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Guidelines to Permit to Work

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1. Purpose

A permit-to-work system is an integral part of a safe system of work and can help to properly manage the wide range of activities which can take place close together in a small space, such as in a storage area or process plant.

When incidents occur, human factors, such as failure to implement procedures properly, are often a cause. These failures may in turn be attributable to root causes such as a lack of training, instruction, communication or understanding of either the purpose or practical application of permit-to-work systems.

Permit-to-work systems form an essential part of the risk assessment process in a task. When a task is identified, an appraisal should be carried out to identify the nature of the task and its associated hazards. Next, the risks associated with the task should be identified together with the necessary controls and precautions to mitigate the risks. The extent of the controls required will depend on the level of risk associated with the task and may include the need for a permit-to-work.

A permit-to-work is not simply permission to carry out a dangerous job. It is an essential part of a system which determines how that job can be carried out safely, and communicate to those doing the job. It should not be regarded as an easy way to eliminate a hazard or reduce risk. The issue of a permit does not, by itself, make a job safe - that can only be achieved by those preparing for the work, those supervising the work and those carrying it out. In addition to the permit-to-work system, other precautions may need to be taken - eg process or electrical isolation or access barriers - and these will need to be identified in task risk assessments before any work is undertaken. The permit-to-work system ensures that authorised and competent persons to recognize any foreseeable risks and that such risks can be avoided by using suitable precautions. Those carrying out the job should also be able to recognize and understand what they are doing to carry out their work safely, and take the necessary precautions for which they have been trained and made responsible.

2. Applicable Laws

Workplace Safety and Health Order, 2009

Workplace Safety and Health (General Provisions) Regulations, 2014

Workplace Safety and Health (Construction) Regulations, 2014

3. References

- Code of Practice on Safe Lifting Operations in the Workplaces, Workplace Safety and Health Council
- Code of Practice for Working Safely at Heights, Workplace Safety and Health Council
- WSH Guidelines on Flammable Materials on Hot Work Permit System, Workplace Safety and Health Council
- Technical Advisory on Working Safely in Confined Spaces, Workplace Safety and Health Council
- SS 651: 2019 Safety and Health Management System for the Chemical Industry — Requirements with guidance for use, Singapore Standards
- Permit-to-Work (PTW) Tripartite Guide for the Oil, Petrochemical, Energy and Chemicals (OPEC) Cluster, Ministry of Manpower, Singapore
- Guidance on Permit-to-Work Systems, UK Health and Safety Executive

4. Scope

Permit-to-work System

a) Principles

The permit-to-work system is a formal documented process used to manage work identified as potentially hazardous.

b) The permit-to-work system aims to:

- Ensure a systematic and tiered authorisation for hazardous work;
- Enable responsible persons to be aware of all hazardous work conducted, their locations in the workplace and when the work cease;
- Establish a standardised approach with clear individual responsibilities to take all reasonably practicable measures to ensure the task can be carried out safely;
- Enhance supervision of hazardous work with routine monitoring of the work; and
- Provide a visual display (of permit) to clearly identify locations of approved tasks and task durations.

To ensure adequate evaluation and review, a permit-to-work system requires various levels as shown in Fig 1.

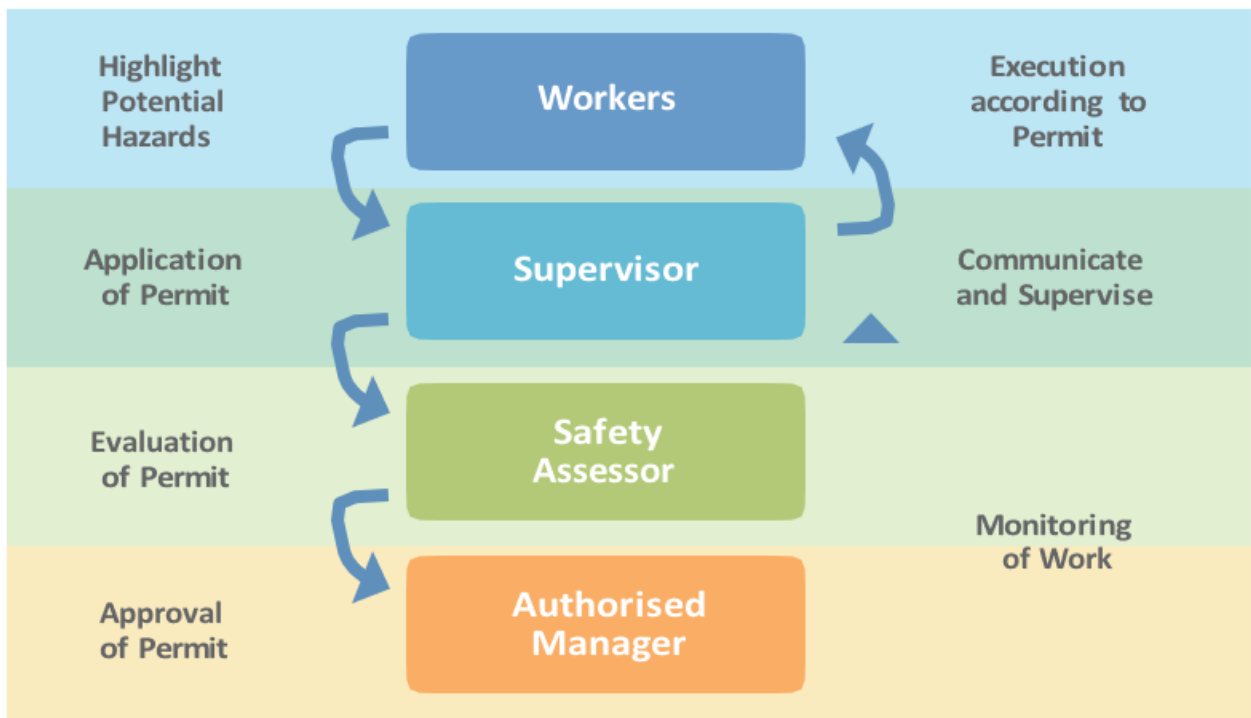


Figure 1: Levels within a Permit-to-work System

5. Risk Assessment and Permit-To-Work for Working at Height

5.1 Requirements and Scope

- a) A permit-to-work is required for work at heights where a person could fall from a height of more than 3 metres, including falling into depth (referred to as hazardous work at heights).
- b) For work at heights where the risks of falling more than 3 metres have been mitigated through adequate and effective edge protection, a permit-to-work may not be required, unless the responsible person deemed it should not be exempted.

