TERMINALS NEW ZEALAND LIMITED

Guidelines for Job Safety Analysis (JSAs)

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Contents

Introduction

This booklet provides guidance to employees and contractors on the requirements of a Job Safety Analysis (JSA) programme.

Doing and using JSAs effectively are important elements in keeping our workforce, the community and the environment safe from hazards associated with jobs and tasks.

Creating incident free workplaces requires JSAs are undertaken extensively and they are done to a consistently high standard.

JSAs also incorporate many workplace risk assessments that are required by laws and regulations. The program described in this guide provides a means for achieving compliance with the regulations.

JSAs should be used to facilitate work group discussions and raise awareness of the potential hazards and the importance of associated controls for all jobs and tasks.

JSAs should be used to enhance employee knowledge and understanding of existing procedures and work instructions.

JSAs are a key element of risk and hazard management' and must be used in conjunction with Standards for:

- 'Industrial Hygiene', and
- 'Work Permit'

Definitions

Working at heights

Working at heights is defined as any job or task that is undertaken at a height greater than 2 metres above ground level where there is no solid barrier preventing an accidental fall.

Hazardous materials, radiation or biological agents

A hazardous material is any workplace substance or chemical that is classified as “hazardous” on their respective Safety Data Sheet. Radiation sources and biological agents present in the workplace should be listed in the respective facility hazard and risk registers.

Plant

“Plant” includes process plant and all stationary or mobile equipment used in the workplace, (other than hand held or hand powered equipment), and includes equipment such as lathes, presses, hoists, cranes, lifts and scaffolds.

Manual handling

Manual handling is any task that requires more than nominal personal exertion to lift, move or restrain an object.

Confined space entry

Confined space entry is defined as work in any space having restricted means for entry or exit or that could contain an atmosphere that may be harmful to people.

Stored energy

Stored energy is any hydraulic, pneumatic, electrical, tensile or gravitational energy that is contained or stored in the plant or equipment being worked on or being used in work.

Tools

Tools include any hand held equipment used in work.

Excavation

Excavation or sub-surface drilling by any means other than by hand.

JSA program – overview

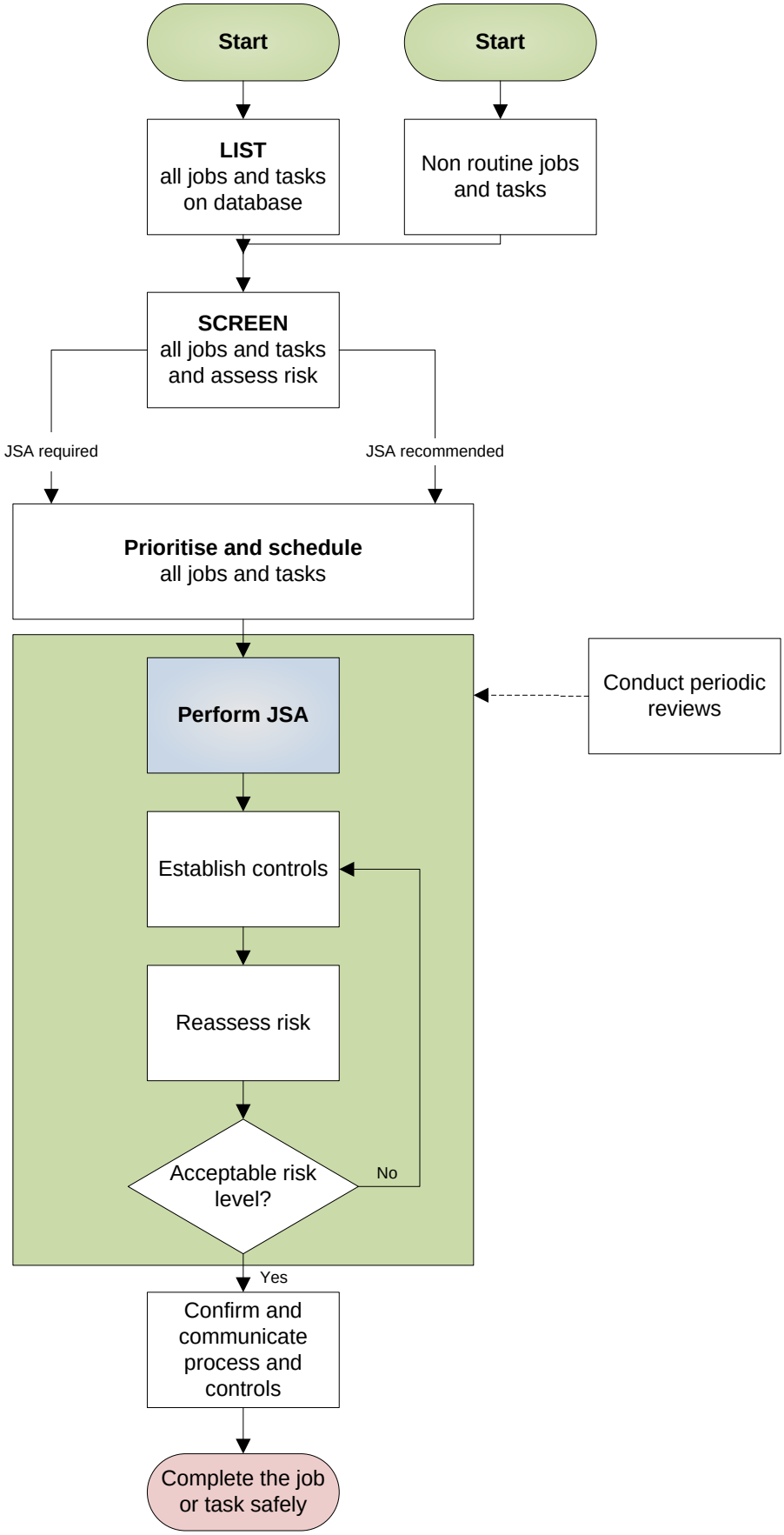
The JSA program described in this booklet provides a systematic approach to the identification, assessment and control of risks and hazards in jobs and tasks.

