

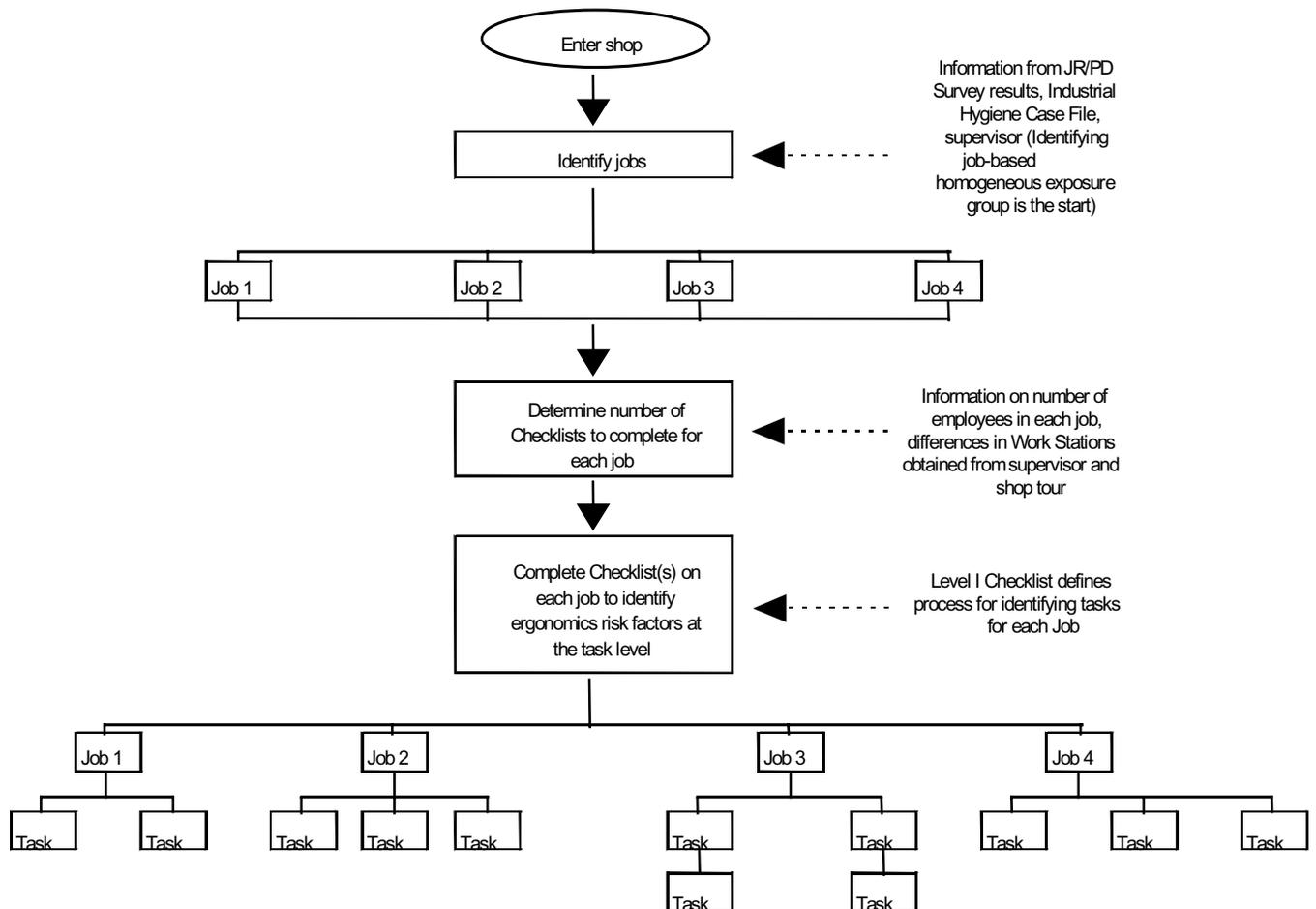
2.2 STEP 2 - RISK FACTOR IDENTIFICATION

Item(s) Needed: Level I Ergonomics Assessment Checklist

The purpose of Step 2 is to identify work-related risk factors to which the employee is exposed. You will use the Level I Ergonomics Assessment Checklist to complete Step 2.

