# DEMONSTRATE KNOWLEDGE PERTAINING TO THE PREPARATION, CONDUCTING, RECORDING AND FOLLOW-UP ACTIONS OF A PLANNED TASK OBSERVATION IN A WORKING PLACE

## LEARNER STUDY GUIDE

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|---|---|
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**Contents**

# Perform a Task Analysis

## WHAT'S THE PURPOSE OF TASK ANALYSIS?

"Task analysis for instructional design is a process of analysing and articulating the kind of learning that you expect the learners to know how to perform Instructional designers perform a task analysis in order to:

1. determine the instructional goals and objectives;
2. define and describe in detail the tasks and sub-tasks that the student will perform;
3. specify the knowledge type (declarative, structural, and procedural knowledge) that characterize a job or task;
4. select learning outcomes that are appropriate for instructional development;
5. prioritize and sequence tasks;
6. determine instructional activities and strategies that foster learning;
7. select appropriate media and learning environments;
8. construct performance assessments and evaluation (Jonassen et al., 1999).

## WHAT METHODOLOGY DOES A TASK ANALYSIS SUPPORT?

The process of task analysis emerged from the behaviorist era in an effort to describe the elemental behaviours involved in performing a task or job. Nevertheless, different methods of task analysis have indeed followed the paradigm shifts to cognitive psychology and onto constructivism. Ultimately, each methodology of instruction commands its own method of analysis, yet regardless of methodology, a task analysis is needed for an in-depth understanding of the learning that's to take place (Jonassen, et al., 1999).

## I KNOW ONE METHOD OF TASK ANALYSIS. CAN I USE IT ALL THE TIME?

According to Jonassen, the answer is no. Too often instructional designers try to force-fit all learning situations into one or two methods with which they are most familiar. However, as different audiences require different instructional strategies, different contexts demand different task analysis methods. To determine the best method for your instruction, you must decide what kind of analysis to perform. In general, there are five kinds of task analyses:

1. job or performance analysis
2. learning analysis
3. cognitive task analysis
4. content or subject matter analysis
5. activity analysis.

Each of the five methods involves a different procedure for conducting a task analysis and also make different assumptions about the process of learning.

## HOW DO I PERFORM A TASK ANALYSIS?

According to Jonassen, the task analysis process consists of five distinct functions:

- Classifying tasks according to learning outcomes –
- Inventorying tasks – identifying tasks or generating a list of tasks
- Selecting tasks – prioritizing tasks and choosing those that are more feasible and appropriate if there is an abundance of tasks to train.
- Decomposing tasks – identifying and describing the components of the tasks, goals, or objectives.
- Sequencing tasks and sub-tasks – defining the sequence in which instruction should occur that will best facilitate learning.

## WHAT FORMATS CAN I USE?

There are different formats to use based on the type of learning outcome. The following are the most prevalent:

1. Procedural Task Analysis (for procedural skills)
2. Hierarchical or Prerequisite Analysis (for intellectual skills)
3. Information Processing Analysis (for procedural and cognitive tasks)
4. Cluster Analysis (for verbal information skills)
5. Conceptual Graph analysis (for concepts)

### What is a procedural analysis?

Unlike learning a concept or a principle, procedures are strictly defined so that each step is clear and unambiguous to the learner. Procedures can be simple, whereby the learner follows one set of steps in a sequential fashion. However, procedures can also be complex, with many decision points that the learner must make. Regardless of the complexity of the procedure, a procedural analysis breaks down the mental and/or physical steps that the learner must go through so that the task can be successfully achieved. The steps that make up a task are arranged linearly and sequentially, illustrating where the learner begins and ends. Oftentimes, the steps throughout the task, from start to finish, as well as any decisions that the learner must make are arranged in a flowchart, but they can also be done in an outline form. See examples below.

Examples of learning outcomes that are procedural in nature are:

- Balancing a checkbook,_
- Changing a tire,
- Formatting a disk,and
- bathing a dog.

**How do I conduct a procedural analysis?**

Learning goals that are procedures are the easiest goals upon which to conduct an instructional analysis. Generally, application of procedures involves these steps:

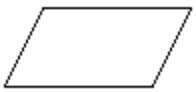
1.Determine whether a particular procedure is applicable.
2. Recall the steps of the procedure.
3. Apply the steps in order, with decision steps if required.
4. Confirm that the end result is reasonable.

(From Smith & Ragan, 1999)

Okay, I've broken down the steps, I'm ready to flowchart...

Flowcharting has a language of its own. The following are the generally accepted conventions for flowcharting.

*Start/End* - This symbol is used as the beginning symbol pointing to the first task and as a symbol indicating that no more tasks are to be performed. A flowchart has only one starting point; therefore there is only one START symbol. However, there can be more than one END point.



*Input/Output* - A parallelogram represents either an input task or an output task. An example of an input task is keying the account number of a savings account in a bank. An example of an output task is printing a reprt or displaying the results of a computation. An output at the end of a chain creates the input for the next step.

*Process* - A process is a simple procedure, an operation, or an instruction. Processes do not include tasks requiring a decision. A process is represented by a rectangle. Calculating simple interest, typing a report, or taking a test are examples of processes.

*Decision* - Decision symbols are used when two alternative sequences are possible depending upon the outcome of the decision. Usually decisions are posed as questions requiring a yes or no answer. However, any two-way alternative may be posed.

(Seels & Glasgow, 1990)

Are there any flowcharting programs available?

Absolutely! Programs like Inspiration and Microsoft's Visio make it very easy to create quick, customized flowcharts. And if you just want to try them out, many of them offer 30-day trial demos for you to download.

What criteria should I use to evaluate my procedural analysis?

_____ Completeness (thoroughness); all steps present; complex procedures broken down; (0-5)

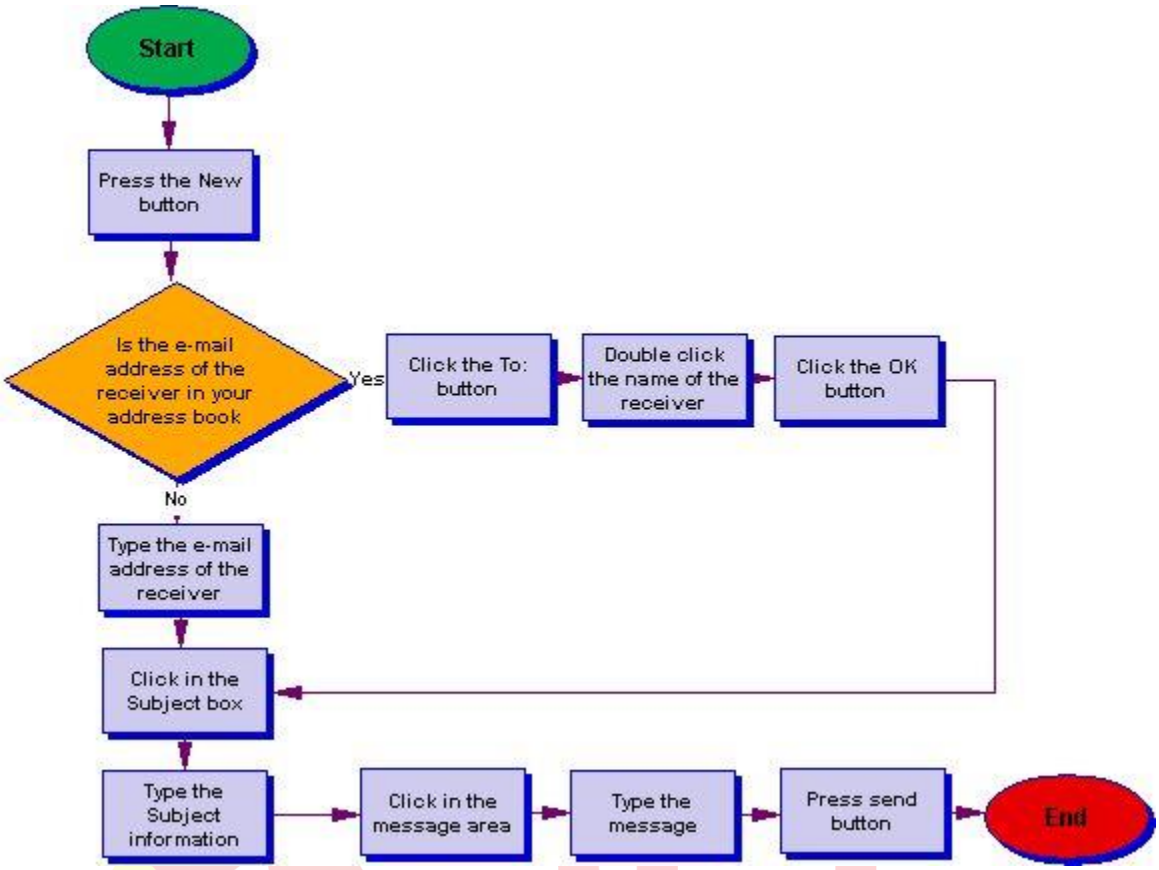
_____ All steps stated in performance terms (using verbs); (0-5)

_____ Appropriateness of procedural analysis for representing task; (0-5)

_____ Validity & accuracy: how well does analysis correspond to actual task; (0-5)

_____ Appropriate use of flowchart or representation used; directional flow obvious and consistent; (0-5)

Can I see an example of a procedural task analysis using a flowchart?




**Example:**

Procedural Task Analysis in an Outline

**Objective:** The learner will be able to give a large dog a bath in a bathroom tub.

**Definition of Learning:** The learner will be able to perform the step-by-step process of giving a large dog a bath.

**Essential Learning:**

## I. Prepare for giving dog a bath

*A. Get Supplies*

1.Purchase dog brush

2.Purchase dog shampoo

3. Gather old towels to use for drying dog and covering floor of bathing area

*B. Arrange bathing area*

1.Cover floor with old towels

2. Place shampoo near water source where dog will be bathed

3. Place remaining old towels in pile within reach, but as far from water sources as possible

4. Place brush near pile of towels

5. Close doors to rooms that you do not want dog to enter while damp

## II. Get dog to bathing area

*A. Lead dog to bath*

1. Secure collar and leash on dog

2. Walk dog to bathing area (you may need dog treats to bribe the dog)

B. Secure the dog in bathing area

1. Close door behind you and dog after entering bathing area

a. Lift/command the dog into bath tub

b. Remove leash and collar from dog

## III. Bathe the dog

*A. Wet the dog*

1. Turn on the water

2. Check the temperature and adjust it until it is luke warm

3. Saturate the dog with water

*B. Shampoo the dog*

1. Pour shampoo on dog

2. Lather and rub into all parts of the dog's fur vigorously with your hands

*C. Rinse the dog*

1. Saturate the dog with water
2. Massage water into fur with your hands until all remaining shampoo is washed away
3. Drain remaining water from tub (if applicable)

### IV. Dry the dog

*A. Reach for the towels and pull closer to you*

*B. Lift/command dog out of tub*

*C. Towel dry the dog*

1. Place towel on dog's back and rub up and down
2. Repeat step one using dry towels and rubbing different areas of dog

*D. When all excess water is off dog and it is essentially damp, put leash and collar on dog*

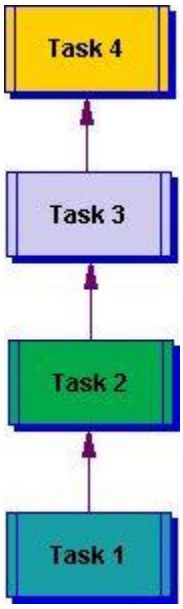
*E. Take the dog to area where you would like it to continue drying*

*F. Give dog a treat*

## HIERARCHICAL TASK ANALYSIS

### What is a hierarchical analysis?

"A hierarchy is an organization of elements that, according to prerequisite relationships, describes the path of experiences a learner must take to achieve any single behaviour that appears higher in the hierarchy" (Seels & Glasgow, 1990, p. 94). Thus, in a hierarchical analysis, the instructional designer breaks down a task from top to bottom, thereby, showing a hierarchical relationship amongst the tasks, and then instruction is sequenced bottom up. For example, in the diagram below, task 4 has been decomposed into its enabling tasks implying that the learner cannot perform the third task until he/she has performed the first and second tasks respectively.




