

Prevention and Management of Occupational Injuries in Manufacturing

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Introduction

Work-related injuries cost companies billions of dollars each year. In 2007, the direct cost of incidental and unplanned absenteeism (commonly referred to as “lost time”) amounted to 9.2% of total payroll (Mercer, 2008). Across all industries, 31% of musculoskeletal disorder (MSD) related injuries involving days away from work each year occur in employees who have 0-12 months of tenure (U.S. Department of Labor, Bureau of Labor Statistics, 2008). Depending on turnover rates, companies across the United States literally hire their next injury, or injuries—to be precise—at a significant cost. How can companies minimize or manage the lost-time absenteeism problem, specifically those absences that are the result of injuries that occur in new employees?

Traditionally, very little emphasis has been placed on functional screening of prospective employees. Many companies hire employees to perform labor-intensive jobs without performing any physical or functional screening evaluation. In many hiring situations, the prospective employee is asked to review a job description (which may or may not be accurate or contain sufficient details about the job demands) and indicate whether he/she is able to perform that job. So, what methods exist for ensuring employees applying for physically demanding jobs can, in fact, safely perform the physical job requirements?

This paper will review the concept of physical abilities' employment testing, the legal compliance with respect to the multitude of state and federal regulations, and look at results from companies that utilized such a testing program.

Post-Offer Physical Abilities Screening

The concept of pre-hire screening has existed for many years. However, the value of such screening is limited by the fact that disability-related inquiries or medical examinations are unlawful at the pre-hire stage. In addition, screening at this stage can be financially prohibitive, since any pre-hire screening must be administered to every job applicant. On the other hand, after making a conditional job offer, but before an individual starts work, an employer may make unrestricted medical inquiries, and ask the conditional employee to perform a physical abilities evaluation, as long as the screening tool used is shown to be job related and consistent with business necessity (Cairns and Magruder, 2008). The only other requirement of a medical and/or physical screening evaluation administered after a conditional job offer has been made (Post Offer of Employment Test or POET) is that it must be consistently and reliably administered to all persons entering a specific job category.

Job relatedness, as defined by the *Uniform Guidelines on Employee Selection Procedures* (UGESP), refers to the validity of the POET device, compared to the actual job demands. Evidence of validity of a post-offer, physical abilities screening test can be established using the following methodologies in order to comply with the UGESP and other regulations:

- Content validity and face validity
- Criterion-reference validity
 - Concurrent validity
 - Predictive validity

Content validity is based on the selection of evaluation tasks that are closely related to, or identical with, critical job demands, as determined by subject matter experts. Face validity refers to what the test appears superficially to measure. The development of content-valid testing protocols employs the use of test development methods that are known to be safe and reliable. It is important to design a test protocol that contains components of the job (based on formal job analyses) so that the tests are representative of the physical demands of the work.

Thus, content validity for post-offer employment testing is intimately linked to a physical demands analysis (PDA). The PDA should be performed by a licensed clinician who has been formally trained and experienced in analyzing and measuring jobs and constructing test protocols. A PDA is a comprehensive review of a job that incorporates the following elements:

- Identification and analysis of the essential functions.
- Recording all pertinent data about the physical demands (i.e., lifting, pushing, pulling, gripping, heights, weights, and movements).

- Analyzing positioning and postural demands.
- Observing frequency with which jobs are performed throughout the workday.
- Recording time required to perform repetitions and tasks.
- Measuring forces required to perform all tasks associated with essential functions.
- Observing and recording information about the environment, organizational and cognitive aspects of the job.

The PDA is the foundation of an accurate post-offer screening program as it is used to match the job applicant's functional abilities to the demands of a specific job (Scott, 2002). In addition, a well-written, accurate and detailed PDA can be utilized to manage return-to-work activities when an employee has sustained an injury. Common errors that can occur when developing PDAs include the following:

- Failure to identify essential functions versus marginal functions.
- Incorrect identification of the physical demands.
- Failure to correctly analyze body positioning and its impact upon strength and performance.
- Failure to accurately classify jobs according to the frequency which they are performed in a typical workday.
- Failure to recognize the pace of the work and the implication it has on the physical demand of a particular job.
- Inaccurate measurements of forces, weights, and distances.
- Failure to consult with subject matter experts for additional insight on the performance of the jobs.

Using the PDA as a resource, a clinical team develops the preliminary components of the post-offer physical abilities screen. Each essential function should be included in the protocol. The ability to replicate each essential function in terms of positioning, posture, and force is critical to establish content validity of the test battery. The test protocol can include the following components:

- Range-of-motion testing for establishing a medical baseline (not a pass/fail component).
- Cardiovascular screening to ensure safety of each individual taking the test.
- Strength testing using isometric forces for optimal safety.
- Work simulation components.
- Dynamic lifting components (if applicable).
- Functional range-of motion-testing to determine postural tolerance (if applicable).

If an employer has multiple plant/worksites locations and the test will be administered in more than one setting to accommodate each worksite, it must be consistent, uniform and reliable from location to location. Finally, to ensure safety during the test, real-time heart rate monitoring should be employed.

After a content-valid physical abilities test protocol has been designed, in order to be optimally compliant with the UGESP, the test should be administered to a representative sample of incumbent workers. The purpose of the exercise is to confirm relevance for the targeted jobs and to set a cut-score for each test component. Sample population testing should be randomized and blinded. Test subjects are identified only by a code number. Gender, age and race of the sample group should be representative of the incumbent workforce in order to identify potential adverse impact of test components. This sample test data becomes the criterion against which subsequent evaluatees' performance is compared. The appropriateness of the pass/fail standards is based on the incumbent worker's sample data and establishes criterion-reference concurrent validity. It is also utilized to minimize adverse impact issues that are identified during testing.