If you are responding to an Occupational Illness Investigation, proceed to Step 2d.

If you are using the Guide to conduct pro-active problem solving in an EPRA-designated shop, complete the following steps. You may also refer to Figure 2.1 to see how an ergonomics assessment proceeds from entering the shop to performing the actual assessment.



**Figure 2.1
Selecting Jobs and Performing the Assessment**

- Step 2a. After entering the shop and introducing yourself to the shop supervisor, explain the purpose and method for completing the Level I Ergonomics Assessment Checklist.
- Step 2b. Make reference to the Industrial Hygiene Case File and previous attempts to identify the primary jobs in the shop. Verify these jobs with the supervisor and ask the supervisor how many employees perform each one of the jobs. (Note: This approach makes your starting point a job instead of an individual employee - unless you are responding to an Occupational Illness investigation.)
- Step 2c. Determine how many employees you need to observe and/or how many checklists you will need to complete for each job.

There is no firm rule on how many employees make up a representative sample of a job classification or homogeneous exposure group. A homogeneous group is a group of employees and/or their jobs that have similar characteristics (similar tools, equipment, work situations, and critical task distributions). You may want to begin by including 20 percent of the population or 3 employees, whichever number is greater. Or, if there are 3 or fewer employees in a job category, include all of the employees.

The following factors typically determine the number of checklists that are required:

- The number of different work situations in which the job occurs (e.g., performed on aircraft, performed on bench)
- The number of different types of tools or equipment, or devices used
- The distribution of critical tasks in the job

Take the example of the job "Molding" in a plastic shop. Say that there are two common parts that must be molded, Molding A and Molding B. If both moldings are made at the workstation, if the same equipment and tools are used during the process, if there is the same amount of grinding, sanding, trimming, etc. for each molding, and if the designs do not require the employee to use a completely different work procedure (e.g., one is done standing, one is done sitting), then the Moldings A and Molding B jobs can be considered the same job. The checklist(s) completed for Molding A also applies to Molding B. If the distribution of critical tasks is appreciably different (e.g., sanding makes up 80% of Molding A repair but only 20% of Molding B repair), you will need to conduct the Level I Assessment separately for each molding job. Also consider posture and movement. For instance, Molding A may be on a part 18 inches tall, while Molding B may be on a part 6 inches tall. If both jobs are performed on a bench, additional factors need to be considered. These factors include reaching overhead to sand the Molding A part.

To complete the appropriate number of checklists for each job type, follow the steps below:

- Complete a checklist for the first work situation, noting the tools, equipment, and tasks performed.
- Go to the next work situation in which the job is being done.
- If there are no significant differences in the tools, equipment, or distribution of critical tasks, then there is no need to complete another checklist. Simply observe the job/tasks to make sure that the risk factor exposure is not significantly different.
- If there are significant differences in the tools, equipment, or distribution of critical tasks, then complete a new checklist for that work situation.
- Repeat this process for all work situations that make up the representative sample for the job classification. Develop recommendations for each checklist. These recommendations will apply (in general) to all work situations in the homogeneous group evaluated by that checklist.

2.2.1 Format.

The Level I Ergonomics Assessment Checklist is comprised of a cover page and four parts:

- Cover Page
- Part I: Work Content (Description of Tasks Performed)
- Part II: Job Factors Checklist
- Part III: Environmental Factors Checklist
- Part IV: Employee Suggestions

2.2.2 Cover Page.

The purpose of the cover page is to identify the work center (shop), location of the work, the name of the job, etc. You will have one cover page for each job. If you complete multiple Checklists for the same job, you should use the same cover page.

Step 2d. Collect the information for the cover page from the supervisor and/or the employee and record in appropriate spaces.

2.2.3 Part I: Work Content (Description of Tasks Performed).

Part I helps you get the employee to describe, in a standardized way, the individual tasks which comprise his or her job. The different task types are listed in the “Task Key List,” one for Administrative areas and one for Maintenance/Warehouse/Service areas. These task types are consistent with the task types listed in Part III of the JR/PD Survey. For both analysis tools, the task types were selected as representative of the most common types of administrative, maintenance, warehouse, and service tasks. Additional space is provided to record other tasks that the employee may describe.