## How do I conduct a hierarchical analysis?

The starting point for constructing a hierarchy is a comprehensive list of the tasks that make up a job or function. There are three major steps to constructing a hierarchy:

1. Cluster or group the tasks. For inclusion in a group, select tasks that bear close resemblance to each other. Each task must be included in at least one of the groups, but a task may also be common to several groups. Label the groups with terms that emerge from the job or function being analyzed. Initial clustering or grouping of tasks may be tentative. The composition of the groups may change as a result of decisions you make later on. Do not hesitate to regroup tasks when it seems appropriate.
2. Organize tasks within each group to show the hierarchical relationships for learning. Ask yourself "What would the learner have to learn in order to do this task?" Once the essential prerequisite relationships are shown, reevaluate the relationship between each pair of tasks with the question "Can this superordinate task be performed if the learner cannot perform this subordinate task?" The lower level skill must be integrally related to the higher-level skill. The learning types (domains) of the tasks should match horizontally. (See taxonomies for identifying learning domains/levels (psychomotor, intellectual, affective).
3. Confer with a subject matter expert to determine the hierarchy's accuracy. This step occurs concurrently with Steps 1 and 2.

(Seels & Glasgow, 1990)

## What criteria should I use to evaluate my analysis?

The following is a checklist for you to evaluate your hierarchical analysis.

_____Adequate breadth (number) of tasks; (0-5)

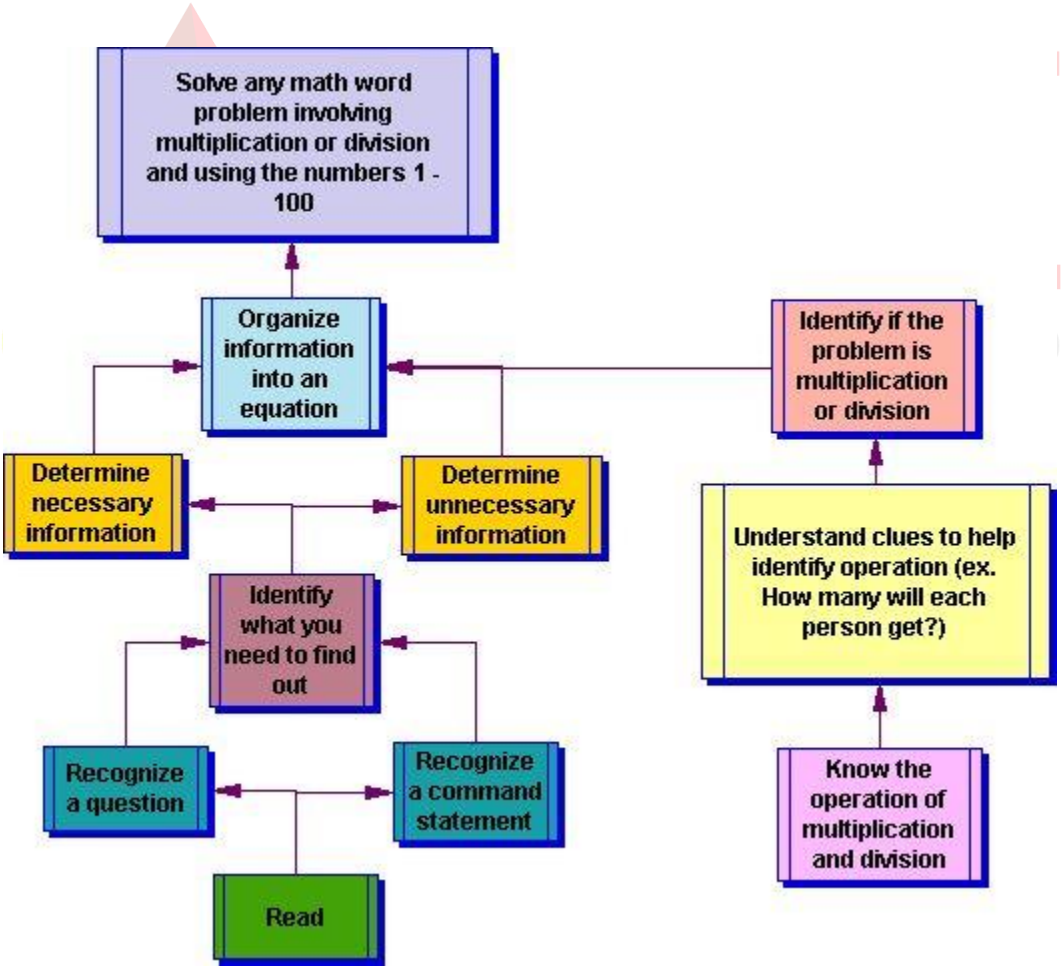
_____ Depth of levels: does hierarchy span all levels of learning (problem-solving to verbal information) leading to the final level of the task; (0-5)

_____ Validity & accuracy: how well does analysis correspond to learning processes; (0-5)

_____ Consistency in grouping similar tasks on same level in hierarchy; (0-5)

_____ All skills/sub-skills stated in performance terms (using verbs); (0-5)

## Can I see an example of a hierarchical task analysis?



# INFORMATION-PROCESSING ANALYSIS

## What is an information-processing analysis?

"Conducting an information-processing analysis is the first step in 'decomposing' or breaking down a goal into its constituent parts, identifying what the students need to learn to attain the goal (Smith & Ragan, 1999, p. 69)." When conducting this type of analysis, the question to keep in mind is "what are the mental and/or physical steps that someone must go through in order to complete this learning task (Smith & Ragan, 1999, p. 69)?" One way to do this is to think through the steps one could go through to complete the task. It is helpful to use a defined procedure such as the steps listed below.

## How do I conduct an information-processing analysis?

The following are ten steps to follow in conducting an information-processing analysis:

1. Collect as much information as possible about the task and the content implied by the goal. Use this to become familiar with the terminology involved. Then create a set of questions that could be asked of a subject matter expert.

2. Rewrite the goal in the form of a representative test question.

3. Ask several individuals who know how to complete the task and do one of the following: a) observe them completing the task and ask them to talk aloud about their thought processes as they complete the task; b) observe them completing the task and write down, videotape, or otherwise record the steps; c) have the individuals record the steps in writing as they complete them; or d) ask them to simply write down the steps they would use to complete the task. Techniques a) and b) give the most information because experts often forget some of the steps they go through when completing a task.

4. Review the steps recorded in step 3 and ask questions about the process of completing the task. This will help you to find out the unobservable cognitive knowledge that underlies the expert's behavior.

5. If more than one expert was used, review the findings and find the common steps and decision points collected from steps 3 and 4.

6. Identify the shortest, simplest way to complete the path, noting factors that require this simpler path.

7. Make notes of factors that may require more steps or more complex steps.

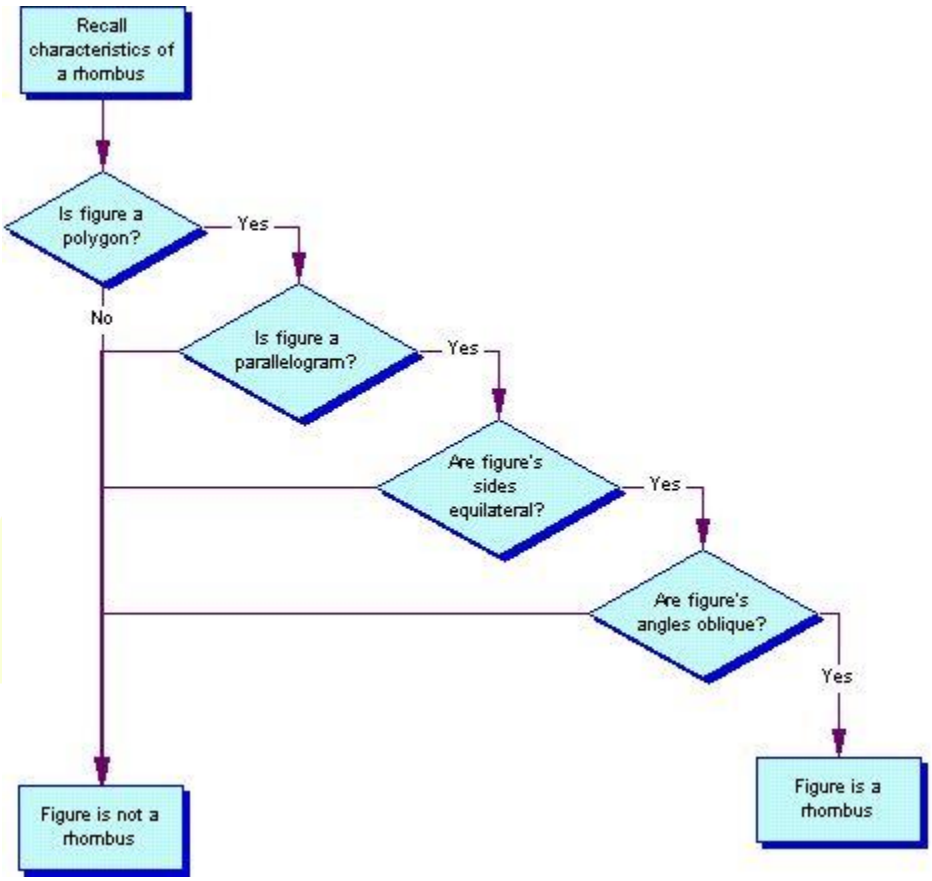
8. Choose the steps and circumstances that best match the intentions of the goal.

9. Make a list of the steps and decision points appropriate for the goal.

10. Confirm the analysis with other experts. (Smith & Ragan, 1999)

## Can I see an example of an information-processing analysis?

Information-Processing Analysis for a Concept



# CLUSTER ANALYSIS

## What is a cluster analysis?

"For goals within the verbal information domain, conduct an 'elaboration analysis,' or 'cluster analysis"' (Oliver, 2002, section 3, para. 3). A cluster analysis is used to analyze verbal information skills where no logical order is required to meet the stated goal(s) (Muffoletto, 2000).

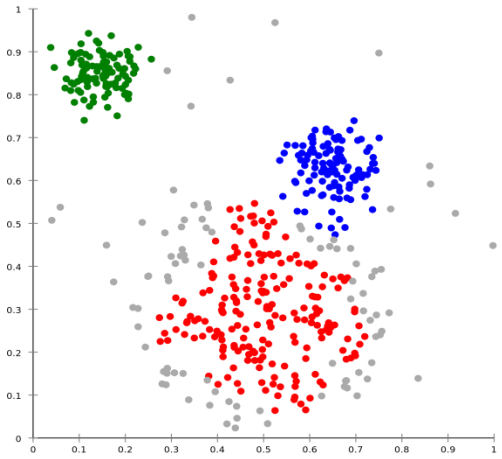
## How do I conduct a cluster analysis?

Before conducting a cluster analysis, an instructional designer needs to first ask if there is a logical order to the steps needed to meet the goal. After determining there is no logical order needed to meet the goal, the next step for the designer is to identify the clusters or categories of information in each step. Oliver (2002) suggests the following procedure when analyzing goals within the verbal information domain.

1. Identify the main concept
2. Determine how the knowledge is structured (e.g., parts, kinds, classes)
3. Identify first-level headings, second-level headings, and so-forth
4. Try to identify what is related to the information being taught.

## Can I see an example of a cluster analysis?

Please see the graph below:



# CONCEPTUAL GRAPH ANALYSIS

## What is a conceptual graph analysis?

Constructing a conceptual graph is similar to concept mapping, but it includes a formal and detailed collection of nodes, relations, and questions. The nodes can include more than just concepts. Nodes can be goals, actions, or events. There are specific relations for each type of node, and a set of formal, probing questions is developed for each node type. Basically, conceptual graph analysis has two stages. The first stage consists of the task analyst or expert creating a basic conceptual graph. The second stage consists of the analyst or expert using the probing questions to find a deeper layer of information for the graph. The analyst or expert may opt to include a third stage of validating the conceptual graph by having an expert perform the task to check for missing information (Jonassen, Tessmer, & Hannum, 1999).