Such work at heights includes:

- Working on a flat roof with a perimeter parapet wall of at least 1 metre in height, and no openings or open sides where a person may fall;

- Working on a mezzanine with safe and proper stair access and effective barricade around the mezzanine perimeter to prevent falls; and
 - Working on a mobile elevated work platform with the appropriate PPE anchored to designated anchor points at all times.
- c) Work at heights that do not require a permit-to-work is exempted. All other relevant sections in this guidelines will apply and all reasonable practicable measures shall be taken to ensure the safety and health of all persons working at heights.
- d) For hazardous work at heights where the falling risk will only be present after the commencement of work (e.g., scaffold erection), the safety assessor and authorised manager should approve the permit only after ensuring that:
- The control measures and resources to implement them effectively are made available; and
 - Review and monitoring of permit is conducted when the task commences.
- e) Relevant documents should be attached to the permit-to-work to support its application (e.g., Safe Work Procedures for scaffold erection).
- f) The permit-to-work at heights can be issued as a joint permit-to-work if necessary, provided all the requirements of the individual permits are fulfilled.
- g) The permit can be used for multiple work areas only if it has been assessed that the work areas share similar fall from height hazards, and that the control measures taken are applicable and effective in all the work areas covered by the permit.
- h) The permit can be used for extended duration only if it has been assessed to be deemed necessary, and that the control measures taken are effective throughout the entire duration of the permit. The maximum duration of such permit is seven days; a daily review is required for such permits.
- i) A sample permit-to-work for hazardous work at heights is provided in Appendix 2. The sample permit-to-work can be customised to better suit the needs of the workplaces' hazardous work at heights.

5.2 Implementation

- a) Prior to the conduct of any work at heights, a thorough risk assessment shall be conducted.
- b) The risk assessment team should give due consideration to eliminate the hazardous work at heights if possible. Elimination measures include working from the ground instead of at heights.
- c) Safe and proper means of access and egress shall be identified and provided as part of the planning process.
- d) Workers assigned to work at heights need to be trained and competent to work at heights (e.g., attended relevant Work at Heights courses for workers). All workers covered under the permit must be identified and briefed on the hazards and control measures for the task and work area prior to commencing work.
- e) The appointed work at heights supervisor must be suitably trained and competent to supervise work at heights (attended relevant Work at Heights courses for supervisors). The supervisor could be a foreman, shift supervisor or in other similar capacity to supervise work at heights.
- f) The appointed work at heights safety assessor must be suitably trained and competent to assess and advise on work at heights safety (e.g., attended relevant Work at Heights courses for safety assessors). The assessor could be a WSH professional or any persons responsible to assess work at heights safety.
- g) The appointed authorised manager must be suitably trained and competent to manage the safety processes with regards to work at heights (e.g., attended relevant Work at Heights courses for authorised managers). The manager could be a project manager, operations/ engineering/ maintenance manager or any other manager in a similar capacity to oversee and manage activities in a workplace.

- h) Upon completion/ suspension/ termination of the hazardous work at heights, the supervisor shall ensure that all persons have egressed from the work area and the work area has been restored with no new hazards introduced.
- i) A flow chart of the permit-to-work application is provided in Appendix 1.

Implementing a Permit-to-work System

- A permit-to-work is not simply permission to perform a hazardous task. The permit, by itself, does not make a task safe.
- The safety enhancements can only be achieved through the persons preparing for the job (e.g., control measures implemented), persons supervising the job (e.g., ensuring that SWPs are prepared) and persons performing the job (e.g., using PPE as intended).
- Providing adequate training for all levels of persons involved in a permit-to-work system is essential to achieve consistent and effective implementation.
- The different levels of evaluation and approval ensure authorised and competent persons have thought about foreseeable risks and that such risks are effectively mitigated.
- It is critical to ensure that the permit is effectively communicated to all persons involved in the task for them to understand the hazards and risk control measures, and how to conduct the work safely.

6. Risk Assessment and Permit-To-Work for Lifting Operations

6.1 General

Under the Part III, Permit-to-work system, Workplace Safety and Health (Construction) Regulation, 2014 law, it is mandatory to conduct a risk assessment on the safety and health risks posed to any person who may be affected by the lifting operation in the workplace. The contractor involved is also responsible to take all reasonably practicable steps to eliminate any foreseeable risk to any person. In addition, there are legislative requirements for lifting operations involving tower, mobile or crawler crane in any workplaces to implement a Permit-To-Work system in order to effectively control lifting operations.

6.2 Risk Assessments and Permit-To-Work

Risk Assessment

- a) By definition, Risk Assessment (RA) is the process of evaluating the probability and consequences of an injury or illness from exposure to an identified hazard and determining the appropriate measures for risk control. As such, there are three basic steps to Risk Assessment.

Step 1 - Hazard Identification

Identifying the hazards associated with each work activity and the type of potential accidents/ incidents that can result from the hazards is the first step to Risk Assessment. Some of the hazards associated with lifting operations such as poorly maintained wire ropes.

Step 2 - Risk Evaluation

Risk evaluation is the process of estimating the severity of an injury or damage and the likelihood of the occurrence. For example, the risk level of workers working underneath a suspended pre-cast component shall be assessed as a high risk hazard as the consequences of the load dropping can result in killing the workers underneath.