In order to identify appropriate jobs to assess, you must help the employee (or supervisor) try to think about the jobs and tasks that are the most fatiguing or difficult on the body. Any information from the employee (e.g., “doing dishes”, etc.) may help you identify several initial targets for your assessment. The second question will help you get an idea from the employee about those jobs that are done on a regular basis. Your goal is to identify the job (e.g., keying/mousing) that will become the focus of your Level I Assessment. Then, you can proceed to the Work Content Matrix with a specific job in mind.

The Work Content Matrix is designed to allow one of three responses under the “Task Frequency” heading. The frequencies (e.g., low, moderate, high) allow you to categorize the tasks by the amount of time devoted to the task when the job is performed. A gray shaded area is superimposed in the matrix to make a distinction between routine tasks and tasks which represent a less significant part of the job. The gray shaded area includes tasks that make up more than 10% of the job (moderate or high frequency). The gray shaded area also includes lifting/exertion tasks. All instances of lifting or exertion are considered critical tasks and should be included in the assessment.

Information provided in the completed matrix is very important. First, it enables you to break a potentially complex job down into smaller components or “tasks” that can be easily analyzed. Second, it enables you to maximize the value of the subsequent assessment by focusing problem-solving efforts on the routine tasks - referred to for the remainder of the assessment as “critical tasks.”

Performance measures are also recorded to help you justify the need for ergonomics improvement. For example, if the employee’s performance is judged according to the quality of the surface finish on an aircraft component, and the current work area arrangement makes the surface more difficult to grind, you may be able to obtain support to fabricate a height-adjustable holding fixture. The rationale behind the suggested corrective action is to help the employee do a better job, do the work faster, and also reduce the potential for a shoulder WMSD.

Obtain the following information directly from the employee:

- Step 2e. Turn to Page 1, *Part I - Work Content* (Description of Tasks Performed).
- Step 2f. Verify with the employee that the job you are targeting (you identified this job for investigation in Step 2b.) is performed on a regular basis (or occurs most frequently) in the shop. Note: If the employee mentions jobs that you do not have in the Industrial Hygiene Case File or that were not mentioned by the supervisor, you may wish to add these jobs to your list of target jobs for the Level I Assessment.
- Step 2g. Ask each employee to explain the *purpose of the job*. The objective is to develop a complete understanding of why the job exists and the type of work done by the employee. As you talk with the employee, refer to page 2, Work Content (Description of Tasks Performed). Circle those tasks which the employee mentions. If a task is not listed on page 2 of the assessment, use the blank lines to write in the task names (e.g., meeting with others) and mark the appropriate time estimate.
- Step 2h. *Fill out the Work Content Matrix*. Write the tasks on page 1, the Work Content Matrix. Ask the employee to indicate the task frequency and mark the appropriate circle. Also note if Lifting/Exertion occur while completing the task.
- Step 2i. *Ask about performance measures*. Ask the employee to describe the performance measures used to measure success in that job. Some employees may not be able to provide this type of information if their performance has not been formally measured in the past. When this is the case, simply ask the employee, "How would you know whether a person doing your job was doing a good job? - What would you look for?" Record the responses in the *Work Performance* box on the bottom of page 1.

Figure 2.2 illustrates a completed Work Content Matrix.

Task	<u>Lifting/Exertion</u> Occur in Task	<u>Task Frequency</u> (Check one)		
		(Low) 0-9%	(Moderate) 10-50%.	(High) 51-100%
1. Baking	X	<input type="radio"/>	X	<input type="radio"/>
2. Dishwashing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	X
3.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

 = Critical tasks are indicated by the shaded boxes in the Work Content Matrix. Critical tasks are tasks which occur greater than 10% of the job time or which involve lifting or high forces.