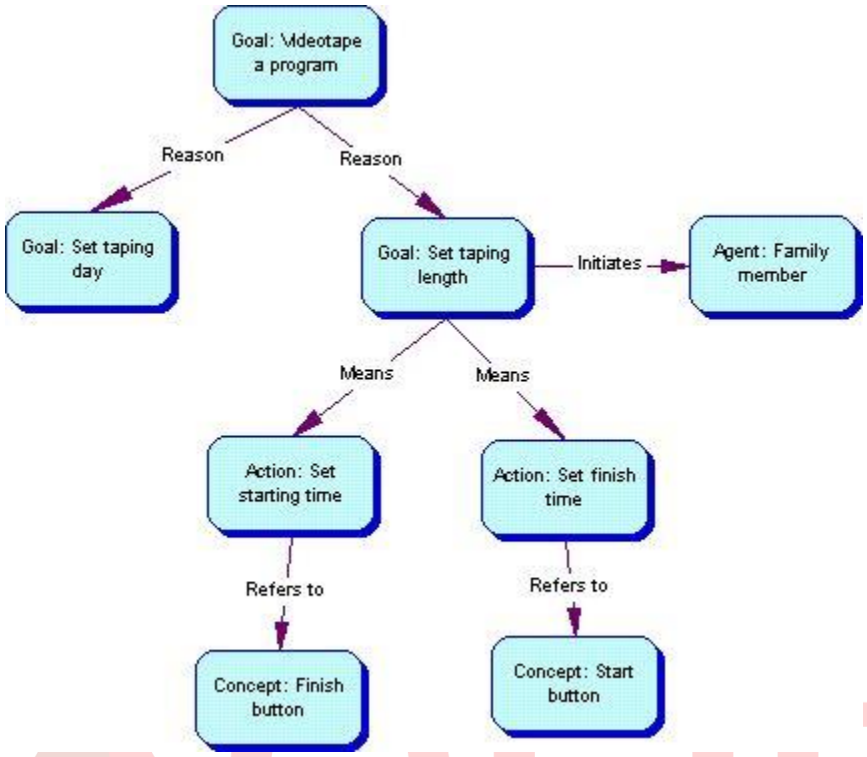
## How do I conduct a conceptual graph analysis?

The following are six steps to follow in conducting a conceptual graph analysis:

1. Clarify the uses for the graph information.
2. Choose a set of situations for the expert to analyze.
3. Construct a rough graph.
4. Prepare a list of follow-up questions.
5. Expand the graph.
6. Review the final graph. (Jonassen, Tessmer, & Hannum, 1999, p.202-203)

## Can I see an example of a conceptual graph analysis?

Excerpt of a conceptual graph on operating a video recorder:




**Needs Analysis: How to determine training needs**

## Chapter Highlights

1. Types of Needs Analyses
2. Knowledge, Skills, Abilities
3. Techniques
4. Checklist for evaluating an assessment

# TRAINING NEEDS ANALYSIS

**Training Needs Analysis**: The process of identifying training needs in an organization for the purpose of improving employee job performance.

# INTRODUCTION

Today's work environment requires employees to be skilled in performing complex tasks in an efficient, cost-effective, and safe manner. Training (a performance improvement tool) is needed when employees are not performing up to a certain standard or at an expected level of performance. The difference between actual the actual level of job performance and the expected level of job performance indicates a need for training. The identification of training

needs is the first step in a uniform method of instructional design.

A successful training needs analysis will identify those who need training and what kind of training is needed. It is counter-productive to offer training to individuals who do not need it or to offer the wrong kind of training. A Training Needs Analysis helps to put the training resources to good use.

## Types of Needs Analyses

Many needs assessments are available for use in different employment contexts. Sources that can help you determine which needs analysis is appropriate for your situation are described below.

- **Organizational Analysis**. An analysis of the business needs or other reasons the training is desired. An analysis of the organization's strategies, goals, and objectives. *What is the organization overall trying to accomplish?* The important questions being answered by this analysis are who decided that training should be conducted, why a training program is seen as the recommended solution to a business problem, what the history of the organization has been with regard to employee training and other management interventions.
- **Person Analysis**. Analysis dealing with potential participants and instructors involved in the process. The important questions being answered by this analysis are who will receive the training and their level of existing knowledge on the subject, what is their learning style, and who will conduct the training. *Do the employees have required skills?* Are there changes to policies, procedures, software, or equipment that require or necessitate training?
- **Work analysis / Task Analysis**. Analysis of the tasks being performed. This is an analysis of the job and the requirements for performing the work. Also known as a task analysis or job analysis, this analysis seeks to specify the main duties and skill level required. This helps ensure that the training which is developed will include relevant links to the content of the job.
- **Performance Analysis**. Are the employees performing up to the established standard? If performance is below expectations, can training help to improve this performance? Is there a *Performance Gap*?
- **Content Analysis**. Analysis of documents, laws, procedures used on the job. This analysis answers questions about what knowledge or information is used on this job. This information comes from manuals, documents, or regulations. It is important that the content of the training does not conflict or contradict job requirements. An experienced worker can assist (as a subject matter expert) in determining the appropriate content.
- **Training Suitability Analysis**. Analysis of whether training is the desired solution. Training is one of several solutions to employment problems. However, it may not always be the best solution. It is important to determine if training will be effective in its usage.
- **Cost-Benefit Analysis**. Analysis of the return on investment (ROI) of training. Effective training results in a return of value to the organization that is greater than the initial investment to produce or administer the training.

**Principle of Assessment**: Use assessment instruments for which *understandable and comprehensive documentation* is available.

## Knowledge, Skills, and Abilities

Today's workplace often requires employees to be independent thinkers responsible for making good decisions based on limited information. This kind of work may require training if the employee

does not have these skills. Below is a list of various competencies that employees may be required to posess in order to perform their jobs well.

- Adaptability
- Analytical Skills
- Action Orientation
- Business Knowledge/Acumen
- Coaching/Employee Development
- Communication
- Customer Focus
- Decision Making
- Fiscal Management
- Global Perspective
- Innovation
- Interpersonal Skills
- Leadership
- Establishing Objectives
- Risk Management
- Persuasion and Influence
- Planning
- Problem Solving
- Project Management
- Results Orientation
- Self-Management
- Teamwork
- Technology

Are any of these KSA's required before the employee is hired? Are the required KSA's included in any job postings or advertisements? Do they need to be?

## Techniques

Several basic Needs Assessment techniques include:

- direct observation
- questionnaires
- consultation with persons in key positions, and/or with specific knowledge
- review of relevant literature
- interviews
- focus groups
- assessments/surveys
- records & report studies
- work samples

# CONDUCTING AN ORGANIZATIONAL ANALYSES

Determine what resources are available for training. What are the mission and goals of the organization in regards to employee development? What support will te senior management and managers give toward training? Is the organization supportive and on-board with this process? Are there adequate resources (financial and personnel)?

# CONDUCTING A WORK / TASK ANALYSIS

Interview subject matter experts (SME's) and high performing employees. Interview the supervisors and managers in charge. Review job descriptions and occupational information. Develop an understanding of what employees need to know in order to perform their jobs.

Important questions to ask when conducting a Task Analysis:

1. What tasks are performed?
2. How frequently are they performed?
3. How important is each task?
4. What knowledge is needed to perform the task?
5. How difficult is each task?
6. What kinds of training are available?

Observe the employee performing the job. Document the tasks being performed. When documenting the tasks, make sure each task starts with an action verb. How does this task analysis compare to existing job descriptions? Did the task analysis miss any important parts of the job description? Were there tasks performed that were omitted from the job description?

Organize the identified tasks. Develop a sequence of tasks. Or list the tasks by importance.

Are there differences between high and low performing employees on specific work tasks? Are there differences between Experts and Novices? Would providing training on those tasks improve employee job performance?

Most employees are required to make decisions based on information. How is information gathered by the employee? What does the employee do with the information? Can this process be trained? Or, can training improve this process?

# COGNITIVE TASK ANALYSIS

Develop a model of the task. Show where the decision points are located and what information is needed to make decisions and actions are taken based on that information. This model should be a schematic or graphic representation of the task. This model is developed by observing and interviewing the employees. The objective is to develop a model that can be used to guide the development of training programs and curriculum.

Since the training is based on specific job tasks, employees may feel more comfortable taking the effort to participate in training.

Gather information about how the task is performed so that this can be used to form a model of the task. Review job titles and descriptions to get an idea of the tasks performed. Observe the employee performing the job. Review existing training related to the job. Make sure you observe both experts and novices for comparison.

# CRITICAL INCIDENT ANALYSIS

Critical Incident Interview Guide.

## Conducting a Performance Analysis

This technique is used to identify which employees need the training. Review performance appraisals. Interview managers and supervisors. Look for performance measures such as benchmarks and goals.

## Sources of performance data:

1. Performance Appraisals
2. Quotas met (un-met)
3. Performance Measures
4. Turnover
5. Shrinkage
6. Leakage
7. Spoilage
8. Losses
9. Accidents
10. Safety Incidents
11. Grievances
12. Absenteeism
13. Units per Day
14. Units per Week
15. Returns
16. Customer Complaints

Are there differences between high and low performing employees on specific competencies? Would providing training on those competencies improve employee job performance?

## Checklist for Training Needs Analysis

It is helpful to have an organized method for choosing the right assessment for your needs. A checklist can help you in this process. Your checklist should summarize the kinds of information

discussed above. For example, is the assessment valid for your intended purpose? Is it reliable and fair? Is it cost-effective? Is the instrument likely to be viewed as fair and valid by the participants? Also consider the ease or difficulty of administration, scoring, and interpretation given available resources.

### Training and Development Needs Analysis Checklist

Your training needs analysis should include the following:

- ☐ Know what the organization is trying to accomplish.
- ☐ Know the history of training within the organization.
- ☐ What "needs" will be addressed by the training?
- ☐ Any recent process or procedure changes?
- ☐ What resources are available for training?
- ☐ Who needs to be trained?
- ☐ Who can serve as subject matter experts?
- ☐ Are any staff going to do the training?
- ☐ Which companies provide training materials?
- ☐ What are the Knowledge, Skills, and Abilities?
- ☐ Review Job Descriptions and Org Charts.

## TRAINING AND DEVELOPMENT: CRITICAL INCIDENT INTERVIEW GUIDE

### Introduction and Purpose

Describe the purpose of the interview. "We want to learn more about how you make decisions in your job. Take as much time as needed to respond thoroughly and accurately."

### Identify Incidents

Have the employee discuss difficult decisions that they have to make on their job. These are decisions that may have or would likely have resulted in an error or critical incident.

### Timelines

For each incident identified, describe the timeline of events that led to that incident. Describe the incident from start to finish. Re-construct the events to form a timeline that establishes the sequence of each event.

### Identify Decision Points

Identify specific decision points on the timeline.

### Decision Point Analysis

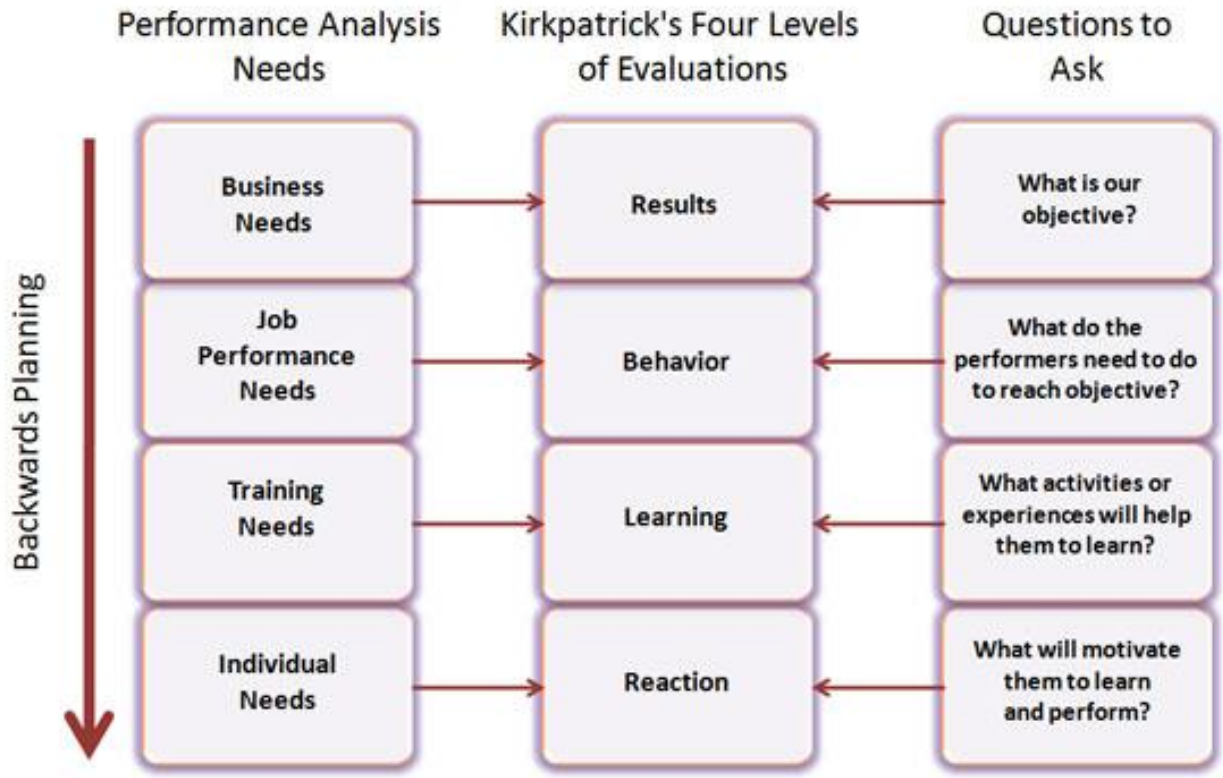
For each decision point, consider the following:

1. **Errors** If an error occurred, what was it?
2. **Optimal** How should the decision have been made?
3. **Ambiguous** What information could have helped make the decision. Was any information missing?
4. **Error Avoidance** Could the error have been avoided? If so, how?
5. **Environmental Factors** What aspects of your environment influenced your decision?
6. **Expert / Novice** Do (or would) experts and novices differ in their decision making?
7. **Information** What information was used in making the decision? How was it obtained?
8. **Training Others** If you were training new employees, what would you teach them about this kind of incident?

