

**Job Demands Analysis:
Defining the physical demands of the work for post-offer and
return-to-work functional testing**

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Knowing the physical demands of work is an essential foundation for injury prevention and management. This knowledge is essential for matching the worker with the work and forms the basis for developing post-offer and return to work screens, transitional duty programs, and industrial rehabilitation programs for the injured worker. Most organizations have poorly written job descriptions that describe only a few physical demands of the job in very general terms and are woefully inadequate for any of these purposes. This paper will describe a variety of processes for performing job analysis with emphasis on a systematic, objective process for gathering this data.

In addition, background information regarding the Department of Labor's classification system will be covered. The classifications of the levels of work, (Sedentary, Light, Medium, Heavy and Very Heavy), the duration of frequency (Constantly, Frequently, Occasionally, and Never) will be described. The definitions of the physical demands (Reaching, Stooping, Crouching, Kneeling, etc.) will be explained. This information will help the reader utilize the DOL's classification system to define the physical demands of the jobs in their organization.

The differences between job demands analysis and hazard identification will also be covered. These two types of assessments are interrelated but significantly different and require different assessment techniques. This distinction will be explained and the utilization of information with these types of assessments will be addressed.

The results of job demands analysis can be used to determine the tasks included on post-offer and return to work screens. In addition, job demands analysis can be an important part of post-injury management and transitional duty.

The purpose of the JDA is to define the physical demands of work utilizing the DOL classification system described in Tables 1 and 2. JDA is not to be confused with hazard identification or work risk analysis (WRA). In WRA, the purpose is to identify elements of the job that might create excessive stress for the worker. In JDA, the purpose is to define or classify the demands of work regardless of the hazard. In some projects, the goal is to combine JDA and WRA. However, different assessment tools are needed for each type of analysis and therefore the purpose of the project and appropriate tools should be determined prior to conducting the analysis. This paper will focus on JDA.

Table 1. Physical demands of work defined by the Dictionary of Occupational Titles
(Adopted with permission from Classification of Jobs, Janet E. Field and Timothy F. Field,
Elliott and Fitzpatrick, Inc., Athens, GA 1992.)

1. Strength demands:

Lifting: raising or lowering an object from one level to another

Carrying: transporting an object, usually holding it in the hands or arms

Pushing: exerting force upon an object so that it moves away from the force

Pulling: exerting force upon an object so that it moves toward the force

Standing: remaining on one's feet in an upright position without moving about

Walking: moving about on foot

Sitting: remaining in a seated position

2. Climbing: ascending or descending ladders, stairs, scaffolding, ramps, poles etc.

3. Balancing: maintaining body equilibrium to prevent falling

4. Stooping: bending the body downward and forward by bending the spine at the waist

5. Kneeling: bending the legs at the knees to come to rest on knee or knees

6. Crouching: Bending body downward and forward by bending legs and spine

7. Crawling: moving about on hands and knees or hands and feet

8. Reaching: extending arms and hands in any direction

9. Handling: seizing, holding, grasping, turning, or working with hands

10. Fingering: picking, pinching, or otherwise working primarily with the fingers

11. Feeling: perceiving attributes of items as size, shape, temperature

12. Talking*: expressing or exchanging ideas by means of the spoken word

13. Hearing*: perceiving the nature of sounds by the ear

14. Tasting/Smelling*: distinguishing flavors or odors using the tongue and/or nose

15. Near Acuity*: clarity of vision at 20 inches or less

16. Far Acuity*: clarity of vision at 20 feet or more

17. Depth Perception*: ability to judge distances and spatial relations

18. Accommodation*: adjustment of lens of eyes to bring an object into sharp focus

19. Color Vision*: ability to identify and distinguish colors

20. Field of Vision*: Observing an area that can be seen up and down and right and left when eyes are fixed on a given point

*Demands assessed indirectly and informally during FCE. If problems are apparent, then patients are referred to the appropriate specialist for further evaluation.

Table 2. Definitions of work intensity and frequency (Adopted with permission from Classification of Jobs, Janet E. Field and Timothy F. Field, Elliott and Fitzpatrick, Inc., Athens, GA 1992.)

Strength Demands

Sedentary: Exerting up to 10 lbs. of force occasionally and/or a negligible amount of force frequently to lift, carry, push, pull, or otherwise move objects, including the human body. Involves sitting most of the time but may involve walking or standing for brief periods of time.