**Figure 2.2
Work Content Matrix**

2.2.4 Part II: Job Factors Checklist.

The format of the checklist enables you to perform an ergonomics analysis for each of the critical tasks. The tasks are analyzed individually to identify the specific source of exposure to ergonomic risk factors. It is not usually the “job” that causes fatigue or discomfort; rather, it is the individual tasks that are the source. You may not be able to change the task. However, it may be possible to address the part of the job that requires prolonged repetitive work or awkward body posture. Figure 2.3 shows one page of the Job Factors Checklist.

The *Job Factors* questions have been grouped into five “body zones”:

- Shoulder/Neck
- Hand/Wrist/Arm
- Back/Torso
- Legs/Feet
- Head/Eyes

The body zones are consistent with those used in the JR/PD Survey. The questions are representative of the types of ergonomic risk factors that are most likely to be found in Air Force Administrative, Maintenance, Warehouse, and Service work areas.

Part II - Checklist, Legs/Feet

Job Factors

For each Job Factor, select the appropriate Job Factor Frequency score in the appropriate Task Frequency column using the following guidelines:

Frequently (F): Job Factor occurs more than 50% of the task time

Sometimes (S): Job Factor occurs for 10-50% of the task time

Infrequently/Never (N): Job Factor occurs less than 10% of the task time or does not apply

Critical Tasks

Job Factor	Task Name:	Task Name:		Task Name:		Comments		
		Task Frequency		Task Frequency			Task Frequency	
		Moderate 10-50%	High 51-100%	Moderate 10-50%	High 51-100%		Moderate 10-50%	High 51-100%
	4.1 Standing in a fixed position (especially on hard floor surfaces)	F S N 1 1 0	F S N 4 1 0	F S N 1 1 0	F S N 4 1 0	F S N 1 1 0	F S N 4 1 0	
	4.2 Exposure to hard edges or surfaces (e.g., edge of chair presses into back of leg, task requires leaning against the hard edge of a table)	F S N 1 1 0	F S N 4 1 0	F S N 1 1 0	F S N 4 1 0	F S N 1 1 0	F S N 4 1 0	
	4.3 Awkward leg postures (e.g. kneeling, squatting, crawling, etc.)	F S N 1 1 0	F S N 4 1 0	F S N 1 1 0	F S N 4 1 0	F S N 1 1 0	F S N 4 1 0	
	Task Scores = (column total)							

Figure 2.3
Administrative Job Factors Checklist

The questions were designed to ensure that each general risk factor type discussed in the scientific literature (e.g., posture, force, repetition, etc.) was reflected for each body region. The questions and illustrations were also designed to prevent the need for you to repeatedly refer to a glossary when completing the checklist. However, a glossary is provided to assist you the first few times you use the checklist. No measurements are required to complete the checklist. All of the questions may be answered based on observing the employee at work.

For each question, you can assess the employee's exposure to the Job Factor as *Frequently*, *Sometimes*, or *Infrequently/Never*. First, you will indicate whether or not the task is a "moderate" or "high" frequency component within the overall job. You will then circle the appropriate Job Factor responses under that column. If the Job Factor occurs greater than 50% of the task time (e.g., the employee is exposed to awkward leg postures "more" rather than "less" of the time) and the task is a "high" task, you circle the *Frequently* (F=4) response. If the Job Factor occurs between 10% to 50% of the task time and the task is a "high" task, circle the *Sometimes* (S=1) response. If the job factor occurs for less than 10% of the task, or the Job Factor does not occur, or the question is not applicable to the task, circle the *Infrequently/Never* (N=0) response.

The three response choices are provided for each of the "Moderate" and "High" categories to maximize the consistency of assessment results between users and to minimize the need for interpretation and estimating actual time. It is significantly easier to decide if a Job Factor occurs "more" or "less" than 1/2 the time than it is to make a consistent distinction between 1/3, 2/3, etc. In addition, many warehouse and assembly jobs include Job Factors that occur, but to a much lesser extent (e.g., <10%). Users of previous versions of the guide will note that the "Infrequently" response choice has been combined with the "Never" response choice. This was designed to recognize and account for risk factors that will be observed, but will not be observed anywhere near the 50% level. The numerical ratings provided for each response were determined based on the relative contribution of the Job Factor type to WMSDs as well as the impact of exposure duration. Providing a numerical rating for each response allows the scoring process to be relatively fast and easy.