The program applies to both routine and non-routine tasks and jobs. The key steps in the JSA program for routine jobs are:

- develop a list of all jobs and tasks undertaken by the work group
- screen the jobs and tasks for potentially high risk activities and determine if a JSA is required or recommended (see page 7 of this guide)
- undertake JSAs on jobs and tasks (using suitably skilled and experienced people)
- document the results of the JSA
- develop, agree and implement controls for hazards identified in the JSA assessment
- re-assess the risk (score) after control actions have been determined to verify that the proposed controls are sufficient
- when changing circumstances require JSAs to be re-assessed (such as when the materials used in a job change) update the JSA database
- use the JSA to communicate and re-focus the workgroup or individuals on the risks and hazards associated with the respective jobs or tasks, and
- complete the job safely.

Non-routine tasks need to be assessed as they arise for execution. All non-routine jobs must be screened for potentially high risk activities. JSAs must be undertaken for all non-routine jobs containing potentially high risk activities.

JSA flowchart



Screening of tasks and jobs

All routine and non-routine tasks and jobs need to be screened to identify those that are potentially high hazard and requiring Job Safety Analysis.

Use the table below as a guide for determining which jobs or tasks would be potentially hazardous and whether a JSA is required or recommended.

JSA is required	JSA is recommended
When there is potential for: • Working at heights • Exposure to hazardous materials • Working with plant • Manual handling • Confined space entry • Excavation or drilling • Release of stored energy	When there is potential for: • Slips, trips or falls • Use of tools • Human factors • Environmental impacts

Non-routine tasks need to be screened for high hazard activities as they are being considered or planned.

Hazard control hierarchy

By law, employers and employees have the responsibility to ensure that workplace hazards are identified, assessed and controlled. Further, the law requires that the control of hazards be considered and implemented according to a set hierarchy.

The controls of workplace hazards implemented according to the following hierarchy.

