decision

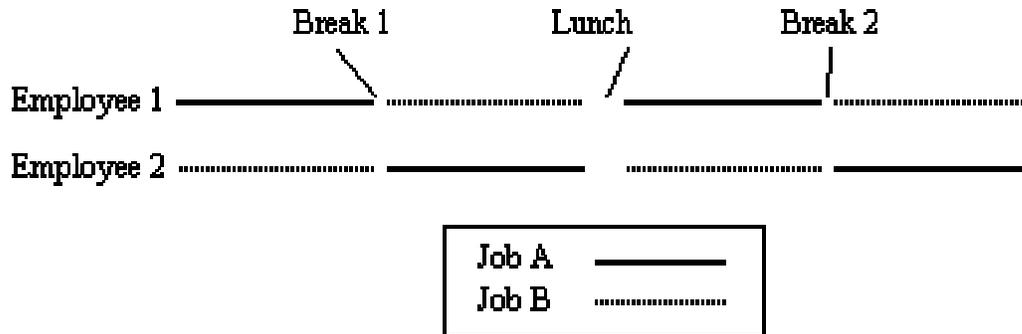
Red & Red =	Unacceptable
Red & Yellow =	Unacceptable
Red & Green =	Acceptable
Yellow & Yellow =	Acceptable*
Yellow & Green =	Acceptable
Green & Green =	Acceptable

**not recommended - try to avoid if possible*

How Often Jobs are Rotated

In general, job rotations should consist of two jobs: an A job that the employee starts at the beginning of the shift, and a B job that the employee rotates to after the first break. The employee returns to the A job after lunch, and then back to the B job after the second break. Jobs would then be posted for bidding by the A job, with the B job defined as part of the process.

Figure 2



This figure depicts one possible organization of two job rotations. For flexibility reasons it may be necessary to use other arrangements or have three job rotations. These questions can be answered as we gain experience with the system.

In some cases, depending on the logistics, rotations may occur more frequently or contain more than two jobs. However, that may complicate the job matching process.

Implementation

It is recommended that a generic list of all acceptable rotations for each department be generated to allow flexibility in making job assignments without violating ergonomic standards.

What Training is Needed

The same training requirements and documentation that a new hire must have before starting in a position should be met by experienced line employees going to a new job. Thus, the training requirements are probably spelled out in existing human resources guidelines.

What Break-In Period is Needed

Similar to above the same guidelines for new hires starting out should apply to experienced employees starting in a new job.

Flexibility and Considerations Needed

Determined at each site.

What Follow-up is Required

Determined at each site.

What Information is Needed to Track the Program

In order to determine if the results experienced meet the goals set forth there should be a system of tracking results in place before starting any further rotations. The system should allow for the comparison of the number of CTDs, restricted duty days, and lost time by man hours worked. Similarly, other characteristics such as medical aids, turnover, yields, and job satisfaction could be monitored.

Job Rotation Checklist

The following must occur for each job rotation set-up.

Jobs proposed to be rotated are:

- Has an employee meeting been held to determine interest and gain involvement and input?
- Has each task involved in the proposed rotation been reviewed with the Physical Job Analysis checklist to determine precise requirements and has a Job Rotation Worksheet been generated?
- Has common sense been used in evaluating job rotation possibilities?

- Have all employees involved in the rotation schedule been trained to do all tasks?

Have all employees been provided an adequate break-in period to insure they are:

- fully qualified to do all tasks?
- physically conditioned and accustomed to do the job?

- Has flexibility and consideration been given for individuals in the rotation schedule? Are there any employees who would have physical difficulty in performing all the tasks? Can accommodations be made for these individuals?
- Have formal follow-up evaluations using TeamErgo and supervisors been conducted?
- Are benefits or problems being tracked (increased or decreased injury rates, turnover, employee satisfaction, workers compensation costs, etc.)?

Keep the above documentation on permanent file.

Base Line Rotation Questionnaire

Name: _____ Date: _____

Department: _____

Job Title: _____

1. Are you currently rotating jobs?..... Yes No

If no, go to the next question.

If yes:

a. Do you like it?..... Yes No

b. If no, why not?

c. To what jobs do you rotate?

d. How often do you rotate? 1/2 hour hourly two hours Other _____

e. Have you received appropriate training for the jobs that you rotate to?. Yes No

2. If you answered no to question 1:

a. Would you like to rotate?..... Yes No

b. If no, why not?

c. If yes, to what jobs would you like to rotate?

3. Please stop and fill out the Discomfort Survey form!

4. If you indicated on the form that you were having discomfort, have you seen the nurse?

5. Are there any other comments that you would like to make?

References

The following information was obtained through an extensive search of five national and international databases. The databases and dates searched are listed below:

<u>Data Bases Searched</u>	<u>Dates Searched</u>
Occupational Safety and Health (NIOSH)	January 1973 - December 1991
NTIS	January 1964 - March 1992
Medline	January 1966 - May 1992
Compendex Plus	January 1970 - March 1992
ABI/Inform	January 1971 - March 1992

- 1 Sven-Åke Axelsson and Bengt Pontén, *New Ergonomic Problems in Mechanized Logging Operations*, International Journal of Industrial Ergonomics, 5 (1990) pp. 267-273
- 2 Steven A. Lavender, *The Development of Preparatory Response Strategies in Anticipation of Sudden Loading of the Torso*, Proceedings of the Human Factors Society 34th Annual Meeting (1990), pp. 757-761
- 3 Bengt Jonsson, MD, *Electromyographic Studies of Job Rotation*, Scand J Work Environ Health 14 (1988): suppl 1, pp. 108-109
- 4 Putz-Anderson, V., 1988, *Cumulative Trauma Disorders - A Manual for Musculoskeletal Diseases of the Upper Limbs*, (London: Taylor & Francis), p. 83.
- 5 Lance Hazzard, Joe Mautz, Denver Wrightsman, *Job Rotation Cuts Cumulative Trauma Cases*, Personnel Journal v71n2 (Feb. 1992), pp. 29-32
- 6 Chris J. Henderson, *Ergonomic Job Rotation in Poultry Processing*, Advances in Industrial Ergonomics and Safety IV (1992), pp. 443-450
- 7 UFCW Office of Occupational Safety and Health, August 1989, *Analyzing Ergonomic Programs: Making Sure They Are the Real Thing*, (Washington, D.C.), pp. 3-4.