Manual Handling Task Evaluation Concepts

More than one fourth of all compensable work injuries are associated with manual handling tasks. The majority of these injuries involve low back pain. Compensable low back pain is the most prevalent type of Workers Compensation (WC) claim, accounting for 17% of WC claims, and 30% of WC costs. The Liberty Mutual Research Institute for Safety in Hopkinton, Massachusetts, has been investigating low back pain problems since the mid-1950s. Results from these investigations have shown that the evaluation and design of manual handling tasks consistent with worker capabilities and limitations, is the most effective of any current approach in reducing industrial low back pain. Good job design can reduce up to one-third of low back claims, and up to two-thirds of claims among workers performing heavy manual handling tasks.

Ergonomics Research

Ergonomics research has identified the following risk factors associated with compensable low back pain:

- Manual handling tasks involving excessive weights, forces, and frequencies; and
- Body motions that require bending, twisting, and reaching.

Each of these risk factors is considered in the overall evaluation of manual handling tasks. The Research Center's experiments have yielded the data necessary to evaluate manual handling tasks and use this data to support solutions. These experiments considered:

- The age, sex, and physique of the worker;
- The size of the object; and
- The height, distance, and frequency of the task.

The experimental results reveal that there is no single maximum object weight that applies to everyone, because strength varies greatly among individuals. Simply stated, some workers are stronger that others, and what is maximum for one is not maximum for another. Consequently, the best way to evaluate object weight is in terms of what percentage of the working population can be expected to perform the task without overexertion. The higher the population percentage is for a given weight, the lower is the risk of injury - conversely, the lower the percentage, the higher the risk.

A low-percentage (high-risk) task means that while many workers may still be able to handle the weight, only a few can perform it without overexertion. The ideal task will fit 90% or more of the male and female population. Population percentages of less than 75% female are not consistent with good safety and health practices and task redesign is recommended. Lifting objects from the floor causes a worker to be particularly vulnerable to low back pain; therefore, population percentages less than 90% are considered risk factors for lifting tasks from the floor. Details of experiments have been published in technical journals, and reprints are available upon request. See the reference list on page 2.

Task Evaluation

Manual handling tasks can be analyzed by collecting measurements such as object weights, pushing/pulling forces, hand distances from the body, distance of lift, hand height at start, task

frequency, and duration, as well as the body motions involved in performing the tasks. These measurements are then used to determine the population percentage able to perform the task. Low back pain risk factors are identified if the population percentages are determined to be unacceptable, if significant body motions are present, and/or if the suggested maximum duration exceeds recommended levels.

Task evaluation not only assists in determining whether redesign is needed for existing jobs, but is also useful as a criterion in the design of new operations. The redesign of existing tasks can usually be shown to be cost effective, with a relatively short payback period based upon low back pain cost savings alone.

Task Redesign

The primary emphasis is on ergonomics - the fitting of the job to the worker. Research has shown that the application of ergonomic principles to job design is the most effective approach in reducing the incidence of compensable low back pain in industry.

Designing the job to fit the worker reduces the worker's exposure to the risk factors of low back pain, and consequently reduces the medical and legal problems of selecting the worker for the job. Good job design also places less reliance upon the worker's willingness to follow established training procedures, such as lifting properly. Good job design is effective because it reduces the probability of initial and recurring episodes of low back pain, allows the worker with moderate symptoms to stay on the job longer, and permits the disabled worker to return to the job sooner. Finally, good job design usually increases the overall efficiency and productivity of a task or operation.

Other Control Approaches

Although job design is the most effective approach for controlling low back pain, it does not provide complete control. The job design approach is applicable to most operations; however, there are some physically demanding jobs that are more difficult to design and control, such as warehouse manual handling work, health care workers, police work and firefighting. Post hire pre-placement testing of workers is becoming popular in these occupations. Selective techniques include medical examinations, strength and physical ability testing, and job-rating programs. Caution is warranted when implementing strength and physical ability testing to be sure the test protocol is validated and in compliance with the Americans with Disabilities Acts (ADA).

Education and training represents another control approach for compensable low back pain. Traditionally, training programs have been directed toward the workers. Equally important is the education of management in responding to low back pain when it does occur. This type of training emphasizes concern for the worker, avoidance of adversary relationships, appropriate follow-up procedures, and establishment of early return-to-work programs.

There is no simple solution to the complex problem of low back pain in industry. An effective control program must be a combination of all approaches. The organizations that have been most successful in controlling compensable low back pain have all used multiple approaches. Although low back pain cannot be completely prevented at the present time, the use of multiple approaches can reduce the problem to controllable levels.

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Notes

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