# Job Safety/Hazard Analysis Booklet

**Washington**

*TRU Solutions LLC*

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## OBJECTIVE

Given an operation, the student will be able to identify and explain the elements of a Job Safety Analysis for a mine operation according to the text materials and exercises.

## INTRODUCTION TO JOB SAFETY ANALYSIS

Fatalities, accidents, and injuries can be reduced if we all work together and share our safety knowledge. An accident prevention method, that has proven effective, is a Job Safety/Hazard Analysis (JSA or JHA) program.

Job Safety Analysis is a basic approach to developing improved accident prevention procedures by documenting the firsthand experience of workers and supervisors, and at the same time instilling acceptance through worker participation. Worker participation is important to efficient, safe, and increased productivity. Through the process of Job Safety
Analysis, these benefits are fully realized.

Job Safety Analysis can be a central element in a safety program, and the most effective safety programs are those that involve all employees. Each worker, supervisor, and manager should be prepared to assist in the recognition, evaluation, and control of hazards.

Job Safety Analysis, commonly known as JSA, is a process used to determine hazards of and safe procedures for each step of a job. A specific job or work assignment can be separated into a series of relatively simple steps; the hazards associated with each step can be identified; and solutions can be developed to control each hazard.

## FOUR BASIC STEPS OF JOB SAFETY ANALYSIS

Job Safety Analysis involves four basic steps:

1. Select a Job to be analyzed
2. Separate the Job into its Basic Steps
3. Identify the Hazards Associated with Each Step
4. Control Each Hazard

## SELECTING A JOB TO BE ANALYZED

The first step of a Job Safety Analysis is to **Select A Job To Be Analyzed**. The sequence in which jobs are analyzed should be established when starting a Job Safety Analysis program. Potential jobs for analysis should have sequential steps with a work goal when these steps have been performed.

To use the Job Safety Analysis program effectively, a method must be established to select and prioritize the jobs to be analyzed. The jobs must be ranked in the order of greatest accident potential. The jobs with the highest risks should be analyzed first. You mayor may not be involved with the ranking process. But if you are asked to rank or prioritize jobs to be analyzed, the following criteria should be used:

## PRIORITIZING JOBS TO BE ANALYZED

- **Accident Frequency**. A job that has repeatedly produced accidents is a candidate for an immediate JSA. The greater the

number of accidents associated with the job, the greater its priority should be. These jobs should be analyzed as soon as possible.

- **Accident Severity**. Every job that has produced an injury that resulted in lost time or required medical treatment should be analyzed. The injuries prove that the preventive action taken before their occurrence was not successful.

- **Accident Potential**. Many jobs qualify for immediate Job Safety Analysis because of the potential hazards involved. An example is one involving the lifting of heavy equipment.

- **New Jobs, Non-routine Jobs, or Job Changes**. These are also prime candidates for JSA's. Because these jobs are not done often or possibly have never been done at a particular mine site, the hazards of the job might not be fully known. By applying the JSA process to these jobs, the likelihood of an accident occurring is reduced.

- **Routine Jobs**. In routine or repetitive jobs with inherent hazards, the employee is exposed repeatedly to these hazards. For example, exposure to high levels of noise over a period of time will affect the hearing of a worker.

Accident statistics, the ability to recognize hazards, and good common sense coupled with the guidelines we have discussed will help you to prioritize which JSA's should be developed first, with the goal that all jobs with sequential steps will ultimately be analyzed. New jobs will be analyzed as they are introduced into the work place.

## THE JOB SAFETY ANALYSIS WORKSHEET

After a job has been selected and the Job Safety Analysis has been initiated, a worksheet is prepared listing the basic job steps, the corresponding hazards, and the safe procedures for each step. The basic form generally has three columns.