1. Elimination (incl. substitution)

Eliminate hazards where possible by:

- modifying plant or equipment design
- using alternative plant or equipment
- removing hazardous materials
- substituting hazardous materials with non-hazardous materials

2. Isolation

If hazards cannot be eliminated isolate hazards where possible by:

- installing machinery guards
- fencing off or barricading
- lock-out and tag-out

3. Administrative Controls

If hazards cannot be eliminated or identified introduce administrative controls, such as:

- revised procedures and practices
- modified rosters or shifts to reduce exposure
- use of warning and instruction signs, colour coding
- use of checklists
- training and education

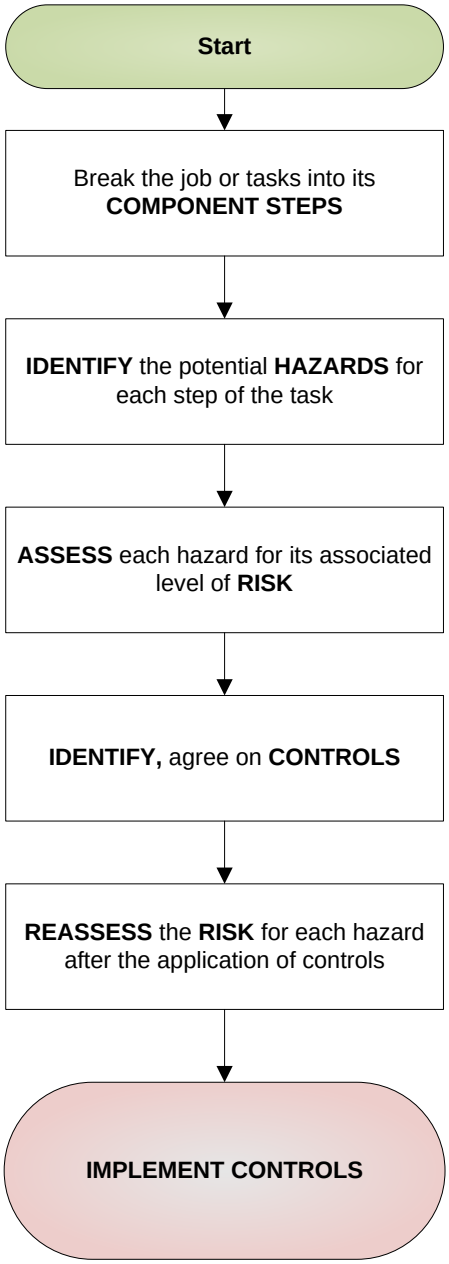
4. Personal Protective Equipment (PPE)

If elimination, isolation and administrative controls are not viable, then and only then, should controls be instigated through the use of basic or enhanced PPE.

PPE must be appropriately rated and suited to the type and intensity of hazard.

Performing a JSA

A JSA on any task or job comprises four steps.



JSAs need to be undertaken by a small team of people which must include representatives of the workgroup who will be undertaking the respective task or job.

The JSA team must be led by or facilitated by someone competent in leading JSA teams.

JSAs previously completed on similar tasks, or completed on the same task done at another location or by another workgroup, can be used as a point of reference by a team doing a JSA. They must not, however, be used as a replacement for the team actually undertaking the JSA.

The Hazard Checklists and Risk Assessment Calculator contained in the following sections of this guide should be used to identify the hazards associated with tasks and to determine whether the risks of injury or incident from the respective hazards are acceptable or unacceptable.

Action Steps

Using the JSA form shown on pages 13 and 14 of this guide complete the following:

1. Component Steps

- list the steps of the job in chronological order
- document the steps of the job on the JSA form

2. Identify Hazards

- identify potential hazards for each step of the job
- use the hazard checklists provided in the back of this guide
- document the hazards on the JSA form

3. Assess the Risk

- use the Risk Calculator on page 12 of this guide
- assess the level of risk associated with each hazard
- document the risk (scores) in the column provided on the JSA form

4. Implement Controls

- identify, agree to, and implement controls for each
- hazard with an unacceptable level of risk
- re-assess the level of risk
- document the control and the final risk score

Using the results of the JSA

Effective communication and use of a completed JSA is critical in the process of protecting the safety of the people who will be performing the task or job.

Work Procedures (routine and non-routine)

Where a detailed written procedure has been developed ensure that:

- The results of the JSA are translated into the written procedure
- The written procedure describes both the hazards and the associated controls with each step of the written procedure.

This is particularly important when it has not been possible to eliminate the hazard and the means of hazard control is either Administrative or the use of PPE.