## TASK ANALYSIS IN INSTRUCTIONAL DESIGN

A *task analysis* is a systemic collection of data about a specific job or group of jobs to determine what an employee should be taught and the resources he or she needs to achieve optimal performance (DeSimone, Werner, Harris, 2002).

In the Backwards Planning model shown below, the first step in the Analysis phase, Business Outcome, identified the Business Need, the second step, Performance Analysis identified the performance that is needed to obtain that objective, and the third step, Needs Assessment, identified the various Learning and Training Needs.




The Task Analysis performed in this phase further defines the Training or Learning Needs by supplying the required process and/or steps to perform a task. In addition, it should focus on how important the task is to both managers and performers, who will aid in the last backwards planning step — Individual Needs. Learners are mainly motivated by both by what they see as important AND what their managers see as important.

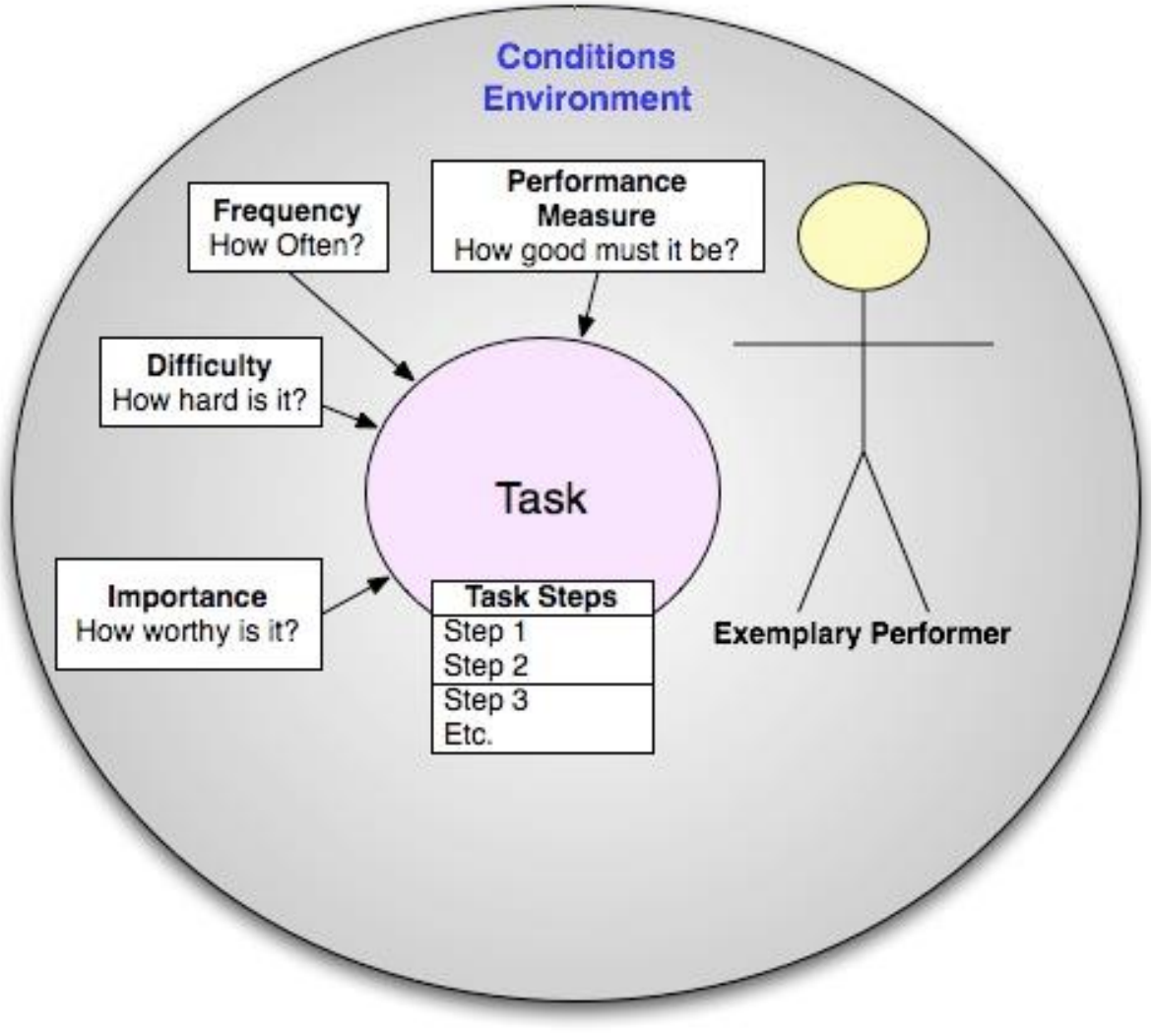
While the previous steps in the Analysis Phase helped you determine the performance requirements and formal and informal learning needs, this step supplies the basic information for designing and building the learning platform, which are discussed in the Design and Development phases.

## INFORMATION SUPPLIED BY A TASK ANALYSIS

The Task Analysis sequences and describes measurable behaviors involved in the performance of a task. It also provides a detailed analysis of each task in terms of frequency, difficulty and importance. The analysis normally begins by observing and interviewing an *exemplary performer* (a person who is presently an expert performer)

performing the task or by discussing the problem with other experts as discussed in the Needs Assessment.

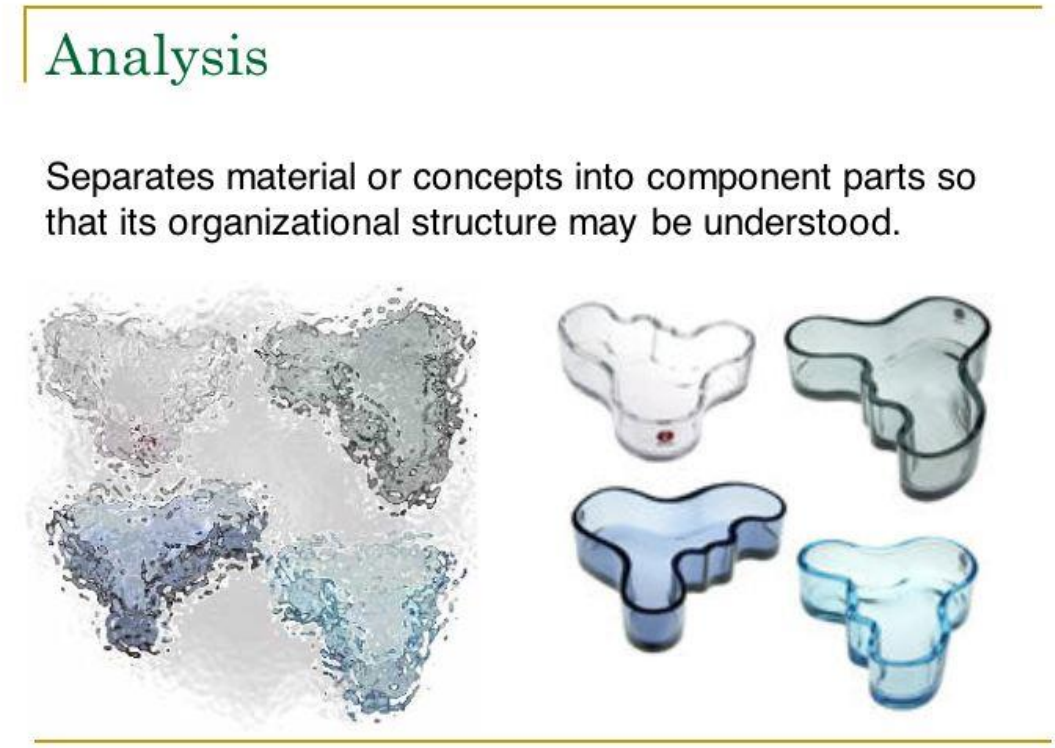
## ITEMS TO CAPTURE




The following must be captured during this step of the Analysis Phase:

- **Conditions**: Tools or equipment needed and the environment the task is performed in.
- **Performance Measure**: How well must it be performed? Note that this sub-step is discussed in more detail in the next step, Build Performance Measures.
- **Frequency**: How often is the task performed (hourly, daily, weekly, etc.)?

- **Difficulty**: Use a standard scale, such as from one to five.
- **Importance**: What place of importance is this task as compared to the performer's other tasks?
- **Steps**: Logical steps for performing the task.




## DRIVERS OF PERFORMANCE

To increase the effectiveness of a task analysis, focus on the *driver* of performance (Rossett, Sheldon, 2001):

- Focus on Individuals
  - skills, knowledge, expectations, information
  - motivation
- Focus on Culture
  - environment
  - incentives

When selecting tasks to be trained, consider the following factors:

- What will happen if we do not train this task?
- What will be the benefits if we do train this task?
- If we don't train it, how will the employees learn it?
- How will the learning platform help to achieve our business goals?
- Is training needed to ensure their behavior does not compromise the company's legal position, i.e., Occupational Safety and Health Act, Equal Employment Opportunity, labor relations laws, or state laws?
- Can people be hired that have already been trained?

Listed below are some suggested questions that might need to be asked:

- How critical is the task to the performance of the job?
- To what degree is the task performed individually, or is part of a set of collective tasks?
- If it is part of a set of collective tasks, what is the relationship between the various tasks?
- What is the consequence if the task is performed incorrectly or is not performed at all?
- To what extent can the task be trained on the job?
- What level of task proficiency is expected following training?
- What information is needed to perform the task? What is the source of information?
- Does execution of the task require coordination between other personnel or with other tasks?
- Are the demands (perceptual, cognitive, psychomotor) imposed by the task excessive?
- How much time is needed to perform this task?
- What prerequisite skills, knowledge, and abilities are required to perform the task?
- What behaviors or outcomes distinguish good performers from poor performers?

# TASK ANALYSIS TOOLS: VARIOUS APPROACHES FOR ANALYSING TASKS AND NEEDS

In a traditional needs analysis, the analyst generates a list of tasks to be performed. This list is integrated into a survey to be completed by job incumbents, subject matter experts and supervisory personnel. Respondents are asked to evaluate the frequency, the criticality of each task to the successful performance of the job, and the amount of training required to reach proficiency. The surveys are then compiled and a committee discusses the findings and approves the tasks. The tasks to be trained are then observed and are broken into task steps. For many jobs, this approach works just fine. For others, some different tools might be required. The following are instruments that may be incorporated into the analysis.