### Job Safety Analysis Worksheet

Title of Job/Operation _____Date _____No._____

Position Title(s) of Person(s) Who Does Job _____

_____

Name of Employee Observed _____

Analysis Made By _____ Department _____

Section _____ Analysis Approved By _____

| Sequence of Basic Job Steps | Potential Accidents or Hazards | Recommended Safe Job Procedures |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

1. Struck By (SB)
2. Struck Against (SA)
3. Contacted By (CB)
4. Contact With (CW)
5. Caught On (CO)
6. Caught In (CI)
7. Caught Between (CBT)
8. Fall to Same Level (FS)
9. Fall to Below (FB)
10. Overexertion (OE)
11. Exposure (E)

## SEPARATING THE JOB INTO ITS BASIC STEPS

In the **left column**, the **Sequence of Basic Job Steps** is listed in the order in which they occur.

The **middle column** describes all **Potential Hazards**

In the **right column** are listed the **Recommended Safe Job Procedures** that should be followed to guard against these hazards to prevent potential accidents.

In the JSA process it is easiest to deal with each column of the form separately. Logically, we should break the job down into its basic steps first.

Each step or activity should briefly describe what is done. Each activity should be listed on the form in the order it is performed.

Avoid the common errors of making the breakdown so detailed that an unnecessarily large number of steps result, or making the job breakdown so general that basic steps are omitted. If many steps result from the analysis (over 15), you should consider breaking that job into more than one JSA.

At this point in the analysis you need to do two things: first, observe the job actually being performed--if possible by more than one person--and second, involve at least one employee who does the job regularly in the analysis. The employee(s) you select to assist in the analysis should be briefed on the purpose of JSAs and the mechanics of how a JSA is developed. There are several ways to get the JSA process started with an employee. You should have him or her review a list of basic job steps you have developed from observations, or have the employee tell you what the job steps are. The important thing is that you and the employee mutually agree that the JSA accurately reflects the steps involved with the job.

Let's look at the basic operation of a front-end loader.

## SEQUENCE OF BASIC JOB STEPS NUMBER 1, THE WALK-AROUND INSPECTION

The first step might be to do a **Walk-Around Inspection** of the loader.

When outlining the job steps, it will be tempting to get very detailed and list how to do the job rather than the basic job steps. An example of this would be to list each part of a machine that the worker will check (visual examination of tires, light lens glass, guards, hoses, etc.) as a job step. If you desire to include this information in a JSA, it is best included in

the third column (Recommended Safe Job Procedures). Another alternative is to add a column to the form for this purpose.

## SEQUENCE OF BASIC JOB STEPS NUMBER 2, CHECK FLUID LEVELS

The next step in the basic operation of a front-end loader might be to check the fluid levels.

The list of job steps in the **Sequence of Basic Job Steps** column of the JSA form will continue to be broken down into manageable steps. Again, the general rule of thumb is to try to keep the JSA between 10 and 15 basic steps. If you have more than 15 steps, you may be trying to include too much information in a single JSA.

It is important that the JSA accurately describe the work.

There may be some disagreement about basic job steps. Some of you may think checking fluid levels are part of the walk-around inspection and on some machines you may be right. However, on the loader, checking fluid levels presents an entirely new set of hazards that may be overlooked if grouped with the general walk-around inspection. Such hazards are working from an elevated position and coming into contact with hot fluids or surfaces. Keep in mind that a JSA that is too broad is also a poor JSA.

Make a List of the Basic Job Steps in the Operation of the Front-end Loader

_____
_____
_____
_____
_____
_____

## IDENTIFYING THE HAZARDS ASSOCIATED IDENTIFY HAZARDS ASSOCIATED WITH EACH JOB STEP

After all basic steps of operating the front-end loader have been listed, **next we need to examine each job step to IDENTIFY HAZARDS ASSOCIATED WITH EACH JOB STEP.** The purpose is to identify and list the hazards that <u>are possible</u> in each job step. Some hazards are more likely to occur than others are, and some are more likely to produce serious injuries than others are. Consider all reasonable possibilities when identifying hazards.