Step 3 - Risk Control

This is a critical last step as it identifies appropriate risk control measures to reduce the risk level to an acceptable level. Following from the previous example of a suspended pre-cast component, an appropriate risk control measure will be to prohibit workers from working directly underneath a suspended load. The lifting zone shall also be demarcated to prevent any unauthorised entry.

Permit-To-Work

A Permit-To-Work System (PTW) is a formalised system of controlling certain types of hazardous work (lifting operations included). A proper PTW involves the contractor applying for permission to carry out a certain work activity. In the application, he is required to state the scope and conditions in which the work will be carried out. An independent inspection is then conducted on-site to verify that appropriate control measures have been taken to mitigate any foreseeable risks. After confirming that the measures have been taken, the application will be approved by an authorised person (i.e., the project manager). The authorised person shall have an oversight on the entire work process so as to avoid any conflicting or incompatible work that is carried out at the same time. The work can commence only after the permit has been approved.

Changes to Risk Assessment and Permit-To-Work

As the Risk Assessment and Permit To Work are developed based on a pre-determined set of parameters and considerations, any significant changes shall result in a temporary stoppage of the lifting operation and a review of the Risk Assessment and Permit To Work. The following scenarios shall result in a review of the Risk Assessment and Permit To Work.

- Changes to the type and capacity of lifting equipment used.
- Changes to the sequence of operations.
- Changes requiring reconfiguration of the crane (boom/ jib length, outrigger beam length reduction, parts of hoist line, etc).
- Changes in the rigging details which could result in a reduction in rigging strength or significant increase in rigging weight.
- Changes in surrounding environment such as sudden presence of a temporary structure obstructing the operation.
- Changes in the weather and environmental conditions which have an adverse impact to the lifting operation.
- Changes to safety-critical personnel.

6.3 Lifting Plan

a) General

The Lifting Plan is a set of plans which is created for use in any crane lifting operation. All lifting operations shall be accompanied by a lifting plan supported by a risk assessment, a safe work procedure and/or method statement and PTW. Frequent or routine lifting operations may only require a basic lifting plan (Appendix 3) supported by an on-site risk assessment and briefing to related personnel. High risk or complex lifts however, requires additional engineering design efforts to ensure that the lifting is conducted safely.

b) Importance of Lifting Plan

The lifting plan aims to facilitate consensus amongst all stakeholders including the lifting crew for a safe outcome. The lifting plan encapsulates

all the important information that must be considered in a lifting operation thus ensuring that the lifting operation is carried out safely.

c) Ownership and Usage of the Lifting Plan

Every member of the Lifting Crew shall be familiar with the Lifting Plan and ensure that the operation is carried out according to the plan. The Lifting Supervisor must take ownership of the lifting plan and make it available to other members of the Lifting Crew. This is to allow common understanding amongst the lifting crew for a safe outcome. The underlying principle is that all foreseeable risks had been assessed and eliminated or mitigated.

d) The lifting plan can be developed by persons who have the expertise and relevant knowledge of the intended lift after which the team involved has to sign and agree upon the developed lifting plan.

6.4 Elements of a Lifting Plan

The lifting plan shall include but not be limited to the following considerations:

- The personnel required.
- The personnel's roles, responsibilities and competencies.
- Compliance with statutory requirements and manufacturer's operation operating manual for the lifting equipment.
- Permit-to-Work system which is mandatory for all lifting operations.
- Nature and weight and dimension of load – including the NET and GROSS weights.
- Type and location of lifting / rigging points.
- Selection of appropriate lifting equipment, lifting gear and appliances.
- Application of the correct lifting methods
- Position of lifting equipment, personnel and of the load, before and after the lift operation.
- The work site operation including proximity of other lifting equipment and work activities.
- Requirements to erect / dismantle the lifting equipment.
- Assessment of the need for tagline to control movement of the suspended load.

- Means of communication during lifting operations.
- Environmental factors detrimental to the lifting operations such as ground conditions, adverse weather, wind, and poor illumination.
- Ensuring a system for reporting any defects is in place.
- Provision of a safe place of work for all personnel during lifting operations.
- The necessity to cordon off the area where lifting is being carried out and in particular where members of the public (anyone not concerned with the lifting operation) may be present.

6.5 Factors that Affect Lifting Plan

a) The factors which may affect lifting plan include:

- Load;
- Rigging Methods;
- Equipment;
- Physical and Environmental Factors;
- Means of communication;
- Sequence/special precautions;
- Sketch of zone of operation;
- Personnel involved in the lifting operation.

b) It is important to note that the factors above are not exhaustive and personnel involved in planning lifting operations must consider other factors that are specific to the situation, especially in complex lifting operations.

6.6 Harmonisation of the Lifting Plan (Risk Assessment and Permit-To-Work)

a) A Risk Assessment for lifting operation shall specify control measures such as appointment of competent personnel, usage of appropriately maintained lifting gears, demarcation of the lifting zone, and taking into account the physical environment. These factors are necessary and useful for the Risk Assessment.

b) The Lifting Plan and the Permit To Work are part of the Risk Control stage of the Risk Assessment process. The purpose of a proper Lifting Plan/ Permit To

Work is to verify that the necessary control measures have been taken. They are complementary and shall not be seen as mere paper exercises.

- c) If the sample of basic Lifting Plan/ Permit To Work template recommended in Appendix 3 is used properly, it would meet the legislative requirements for basic Lifting Plan and Permit To work.

6.7 Changes to Lifting Plan

In any case where the actual information presented at the lifting site does not tally with or deviate from the Lifting Plan, any stakeholder in the Lifting Operation has the right to cease further progress of the Lifting Operation until the plan is reviewed according to the operation's requirement.

7. Hot Work Permit System

- a) Hot work refers to any work where an ignition or heat source is brought into a work environment where flammable materials are present. Common hot work activities include welding, soldering, cutting, brazing, grinding and drilling.