Work Practices (where there is no written procedure)

For all work practices where there is no written procedure:

- Every member of the work group performing the task or job MUST be briefed in the JSA
- Discussion of the JSA **must** include participation by a member of the team that developed the JSA
- The JSA **must** be readily available and accessible to every member of the workgroup.

Non-routine work practices:

- The JSA must be discussed immediately prior to the commencement of work **and** at the start of each working day.

Routine work practices:

- The JSA must be discussed and refreshed periodically
- Refreshers should be no less than 6 monthly for potentially high hazard jobs where Administrative or PPE controls are required

JSAs on tasks and jobs should be updated if elements of the task or job change sufficiently to alter the potential risks.

Risk assessment calculator

Likelihood	Negligible	Minor	Moderate	Major	Catastrophic
Almost certain (71-100%) The risk is expected to occur in most circumstances and at least 3 times in 12 months.	Medium 11	High 16	Very high 20	Extreme 23	Extreme 25
Likely (41-70%) The risk will probably occur once within the next 12 months.	Medium 7	High 12	Very high 17	Very high 21	Extreme 24
Possible (16-40%) The risk could occur at least once in the next 3 years.	Low 4	Medium 8	High 13	Very high 18	Very high 22
Unlikely (6-15%) Not expected to occur more than once in 10 years.	Low 2	Low 5	Medium 9	High 14	Very high 19
Rare (0-5%) May occur only in exceptional circumstances less than once per 10 years.	Low 1	Low 3	Low 6	Medium 10	High 15
	Negligible	**Minor**	**Moderate**	**Major**	**Catastrophic**
	Consequence				
Safety	Any injury not requiring treatment by medical professional.	Lost time injury directly attributable to organizational, mechanical or infrastructural failure.	Serious harm injury directly attributable to organisational, mechanical or infrastructural failure.	One fatality directly attributable to organisational, mechanical or infrastructural failure.	Multiple fatalities and/or multiple serious harm injuries directly attributable to organisational, mechanical or infrastructural failure.

Job Safety Analysis template

Risk & Hazard Management

NZ CHAMBERS OF COMMERCE HUTT VALLEY Business Vitality

Job Safety Analysis Worksheet

JSA No. 001	Job title:		Date:
	Person(s) doing the job or task:	Analysis completed by:	JSA facilitated by:
	Plant/location:	PPE Requirements:	Approved by:

Summary of Assessed Hazards:

☐ Working at heights	☐ Manual handling	☐ Slips, trips and falls	☐ Environmental impacts
☐ Exposure to hazardous materials	☐ Confined space entry	☐ Use of tools	☐ Excavation (and sub-surface drilling)
☐ Working with plant	☐ Release of stored energy	☐ Human factors	☐ Live electrical work
☐ Other:	☐ Other:	☐ Other:	☐ Other:

Basic Job Steps *(logical and sequential steps)*	**Potential Hazards**	**Level of Risk** *(Extreme, Very high, High, Medium, Low)*	**Controls** *(eliminate, substitute, isolate, procedure, PPE)*	**Re-assessment of Risk** *(Extreme, very high, High, Medium, Low)*
1.			○	
2.			○	
3.			○	
4.			○	
5.			○	
6.			○	
7.			○	
8.			○	
9.			○	
10.			○	
11.			○	
12.			○	
13.			○	
14.			○	

Basic Job Steps *(logical and sequential steps)*	Potential Hazards	Level of Risk *(Extreme, Very high, High, Medium, Low)*	Controls *(eliminate, substitute, isolate, procedure, PPE)*	Re-assessment of Risk *(Extreme, Very high, High, Medium, Low)*
15.			°	
16.			°	
17.			°	
18.			°	
19.			°	

Comments:

Risk Assessment Matrix:

Consequence / *Likelihood*	*None / First Aid Injury*	*Medical Treatment or Single Lost Time Injury*	*Moderate Serious Harm Injury*	*Major Single Fatality*	*Catastrophic Multiple Fatalities*
Almost Certain ***(Several events a year)***	Medium	High	Very High	Extreme	Extreme
Likely Annually ***(Event once a year)***	Medium	High	Very High	Very High	Extreme
Possible ***(Event 1 event in 3 yrs.)***	Low	Medium	High	Very High	Very High
Unlikely ***(Event 1 event in 10 yrs.)***	Low	Low	Medium	High	Very High
Rare ***(Less than 1 event in 10 yrs.)***	Low	Low	Low	Medium	High

O Inherent Risk mitigated through controls to Residual Risk ⦿. Planned risk ✚

Hazard assessment checklists

Working at heights

Controls decision criteria

Controls must be implemented if anyone is to work within two metres from any edge where any person could fall 2 metres or more.