To make this task manageable we will work with basic types of accidents. The question we will ask ourselves is, "Could any of these accident types or hazards inflict injury to a worker?" There are eleven **basic types of accidents**:

- Struck By
- Struck Against
- Contacted By
- Contact With
- Caught On
- Caught In
- Caught Between
- Fall To Same Level
- Fall To Below
- Overexertion
- Exposure

We will look at each of these basic accident types in more detail.

## Basic Accident Type 1 Struck Against

Let's look at these first four basic accident types -- struck against, struck by, contact with, and contacted by -- in more detail, with the walk-around inspection of the front-end loader in mind.

Can the worker Strike Against anything while doing the job step? Think of the miner moving and contacting something forcefully and unexpectedly--an object capable of causing injury. Can he or she forcefully contact anything that will cause injury? This forceful contact may be with machinery, timber or bolts, protruding objects, or sharp, jagged edges. Identify not only what the worker can strike against, but also how the contact can come about. This does not mean that every object around the worker must be listed.

## Basic Accident Type 2 Struck By

Can the worker be **Struck By** anything while doing the job? The phrase "struck by" shows that something moved and struck the worker abruptly with force. Study the work environment for what is moving near the worker, what will move, or what will move as a result of what the miner does. Is unexpected movement possible from normally stationary objects? Examples are ladders, tools, containers, supplies, and so on.

List Any Struck Against or Struck By Hazards Associated with the Walk-Around Inspection of the Front-end Loader

_____
_____
_____
_____
_____
_____
_____

## Basic Accident Types 3 and 4 Contacted By and Contacted With

Can the worker be **Contacted By** anything while doing the job step? The "contacted by" accident is one in which the miner could be contacted by some object or agent. This object or agent is capable of injuring by <u>non-forceful</u> contact. Examples of items capable of causing injury are chemicals, hot solutions, fire, electrical flashes, and steam.

Can the worker come in **Contact With** some agent that will injure by <u>non-forceful</u> contact? Any type of work that involves materials or equipment that may be harmful by non-forceful contact is a source of "contact with" accidents. There are two kinds of work situations that account for most of the "contact with" accidents. One situation is working on or near electrically charged equipment, and the other is working with chemicals or handling chemical containers.

The subtle difference between contact with and contacted by injuries is that in the first the agent moves to the victim, while in the second, the victim moves to the agent.

List Any Contacted By or Contact With Hazards Associated with the Walk-Around Inspection of the Front-end Loader

_____
_____
_____
_____
_____
_____

## Basic Accident Types 5, 6 and 7 Caught In, Caught On, and Caught Between

The next three accident types involve "Caught" accidents. Can the person be caught in, caught on, or caught between objects?

A **Caught In** accident is one in which the person, or some part of his or her body, is **caught in** an enclosure or opening of some kind.

Can the worker be **Caught O**n anything while doing the job step? Most **caught on** accidents involve worker's clothing being caught on some projection of a moving object. This moving object pulls the worker into an injury contact. Or, the worker may be caught on a stationary protruding object, causing a fall.

Can the worker be **Caught Between** any objects while doing the job step? **Caught between** accidents involve having a part of the body caught between something moving and something stationary, or between two moving objects. Always look for pinch points.

List Any Caught In, Caught On, or Caught Between Hazards Associated with the Walk-Around Inspection of the - Front-end Loader.

_____
_____
_____
_____
_____
_____
_____

## Basic Accident Types 8 and 9 Fall To Same Level and Fall To Below

Next, let's look at slip, trip, and fall accident types.

Can the worker **Fall** while doing a Job step? Falls are such frequent accidents that we need to look thoroughly for slip, trip and fall hazards. Consider whether the worker can fall from something above ground level, or whether the worker can fall to the same level. Two hazards account for most **Fall To Same Level** accidents: slipping hazards and tripping hazards. The **Fall To Below** accidents occur in situations where employees work above ground or above floor level, and the results are usually more severe.