- b) A hot work permit is essentially part of a Permit-To-Work (PTW) system where a permit is required before hot work can be allowed to proceed. See Figure 2 as an example. For hot work to be authorised, site conditions must first be checked by a competent person to ensure that flammable/ combustible materials have been removed from the work area, flammable conditions are non-existent (via flammable gas testing) and fire protection measures (e.g., on-site water sprinklers, fire watch and fire extinguishers) are in place.

1. Permit Title	2. Permit Number – referenced to other relevant permits
3. Place of Work <ul style="list-style-type: none"> • specifies the exact location where the work will be taking place 	
4. Description of Work <ul style="list-style-type: none"> • provides overview of the work activities to be carried out 	
5. Hazard Identification <ul style="list-style-type: none"> • includes existing hazards and new hazards introduced by the work 	
6. Necessary Precautions <ul style="list-style-type: none"> • permit evaluator (i.e., the safety assessor) signs to confirm that the necessary precautions (e.g., flammable material removed from place of work, followed by gas testing) have been taken 	
7. Protective Equipment <ul style="list-style-type: none"> • includes use of equipment safeguards (e.g., isolation devices, machine guards) and personal protective equipment (e.g., heat-resistant gloves and coveralls) suitable for the work to be carried out 	
8. Authorisation <ul style="list-style-type: none"> • permit issuer (i.e., the authorising manager) signs to confirm that the necessary precautions and protective equipment are in place and approves the permit • checks that there is no ongoing incompatible work and specifies the location, date and time duration of the permit 	
9. Acceptance <ul style="list-style-type: none"> • permit acceptor signs to confirm he/ she understands the work to be carried out, the hazards involved and the necessary precautions • also confirms that the information on this permit has been explained to all workers involved 	
10. Extension/ Shift Handover Procedures <ul style="list-style-type: none"> • signatures confirming that checks have been made and the place of work remains safe for continued work and that the new permit acceptor/ new workers coming on board are fully aware of the hazards involved and the necessary precautions • permit updated with new time of expiry 	
11. Hand Back <ul style="list-style-type: none"> • work location checked to ensure no sign of fire after the work is complete • for hot work inside a building, fire command centre notified if impairment to the building's fire protection system has occurred • signed by the permit acceptor notifying that the work has been completed • signed by the permit issuer certifying that the work is complete 	
12. Cancellation <ul style="list-style-type: none"> • permit is officially cancelled, and the work is no longer allowed to continue 	

Figure 2 : Typical components of a hot work Permit-To-Work form

8. Working Safely In Confined Spaces

8.1 Confined Space Entry Permit

- a) A formal check is necessary to ensure that all the elements of a safe system of work are in place before persons are allowed to enter or work in confined spaces. No person shall enter or work in a confined space without a valid entry permit.
- b) It is recommended that an entry permit clearly identifies the roles and responsibilities of persons who may authorise particular jobs and who are responsible for specifying the necessary precautions (e.g., isolation, atmospheric testing, emergency arrangements, etc).
- c) However, the entry permit does not entitle the applicant to carry out hotwork or any other hazardous work. Separate permit-to-work (PTW) must be obtained to carry out these works. A permit-to-work system for entry into a confined space shall be established and implemented. The confined space entry permit (hereinafter referred to as entry permit) and PTW ensure that:
 - The confined space work is carried out with careful consideration on safety and health of persons who are carrying out the work;
 - Such persons are informed of the hazards associated with confined space work; and
 - The necessary safety precautions are taken and enforced when confined space work is being carried out.

8.2 Information Required on The Entry Permit

The entry permit should include:

- Identification of the confined space;
- Location of the confined space;
- Purpose of entry;
- Entry date and time duration;
- Validity of the permit (date and time of completion/expiration of entry/work);
- Potential hazards in the confined space:

- i. Atmospheric hazards
 - ii. Non-atmospheric hazards
- Control measures (how hazards will be controlled so that the space is safe to enter). The following are some of these measures:
 - i. Isolation:
 - De-energisation and lockout/tagout (LOTO);
 - Blanking/bleeding/isolation of pipes; Removal of mechanical belt/linkages.
 - ii. Personal Protective Equipment (PPE):
 - Safety helmet;
 - Safety shoes;
 - Eye protection;
 - Hand protection;
 - Fall protection/lifelines;
 - Respiratory protection;
 - Protective and reflective clothing;
 Other personal equipment, such as:
 - Pocket/Personal gas detector;
 - Torchlight.
 - iii. Other precautions:
 - Barricades and signboards.
 - iv. Emergency response:
 - A well-rehearsed rescue plan;
 - Rescue equipment;
 - Name and contact number of emergency responders.
- Name of confined space attendant;
- Provision of ventilation;
- Lighting arrangement;
 - i. Use of flame-proof light (protected light)
- Results of the atmospheric testing of the confined space:
 - i. Oxygen;
 - ii. Flammable gases;
 - iii. Other toxic gases.
- Names and signatures of supervisor, confined space safety assessor(CSSA), and authorised manager.

8.3 Risk Assessment

A Risk Assessment shall be jointly conducted by the supervisor and the authorised manager before the application for entry or work in a confined space.

8.4 Issuance of Entry Permit

An entry permit procedure typically consists of the following stages:

STAGE 1 — Application of Entry Permit by Supervisor

The supervisor should:

- State the measures which will be taken to ensure the safety and health of the persons who will enter or carry out work in the confined space based on the completed risk assessment;
- Inspect and prepare the pre-entry requirements for the confined space;
- Highlight the intended work to the concerned personnel; and
- Complete and forward the entry permit to the Confined Space Safety Assessor.

STAGE 2 — Evaluation by Confined Space Safety Assessor

The Confined Space safety assessor (CSSA) should:

- Inspect the site/area together with the applicant;
- Determine possible atmospheric hazards and establish appropriate sampling strategy, such as measurement method, number and location of sampling points;
- Use suitable and properly calibrated atmospheric gas/vapour testing instruments;
- Conduct the test in the following sequence:
 - i. test for level of oxygen content;
 - ii. test for level of flammable gas or vapour; and
 - iii. test the concentration of toxic gas or vapour, where applicable.