## PEOPLE-DATA-THINGS ANALYSIS

Jobs are often characterized by the proportions of time spent on people, data, and things. Performance deficiencies are often the result from a mismatch between the nature of a job, and the employee's preference for focus on people, data, or things. Although most jobs entail that the jobholder work with all three, there is usually one of the three that the job most extensively focuses on. Listing all job responsibilities under one of the three categories will provide the information as to what major role an employee will be expected to fulfill -- a people person, a data person, or a thing person. The following verbs will help you to properly place a responsibility into a category:

- **people duties:** advises, administer, briefs, communicates, coordinates, conducts, consults, counsels, critiques, delegates, demonstrates, directs, explains, facilitates, guide discussions, implements, informs, instructs, interviews, manages, mentors, negotiates, notifies, plans, participates, persuades, promotes, provide feedback, organizes, sells, speaks (public), sponsors, supervises, teaches, trains, tutors, welcomes
- **data duties:** analyzes, arranges, audits, balances, budgets, calculates, compares, compiles, computes, designs, determines, documents, estimates, forecasts, formulates, identifies, lists, monitors, obtains, predicts, prepares, selects, surveys, tracks

- **thing duties:** activates, adjusts, aligns, assembles, calibrates, constructs, controls, cooks, cuts, develops, disassembles, drives, grows, inspects, lifts, loads, maintains, maneuvers, monitors, mixes, operates, paints, packs, repairs, services, transports, writes

A larger and more organized list can be found at People-Data-Things list

## TABLETOP ANALYSIS

Using a facilitator, a small group of 3 to 10 subject matter experts convene to identify the various tasks to be performed. A minimum of one job incumbent and one supervisor are needed to discuss the tasks. The facilitator conducts the sessions and documents the information. Through brainstorming and consensus building, the team develops a sequential list of tasks. Following this process, the team determines which tasks should be trained. Task selection is based on the frequency, difficulty, criticality and the consequences of error or poor performance. This method is labor intensive for the subject matter experts. The validity of the identified tasks is dependent upon the credibility of the selected subject matter experts. For consistency, the team of experts should remain the same throughout the process. The table-top method of job analysis typically consists of:

- Orienting the team.
- Reviewing the job.
- Identifying the duty areas associated with the job.
- Identifying the tasks performed in each duty area and write task statements.
- Sequencing the duty areas and task statements.
- Selecting tasks for training.

## HYBRID METHOD

This involves both a quantitative analysis and consensus building. Using job task documents, a list of tasks is compiled by an analyst. Through an iterative process involving consensus building, the validity of the task list is assessed by subject matter experts, supervisors and job incumbents. Through discussions, each task's complexity, importance and frequency are numerically rated by members of the consensus group.

Once the tasks are identified, the group identifies and validates the knowledge, skills and abilities required to perform each task.

## COGNITIVE TASK ANALYSIS

For tasks with a high cognitive component, (i.e., decision making, problem solving, or judgments), a traditional task analysis may fail to identify those cognitive skills required to perform a given task or job. A cognitive task analysis is performed to identify and to describe the cognitive components of a task. There are a variety of methodologies available to help the instructional designer to represent and define the various knowledge structures needed to perform a task or job. These techniques can also be used to define expert systems and the "expert" in Intelligent Tutoring Systems. There are three knowledge structures: declarative, procedural and strategic:

1. **Declarative knowledge** tells us why things work the way they do, or that the object or thing has a particular name or location. It includes information about the concepts and elements in the domain and the relationships between them. The type of knowledge found at this level include facts, principles, rules of science and concepts. "Knowing the rules of good database design" is one example. Another is "knows the names, location, and prices of all the SKUs in inventory." Methods for eliciting declarative knowledge:
    - Card Sorting - The researcher obtains sets of concepts that broadly cover the domain (derived from glossary, texts, or gleaned from introductory tutorial talk), then transfers each concept onto a card. Subject matter experts then sorts the cards into common groups or functions according to similarity. The SMEs then creates the sorting criteria. The groups themselves are grouped until eventually a hierarchy is formed.
    - Data Flow Modeling - An expert is interviewed. The researcher then draws data flow diagram using data gathered from interview. Expert verifies diagram.
2. **Procedural knowledge** tells us how to perform a given task. Procedural knowledge contains the discrete steps or actions to be taken and the available alternatives to perform a given task. With practice, procedural knowledge can become an automatic process, thus allowing us to perform a task without conscious awareness. This automatically also allows us to perform more than one complex task at a given time. A

couple of examples would be "creates a v-ditch using a motored grader" or "types a letter at 95 words per minute." Methods for eliciting procedural knowledge:

- Interviewing - This is a variation of a basic interview. There are several variations. Some of them are: (1) working backwards through the problem, (2) drawing a concept map, (3) showing an expert photographs depicting system in a number of states and asking questions, (4) expert describes procedure to interviewer and then the interviewer teaches it back to the expert.
- Discourse Analysis (observation) - An expert helps an user while a researcher records the process. The transcript is then analyzed for tasks and elements. The data is then converted into a taxonomy.

3. **Strategic knowledge** is comprised of information that is the basis of problem solving, such as action plans to meet specific goals; knowledge of the context in which procedures should be implemented; actions to be taken if a proposed solution fails; and how to respond if necessary information is absent. An example of this would be a production plant manager who formulates a plan to meet the needs of a greatly increased forecast. Methods for eliciting strategic knowledge:
   - Critical Decision Method (Interview) first method - Interview of expert to identify non-routine events that challenged her expertise and events which expertise made a significant difference. A time line of events is then constructed and key points are further probed.
   - Critical Decision Method (Interview) second method - A semi-structured interview is performed utilizing specific probes designed to elicit a particular type of information. The data is then examined for perceptual cues, judgment details, and decision strategy details that are not generally captured with traditional reporting methods.

Also see Cognitive Task Analysis.

## OBSERVING THE EXPERT ANALYSIS

This method uses an observer to record an expert performing a task. The observer is a person who aspires to be an expert in a similar job. The trainer's role is to set the analysis in motion by briefing the observer and the expert regarding the intended outcome of the observation. This method works best when three similar experts are observed by

three different aspiring observers. After the observations, the observers become a task force who meet with the training analysis who functions as a discussion facilitator.

## VERIFICATION

This technique allows training program products to be determined based on work at other facilities on the same or similar tasks. This process can save significant effort and cost. Communication with, or benchmarking visits to the facilities will enable each facility to take advantage of existing experience and materials. Use of this technique requires the help of SMEs and a trained facilitator. These experts use various lists and documents to decide which tasks apply and to identify the tasks that require modification to reflect job requirements. The verification technique consists of the following steps:

- Gathering relevant existing training materials and task information from local and external sources.
- Comparing this information to the facility-specific needs.
- Modifying the information as needed.
- Verifying the accuracy of the information by Subject Matter Experts.

## FUNCTIONAL ANALYSIS

When a position that performs a large number of tasks (e.g., management or engineering) is being analyzed, a technique called functional analysis can be used. Rather than conducting a job analysis to identify specific tasks, major functions within the position are identified. After the competencies necessary to perform the major functions are identified, those competencies can be analyzed to determine objectives for training. For example, a manager might make many plans such as production planning, personal requirements, facility and equipment requirements, forecasting materials, and formulating budgets. The training objectives needed to perform these actions might read as: Create a Gantt Chart, Build a Capacity Requirement Plan, or Use the Basic Exponential Smoothing Model for forecasting.

## TEMPLATING

Training content can be determined by the careful review and analysis of a template (a list of system facilities, procedures, theory topics, or generic learning objectives). The template technique uses a simplified process for determining content or developing learning objectives associated with the operation or maintenance of a specific system. This technique produces generic and system-specific learning objectives for the training and evaluation of personnel. Some organizations have approached the design of training based on the systems an individual operates or maintains. A template containing generic learning objectives is reviewed by subject matter experts for applicability. This approach directly generates system-specific terminal and enabling learning objectives. It is important that the template be carefully reviewed to determine the applicability of each item to the system. If this review is not accomplished, the result can readily become "know everything about everything." The template technique includes the following steps:

- Develop or modify an existing template to meet facility needs.
- Use of a trainer and a subject matter experts to select applicable objectives and/or complete portions of the template for a given system, component, or process.

## DOCUMENT ANALYSIS

This technique is especially valuable when accurate procedures and other job related documents are available. Document analysis is a simplified technique for determining required knowledge and skills directly from operating procedures, administrative procedures, and other job related documents. A SME and a trainer review each section and step of the procedure or document to determine training program content. Document analysis consists of the following steps:

- Review the procedure or document and list the knowledge and skills required by a worker.
- Verify the accuracy of the results.

# TASK SELECTION INSTRUMENT

Purpose: To determine if a task should be trained. The first four sections are used to determine if it should be trained. The last two sections will be of aid in selecting the type of training. Depending upon the task, not all questions require an answer.

**TASK:**

**1. REQUIRED BY LAW, SAFETY FACTORS, ORGANIZATIONAL REQUIREMENTS**

- **Is the training mandated by the Occupational Safety and Health Act?**
- **Is there a chance that someone may hurt or that damages may occur if it is not trained?**
- **Is training needed to ensure their behavior does not compromise the company's legal position, i.e., equal employment opportunity, labor relations laws, or state laws?**
- **Is training required to meet an organizational vision or mission?**
- **Is the training required to meet company goals or objectives?**

**Generally, any yes answers is this section requires training or another performance initiative. Analyst's recommendation:**

**2. USE OF ANOTHER PERFORMANCE INITIATIVE**

- **Is there another solution, such as a job performance aid or self-study packet?**
- **Can people be hired that have already been trained?**
- **To what extent can the task be learned on the job?**
- **Are the demands (perceptual, cognitive, psychomotor or physical) imposed by the task excessive?**
- **Are other performance interventions required?**
- **Is there another creative solution that better meets the organization's needs (brainstorming required to correctly answer this question)?**

**Another performance solution is generally recommended if it is cheaper or if it better meets the organization needs. Analyst's recommendations:**

**3. RISKS AND BENEFITS**

- **What will happen if we do not train this task?**
- **What are the benefits if we train this task?**
- **How critical is the task?**
- **What is the consequence if the task is performed incorrectly?**

**Identifying the risks and benefits helps in arriving at the correct solution. Analyst's recommendations:**

**4. TASK COMPLEXITY**

- **How difficult or complex is the task?**
- **How often is the task performed during a specified time frame (e.g., daily, weekly, monthly, yearly)?**

- **How much time is needed to perform this task?**
- **What behaviors are used in its performance?**
- **How critical is the task to the performance of the job?**
- **What information is needed to perform the task? What is the source of information?**

**Generally, complex and frequently performed tasks require training, while simpler and infrequently performed tasks require other performance solutions (such as job performance aids).**

**5. COLLECTIVE (TEAM CONSIDERATIONS)**

- **Does execution of the task require coordination between other personnel or with other tasks?**
- **If it is one of a set of collective tasks, what is the relationship between the various tasks?**

**Although identifying the collective degree of the task plays a small amount in deciding if a task should be trained, it is a determining factor in deciding how it will be trained.**

**6. REQUIREMENTS FOR TRAINING**

- **What are the performance requirements?**
- **What prerequisite skills, knowledge, and abilities are required to perform the task?**
- **What behaviors distinguish good performers from poor performers?**
- **What level of task proficiency would be expected by the department following training?**

**This section provides training requirements.**

**FINAL RECOMMENDATION**

**Performance Intervention Required:**

**Client's Buy-Off:**

**Training Departments Buy-Off:**

Task Selection Example

Purpose: To determine if a task should be trained. The first four sections are used to determine if it should be trained. The last two sections will be of aid in selecting the type of training. Depending upon the task, not all questions require an answer.

**TASK:** Move a load with a forklift.

**1. REQUIRED BY LAW, SAFETY FACTORS, ORGANIZATIONAL REQUIREMENTS**

- **Is the training mandated by the Occupational Safety and Health Act?** Yes
- **Is there a chance that someone may hurt or that damages may occur if it is not trained?** Yes
- **Is training needed to ensure their behavior does not compromise the company's legal position, i.e., equal employment opportunity, labor relations laws, or state laws?** Yes

- **Is training required to meet an organizational vision or mission?** Yes (mission) – Provide a Safe working environment for all personal.
- **Is the training required to meet company goals or objectives?** No

**Generally, any yes answers is this section requires training or another performance initiative. Analyst's recommendation:** Training must be provided.