List Any Slip, Trip or Fall Hazards - Associated with the Walk-Around Inspection of the Front-end Loader

_____
_____
_____
_____
_____
_____
_____

## Basic Accident Types 10 and 11 Overexertion and Exposure

The next two accident types are **Overexertion** and **Exposure**. Can the worker be injured by overexertion; that is, could he or she be injured while lifting, pulling or pushing? Could awkward body positioning while doing a job step cause a sprain or strain? Could the repetitive nature of a task cause injury to the body? An example is excessive flexing of the wrist that can cause carpal tunnel syndrome (which is abnormal pressure on the tendons and nerves in the wrist).

Finally, can exposure to the work environment cause injury to the worker? Environmental conditions such as noise, extreme

temperatures, poor air, toxic gases and chemicals, or harmful fumes from work operations also should be listed as hazards.

List Any Overexertion or Exposure Hazards Associated with the Walk-Around Inspection of the Front-end Loader

_____
_____
_____
_____
_____
_____
_____

## CONSIDERING HUMAN PROBLEMS IN THE JSA PROCESS

While working with the middle column, **Potential Accidents or Hazards**, we will also need to consider the following points related to human problems:

- What effects could there be if equipment is used incorrectly?
- Can the worker take shortcuts to avoid difficult, lengthy, or uncomfortable procedures?

Normally, the job steps for a JSA are listed in a logical sequence. Some workers, however, may wish to change the sequence for one reason or another. For example, one operator may choose to check fluid levels before he or she does a general walk-around. This type of flexibility is good for worker morale and productivity. On the other hand, there are times when the sequence of the job steps or deviations from the job steps are critical to safe performance of the job. An example is that the walk-around inspection must be made and safety deficiencies corrected before the machine is put into service for the day. It would not be safe or proper to do the walk-around inspection after the machine has been put into service.

If the sequence of job steps or the deviations from established job steps are critical to the safe performance of a job, this should be noted in the JSA.

## CONTROLLING EACH HAZARD

The next part of the JSA process is to develop a Recommended Safe Job Procedure to eliminate or reduce the potential accidents or hazards that have been identified. This is the third column of the JSA form.

The following five points should first be considered for each hazard identified for the job step:

### Less Hazardous way to do the Job

- Can a less hazardous way to do the job be found? Can an engineering revision take place to make the job or work area safer? Is there a better way to do the job? This requires determining the work goal and then analyzing various ways to reach the goal to see which way is safest. Are there work-saving tools and equipment available that can make the job safer?

What we want to consider with this group of questions is how can we change the equipment and work area or provide additional tools or equipment to make the job safer. An example of an engineering revision to a machine could be to change the ladders and platforms on it with some type of anti-slip surface. An example of adding a work

saving tool might be to purchase special hand trucks for a shop or an area where 55-gallon drums are now moved by hand.

If a new, less hazardous way to do the job cannot be found, physical conditions should be studied carefully.

## Physical Conditions

- Can the physical conditions that created the hazard be changed? Physical conditions may be tools, materials, and equipment that may not be right for the job. These conditions can be corrected by either engineering revisions, administrative revisions, or a combination of both.

As an example of changing physical conditions, consider this example: We have had several injuries while putting lime into a new hopper in the water treatment plant. Upon investigation, we find that the hopper opening is 5 feet off the floor and the lime is packaged in 100-pound bags. An administrative revision may be to purchase 50 pound bags of lime; and an engineering revision would be to build a platform and steps so the bags would only have to be lifted waist high. Obviously, a combination of both would be the best solution.

## Change Job Procedures

- If hazards cannot be engineered out of the job, can the job procedures be changed? Be careful here because changes in job procedures to help eliminate the hazards must be carefully studied. If the job changes are too difficult, long, or uncomfortable, then the employee will take risks or shortcuts to avoid these procedures. Be careful when changing job procedures to avoid creating additional hazards.