Light: Exerting up to 20 lbs of force occasionally and/or up to 10 lbs force frequently and/or a negligible amount of force constantly. Even when weight lifted is negligible, a job is rate light when: 1) it involves walking or standing to a significant degree; 2) it requires sitting most of the time but involves pushing and/or pulling of arm or leg controls; 3) it involves working at a production rate that requires constant pushing or pulling of materials.

Medium: Exerting 20 to 50 lbs of force occasionally and/or 10 -25 lbs force frequently and/or up to 10 lbs of force constantly. Physical demand requirements are greater than that required for Light Work.

Heavy: Exerting 50 to 100 lbs of force occasionally and/or 25 -50 lbs force frequently and/or 10 to 20 lbs of force constantly. Physical demand requirements are greater than that required for Light Work.

Very Heavy: Exerting greater than 100 lbs of force occasionally and/or greater than 50 lbs force frequently and/or greater than 20 lbs of force constantly. Physical demand requirements are greater than that required for Light Work.

Frequency Demands

Never:	Activity or condition does not exist.
Occasionally:	Activity or condition exists up to 1/3 of the time.
Frequently:	Activity or condition exists from 1/3 to 2/3 of the time.
Constantly:	Activity or condition exists 2/3 or more of the time.

Methods of Job Analysis

Information regarding physical job demands can be acquired from a variety of sources. Perhaps the most frequently used method is employee or employer self report. The accuracy of this self-report process, however, is questionable, since employees/employers often over or under estimate the demands of work. In this author's experience, workers tend to overestimate the more difficult tasks and underestimate the more mundane tasks such as sitting, standing or walking. Because of these inaccuracies, worksite assessment of the job by a trained analyst is the optimal method for creating defensible job descriptions. At the worksite, the analyst can observe job tasks being performed, talk to workers performing the job, measure the forces required to perform the work, and videotape the jobs for further analysis or patient education.

The analyst must understand the difference between a task and a physical demand of work. The task for an auto mechanic might be replacing a carburetor. The physical demands for that task might include standing, stooping, reaching, handling, fingering, walking, squatting, lifting and carrying. The ultimate goal of the job demands analysis is to determine the percent of day spent performing the physical demands and weights or forces. However, the analyst must begin with a list of the tasks to be observed/videotaped in order to assess the physical demands.

The optimal, objective process begins with reviewing existing job descriptions and interviewing existing employees and supervisors who know the job. From these reviews and interviews, a comprehensive task list can be developed. During this interview the analyst should determine the percent of the day spent performing each tasks by asking the number of times the task is performed and the average duration. This percentage information from the tasks should be factored into any duration determinations for the physical demands. After a complete task list is generated, each task can then be videotaped, if possible, or observed if videotaping is not allowed. The videotaping or observing process allows the analyst to determine the percent of the task spent in the various physical demands, such as sitting, standing, walking, reaching, crouching, lifting, etc. In addition, the push/pull forces can be measured with a force gauge, materials are weighed with a scale, distances for lifting, reaching, carrying, walking are measured. The materials handling tasks are evaluated according to the force required and the duration of the day they are required. The non-materials handling tasks are reported according to the percent of day spent performing them.

The hand and finger dexterity and coordination demands of the job are reported according to the level of skill required. The DOL uses a 1-5 point scale to describe skill level

with 1 being the highest level and 5 the lowest, with most jobs falling at a level 3 dexterity and coordination demands.

A variety of environmental factors are documented. For example, a job might require the worker to be exposed to excessively cold, hot, wet, or humid environments. The worker might be exposed to chemicals, explosives, or respiratory contaminants. Personal protective equipment, such as a hard hat, safety glasses, hair nets, or hearing protection may be required for the job. These job conditions are typically reported as required or not required.

Test Length and Equipment

The time required for self-report job analysis is approximately 10-30 minutes per interview. The time required for observation-based JDA varies greatly with the variability of the job. For assembly line work, a position on the line could be analyzed in approximately 15-30 minutes. For a construction or maintenance position where job duties vary from day to day, the analysis could take the better part of a day or require an analysis that stretches over a several day period to accurately capture all job tasks. The equipment needed for the self-report approach is minimal and includes a questioning process and forms for recording data. The observation-based approach requires a force gauge to measure forces, weighing scales to determine the weight of certain containers, a retractable metal tape measure and video camera if videotaping is allowed.