- Conduct the test in a manner that will not endanger himself or others;
- Record the results of the test in the entry permit;
- Highlight any deviation from the acceptable limits to the authorised manager; and
- Endorse and forward the permit to the authorised manager.

STAGE 3 — Issuance by Authorised Manager

The authorised manager may issue an entry permit if he is satisfied that:

- The level of oxygen in the confined space is within the range of 19.5% to 23.5% by volume;
- The level of flammable gases or vapours in the confined space is less than 10% of its lower explosive limit;
- The levels of toxic substances in the atmosphere and toxic substances in the atmosphere of the confined space do not exceed the PELs specified in the First Schedule of the Workplace Safety and Health (General Provisions) Regulations, 2014;
- The confined space is adequately ventilated;
- Effective steps have been taken to prevent any ingress of dangerous gases, vapours or any other dangerous substances into the confined space; and
- All reasonable practicable measures have been taken to ensure the safety and health of persons who will be entering or working in the confined space.

STAGE 4 — Posting of Entry Permit

The supervisor should:

- Clearly post a copy of the Entry Permit at the entrance to the confined space, including where reasonably practicable, a sketch of the area within the confined space where the entry is to be made or work is to be conducted; and
- Ensure that the copy of the Entry Permit is not removed until:
 - i. the date of the expiry of the Permit;
 - ii. the revocation of the Permit; or

- iii. the person entering or working in the confined space has left the confined space after achieving the purpose of the entry or completing the work, as the case may be; whichever is the earliest.

8.5 Display of Entry Permit

A copy of the Entry Permit issued by the authorised manager shall be displayed by the supervisor clearly at the entrance to the confined space so that entrants are informed of the condition of the space and the measures taken to ensure safe entry.

8.6 Review and Endorsement of Entry Permit

- a) It is the duty of the authorised manager to review and assess the need to continue the work in the confined space on a daily basis and revoke the Entry Permit if he thinks fit to do so.
- b) If the work in the confined space needs to be continued after the assessment, the authorised manager shall endorse the Entry Permit by signing on the Permit or by using other equally effective means.

8.7 Revocation of Entry Permit

If, after issuing an Entry Permit, the authorised manager determines that carrying out the work in the confined space poses or is likely to pose a risk to the safety and health of persons in the confined space, he may order the work to cease immediately and revoke the Entry Permit.

The authorised manager shall terminate entry and cancel the Permit when:

- The entry operations covered by the Entry Permit have been completed;
or
- A condition that is not allowed or covered under the Entry Permit arises in or near the permit space.

For example, the authorised manager is to revoke the Entry Permit when the monitoring equipment alarm goes off indicating the deficiency of oxygen level or 10% of LEL, or PEL of toxic gas is exceeded.

8.8 Re-certification of Confined Spaces

- a) When a hazardous atmosphere in a confined space is detected by periodic tests or continuous monitoring, the supervisor or confined space safety assessor shall withdraw the Entry Permit and a "no entry" sign shall be clearly displayed at the entrance to the confined space. The authorised manager will have the final authority to revoke the Entry Permit.
- b) The supervisor, CSSA and the authorised manager shall then assess how the hazardous atmosphere came about. Effective means shall be provided to remove the atmospheric hazards in the confined space.
- c) Upon removal of the atmospheric hazards, the supervisor shall reissue a "new" Entry Permit for the confined space, if entry or work in the confined space is to be continued. The application procedure stated above shall apply.
- d) No person shall re-enter the confined space until the confined space has been re-certified safe for entry and a new Entry Permit has been ~~is~~ issued by the authorised manager.

8.9 Record Keeping

Employers are required to keep all records of work in confined spaces, including Entry Permits and test results for two years.

8.10 Control of Hazardous Energy

It is important to ensure, as much as possible, that the confined space is isolated before entry. This is to prevent materials going into the confined space via pipelines or vents and to ensure that equipment inside the space does not start up while the entrant is inside. This procedure is also to protect personnel from injury due to unexpected energisation, start-up or the release of stored energy

from the machines, equipment or processes during the repair or maintenance of equipment.

8.10.1 Energy Isolation and Lockout

- a) Before allowing any person to enter a confined space, the authorised manager shall ensure that all potentially hazardous services and energy sources normally connected to that space are isolated in order to prevent:
- The introduction of any materials, contaminants, agents or conditions harmful to people occupying the confined space; and
 - The activation or energisation in any way of equipment or services which may pose a risk to the health or safety of persons within the confined space.
- b) The authorised manager shall ensure that positive steps are taken to achieve the following:
- Prevention of accidental introduction into the confined space of materials, through equipment such as piping, ducts, vents, drains, conveyors, service pipes or fire protection equipment.
 - De-energisation and lockout, or if lockout is not practicable then tagout, or both lockout and tagout, of machinery, mixers, agitators or other equipment containing moving parts in the confined space. This may require additional isolation, blocking or de-energising of the machinery itself to guard against the release of stored energy (e.g., springs).
 - Isolation of all other energy sources which may be external to, but still capable of adversely affecting the confined space (e.g., heating or refrigerating methods).

8.10.2 Forms of Hazardous Energy

Energy sources can come in many forms but not limited to electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravitational, ionising and non-ionising radiation. It is necessary to isolate all mechanical, electrical equipment and all other energy sources connected to a confined space to prevent them from unintentional activation. If gases or vapours can enter the confined space, physical isolation of pipelines,

valves and so on would need to be locked and tagged using lockout and tagout procedures. In all cases, a check is required to ensure isolation is effective.