**2. USE OF ANOTHER PERFORMANCE INITIATIVE**

- **Is there another solution, such as a job performance aid or self-study packet?** Yes, part of the training will use a self-study packet to reduce classroom-training time.
- **Can people be hired that have already been trained?** Yes, but we try to promote from within and training must be provided by law.
- **To what extent can the task be learned on the job?** Training will only be provided to ensure they know how to operate safely. The rest of the training will be provided on the job.
- **Are the demands (perceptual, cognitive, psychomotor or physical) imposed by the task excessive?** They require good perception (must be able to place loads 40 feet in the air) and they require some manual dexterity to manipulate the controls. Also, they are required to stand for a long period on a moving platform that vibrates quite hard at times (standup forklifts).
- **Are other performance interventions required?** None at this time.
- **Is there another creative solution that better meets the organization's needs (brainstorming required to correctly answer this question)?**

**Another performance solution is generally recommended if it is cheaper or if it better meets the organization needs. Analyst's recommendations:** A self-study packet will be used, followed by a brief class, demonstrations, and then practice and evaluation.

**3. RISKS AND BENEFITS**

- **What will happen if we do not train this task?** Accidents likely to occur
- **What are the benefits if we train this task?** We will meet OSHA's requirements.
- **How critical is the task?** Very – must be trained to meet distribution requirements.
- **What is the consequence if the task is performed incorrectly?** Accidents likely to occur

**Identifying the risks and benefits helps in arriving at the correct solution. Analyst's recommendations:** Training required

**4. TASK COMPLEXITY**

- **How difficult or complex is the task?** Moderate
- **How often is the task performed during a specified time frame (e.g., daily, weekly, monthly, yearly)?** Throughout the day.
- **How much time is needed to perform this task?** Normal task completion is about 7 minutes, however it is performed throughout the day on a continuous basis.
- **What behaviors are used in its performance?** Coordinate movement of material with other personal, works without supervision, and perform basic math.
- **How critical is the task to the performance of the job?** Extremely critical.
- **What information is needed to perform the task?** Name of item, quantity, and location. **What is the source of information?** Receiving paperwork, put-away sheets, and letdown sheets.

**Generally, complex and frequently performed tasks require training, while simpler and infrequently performed tasks require other performance solutions (such as job performance aids).**

**5. COLLECTIVE (TEAM CONSIDERATIONS)**

- **Does execution of the task require coordination between other personnel or with other tasks?** Must work with receivers and pickers to ensure material is in its designated position at the correct time.
- **If it is one of a set of collective tasks, what is the relationship between the various tasks?**

**Although identifying the collective degree of the task plays a small amount in deciding if a task should be trained, it is a determining factor in deciding how it will be trained.**

**6. REQUIREMENTS FOR TRAINING**

- **What are the performance requirements?** Material must be located correctly so that it can be found when needed.
- **What prerequisite skills, knowledge, and abilities are required to perform the task?** Basic math skills, knowledge of warehousing operations, and the ability to operate machinery.
- **What behaviors distinguish good performers from poor performers?** Accuracy and being able to operate safely.
- **What level of task proficiency would be expected by the department following training?** Being able to operate a forklift safely.

| Selecting Jobs for Analysis | 3 |
|---|---|

A job safety analysis can be performed for all jobs in the workplace, whether the job task is special (non-routine) or routine. Even one-step-jobs such as those in which only a button is pressed can and perhaps should be analyzed by evaluating surrounding work conditions.

To determine which jobs should be analyzed first, review your job injury and illness reports. Obviously,

- **A job safety analysis should be conducted**

**first for jobs with the highest rates of disabling injuries and illnesses.**

Also, jobs where close calls or near misses have occurred should be given priority. Analyses of new jobs and jobs where changes have been made in processes and procedures should follow. Eventually, a job safety analysis should be conducted and made available to employees for all jobs in the workplace.

| Involving the Employee | 4 |
|---|---|

Once you have selected a job for analysis, discuss the procedure with the employee performing the job and explain its purpose. Point out that you are studying the job itself, not checking on the employee's job performance. Involve the employee in all phases of the analysis from reviewing the job steps and procedures to discussing potential hazards and recommended solutions. You also should talk to other workers who have performed the same job.

 Are lockout procedures used for machinery deactivation during maintenance procedures?

| Conducting the Job Safety Analysis | 5 |
|---|---|

Before actually beginning the job safety analysis, take a look at the general conditions under which the job is performed and develop a checklist. Below are some sample questions you might ask.

- Are there materials on the floor that could trip a worker?
- Is lighting adequate?
- Are there any live electrical hazards at the jobsite?
- Are there any chemical, physical, biological, or radiation hazards associated with the job or likely to develop?
- Are tools including hand tools, machines, and equipment in need of repair?
- Is there excessive noise in the work area, hindering worker communication or causing hearing loss?
- Are job procedures known and are they followed or modified?
- Are emergency exits clearly marked?
- Are trucks or motorized vehicles properly equipped with brakes, overhead guards, backup signals, horns, steering gear, and identification, as necessary?
- Are all employees operating vehicles and equipment properly trained and authorized?
- Are employees wearing proper personal protective equipment for the jobs they are performing?
- Have any employees complained of headaches, breathing problems, dizziness, or strong odors?
- Is ventilation adequate, especially in confined or enclosed spaces?
- Have tests been made for oxygen deficiency and toxic fumes in confined spaces before entry?
- Are work stations and tools designed to prevent back and wrist injuries?
- Are employees trained in the event of a fire, explosion, or toxic gas release?

| | |
|---|---|
| | 6 |

Naturally this list is by no means complete because each worksite has its own requirements and environmental conditions. You should add your own questions to the list. You also might take photographs of the workplace, if appropriate, for use in making a more detailed analysis of the work environment.

- Is the worker wearing clothing or jewelry that could get caught in the machinery or otherwise cause a hazard?

| | |
|---|---|
| Breaking Down the Job | 7 |

Nearly every job can be broken down into job tasks or steps. In the first part of the job safety analysis, list each step of the job in order of occurrence as you watch the employee performing the job.

Be sure to record enough information to describe each job action, but do not make the breakdown too detailed. Later, go over the job steps with the employee.

Figure 1 shows a worker performing the basic job steps for grinding iron castings.

Figure 1. Grinding Castings: Job Steps

1.Reach into metal box to right of machine, grasp casting, and carry to wheel.

2. Push casting against wheel to grind off burr.

3.Place finished casting in box to left of machine.

| Identify Hazards | 8 |
|---|---|

After you have recorded the job steps, next examine each step to determine the hazards that exist or that might occur. Ask yourself these kinds of questions.

- Are there hazards that would require the use of personal protective clothing and equipment that are appropriate for the job?
- Are work positions, machinery, pits or holes, and hazardous operations adequately guarded?
- Are lockout procedures used for machinery deactivation as required?

- Is the worker wearing clothing or jewelry, or have long hair that could get caught in the machinery or otherwise cause a hazard?
- Are there fixed objects that may cause injury, such as sharp edges?
- Is the flow of work organized (e.g., Is the worker required to make movements that are too rapid)?
- Can the worker get caught in or between moving parts?
- Can the worker be injured by reaching over moving machinery parts or materials?
- Is the worker at any time in an off-balance position?
- Is the worker positioned to the machine in a way that is potentially dangerous?
- Is the worker required to make movements that could lead to or cause hand or foot injuries, or strain from lifting the hazards of repetitive motions?
- Can the worker be struck by an object or lean against or strike a machine part of object?
- Can the worker fall from one level to another?
- Can the worker be injured from lifting or pulling objects, or from carrying heavy objects?
- Do environmental hazards (dust, chemicals, radiation, welding rays, heat, or excessive noise) result from the performance of the job?

| Identify Hazards | 9 |
|---|---|

Repeat the job observation as often as necessary until all hazards have been identified. Figure 2 shows basic job steps for grinding iron castings and any existing or potential hazards.

Figure 2. Grinding Castings: Hazards

| | | |
|---|---|---|
| 1.Strike hand on edge. of metal box or casting; cut hand on burr. Drop casting on toes. Not enough of wheel guarded. No dust removal system. Sleeves could get caught in machinery. | 2. Strike hand against wheel. Flying sparks, dust, or chips. Wheel breakage. | 3. Strike hand against metal box or castings. |

| Recommending Safe Procedures and Protection | 10 |
|---|---|

After you have listed each hazard or potential hazard and have reviewed them with the employee performing the job, determine whether the job could be performed in another way to eliminate the hazards, such as combining steps or changing the sequence, or whether safety equipment and precautions are needed to control the hazards. An alternative or additional procedure is to videotape the worker performing his or her job and analyze the job procedures.

If safer and better job steps can be used, list each new step, such as describing a new method for disposing of material. List exactly what the worker needs to know to perform the job using a new method. Do not make general statements about the procedure, such as "Be Careful." Be as specific as you can in your recommendations.

You may wish to set up a training program using the job safety analysis to retrain your employees in the new procedures, especially if they are working with highly toxic substances or in hazardous situations. (Some OSHA standards require that formal training programs be established for employees.)

If no new procedure can be developed, determine whether any physical changes such as redesigning equipment, changing tools, adding machine guards, personal protective equipment, or ventilation will eliminate or reduce the danger.

If hazards are still present, try to reduce the necessity for performing the job or the frequency of performing it.

Go over the recommendations with all employees performing the job. Their ideas about the hazards and proposed recommendations may be valuable. Be sure that they understand what they are required to do and the reasons for the changes in the job procedures.

| Recommending Safe Procedures and Protection | 11 |
|---|---|

Figure 3 identifies the basic job steps for grinding iron castings and recommendations for new steps and protective measures.

Figure 3. Grinding Castings: New Procedure or Protection

| | | | | | |
|---|---|---|---|---|---|
| 1. | Provide gloves and foot protection. local exhaust system. Provide safety goggles. Instruct worker to wear short or tight-fitting sleeves. | 2. | Provide larger guard over wheel. Install completed | 3. | Provide for removal of stock. |

| Revising the Job Safety Analysis | 12 |
|---|---|

A job safety analysis can do much toward reducing accidents and injuries in the workplace, but it is only effective if it is reviewed and updated periodically. Even if no changes have been made in a job, hazards that were missed in an earlier analysis could be detected.

If an illness or injury occurs on a specific job, the job safety analysis should be reviewed immediately to determine whether changes are needed in the job procedure. In addition, if a close call or near miss has resulted from an employee's failure to follow job procedures, this should be discussed with all employees performing the job.

Any time a job hazard analysis is revised, training in the new job methods, procedures, or protective measures should be provided to all employees affected by the changes. A job safety analysis also can be used to train effectively new employees on the steps and job hazards.

| Job Title: | Page: ____ of | JSA No. | Date: | ____New<br>____Revised |
|---|---|---|---|---|
| Equipment: | Supervisor: | | Analysis by: | |
| Department: | Approved by: | | | |
| Required Personal Protective Equipment (PPE): | | | | |

| JOB STEPS | POTENTIAL HAZARDS | RECOMMENDED SAFE JOB PROCEDURES |
|---|---|---|
| Break down the job into its basic steps, e.g., what is done first, what is done next, and so on. You can do this by:<br><br>1. Observing the job<br>2. Discussing it with the operator<br>3. Drawing on your knowledge of job<br>4. A combination of the three<br><br>Record the steps in their normal order of occurrence. Describe what is done, not the details of how it is done. Usually three or four words are sufficient to describe each basic job step.<br><br>For example, the first basic job step in using a pressurized water fire extinguisher would be:<br>1. Remove the extinguisher from the wall bracket. | For each step, ask yourself what accidents could happen to the employee doing the job. You can get the answers by:<br><br>1. observing the job.<br>2. discussing it with the operator<br>3. recalling past accidents<br>4. a combination of the three<br><br>Ask yourself; can he/she be struck by or contacted by anything; could they strike against or come in contact with anything; could the employee be caught in, on, or between anything; can they fall; be over exerted; or be exposed to anything injurious such as gas, radiation, welding rays, etc.? | For each potential accident or hazard, ask yourself what safeguards should be provided for the employee and how should the employee do the job step to avoid the potential accident, or what should they do or not do to avoid the accident. You can get your answers by:<br><br>1. observing the job for leads<br>2. discussing precautions with experienced job operators<br>3. drawing on your experience<br>4. a combination of the three<br><br>Be sure to describe specifically the provided safeguards and precautions an employee must use. Don=t leave out important details. Number each separate recommended precaution with the same number you gave the potential accident (see center column) that the precaution seeks to avoid. Use simple do or don=t statements to explain |

| | | |
|---|---|---|
| | For example, acid burns, fumes. | recommended precautions as if you were talking to the employee.<br><br>For example: Lift with your legs, not your back.<br>Avoid generalities such as, Be careful, Be alert, Take caution, etc. |
| Trainee's Name: | | Training Date: |
| Trainer's Name: | | Trainer's Signature: |
| Four-Step Instruction Completed? | Prepare the Worker . . . . . Trainer's Initials<br>Present the Operation . . . . . Trainer's Initials | |
| Try Out Performance . . . . . | Trainer's Initials | |
| Follow Up . . . . . | Trainer's Initials | |
| Comments: | | |