Is the additional equipment, time and expense required for onsite analysis worth the effort? This author believes it is. Job demands analyses are used to form the basis of functional post-offer and return to work screens. If the job descriptions are flawed, the screens will be flawed. If screens are inaccurate, job applicants can be denied work and workers can be injured. The financial and personal ramifications of inaccurate screens should not be underestimated.

Reporting Process and Format

The JDA report should define the tasks of the job and the physical demands required to perform those tasks. For example, a hospital housekeeper might have to wet mop floors as one of the essential tasks of the job. The physical demands to perform the task might include standing, walking, reaching, stooping, crouching, lifting and pushing. The environmental conditions to which the worker is exposed and the protective equipment the worker must wear also are important aspects of the report. If the job demands analysis is being done to develop post offer screening, the screening tasks and cut points for the screening process can be part of the report. Similarly, if the job analysis is being done to develop a transitional duty program for an injured worker, transitional duty recommendations may be part of the report as well.

Professional Qualifications for Job Analysts

Job analyses can be performed by physical and occupational therapists, occupational health nurses, vocational analysts, case managers, human resource professionals and safety officers. The most important issue is whether these individuals have been properly trained in a procedure for job demands analysis that is standardized, objective, and reliable.

Objectivity

There is a paucity of data regarding the reliability of JDA. A recent unpublished reliability study of JDA performed by this author¹ involving case managers, vocational evaluators, and physical and occupational therapists, indicated that all of these disciplines are capable of performing highly reliable JDA, provided they use a standardized, objective process.

Safety precautions

Safety precautions related to JDA primarily involve the safety of the analyst. Many industrial environments are full of hazards, particularly to the person unfamiliar with the environment. For this reason, most employers will require the job analyst to have an official company escort and to wear safety equipment, such as a hard hat, metal-toed shoes, earplugs, safety glasses, hairnets, or protective clothing. Therefore the job analyst must clarify any safety equipment requirements prior to making the work site visit. If the job analyst is internal to the company, then this information will already be known.

Another safety precaution is for the analyst to use a video camera with a flip out LCD panel rather than viewing the work tasks through an eye piece. Using the LCD panel allows the evaluator to move and walk through the work environment with better peripheral vision when following a worker throughout a worksite.

Utilization of JDA Results

JDA data can be utilized to develop post-offer screens. The most demanding aspects of the job can be identified. Screens can then be developed that tests these job demands. It is extremely important for the test developer to utilize functional testing protocols that have reliability and validity studies published in the peer reviewed literature and to make sure that the tasks and minimal passing requirements are clearly linked with the tasks of the job. A conditional offer is made, contingent upon passing the functional screen. If the work is a non-disabled individual and passes the test, employers know that they are hiring a worker whose abilities are a good fit for the job. If the non-disabled person fails the screen, then the employer may legally rescind the offer. If the applicant is a qualified person with a disability, then the employer must make reasonable accommodations.

JDA can also be utilized effectively throughout the course of management of the injured worker. At any point in the delivery of care where a return-to-work decision is being made, job demands information can provide objective information for comparison to the injured worker's abilities. If the worker's abilities match the job demands, return to work can be made knowing that the worker is capable of performing his job. If the worker's abilities do not match the job demands, a work conditioning or work simulation treatment program may help the worker build up strength, flexibility, endurance and tolerance of the work tasks. JDA data can be used to make the return-to-work treatment program more job-specific. If a transitional duty program is needed, job demands information may be needed on a variety of jobs that are involved in the patient's transition back to full duty. When job demands analysis is used for return-to-work decisions, it cannot just report the physical demands of the work but must help the employer understand the

link between physical demands and the job tasks with which they are associated. Transitional duty plans must be written in terms of job tasks rather than physical demands to be meaningful to the employer. For example the hospital housekeeper's return to work restrictions may be written to avoid lifting more than 50 lbs and standing more than occasionally. However, the employer needs to know which tasks this employee with these restrictions can perform: wet mopping, dusting, cleaning the bathroom, changing the linen etc.

Summary

In summary, JDA is the foundation for developing sound, objective and defensible functional testing. If the foundation is weak, the building is unstable. If the description of job demands is inaccurate, the functional screens built from these job descriptions will not be defensible. It is well worth the time and effort to perform accurate and reliable job descriptions that can be used for a variety of injury prevention and work injury management programs.