Further Information on different permit types

9. Hot work permit

- a) Hot work is usually taken to apply to an operation that could include the application of heat or ignition sources to tanks, vessels, pipelines etc which may contain or have contained flammable vapour, or in areas where flammable atmospheres may be present.
- b) Hot work permits, typically coloured red or red-edged, are more generally applied to any type of work which involves actual or potential sources of ignition and which is done in an area where there may be a risk of fire or explosion, or which involves the emission of toxic fumes from the application of heat.
- c) They are normally used for any welding or flame cutting, for the use of any tools which may produce sparks and for the use of any electrical equipment which is not intrinsically safe or of a suitably protected type.
- d) Some sites or installations distinguish between high energy sources of ignition like naked flames, welding and spark-producing grinding wheels, which are almost certain to ignite flammable atmospheres, and low energy sources like hand tools and non-sparking portable electrical equipment, which are likely to cause ignition only if there is a fault.
- e) In some cases, to differentiate between these tasks, fire and naked flame certificates or electrical certificates have been used, to minimise the risk of electric shock to people carrying out any work on electrical equipment.

10. Cold work permit

Cold work permits, typically blue-edged or coloured blue, are frequently used to cover a variety of potentially hazardous activities which are not of a type covered by a hot work permit. The activities for which a cold work permit may be appropriate will vary from site to site but should be clearly defined.

11. Electrical work permit

An electrical permit-to-work is primarily a statement that a circuit or item of equipment is safe to work on. A permit should not be issued on equipment that is live.

12. Equipment disjoining certificate/breaking containment permit

This type of certificate is used for any operation that involves disconnecting equipment or pipe work that contains (or has contained) any hazardous or high- pressure fluids or other substances. This type of certificate will normally be used for the insertion of spades into pipe work, and for the removal of such spades. These permits are typically black-edged.

13. Confined spaces entry certificate

- a) Confined space entry certificates (unless detailed on a hot work or cold work permit) are used to specify the precautions to be taken to eliminate exposure to dangerous fumes or to an oxygen-depleted atmosphere before a person is permitted to enter a confined space. The certificate should confirm that the space is free from dangerous fumes or asphyxiating gases. It should also recognise the possibility of fumes desorbing from residues, oxygen depletion of the atmosphere as a result of oxidation, or the ingress of airborne contaminants from adjacent sources.
- b) The certificate should specify the precautions to be taken to protect the enclosed atmosphere against these hazards, eg by forced ventilation, physical isolation or by the provision of personal protective equipment including breathing apparatus.

14. Machinery certificate

This type of certificate is used for work on large, complex items of machinery to ensure correct isolation before the work is carried out.

15. Isolation certificate

This type of certificate may be very similar to a machinery certificate or an electrical certificate. It is usually used as a means of ensuring that the particular equipment is mechanically and electrically isolated before it is

worked on. It is possible that a similarly named certificate may be used for chemical isolation of plant before work is done on it or entry is made. If so, these should be cross-referenced to associated permits.

16. Excavation certificate/heavy equipment movement certificate

This may also be called a 'ground disturbance permit' or something similar. It will typically be required whenever any digging, excavation or boring has to be done, to ensure that no underground services or pipe work will be affected, eg by damage or subsidence. The movement or placing of heavy equipment may also cause damage.

17. Radiation certificate

Radiation certificates, typically coloured yellow, outline necessary control measures to minimise risks of exposure to radioactive sources including site inspection, controls on source exposure, access or containment barriers and radiation monitoring.

18. Control of less hazardous work

The lowest level of control within a safe system of work involves 'routine duties', can be managed through assessment and approved work instruction or procedures that define work to be undertaken on site (eg process operators changing filters). Some offshore sites may use a 'T-card' or other simplified certificate to enable less hazardous work to be integrated with other more hazardous work (eg changing filters near hot work).

19. Checklist for the assessment of permit-to-work systems

The purpose of this checklist is to help all persons concerned with the preparation of permit-to-work systems to decide whether a permit-to-work system covers all the points which are considered essential in this guidance. The checklist is intended for use when setting up a new permit-to-work system or when auditing an existing system.

Policy

- 1) Is there a clearly laid down policy for risk assessment of high-hazard operational and maintenance activities and their control procedures?
- 2) Are the objectives of the permit system clearly defined and understood?
- 3) Is the permit system flexible enough to allow it to be applied to other potentially hazardous work, apart from that which may have been specifically identified when the system was established?

Organising

A) Control

- 1) Are responsibilities for the following made clear:
- 2) Management of the permit-to-work system?
- 3) Permit form design and system scope?
- 4) Type of jobs subject to permit?
- 5) Control of contractors?
- 6) Are the types of work, or areas where permits must be used, clearly defined and understood by all concerned?
- 7) Is it clearly laid down who may issue permits?
- 8) Is it clearly laid down how permits should be obtained for specific jobs?
- 9) Are people prevented from issuing permits to themselves?
- 10) Is the permit system recognised throughout the site or installation as being essential for certain types of work?
- 11) Are copies of permits issued for the same equipment/area kept and displayed together?
- 12) Is there a means of co-ordinating all work activities to ensure potential interactions are identified?
- 13) Is there provision on the permit form to cross-reference other relevant certificates and permits?
- 14) Is there a means to ensure other people who could be affected by the proposed work give their agreement before the work (or preparations for it) is started?
- 15) Where there are isolations common to more than one permit, is there a procedure to prevent the isolation being removed before all the permits have been signed off?
- 16) If an electronic system is in place, is a valid means available to recover the co-ordination of work activities in the event of the electronic system failing?

B) Communication

- 1) Does the system provide both for the recipient to retain the permit and for a record of live permits and suspended permits to be maintained at the point of issue?
- 2) Does the system require a copy of the permit to be displayed at the workplace?
- 3) Do permits clearly specify the job to be done?
- 4) Do permits clearly specify whom they are issued to?
- 5) Do permits clearly specify the plant or geographical area to which work must be limited?
- 6) Does the recipient have to sign the permit to show that they have both read and understood the hazards and control measures detailed in the permit?
- 7) Do permits clearly specify a time limit for expiry or renewal?
- 8) Does the permit include a handover mechanism for work which extends beyond a shift or other work period, including work which has been suspended?
- 9) Is a hand-back signature required when the job is complete?