A numerical Task Score is calculated for each task by adding the numbers in the column. The Task Score represents the degree to which the task exposes the employee to ergonomic risk factors. The score is compared to evaluation criteria (0-3/Low, 4-7/Medium, and 8+/High) which allows you to establish priorities for problem solving.

After obtaining a job description and a basic task frequency breakdown from the employee, you are ready to begin *Part II - Ergonomics Checklist/Job Factors*.

In some cases, the employee will not be performing all of the critical tasks at the time of your observation. When this is the case, ask the employee to demonstrate each of the critical tasks. Complete the checklist for each task during the demonstration.

- Step 2j. Turn to Page 2, Part II - Checklist, Shoulder/Neck and review the definition for Frequently (F), Sometimes (S), and Infrequently/ Never (N).
- Step 2k. From Page 1 of the checklist, note the tasks from the marked circles in the gray area and write the task(s) on the blank lines under Critical Tasks. If there are more than 3 tasks, put the additional tasks on another checklist.
- Step 2l. In the work Content Matrix, you identified the tasks rated as moderate (10%-50%) or high (51%-100%). Note the tasks that occur less than 10% of the time are excluded from the assessment.
- Step 2m. Next, answer each question for *each* task by circling (F), (S), or (N) in the appropriate Task Frequency column.
- Step 2n. After you have answered *every* question for each task, compute the *Task Scores* (add each column and total at the bottom). The Comments box in the far right column is for additional notes regarding the tasks.
- Step 2o. Repeat the identical process four more times. Review each critical task again for Hands/Wrist/Arm; Back/Torso; Legs/Feet; and Head/Eyes. Record the all of the results in the same way as for Shoulder/Neck.

2.2.5 Part III: Environmental Factors.

Four criteria are provided to assess potential exposure to general environmental factors/stressors (restricted space, temperature, noise, and indoor air quality). Responses are based on five levels of potential exposure (strongly disagree to strongly agree) and are scored on a 4-point scale. This section of the assessment is completed either by asking the employee to rate each one of the factors or by referring to environmental data in the BEF case files or the Command Core System (CCS). See the Glossary for descriptions of each Environmental Factor. Figure 2.4 shows the Environmental Factors.

Part III - Environmental

Environmental Factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
1. Restricted space	0	0	0	1	4
2. Extreme temperatures - heat/cold	0	0	0	1	4
3. Noise and/or distractions	0	0	0	1	4
4. Air quality concerns	0	0	0	1	4

Environmental Score =

Environmental Rating	Low	Med	High
Environmental Score	0-3	4-7	8+

**Figure 2.4
Environmental Factors**

This data indicates employee exposure to environmental factors that may be impacting the way the employee performs the job/tasks. For example, working in a restricted space may be one of the reasons why the employee must reach or lean forward. The environmental rating is not used to determine the overall job priority score or priority scores for individual tasks. It is, however, accounted for during the problem-solving process.

Complete the following:

- Step 2p. Turn to page 7, *Part III - Environmental* and answer the questions relating to Environmental Factors and circle the appropriate number.
- Step 2q. Total the numbers and write the score in the Environmental Score box and circle the appropriate rating *High, Medium, or Low*.

2.2.6 **Part IV: Employee Suggestions.**

Employee involvement is critical in the problem identification and problem solving processes. Employees who have previously completed the JR/PD Survey may have already provided feedback on improvement opportunities. Your questions for the employee in Part IV should have a slightly different focus. The JR/PD Survey asked about general improvement opportunities for the shop. Part IV enables you to record any comments or suggestions that the employee may have on how to improve the specific job. Employee suggestions must be thoughtfully considered and evaluated along with the controls provided in the Case Study Problem-Solving Matrices when you develop the final list of recommendations in Step 5.

- Step 2r. Ask the employee for any suggestions for Corrective Actions that he/she may have. *The employee may have provided you with improvement suggestions during the initial interview.* Record all employee comments.

The on-site part of the Level I Ergonomics Assessment Checklist is now finished.

Detailed information on question interpretation and research references is contained in the Checklist Glossary.