Control methods available include:

- **Guard rails**
- **Safety mesh**
- **Fall arrest systems**
- **Scaffolding**
- **Safety nets**
- **Cranes or scissor lifts**

The Risk Assessment Calculator should be used to assess the need for controls if the height to be worked at is less than 2 metres.

“Height Safety” reference documentation should be referenced for further guidance on the assessment and control of hazards associated with working from heights.

Qualitative assessment checklist

Is a Work Permit required?

Is there the potential for a fall because of:

- **Lack of an appropriate work platform?**
- **Lack of stairs or ladders?**
- **Lack of guard rails or suitable edge protection?**
- **Unprotected holes or gaps?**
- **Collapse of a supporting structure?**

Is the guard rail or fall barrier suitably sturdy?

Is a harness required and if so, what is the correct type of harness?

Are there suitable anchor points for harnesses?

Is there a rescue plan in the event that someone falls and is caught by a harness?

Are ladders and scaffold correctly constructed?

Can objects fall and is the area beneath the work appropriately barricaded?

Is there a risk of a fall during climbing or descending ladders?

How are tools and materials of construction to be lifted to the work site?

Are personnel properly trained and certificated for operation and use of lifting equipment and other control equipment?

Hazardous materials

Controls decision criteria

Controls must be implemented if there is the potential for anybody to be exposed to hazardous materials where the potential degree of the exposure is unknown or where the potential level of exposure is known and is likely to be above the Workplace Exposure Standard.

The Risk Assessment Calculator should be used to assess the need for controls for known levels of exposure below the Workplace Exposure Standard.

Reference “Industrial Hygiene” Standards or seek the input of an Industrial Hygiene Advisor to provide detailed guidance on the assessment and control of hazards associated with hazardous materials.

Qualitative assessment checklist

Have Safety Data Sheets for all materials been reviewed – (consult the site Hazardous Substances Register (HSR))?

Which of the materials are classified as being hazardous?

For any hazardous substance is it possible that you may:

- **Contact the substance with your skin?**
- **Get the substance in your eyes?**
- **Swallow the substance?**
- **Inhale the substance?**

Has there been monitoring of a similar task in the past?

Is the storage of the substance adequate?

Will a dangerous reaction with other substances occur?

Is there potential for unplanned releases of materials?

Are radiation sources located near to the work site?

Is there potential for contact with biological agents – (consult the site Biological Agents Register or HSR)?

Is there asbestos present in the work place – (consult the site Asbestos Register or HSR)?

Should a Workplace Industrial Hygiene Advisor be consulted to assess the expected level of exposure?

Is exposure to sunlight (sunburn) an issue?

Are noise levels an issue – both background noise and sudden noises from the work?

Working with plant

Controls decision criteria

The Risk Assessment Calculator should be used to assess the need for control of hazards associated with working with plant.

Consider carefully the appropriate hierarchy when deciding on hazard controls: First Eliminate or Isolate if practicable, otherwise use Administrative Controls, and finally if nothing else is viable use Personal Protective Equipment.

Qualitative assessment checklist

List the “plant” being used in the job or task?

Can anyone’s clothing or part of their body become entangled in moving parts of the plant?

Can anyone be crushed due to:

- **material or equipment falling from the plant**
- **uncontrolled or unexpected movement of the plant, or collapse of building and equipment**
- **the plant tipping or rolling over**
- **being thrown off or under the plant**
- **being trapped between the plant and any object**

Are there any hot or cold surfaces that could cause burns?

Can the plant cause sparks?

Can equipment exhausts cause a build-up of fumes?

Can anyone be struck by moving objects due to:

- **uncontrolled or unexpected movement of the plant**
- **the plant or work pieces disintegrating**
- **work pieces being ejected**

Are there fluids under pressure or cables under tension that could be accidently released?