Training and competence

- 1) Is the permit system thoroughly covered during site or installation safety induction training?
- 2) Are personnel who have special responsibilities under the permit system, eg issuing and isolating authorities, properly authorised and trained?
- 3) Do these people have sufficient time to carry out their duties properly?
- 4) Does the permit system require formal assessment of personnel competence before they are given responsibilities under the permit procedure?
- 5) Is a record of training and competence maintained?
- 6) Do training and competence requirements include contractors with responsibilities under the permit-to-work system?
- 7) Are individuals provided with written confirmation of completion of relevant training, and are these documents checked before appointments are made within the permit-to-work system?
- 8) Do authorised issuers have sufficient knowledge about the hazards associated with relevant plant?

Planning and implementation

- 1) Does the permit clearly specify the job to be undertaken?
- 2) Is there a set of properly documented isolation procedures for use when working on potentially hazardous items of plant, and do they provide for long-term isolation?
- 3) Is there a clear requirement for work being done under a permit to be stopped if site conditions change or any new hazards have arisen?
- 4) Does the permit contain clear rules about how the job should be controlled or abandoned in the event of an emergency?
- 5) Does the permit system require any potential hazards at the work site to be clearly identified and recorded on the permit?
- 6) Does the permit clearly specify the precautions to be taken by permit users and other responsible people?
- 7) Is there a procedure to identify and monitor tasks which require inhibiting safety devices, eg fire and gas detectors, to ensure that contingency plans and precautions are in place?

Measuring performance

- 1) Is there a monitoring procedure or are there scheduled spot checks to ensure that permits are being followed?

Audit and review

- 2) Is there a procedure for reporting any incidents that have arisen during work carried out under a permit?
- 3) Is the permit-to-work system audited as appropriate, preferably by people not normally employed at the site or offshore installation?
- 4) Is there a procedure for reviewing the permit system at defined intervals?

20. Permit To Work monitoring checklist

This checklist is intended to be used for the day-to-day monitoring of permits in use.

Date:	Time:	Active:
Permit type:	Reference number:	Complete:
Reviewer:	Position:	Installation:
Appended certificates: (list)		

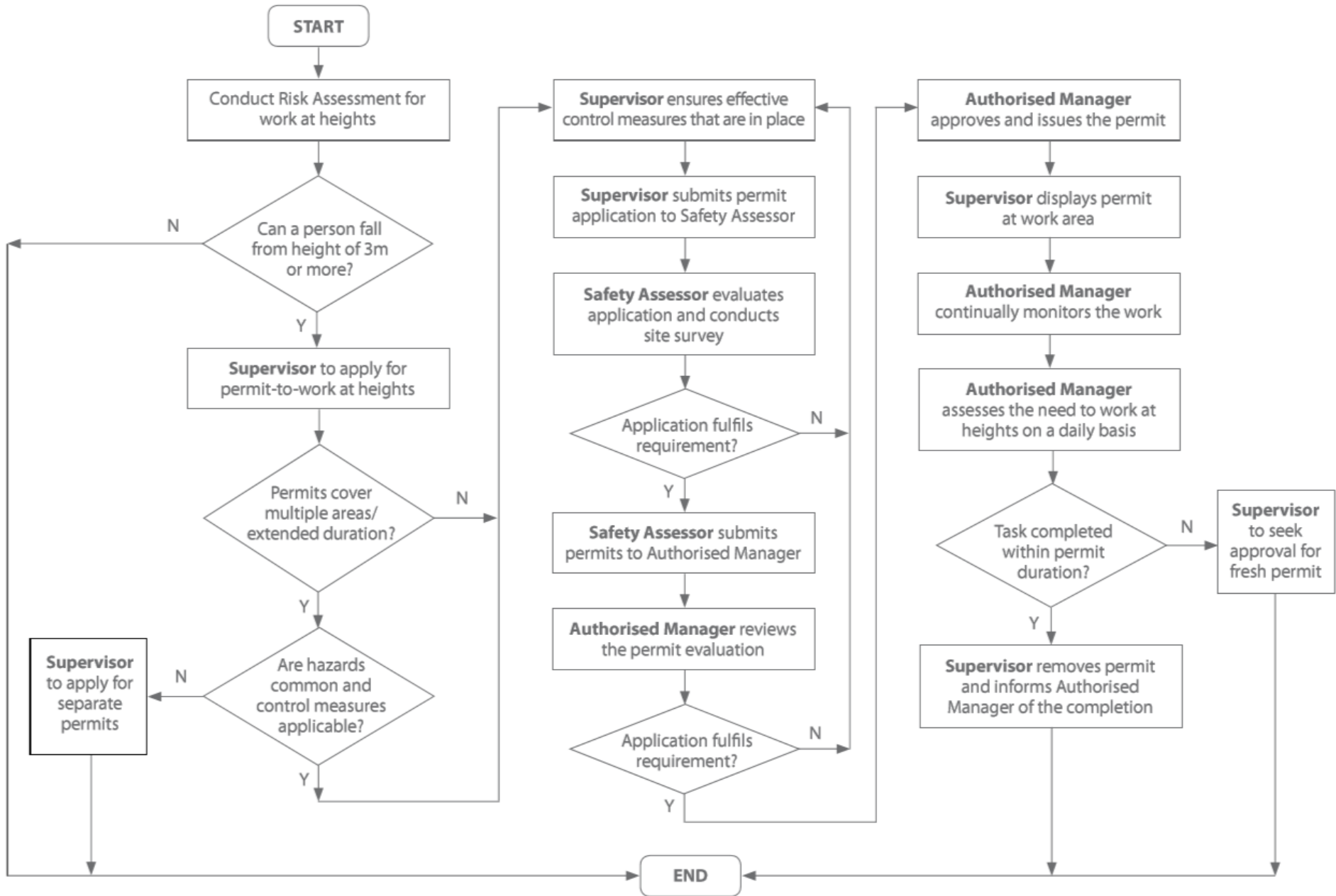
If any unsafe conditions are found, the work must be stopped and the issuing authority and the performing authority notified immediately.

