Job Safety Analysis

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Published: June 2003
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Introduction

Job Safety Analysis (J.S.A.) is a simple yet highly effective technique that is under-utilised in industry. J.S.A. aims to prevent incidents and losses by identifying and controlling potential loss situations

J.S.A. should be used with **critical** tasks-
1 High risk tasks
2 Tasks with an incident history
3 New tasks

J.S.A. is based on the principle that any job or task can be separated into a set of relatively simple steps and that the hazards associated with each step can be identified. Solutions to control hazards at each step can then be developed and written into safe working procedures.

The advantages of J.S.A. are
1 S.W.P.'s can be developed for skills training and use on the job
2 Developing J.S.A.'s helps to raise the safety awareness of workers
3 Assists in making observations of safe behaviour
4 Involves workers in the safety programme in a relevant, meaningful manner

J.S.A. Technique Summary

1 Select the job or task to be analysed
2 Separate the job into its basic steps
3 Identify all the hazards / potential losses associated with each step
4 Evaluate your options for hazard / loss control action
5 Establish controls for each hazard or other potential loss area
6 Prepare a Safe Work Procedure

J.S.A. Technique-Detailed

Step 1-Task Selection
Identify critical jobs and set priorities for analysis
Train your selected team in carrying out J.S.A.
Inform people who are involved with the process what you are doing and why
Encourage workers to contribute safety improvement ideas
Where possible involve the people who normally carry out the task in the J.S.A.

Step 2 – Separation into steps
Separate the selected tasks into 10-15 basic steps and record each step on the Job Analysis Work Sheet (Appendix 1)
Each step or activity listed should briefly describe what is being done not how to do it
Usually 3-4 words for each step
Use an activity or verb / action word first
Do not omit steps

Step 3- Hazard Identification

Examine each step to identify any hazards or potential incident or loss sources

Include hazards associated with:

- Machines
- Tools
- Supplies
- Worker action or lack of action
- Job procedures
- Work environment
- Start with the question "What would happen if…."
- Apply the hazard identification check-list-
- Struck by
- Contact by
- Struck against
- Contact with
- Caught between
- Caught on
- Caught in
- Fall to below
- Fall same level
- Over-exertion
- Exposure

Step 4-Evaluate Hazard Controls

- Develop suitable controls
- For every hazard there must be a control
- Refer to Haddon's 10 countermeasures, the Hierarchy of Controls and the A.C.I.R.L. 9 Box Model for controls

Step 5 Establish Controls

There must be a clearly defined procedure for controlling hazards

Step 6-Safe Work Procedure

- A Safe Work Procedure is prepared from
- Steps outlined on the job analysis sheet
- Hazards identified
- Recommended equipment, including P.P.E.
- The procedures for controlling the hazards at each step

Developing controls

The traditional wisdom when developing hazard controls is to use the Hierarchy of Controls. The author's experience is that a better result will be achieved by using either Haddon's 10 Countermeasures or the A.C.I.R.L. 9 Box Model. The main advantage of these approaches is that it expands your options for control

Hazard Control Model

Various hazard control strategies and models have been developed by safety professionals over the years. One of the most effective but still easiest to apply is that devised by American researcher Bill Haddon

Haddon’s model for hazard control is as follows:

Countermeasure 1	Prevent the marshalling of the form of energy in the first place. eg. Ripping seams - instead of blasting, substitution of radiation bin level sources with ultra-sonic level detectors, using water based cleaners rather than flammable solvents.
Countermeasure 2	Reduce the amount of energy marshalled. eg. Radiation – gauge source strength, explosive store licence requirements, control number of gas cylinders in an area
Countermeasure 3	Prevent the release of the energy. eg. handrails on work stations, isolating procedures, most interlock systems
Countermeasure 4	Modifying the rate or distribution of energy when it is released. eg. slope of ramps, frangible plugs in gas bottles, seat belts.
Countermeasure 5	Separate in space or time the energy being released from the susceptible person or structure. eg. minimum heights for powerlines, divided roads, blasting fuse.
Countermeasure 6	Interpose a material barrier to stop energy or to attentuate to acceptable levels. eg. electrical insulation, personal protective equipment, machinery guards, crash barriers
Countermeasure 7	Modify the contact surface by rounding or softening to minimise damage when energy contacts susceptible body. eg. round edges on furniture, building bumper bars, padded dashboards in cars.
Countermeasure 8	Strengthen the structure living or non-living that would otherwise be damaged by the energy exchange. eg. earthquake and fire resistant buildings, weightlifting.
Countermeasure 9	To move rapidly to detect and evaluate damage and to counter its continuation and extension. eg. sprinkler systems, emergency medical care, alarm systems of many types.
Countermeasure 10	Stabilisation of damage – long term rehabilitative and repair measure. eg. clean-up procedures, spill disposal, physiotherapy

Note

Generally the larger the amounts of energy involved in relation to the resistance of the structures at risk, the earlier in the countermeasure sequence must the strategy be selected. In many situations where preventative measures are being considered the application of more than one countermeasure may be appropriate.

Countermeasures may be ‘passive’ in that they require no action on the part of persons, or ‘active in the sense that they require some action or co-operation on the part of the persons, perhaps in association with a design related countermeasure (eg. seatbelts).

Passive’ countermeasures tend to be more reliable in the long term. A short term solution to an immediate problem may require the adoption of an ‘active’ countermeasure eg. toolbox sessions on replacing guards over a mechanical hazard, the long term or ‘passive’ countermeasure might be the fitting of interlocks to the guard so that power is off when the guard is off.

Further reading
Haddon, W ‘On the escape of tigers an ecologic note – strategy options in reducing losses in energy damaged people and property’ Technology Review Massachusetts Institute of Technology, 72;7, 44-53, 1970.

A.C.I.R.L. 9 Box Model

This model says that to have effective control one must have at least one control in each of the boxes. Experience in industry suggests many organizations have many Prevention controls and many Contingency controls (nice trucks with flashing red lights, first-aid kits, trained first-aiders etc) but that they are poor at Monitoring the effectiveness of these controls

9 BOX MODEL	Prevention	Monitoring	Contingency
Eqpt, / Engineering			
Procedures			
Skills/Competencies			

Training in J.S.A.

The author found an approx 4 hour training programme very beneficial in training teams to carry out effective J.S.A.
Course content included:
Theory of J.S.A. backed up by a video illustrating how to carry out a J.S.A.
Demonstration on carrying out a J.S.A.
Guided practice in teams carrying out a J.S.A
Discussion-What went well / What opportunities for improvement were presented
Unguided practice in teams carrying out a J.S.A..
Discussion-What went well / What opportunities for improvement were presented

Conclusion

The commonest mistake the author has seen with safety programmes is the development of extensive safety procedures that the workers do not know about, care about or use. The procedures sit on the supervisor’s bookcase or a computer programme and are rarely referred to. The job safety analysis technique must be used to develop safe working procedures and involvement of the workforce is crucial. If your safe working procedures are over 2 pages in length worry about whether they will ever be used. Use flow-charts, pictures and diagrams in your safe working procedures and base them on a very basic level of English. The K.I.S.S. principle applies. The organisation’s Quality system would dictate the format of the Safe Working Procedure.

Do not think your safety efforts end when you have written a safe working procedure, procedural controls in isolation are notoriously ineffective.

Reference
The New South Wales Coal Association-The Supervisors Guide to Job Safety Analysis

Appendix 1

Job Analysis Worksheet
Refer next page

JOB SAFETY ANALYSIS	Job Title:	JSA No.	New
		Page of	Revise
	Title of person who does job:	Supervisor:	Revisio number
Company:	Department:	Plant / Location	Analyse
	Required or recommended Personal Protective equipment:		Review
			Approv
Sequence of basic job steps	Potential Hazards	Recommended action or pr	