## GROUP EXERCISE

### JOB SCENARIO

**Work in groups using the following information to create a JSA.**

**When the class has finished, we will discuss the project.**

- CINCINNATI HYDRAULIC PRESS BRAKE IN THE METAL FORMING DEPARTMENT
- THE JOB HAS JUST BEEN SET UP, THESE ARE THE FIRST PIECES OF A 1,200 PIECE PRODUCTION RUN
- ONE WORKER IS REQUIRED TO DO THIS JOB
- THE PRESS BRAKE IS ACTUATED AND SAFEGUARDED BY 2-HAND CONTROLS SECURED TO FRONT OF PRESS BRAKE ABOUT 48 INCHES FROM THE FLOOR.
- ONE PALLET OF BLANKS IS DELIVERED BY HILO, SET ON WORKBENCH ABOUT 40 INCHES HIGH 4 STACKS, 250 BLANKS PER STACK ARE SECURED BY BANDING TO THE PALLET
- THE BLANKS ARE 6 INCH x 12 INCH METAL AND WEIGHT ABOUT 2 POUNDS
- THE OPERATION CONSISTS OF MAKING ONE 90 DEGREE BEND LENGTHWISE IN THE BLANK
- THE DIE FIXTURE HOLDS THE PART SECURELY IN DIE
- FINISHED PARTS ARE STACKED IN A PARTS BIN SET ON THE FLOOR

## JOB SAFETY ANALYSIS

| | | | | |
|---|---|---|---|---|
| **Job Title:** | **Page: 1 of 2** | **JSA No. ____** | **Date:** | **____New**<br>**____Revised** |
| **Equipment:** | **Supervisor:** | | **Analysis by:** | |
| **Department:** | | | **Reviewed by:** | |
| **Required Personal Protective Equipment (PPE):** | | | | |

| JOB STEPS | POTENTIAL HAZARDS | RECOMMENDED SAFE JOB PROCEDURES |
|---|---|---|

| | | |
|---|---|---|
| | | |

## JOB SAFETY ANALYSIS

| Job Title: | Page: 2 of 2 | JSA No. | Date: | __New<br>__Revised |
|---|---|---|---|---|
| Equipment: | Supervisor: | | Analysis by: | |
| Department: | Approved by: | | | |
| Required Personal Protective Equipment (PPE) | | | | |
| JOB STEPS | POTENTIAL HAZARDS | | RECOMMENDED<br>SAFE JOB PROCEDURES | |
| | | | | |
| Trainee's Name: | | | Training Date: | |

| Trainer's Name: | Trainer's Signature: |
|---|---|
| **Four-Step Instruction Completed?** | **Prepare the Worker . . . . . .Trainer's Initials**<br>**Present the Operation . . . . . .Trainer's Initials**<br>**Try Out Performance . . . . . .Trainer's Initials**<br>**Follow Up . . . . . .Trainer's Initials** |
| **Comments:** | |

## SAMPLE JOB SAFETY ANALYSIS

| Job Title: MACHINE OPERATOR | Page: 1 of 2 | JSA No. 103 | Date:<br>7-7-00 | _x_ New<br>___ Revised |
|---|---|---|---|---|
| Equipment: CINCINNATI PRESS BRAKE | Supervisor: James Smith | | Analysis by: James Smith and Louis Andres, Operator | |
| Department: METAL FORMING | Approved by: Rhonda Ames | | | |
| Required Personal Protective Equipment (PPE): Heavy gloves, Kevlar sleeves, safety glasses w/side shields, heavy work boot (steel toe optional). | | | | |

| JOB STEPS | POTENTIAL HAZARDS | RECOMMENDED SAFE JOB PROCEDURES |
|---|---|---|
| 1. Turn on press brake | Parts: tools, debris, electric shock<br>Inside/outside press brake, floor area<br>Flying pieces/slip, trip, fall | Good housekeeping; check area is clear of tools, parts, debris.<br>Check flex cords for damage and exposed wiring. Wear PPE. |

| | | |
|---|---|---|
| 2. Test 2-hand controls | Point of operation<br>Crush or amputate<br>Finger, hand | Check operating selector - single stroke. Test controls-concurrent, anti-tie-down, anti-repeat, no bridging, protected from accidental activation. Test stop control. |
| 3. Receive parts | Moving Hilo and stationary parts<br>Struck by or crushed between Hilo and<br>Press brake or table | Move out of way while Hilo is delivering parts so body is not in pinch point. |
| 4. Cut banding | Sharp edges and release of coiled energy<br>Lacerations<br>Hands, arms, face, eyes | Use proper cutting tool. |
| 5. Discard banding | Sharp edges and long, loose banding<br>Lacerations/trip, fall<br>Hands, arms, face, eyes | Wind up banding and deposit into-drum. Observe for tripping on loose bands. |
| 6. Remove blank from stack | Sharp edges<br>Lacerations, cuts<br>Hands, fingers | Grasp along edges. Pull blank toward you. |

| Job Title: MACHINE OPERATOR | Page: 2 of 2 | JSA No. 103 | Date: 7-7-00 | _X_ New<br>___ Revised |
|---|---|---|---|---|
| Equipment: CINCINNATI PRESS BRAKE | Supervisor: James Smith | | Analysis by: James Smith | |
| Department: METAL FORMING | | | Reviewed by: Jane Martin | |
| Required Personal Protective Equipment (PPE): Heavy gloves, Kevlar sleeves, safety glasses w/side shields, heavy work boot (steel toe optional, face shield (steps 4 and 5). | | | | |

| JOB STEPS | POTENTIAL HAZARDS | RECOMMENDED SAFE JOB PROCEDURES |
|---|---|---|
| 7. Put blank in fixture | Same as #6<br>Part can fall from fixture | Locate securely in fixture |
| 8. Actuate press brake | Point of operation, struck by metal debris<br>Amputation, lacerations<br>Fingers, hands, eyes | Use 2-hand control safeguards to actuate |
| 9. Remove formed part | Same as #6 | Same as #6 |
| 10. Place part in bin on floor | Bending to floor level, handling metal parts<br>Strain, sprain, cuts, lacerations<br>Back, shoulder, fingers, hands | Use safe lifting techniques. (See Comments)<br>(Short-term solution until work station is adapted according to good ergonomic guidelines) |
| Trainee's Name: | | Training Date: |
| Trainer's Name: | | Trainer=s Signature: |

| |
|---|
| Four-Step Instruction Completed? Prepare the Worker. . . . . Trainer's Initials<br>Present the Operation . . . . . Trainer's Initials<br>Try Out Performance. . . . . Trainer's Initials<br>Follow Up . . . . . . Trainer's Initials |
| Comments: Refer to Safe Back Training module. |

## GRINDING CASTINGS

| STEP | HAZARD | CAUSE | PREVENTIVE MEASURE |
|---|---|---|---|
| 1. Reach into right box and select casting | Strike hand on wheel | Box is located beneath wheel | Relocate and select casting side of wheel |
| Tear hand on corner of casters | Corners of casters are sharp | Require wearing of leather gloves | |
| 2. Grasp casting, lift and position | Strain shoulder/elbow by lifting with elbow extended | Box too low | Place box on pallet |
| Drop casting on toe during positioning | Slips from hand | Require wearing of safety shoes | |
| 3. Push casting against wheel and grind burr | Strike hand against wheel | Wheel guard is too small | Provide larger guard with tongue guard and work rest |
| Wheel explodes | Incorrect wheel installed | Check rpm rating of wheel | |
| Cracked wheel | Inspect wheel for cracks | | |
| Flying sparks/chips with caster | Wheel friction | Require wearing of eye goggles | |

| | | | |
|---|---|---|---|
| Respirable dust metal and wheel material | Dust from caster | exhaust system | Provide local |
| Sleeves caught in machinery | Loose sleeves | Require tight or short sleeves | |
| 4. Place finished casting into box | Strike hand on castings | Buildup of completed stock | Remove completed stock routinely |

## SAMPLE JOB SAFETY ANALYSIS

| | | | |
|---|---|---|---|
| JOB TITLE (AND NUMER IF APPLICABLE):<br>STOCK LOADING PAGE 1 JSA NO. 103 | | DATE:<br>1-1-95 | ___ NEW<br>___ REVISED |
| TITLE OF PERSON WHO DOES JOB:<br>LOADER | | SUPERVISOR:<br>JAMES SMITH | ANALYSIS BY:<br>JAMES SMITH |
| COMPANY/ORGANIZATION:<br>METAL FABRICATING CORP. | PLANT/LOCATION:<br>CHICAGO | DEPARTMENT:<br>PACKAGING | REVIEWED BY:<br>JOHN MARTIN |
| REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:<br>GLOVES, SAFETY SHOES, SAFETY GLASSES, HARD HATS | | | APPROVED BY:<br>JOE BOTTAN |
| SEQUENCE OF BASIC JOB STEPS | POTENTIAL HAZARDS | RECOMMENDED ACTION OR PROCEDURE | |
| 1. REMOVE BOX FROM CONVEYOR AND PLACE ON TRUCK. | 1a. HEAVY BOXES & IMPROPER HAND PLACEMEN OR HANDLING METHOD.<br>(MASHED FINGERS, HIT ELBOWS, STRAINS). | 1a. USE PALMAR GRIP, GRASP BOTTOM<br>WITH ONE HAND ON BOTTOM FRONT CORNER AND OTHER HAND ON TOP OPPOSITE CORNER OF OTHER END.<br>KEEP ONE ELBOW INTO SIDE.<br>TURN BODY INSTEAD OF TWISTING. | |
| | 1b. SPLINTERS (PUNCTURES). | 1b. WEAR GLOVES. | |
| | 1c. HEAVY BOXES, POOR GRIP, & IMPROPER SHOES<br>(FOOT INJURIES). | 1c. WEAR HARD TOE SHOES. | |
| | 1d. UNGUARDED V-BELT | 1d. GUARD V-BELT WITH ENCLOSURE | |

| | | |
|---|---|---|
| | (HAND INJURIES). | AND KEEP IN PLACE. |
| | 1e. TRUCK PARKED TOO CLOSE OR TOO FAR FROM WORK AREA.(STRAINS, BOXES CROPPED ON FEET, (SLIPS/TRIPS/FALLS). | 1e. PARK TRUCK AT A DISTANCE AWAY FROM THE BODY SO THAT YOU ARE NOT REQUIRED TO TWIST THE BODY AND SO THAT YOU HAVE ENOUGH WORKING ROOM TO AVOID BUMPING INTO THE CONVEYOR OR TRUCK. |

* NATIONAL SAFETY COUNCIL

SAMPLE JOB SAFETY ANALYSIS

**JOB SAFETY ANALYSIS SAMPLE**

| | | | |
|---|---|---|---|
| JOB TITLE (and number if applicable):<br>STOCK LOADING PAGE 2 OF 4 JSA NO. 103 | | DATE:<br>1-1-95 | X NEW<br>___ REVISED |
| TITLE OF PERSON WHO DOES JOB:<br>LOADER | | SUPERVISOR:<br>JAMES SMITH | ANALYSIS BY:<br>JAMES SMITH |
| COMPANY/ORGANIZATION:<br>METAL FABRICATING CORP. | PLANT/LOCATION:<br>CHICAGO | DEPARTMENT:<br>PACKAGING | REVIEWED BY:<br>JOHN MARTIN |
| REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:<br>GLOVES, SAFETY SHOES, SAFETY GLASSES, HARD HATS | | | APPROVED BY:<br>JOE BATTON |

| SEQUENCE OF BASIC JOB STEPS | POTENTIAL HAZARDS | RECOMMENDED ACTION OR PROCEDURE |
|---|---|---|
| CONT=D FROM PAGE 1. | 1f. OBJECTS ON FLOOR.<br>(SLIPS/TRIPS/FALLS). | 1f. OBSERVE AREA FOR SLIPPING AND TRIPPING HAZARDS. |
| 2. PUSH LOADED TRUCK. | 2a. OVERLOADED TRUCK & WORN CASTERS<br>(STRAINS WHILE (PUSHING). | 2a. IF TRUCK WILL NOT MOVE BY USING BODY WEIGHT AGAINST IT, GET POWERED EQUIPMENT,<br>REMOVE PART OF LOAD, OR<br>SECURE ASSISTANCE. |
| | 2b. HANDS ON SIDE OF TRUCK. | 2b. KEEP HANDS ON END OF TRUCK. |
| | 2c. PULLING TRUCK (RUN<br>OVER FOOT). | 2c. PUSH, NEVER PULL. |
| | 2d. BOXES STACKED TOO HIGH & UNBALANCED.<br>(FOOT INJURIES). | 2d. STACK BOXES ORDERLY & NO HIGHER THAN NORMAL EYE LEVEL. |
| | 2e. OBJECTS ON FLOOR.<br>(SLIPS/TRIPS/FALLS). | 2e. OBSERVE FOR SLIPPING/ TRIPPING HAZARD WHEN TRAVELING. |

## What is a Job Safety Analysis?

A job safety analysis (JSA) is a procedure which helps integrate accepted safety and health principles and practices into a particular task or job operation. In a JSA, each basic step of the job is to identify potential hazards and to recommend the safest way to do the job. Other terms used to describe this procedure are job hazard analysis (JHA) and job hazard breakdown.