The post-offer physical abilities test protocol and pass/fail cutscores can now be finalized. Cutscores can be set to the actual physical demand of the job. However, they should be consistent with the performance of the incumbent workforce. This component of the post-offer screening program requires some thoughtful analysis in order to withstand the scrutiny of a challenge by a job offer candidate who was unable to pass the test (Scott, 2002).

Testing protocol policies and procedures should be developed and distributed to all test administrators to insure uniformity and reliability. Test results should be monitored periodically for adverse impact. Job changes may require reassessing the physical demands, and adjusting the test components and/or pass/fail cutscores in order to maintain validity.

Criterion-reference predictive validity can be defined as empirical data demonstrating that the selection procedure is predictive of, or significantly correlated with, important elements of job performance. Predictive validity is addressed in follow-up studies that analyze the testing process in terms of hiring and subsequent job experience. The ability of the test to predict job performance and subsequent effects at the workplace (i.e., reduced injury rate) should be investigated periodically after a post-offer physical abilities' screening program has been instituted.

Benefits of Post-Offer Physical Abilities Testing

Selecting employees who meet minimum medical standards (blood pressure and heart rate) and pass a job-specific physical abilities' evaluation following a conditional job offer results in reduced incidence and severity of work-related MSD illnesses and injuries. Other beneficial effects of employment testing include reduced turnover rates, hiring and training costs, worker

absenteeism, and healthcare and disability expenses. The following case studies clearly illustrate the tangible financial benefits of post-offer physical abilities testing.

Case 1

A large multinational industrial employer implemented a post-offer screening program and initiated a study to determine if the program reduced injury frequency and associated expenses. The study group consisted of 220 new hires, of which 110 were administered a post-offer of employment physical abilities' test, and 110 who were not tested. In the tested group, 83% (n = 92) passed the test, and accepted the job that was offered. Data was collected and analyzed over a four-year period on these 220 new hires. In the tested group, only one injury occurred during the four-year study, while the group that was not tested experienced 23 injuries. Additionally, the cost of the injuries differed substantially in the tested versus the non-tested group. Total injury-related expenses in the tested group were \$6,500. Total expenses in the non-tested group were \$2,073,000 (\$90,130 per injury) (Scott, 2002).

Case 2

An automobile manufacturing plant implemented a post-offer of employment physical abilities' testing program in December 2005 for its hourly production employees to ensure that job candidates possessed the necessary physical capabilities to safely perform the job duties for which they were being hired. The development of the employer-specific test protocol involved data collection, physical demands and essential function analysis, incumbent employee testing, and validation to ensure a reliable, non-discriminatory method for screening job candidates. Data was analyzed over a two-year period following implementation of the testing program in both the group of employees that were tested, and the established employees that were not tested. A conditional job offer was made to 3,128 prospective employees, who then underwent a physical abilities' test; 2,540 (81%) passed the test, and reported to work. In the two-year study period, the tested group experienced a 0.6 incidence rate (IR) versus a 2.6 IR in the established employee group. In the tested group, 3.9% of the employees reported an injury versus 8.3% in the established employee group. Injury costs were calculated to be \$1,364,395 in the tested group versus \$3,017,800 in the established employee group. The difference in the injury rates of the POET-tested group versus the non-tested established employees represented a savings to the employer of \$1,653,405 over the two-year period (Data on file, BTE Technologies, Inc.).

Case 3

A food processing company implemented a post-offer physical abilities' testing program in June 2008. The primary objectives were to reduce injury rates and associated expenses that the company was experiencing, and decrease the "early turnover" (employees leaving within the first two weeks of employment). In the first 12 months following program implementation, 463 job candidates were tested, of which 396 (86%) passed the test. An additional 3% of the candidates did not meet the medical requirements to take the test, bringing the total fail rate of conditional job candidates to 17%. This plant compared its injury experience in the first year of employee testing to the 12-month period prior to implementing the test. Forty MSD claims were filed in the pre-test year versus 10 claims filed in the post-test year. Costs associated with those injuries were \$246,468, compared to \$22,885 (a 93% reduction) in the year after the test was implemented.

Early turnover was reduced by 75% in the first year of physical abilities testing, which resulted in savings of \$115,500 in recruiting and training expenses (Data on file, BTE Technologies, Inc.).

Summary

A well-designed, legally compliant and reliable post-offer of employment testing program, which includes a physical-demands and essential-function analysis, clear acceptable pass-fail criteria, validation studies, and standardized, job-specific, objective test components can substantially decrease the frequency of injuries and associated costs. Additionally, the employer benefits from a medical and functional baseline to use as a return-to-work decision trigger should an injury occur in a tested employee. This baseline data can also be utilized to mitigate indemnity costs associated with a disability claim in apportionment states. The indirect costs associated with injured employees (turnover, hiring, training, absenteeism, healthcare, and disability) will also decrease following implementation of a physical abilities' testing program. Matching the demonstrated physical abilities of a potential worker to the physical demands of the job is one of the most effective ways to prevent and reduce workplace injuries and absenteeism, especially those that occur in the first 12 months of an employee's tenure.

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