An example of changing job procedures might be to service equipment at the beginning of the shift rather than at the end of the shift. This will allow the engine and other parts of the machine to cool down and thus will eliminate contact with or contacted by hazards.

## Change the Frequency of performing the Job

- Can the need of doing the job or the frequency of performing the job be reduced? Often, maintenance jobs requiring frequent service or repair of equipment are hazardous. To reduce the need of such a repetitive job, ask what can be done to eliminate the cause or condition that makes excessive repair or service necessary.

For example, a guard keeps vibrating loose on a piece of equipment requiring reinstallation. Different types of bolts and nuts or some other type of fasteners may eliminate the problem.

If the sequence of job steps or the deviations from established job steps are critical to the safe performance of a job, this should be noted in the JSA.

## Personal Protective Equipment

Finally can **personal protective equipment** be used? The use of personal protective equipment should always be the last consideration in reducing the hazards of a job. Personal protective equipment usefulness depends entirely on the worker's willingness to use it faithfully. It is always better to control the hazards of a job by administrative or engineering revisions. Personal protective equipment

should only be considered as a temporary solution to protecting a worker from a hazard.

Let's go to the second job step of operating the front-end loader.

One of the recommendations might be to use the three-point method of contact when climbing the ladder.

During the JSA process, safety problems are going to surface. Some of these problems will be easily solved with suggestions you have made to upper management. Administrative revisions are the easiest to make because there is little if any capital outlay. New, better or additional personal protective equipment normally takes minimum expenditures, and might be phased in over time as tools or equipment are replaced. Engineering revisions may take time to design and install. Changes in physical conditions may have to be engineered into the next setup.

## SUMMARY

We have outlined the steps involved in the process of Job Safety Analysis. The main point is that Job Safety Analysis prevents accidents by anticipating and eliminating hazards. Job Safety Analysis is a procedure for determining the sequence of basic job steps; identifying potential accidents or hazards; and developing recommended safe job procedures.

There are many advantages in using Job Safety Analysis. JSA provides training to new employees on safety rules and how the rules are applied to their work. This training is provided before the new employees perform the job task(s). JSA also instructs new employees in safe work procedures.

With JSA, experienced employees can maintain safety awareness behavior and receive clear instructions for job changes or new jobs. Benefits also include updating current safety procedures and instructions for infrequently performed jobs.

It is important to involve the workers in the Job Safety Analysis process. The workers are familiar with the jobs and can combine their experience to develop the JSA. This results in a more thorough analysis of the job. A complete Job Safety Analysis program is a continuing effort to analyze one hazardous job after another until all jobs with sequential steps have a written JSA. Once established, the standard procedures should be followed by all employees.

Job Safety Analysis is an accident prevention technique used in many successful safety programs. The JSA process is not difficult if it is taken with a common sense approach on a step-by-step basis.

JSA's should be reviewed often and updated with input from both supervisors and workers who do the job everyday.

The implementation of the JSA process will mean continuous safety improvement at amine, with the ultimate goal of zero accidents.

Job Safety Analysis takes a little extra effort, but the results are positive and helpful for everybody.

# JOB HAZARD ANALYSIS

| JOB: | DEPARTMENT: | DATE: |
|---|---|---|
| SUPERVISOR: | SAFETY CONCURRENCE: | APPROVED BY: |

REQUIRED AND OR RECOMMENDED
PERSONAL PROTECTIVE EQUIPMENT

| ITEM | SEQUENCE OF BASIC JOB STEPS | POTENTIAL ACCIDENTS/HAZARDS | RECOMMENDED SAFE JOB PROCEDURE |
|---|---|---|---|
| | | | |

| ITEM | SEQUENCE OF BASIC JOB STEPS | POTENTIAL ACCIDENTS/HAZARDS | RECOMMENDED SAFE JOB PROCEDURE |
|---|---|---|---|
| | | | |