Some individuals prefer to expand the analysis into all aspects of the job, not just safety. This approach is known as total job analysis. Methodology is based on the idea that safety is an integral part of every job and not a separate entity. In this document, only health and safety aspects will be considered.

The terms "job" and "task" are commonly used interchangeably to mean a specific work assignment, such as "operating a grinder," "using a pressurized water extinguisher," or "changing a flat tire." JSAs are not suitable for jobs defined too broadly, for example, "overhauling an engine"; or too narrowly, for example, "positioning car jack."

# WHAT ARE THE BENEFITS OF DOING A JOB SAFETY ANALYSIS?

One of the methods used in this example is to observe a worker actually perform the job. The major advantages of this method include that it does not rely on individual memory and that the process prompts recognition of hazards. For infrequently performed or new jobs, observation may not be practical.

One approach is to have a group of experienced workers and supervisors complete the analysis through discussion. An advantage of this method is that more people are involved in a wider base of experience and promoting a more ready acceptance of the resulting work procedure. Members of the joint occupational safety and health committee must participate in this process.

Initial benefits from developing a JSA will become clear in the preparation stage. The analysis process may identify previously undetected hazards and increase the job knowledge of those participating. Safety and health awareness is raised, communication between workers and supervisors is improved, and acceptance of safe work procedures is promoted.

A JSA, or better still, a written work procedure based on it, can form the basis for regular contact between supervisors and workers. It can serve as a teaching aid for initial job training and as a briefing guide for infrequent jobs. It may be used as a standard for health and safety inspections or observations. In particular, a JSA will assist in completing comprehensive accident investigations.

## What are the four basic steps?

Four basic stages in conducting a JSA are:

- selecting the job to be analyzed
- breaking the job down into a sequence of steps
- identifying potential hazards
- determining preventive measures to overcome these hazards

## What is important to know when "selecting the job"?

Ideally, all jobs should be subjected to a JSA. In some cases, there are practical constraints posed by the amount of time and effort required to do a JSA. Another consideration is that each JSA will require revision whenever equipment, raw materials, processes, or the environment change. For these reasons, it is usually necessary to identify which jobs are to be analyzed. Even if analysis of all jobs is planned, this step ensures that the most critical jobs are examined first.

Factors to be considered in setting a priority for analysis of jobs include:

- Accident frequency and severity: jobs where accidents occur frequently or where they occur infrequently but result in disabling injuries.
- Potential for severe injuries or illnesses: the consequences of an accident, hazardous condition, or exposure to harmful substance are potentially severe.
- Newly established jobs: due to lack of experience in these jobs, hazards may not be evident or anticipated.
- Modified jobs: new hazards may be associated with changes in job procedures.
- Infrequently performed jobs: workers may be at greater risk when undertaking non-routine jobs, and a JSA provides a means of reviewing hazards.

## How do I break the job into "basic steps"?

After a job has been chosen for analysis, the next stage is to break the job into steps. A job step is defined as a segment of the operation necessary to advance the work. See examples below.

Care must be taken not to make the steps too general. Missing specific steps and their associated hazards will not help. On the other hand, if they are too detailed, there will be too many steps. A rule of thumb is that most jobs can be described in less than ten steps. If more steps are required, you might want to divide the job into two segments, each with its separate JSA, or combine steps where appropriate. As an example, the job of changing a flat tire will be used in this document.

An important point to remember is to keep the steps in their correct sequence. Any step which is out of order may miss serious potential hazards or introduce hazards which do not actually exist.

Each step is recorded in sequence. Make notes about what is done rather than how it is done. Each item is started with an action verb. Appendix A illustrates a format which can be used as a worksheet in preparing a JSA. Job steps are recorded in the left hand column, as shown below:

| Sequence of Events | Potential Accidents or Hazards | Preventive Measures |
|---|---|---|
| Park vehicle | | |
| Remove spare and tool kit | | |

| | | |
|---|---|---|
| Pry off hub cap and loosen lug bolts (nuts) | | |
| And so on..... | | |

This part of the analysis is usually prepared by knowing or watching a worker do the job. The observer is normally the immediate supervisor. For a more thorough analysis often happens by having another person, preferably a member of the joint occupational health and safety committee, participate in the observation. Key points are less likely to be missed in this way.

The job observer should have experienced and be capable in all parts of the job. To strengthen full co-operation and participation, the reason for the exercise must be clearly explained. The JSA is neither a time and motion study in disguise, nor an attempt to uncover individual unsafe acts. The job, not the individual, is being studied in an effort to make it safer by identifying hazards and making modifications to eliminate or reduce them. The worker's experience contributes in making job and safety improvements.

The job should be observed during normal times and situations. For example, if a job is routinely done only at night, the JSA review should also be done at night. Similarly, only regular tools and equipment should be used. The only difference from normal operations is the fact that the worker is being observed.

When completed, the breakdown of steps should be discussed by all the participants (always including the worker) to make that all basic steps have been noted and are in the correct order.

## How do I "identify potential hazards"?

Once the basic steps have been recorded, potential hazards must be identified at each step. Based on observations of the job, knowledge of accident and injury causes, and personal experience, list the things that could go wrong at each step.

A second observation of the job being performed may be needed. Since the basic steps have already been recorded, more attention can now be focused on each potential hazards. At this stage, no attempt is made to solve any problems which may have been detected.

To help identify potential hazards, the job analyst may use questions such as these ( this is not a complete list):

- Can any body part get caught in or between objects?
- Do tools, machines, or equipment present any hazards?
- Can the worker make harmful contact with moving objects?
- Can the worker slip, trip, or fall?
- Can the worker suffer strain from lifting, pushing, or pulling?
- Is the worker exposed to extreme heat or cold?
- Is excessive noise or vibration a problem?
- Is there a danger from falling objects?
- Is lighting a problem?
- Can weather conditions affect safety?
- Is harmful radiation a possibility?
- Can contact be made with hot, toxic, or caustic substances?
- Are there dusts, fumes, mists, or vapours in the air?

Potential hazards are listed in the middle column of the worksheet, numbered to match the corresponding job step. For example:

| Sequence of Events | Potential Accidents or Hazards | Preventive Measures |
|---|---|---|
| Park vehicle | a) Vehicle too close to passing traffic<br><br>b) Vehicle on uneven, soft ground<br><br>c) Vehicle may roll. | |
| Remove spare and tool kit | a) Strain from lifting spare. | |
| Pry off hub cap and loosen lug bolts (nuts). | a) Hub cap may pop off and hit you<br><br>b) Lug wrench may slip | |
| And so on..... | a) ... | |

Again, all participants should jointly review this part of the analysis.

**How do I "determine preventive measures?"**

The final stage in a JSA is to determine ways to eliminate or control the hazards identified. The generally accepted measures, in order of preference, are:

**1. Eliminate the hazard**

This is the most effective measure. These techniques should be used to eliminate the hazards:

- Choose a different process
- Modify an existing process
- Substitute with less hazardous substance
- Improve environment (ventilation)
- Modify or change equipment or tools

**2. Contain the hazard**

If the hazard cannot be eliminated, contact might be prevented by using enclosures, machine guards, worker booths or similar devices.

**3. Revise work procedures**

Consideration might be given to modifying steps which are hazardous, changing the sequence of steps, or adding additional steps (such as locking out energy sources).

**4. Reduce the exposure**

These measures are the least effective and should only be used if no other solutions are possible. One way of minimizing exposure is to reduce the number of times the hazard is encountered. An example would be modifying machinery so that less maintenance is necessary. The use of appropriate personal protective equipment may be required. To reduce the severity of an accident, emergency facilities, such as eyewash stations, may need to be provided.

In listing the preventive measures, do not use general statements such as "be careful" or "use caution". Specific statements which describe both what action is to be taken and how it is to be performed are preferable. The recommended measures are listed in the right hand column of the worksheet, numbered to match the hazard in question. For example:

| Sequence of Events | Potential Accidents or Hazards | Preventive Measures |
|---|---|---|
| Park vehicle | a) Vehicle too close to passing traffic<br><br>b) Vehicle on uneven, soft ground<br><br>c) Vehicle may roll. | a) Drive to area well clear of traffic. Turn on emergency flashers<br><br>b)Choose a firm, level parking area<br><br>c) Apply the parking brake; leave transmission in PARK; place blocks in front and back of the wheel diagonally opposite to the flat |
| Remove spare and tool kit | a) Strain from lifting spare. | a) Turn spare into upright position in the wheel well. Using your legs and standing as close as possible, lift spare out of truck and roll to flat tire. |
| Pry off hub cap and loosen lug bolts (nuts). | a) Hub cap may pop off and hit you<br>b) Lug wrench may slip | a) Pry off hub cap using steady pressure<br><br>b) Use proper lug wrench; apply steady pressure slowly. |
| And so on..... | a) ... | a) ... |

**How should I make the information available to everyone else?**

JSA is a useful technique for identifying hazards so that workers can take measures to eliminate or control hazards. Once the analysis is completed, the results must be communicated to all workers who are, or will be, performing that job. The side-by-side format used in JSA worksheets is not an ideal one for instructional purposes. Better results can be achieved by using a narrative-style communication format. For example, the work procedure based on the partial JSA developed as an example in this document might start out like this:

**1. Park vehicle.**

a) Drive vehicle off the road to an area well clear of traffic, even if it requires rolling on a flat tire. Turn on the emergency flashers to alert passing drivers so that they will not hit you.

b) Choose a firm and level area for parking. You can jack up the vehicle to prevent rolling.

c) Apply the parking brake, leave the transmission in PARK, place blocks in front and back of the wheel diagonally opposite the flat. These actions will also help prevent the vehicle from rolling.

**2. Remove spare and tool kit.**

a) To avoid back strain, turn the spare up into an upright position in its well. Stand as close to the trunk as possible and slide the spare close to your body. Lift out and roll to flat tire.

**3. Pry off hub cap, loosen lug bolts (nuts).**

a) Pry off hub cap slowly with steady pressure to prevent it from popping off and striking you.

b) Using the proper lug wrench, apply steady pressure slowly to loosen the lug bolts (nuts) so that the wrench will not slip, get lost or and hurt your knuckles.

**4. And so on.**

**Appendix A: Sample form for Job Safety Analysis Worksheet**

| **Job Safety Analysis Worksheet** | | |
|---|---|---|
| **Job:** | | |
| Analysis By: | Reviewed By: | Approved By: |
| Date: | Date: | Date: |
| **Sequence of Steps** | **Potential Accidents or Hazards** | **Preventative Measures** |
| | | |

**Appendix B: Sample forms for Tasks and Job Inventory**

| Tasks with Potential Exposure to Hazardous Materials or Physical Agents | | |
|---|---|---|
| Analysis By: | Reviewed By: | Approved By: |
| Date: | Date: | Date: |
| **Tasks** | **Name of Material or Physical Agent** | **Location** |
| | | |

| Job Inventory of Hazardous Chemicals | | |
|---|---|---|
| Analysis By: | Reviewed By: | Approved By: |
| Date: | Date: | Date: |
| **Name of Chemical** | **Route of Entry and Physical State** | **Controls** |
| | | |