Can anyone be injured by electrical shocks due to contact with live electrical lines?

Are there cutting or piercing parts on the plant?

Is the plant licensed, stamped and maintained as suitable for use?

Are there unprotected pinch points or any exposed moving parts?

Are there adequate and accessible Emergency Stops?

Manual handling

Controls decision criteria

A person should never be expected or allowed to manually handle any object that weighs more than 50 kg. As general guidance, controls should be used when weights exceed:

- 4.5 kg for seated work
- 16 kg for other work

Qualitative assessment checklist

Is there frequent or prolonged:

- **lifting**
- **bending**
- **twisting**
- **reaching above shoulder height**
- **extended forward reaching**

Are awkward positions assumed frequently or over an extended period?

For repetitive tasks, is it difficult for work positions to be varied through the work period?

Are loads moved or carried over long distances?

Is there need to place the load accurately or precisely?

Is the load difficult to handle due to its size or shape?

Is it difficult to maintain a grip on the load due to the location of the carry points or through slipperiness?

Are there sharp, jagged or pointed edges that could cause injury?

Does the work area create hazards for manual handling due to congestion, slippery flooring or potential trip hazards?

Confined space entry

Controls decision criteria

The confined space entry procedures outlined in in your organisation's "Work Permit" procedure **must** be followed for all confined space entry activities.

The Risk Assessment Calculator should be used to assess the need for controls in addition to those required under the "Work Permit" for all confined space entries.

Qualitative assessment checklist

Are you planning to work in a confined space? "Confined Spaces" may include:

- **storage tanks**
- **floating roof tank roofs**
- **rail tank and bulk transport cars**
- **process vessels, boilers and pressure vessels**
- **silos and other tank-like vessels**
- **pipes, sewers, shafts, ducts, basements, separators, manholes and similar structures**
- **shipboard spaces entered through a small hatchway**
- **cargo holds, cellular bottom tanks, ballast, oil and fuel tanks**
- **trenches and excavations deeper than they are wide at the top**

Has the compulsory training for confined space entry been completed for both the people entering the combined space and the mandatory safety watch people?

Could the atmosphere within the confined space change?

Could the confined space move or collapse?

Could the confined space fill with water or other substances?

Is there a credible rescue plan, has it been practiced?

Is the Confined Space Work Permit complete and valid for the time of work?

Has consideration been given to all hazards within the confined space? E.g. manual handling, noise, light etc.

Has a means of communication been established?

Have roles and responsibilities been defined?

Stored energy

Controls decision criteria

Tag-out/Lock-out procedures outlined in your organisation's "Work Permit" procedure **must** be followed for all jobs and tasks where there is the potential for release of flammable materials, fluids under pressure or contact with live electrical equipment.

The Risk Assessment Calculator should be used to assess the need for control of hazards associated with the potential release of stored energy where the issues are not covered by the Work Permit Standard.

Qualitative assessment checklist

Are there sufficient pressure gauges and are they appropriately located?

Are fluids under pressure?

Are cables under tension?

Can anything fall or move?

Where are relief devices, are they adequate, are they sufficient capacity to carry the relief load?

Are relief ports, blow-downs or vents located so that they do not create a hazard if they discharge?

Are the pressure and temperature ratings on equipment adequate?

Are there any internally sealed volumes that could contain residual product or pressure?

Are electrical cables protected from physical or fire damage?

Are adequate isolations in place?

Can equipment unexpectedly move or rotate?

Are conduits buried or otherwise hidden?

Are residual current detectors required?

Are static electrical hazards identified; is there appropriate grounding?

Have the ground points been checked for continuity?

Slips, trips and falls

Controls decision criteria

The Risk Assessment Calculator should be used to assess the need for control of hazards associated with potential for slips, trips and falls.

Consider carefully the appropriate hierarchy when deciding on hazard controls: First Eliminate or Isolate if practicable, otherwise use Administrative Controls, and finally if nothing else is viable use Personal Protective Equipment.

Qualitative assessment checklist

What are the permanent trip hazards?

Can temporary trip hazards be created during the job through movement and placement of equipment or tools?

Is the work area overly congested?

Are there any overhead objects or hazards?

