

# JOB SAFETY ANALYSIS IN ENGINEERING INDUSTRY

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**Abstract** -A Job Safety Analysis is a procedure which helps integrate accepted safety and health principles and practices into a particular task or job operation. In JSA, each basic step of the job is to identify potential hazards and to recommend the safest way to do the job. This project is done in the Needle Industries India Private Limited, The Nilgiris, Tamilnadu, India. In this project the step by step analysis of a job is done in order to find out the potential hazards related with each step of the job. Based on the hazards suitable control measure are put in place. These control measure either reduce or root out the potential hazards from the job. Thus, increasing the safety of the employees and their trust in the employers. This increases the confidence of the employee in doing the job, which in turn increases the productivity. JSA helps in identifying the unsafe work practices, decreases injury rates, increases quality and increases productivity. For the effectiveness of JSA, the control measures should be implemented and made sure they are followed by everyone.

**Key Words:**JSA, Hazards, Injury rates, Unsafe work practices.

## 1.INTRODUCTION

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.

JSA is helpful for following,

- Unsafe work practices identification
- Decrease injury rates.
- Better quality
- Productivity increase.

Four steps in conducting JSA,

- Select the job
- Break the job into a sequence of steps.
- Potential hazard identification.
- Preventive measure for the hazards.

Factors consideration for priority for analysis of jobs,

- Accident frequency and severity
- Potential for severe injuries or illnesses.
- Jobs newly inducted.
- Jobs that are modified.
- Frequently performed jobs.

Potential hazards identification,

- 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 products?
- Are there dusts, fumes, mists, or vapours in the air?

## 2.LITERATURE SURVEY

### SAFETY ANALYSIS: PRINCIPLES AND PRACTICE IN OCCUPATIONAL SAFETY

Over a number of years great interest has been shown in the prevention of accidents that may have major consequences. This applies above all to technologically advanced installations in the chemical processing and nuclear industries. A great deal of effort has been put in and much research and practical work on development has been devoted to how major accidents can be prevented. Safety analysis has become a methodology that is applied to a growing extent, often providing the basis for safety activities at plant.

### THE MARGINAL VALUE OF JOB SAFETY: A CONTINGENT VALUATION STUDY

This article estimates the marginal value of safety based on contingent values obtained in a labor-market-oriented national random-sample mail survey. Thus, worker preferences for safety are assessed directly, in contrast to the hedonic price method that has been used almost exclusively in related studies. Key aspects of this article are that (1) contingent values are obtained for small changes in risks of job-related fatal accidents perceived by respondents, and relationships are analyzed between respondents' marginal safety values and their income, socioeconomic/demographic characteristics, union membership status, and initial levels of risk faced.

### THE APPLICATION AND BENEFITS OF JOB SAFETY ANALYSIS

The aim of the presented study is to investigate the practices and benefits of Job Safety Analysis (JSA) in construction projects. The study was performed by executing interviews at six construction projects; by observations of JSA meetings;

and by a document study of 97 JSA forms. The study demonstrates that too many JSAs are performed for activities in which barriers and procedures should have been established prior to initiating the JSA. Although hazard control can be established on the basis of other methods than JSA, the method has other benefits in terms of safety as well as production. The study identifies six interwoven benefits of the JSA: formalisation of work; retrospective and prospective accountability; worker participation and possibility to influence their own work; organisational learning in communities of practice; improved situational awareness; and loss prevention in dynamic systems. These are benefits both in terms of safe and efficient operations, which underline the link between safety, quality and effectiveness.

## 3.HAND SEWING NEEDLE FACTORY

STRAIGHTENING & CUTTING



POINTING



STAMPING & EYEING



HARDENING & TEMPERING



SCOURING



WASHING & BARRELING



PLATING



WASHING & BARRELING



CASS TEST



INSPECTION

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TRANSFER to PACKING DEPARTMENT

### 3. RESULT AND DISCUSSION

#### STRAIGHTENING AND CUTTING

1.Lifting the steel coil and placing it on the rotating tray.	1.Strain on the lower back. 2.Injury to leg and hand. 3.Slips or falls. 4.Finger injuries. 5.Eye strain. 6.Ear damage (upon long exposure).	1.Maintain correct posture 2.Use gloves 3.Wear safety shoes. 4.Regular break intervals. 5.Ear muff or ear plug. 6.move cautiously around the machine.
2.Pulling the steel coil manually through the machine (OFF state) until the cutter.		
3.(ON state) the cut pieces get collected in the tray attached around the cutter.		
4.The cut pieces are taken by hand and put into another tray for further processing.		

#### HEAT TREATMENT MUFFLE

1.The needles are kept lined in a treatment tray.	1.Finger injuries. 2.Burn injuries. 3.Smoke inhalation (very low amount). 4.Splashing of oil. 5.Minor strain on lower back. 6.Slips, trips and falls. 7.Possible Electric shock injuries. 8.Splashing of hot water.	1.Wear heat resistant gloves. 2.Wear glasses & eye was station 3.Wear heat resistant apron. 4.Wear safety shoes. 5.Make sure that the hook being used is dry. 6.Use fume mask. 7.Be mindful of the surrounding and move around cautiously.
2.The treatment tray with needles are put inside the furnace (850°C) (30 – 40 minutes) by the use of hook.		
3.After hardening the needles are taken out and put straight into the oil bath (quench oil).		
4.The water heater in the degreasing		

bath is switched ON. 5.The needles are then transferred into tray with holes at the bottom and put into the decreasing bath. (hot water – 97°C).	9.Eye irritation and strain. Leg injuries.	8.Dry the gloves while switching on the heater.
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#### NEEDLE CAPPING

1.The needles are taken from the tray and placed in a lined manner in the table. 2.The caps are taken placed on the other side of the table. 3.The caps are put on every needle head by hand and placed in a different tray.	1.Cut injuries. 2.Eye strain. 3.Strain on the fingers. 4.Minor strain on lower back.	1.Wear gloves 2.maintaining correct posture with help of lumbar support. 3.Take rest in regular intervals
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#### ACID ETCHING SOLUTION

1.The sulphuric acid can is taken from storage area to the bath tub. 2.The sulphuric acid is poured into a chemical proof jug with level indicator. 3.Then poured into the bath tub. 4.Then enough amount of water is added. 4.The solution is mixed thoroughly with the help of an agitator.	1.Burn injuries. 2.Fume inhalation. 3.Strain on lower back and hands. 4.Eye irritation. 5.Slips, trips or falls. 6.Splashing of chemicals.	1.Wear chemical proof gloves. 2.Wear safety shoes. 3.Wear chemical proof apron. 4.Maintain correct posture. 5.Fume mask. 6.Eye glasses. 7.Eye wash station 8.Face shield. 9.Hold the grab rail while walking up the steps and also once on the
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		elevated platform. 10.Walk very cautiously. 11.Use hydraulic trolley if needed. 12.Be very mindful of the surroundings.
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#### 4.CONCLUSION

Job safety analysis is performed using the four basic steps as discussed above. The results obtained from this safety analysis are the potential hazards present in the industry, these findings are based on assessments of work steps of various jobs, described in detail in JSA table. According the existing potential hazards different control measures are implemented.This project is done in order to reduce/root out: the injuries, strain on the body parts, internal body damage and in some cases fatality.It is effective, only if the prescribed control measures are followed. This in turn increases the confidence of the employees and also the trust on the employer. Following JSA would lead to quality throughout the job process and increased productivity.

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