Are trenches, drains, excavations or other ground depressions adequately barricaded?

Are the work surfaces or approach areas slippery?

Can work areas or approaches become slippery during the work?

Can body parts bang on equipment during use of tools?

Use of tools

Controls decision criteria

The Risk Assessment Calculator should be used to assess the need for control of hazards associated with the use of tools.

Consider carefully the appropriate hierarchy when deciding on hazard controls: First Eliminate or Isolate if practicable, otherwise use Administrative Controls, and finally if nothing else is viable use Personal Protective Equipment.

Qualitative assessment checklist

List the tools being used in the job or task.

Are the right tools being used for the right jobs?

Are the tools overpowered or underpowered for the job?

Are the tools overpowered or too heavy for the person using them?

Are the tools in good general order?

Can the tools cause sparks or fumes?

Are cutting edges sharp and in good order?

Are working surfaces in good order?

Have the tools been modified from the manufacturer's specifications?

Are all as-bought guards and safety devices in place?

Have repairs been done by qualified people?

Are all electrical cables in good order?

Are all electrical tools protected by an earth leak detection device?

Can clothing or jewellery become caught in any moving parts?

Are people trained and experienced in the use of the tools?

Are PPE requirements for the tools clearly understood?

Human factors

Controls decision criteria

The Risk Assessment Calculator should be used to assess the need for control of hazards associated with the human factors associated with tasks and jobs.

Consider carefully the appropriate hierarchy when deciding on hazard controls: First Eliminate or Isolate if practicable, otherwise use Administrative Controls, and finally if nothing else is viable use Personal Protective Equipment.

Qualitative assessment checklist

Is the work within the skill and experience limits of the designated work team?

What additional training or work instructions are needed to ensure that the work is done competently and safely?

Can the work be achieved with the resources allocated and within the planned timeframe?

Is it clear who is leading the work and who is responsible for safe and effective completion of the work?

Have all risks and hazards been clearly communicated to all members of the work team?

Are languages or other communication barriers to be overcome?

Have emergency situations been identified and is the emergency response plan for the job appropriate?

Are there personal relationship issues within the work group that need to be considered?

Who is responsible for “fit for work” assessments to be done each day?

Have the specialist credentials of contractors been verified?

Environmental impacts

Controls decision criteria

The Risk Assessment Calculator should be used to assess the need for control of hazards associated with the potential for environmental impacts.

Consider carefully the appropriate hierarchy when deciding on hazard controls: First Eliminate or Isolate if practicable, otherwise use Administrative Controls, and finally if nothing else is viable use Personal Protective Equipment.

Qualitative assessment checklist

Is there potential for product to be spilled or released?

Have all release scenarios been identified?

Are drip-pans needed to catch residual product?

Are temporary bunds needed to catch product accidently spilled?

Is there potential for release of odorous vapours?

Will agents or materials react to form noxious or odorous fumes?

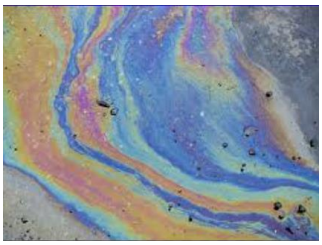
Will the work create unacceptable noise that could impact on the community?

Should the local community, Port Authority or the EPA be advised of the work?

Will there be any waste materials produced from the work, how will these be handled and disposed of?

Are specific environmental risk assessments warranted?

Will heavy rain or gusty winds transport contaminants offsite?



Excavation (and sub-surface drilling)

Controls decision criteria

Rigorous procedures **must** be followed for all jobs and tasks involving excavation or sub-surface drilling.

The Risk Assessment Calculator should be used to assess the need for controls of hazards associated with the excavation or sub-surface drilling where the issues are not covered by a Work Permit Standard.

Qualitative assessment checklist

Have all possible underground services (sewers, storm water drains, gas mains electrical cables etc.) been identified prior to commencement of work?

Is there any possibility of live electrical cables being present?

Is there potential for collapse of excavations?

Is a licence or approval from the authorities required to excavate or drill?

Is the excavation likely to become a confined space?

Are fluids or vapours likely to enter the excavation or drilling bore hole?

What will happen with the excavation spoil or drillings?

Will the spoil or drillings be contaminated?