	Yes	No	N/A
1 Is the scope of work clearly specified?			
2 Are necessary risk assessments available for review?			
3 Are identified hazards listed on the permit-to-work?			
4 Are appropriate precautions listed on the permit-to-work (including clearly specified isolations)?			
5 Is the operational time limit of the permit clear? (Are extensions properly authorised?)			
6 Are certificates completed properly and appended to the permit?			
7 Are other area or system activities cross-referenced correctly via the permit?			
8 Are copies of permits, certificates and attachments legible?			
9 Are signatures and initials traceable and legible?			
10 Are copies of permits and certificates posted at correct locations?			
11 Are attachments, drawings etc held at the correct locations?			
12 Are users briefed on the permit-to-work, and have they acknowledged understanding of requirements?			
13 Do people know what to do in the event of emergency?			
14 Are isolations appropriate for the task, clearly specified on the permit or isolation certificate, and correctly implemented?			
15 Are common isolations cross-referenced?			
16 Are the right people aware of isolated equipment?			
17 Is the area authority aware of the work?			
18 Is the work carried out in conformance with the permit?			

	Yes	No	N/A
19 Are control measures and personal protective equipment appropriate for the task?			
20 Are tools and equipment suitable and in good condition?			
21 Are housekeeping standards satisfactory?			

Comments:	
Reviewer:	Signature:
Performing authority:	Signature:

APPENDIX 1 : SAMPLE OF PERMIT-TO-WORK FOR HAZARDOUS WORK AT HEIGHTS



APPENDIX 2 : SAMPLE OF PERMIT-TO-WORK AT HEIGHTS

PERMIT TO WORK AT HEIGHTS					
Permit No: _____					
This permit shall be displayed for the duration of the approved task and removed only upon task completion or upon its expiry.					
SECTION 1: APPLICATION <small>(to be completed by Supervisor)</small>					
Task Description:					
Location of WAH:		<input type="checkbox"/> Task covers multiple locations (attach sketch/ map if necessary)			
Start/ End Date:		<input type="checkbox"/> Task exceeds one work shift (daily endorsement required)			
No. of Workers:		No. of Supervisors			
WAH Control Measures Implemented:		Y	N	NA	Remarks
Due consideration given to eliminate work at heights tasks.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Safe means of access or egress provided.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Edge protection provided wherever there is falling risks.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fall prevention equipment used to provide access or work platform.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fall prevention equipment are adequate and in good condition.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Anchorage/ lifeline installed and inspected by competent person.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Travel restraint system used to exclude persons from falling risks.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All persons subjected to falling risks are equipped with PFAS*.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All personnel are adequately trained to perform work at heights.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Hazards and risk assessment are conducted and communicated.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Others (please specify).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
* Personal Fall Arrest System					
<input type="checkbox"/> I declare that the information provided is accurate and the control measures listed above have been effectively implemented.					
Name/ Designation/ Signature: _____				Date: _____	

SECTION 2: EVALUATION (to be completed by Safety Assessor)

Assessment of Control Measures:	Y	N	NA	Remarks
All reasonably practicable measures have been taken.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Verification of documents/ interview workers/ others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Site Survey with Supervisor:				
All persons on site are protected from falling risks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Surrounding areas do not pose additional hazards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Multiple Locations/ Extended Duration:				
Hazards are common at various locations/ time period.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Control measures are applicable and effective.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

I have evaluated the application and am satisfied that all reasonably practicable measures have been taken effectively.

Name/ Designation/ Signature: _____ Date: _____

SECTION 3: APPROVAL (to be completed by Authorised Manager)

Review of Permit:	Y	N	NA	Remarks
Proper permit-to-work evaluation has been completed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No incompatible works that may pose additional hazards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Control measures have been implemented effectively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fall from heights risks have been effectively mitigated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

I authorise the work at heights to the conditions and duration stated in this permit.

Name/ Designation/ Signature: _____ Date: _____

SECTION 4: TASK COMPLETION (to be completed by Supervisor)

The WAH task has been:	Date/ Time:	
	Remarks	
<input type="checkbox"/> Completed.		
<input type="checkbox"/> Suspended due to permit expiry.		
<input type="checkbox"/> Terminated due to change in condition.		

I confirm that the work area has been restored to its original condition and no new hazards have been introduced.

Name/ Designation/ Signature: _____ Date: _____

APPENDIX 3 : SAMPLE OF BASIC LIFTING PLAN / PERMIT-TO-WORK

1. General

Project			
Location of lifting operation			
Contractor carrying out the lifting operation		Date/ time of lifting operation	
		Validity period of lifting operation	

2. Details of the Load/s

Description of load/s			
Overall dimensions			
Weight of load	Kg / tonne	<input type="checkbox"/> Known weight	<input type="checkbox"/> Estimated weight
Centre of gravity	<input type="checkbox"/> Obvious	<input type="checkbox"/> Estimated	<input type="checkbox"/> Determined by drawing

3. Details of the Lifting Equipment/ Lifting Gears

Type of lifting equipment			
Maximum SWL as certified on the LM cert		Date of last certification	
Max boom / Jib length	m	Fly jib / offset	
Intended load radius	Distance between the load and the crane	SWL at this radius	
Type of lifting gears	Slings / webbing / chains / shackles / spreader beam / receptacle		
Combined weight of the lifting gears	Kg / tonne	Certification of lifting gears	<input type="checkbox"/> Yes
SWL of LG	Kg / tonne		<input type="checkbox"/> No

4. Means of Communications

Can the operator see the loading and unloading point for the load from his position?

Yes No

What are the means of communication between the lifting crew?

Standard hand signals Radio Others _____

5. Personnel Involved In Lifting Operation

Position	Name	Qualification/ Experience
Site Supervisor		
Lifting Supervisor		
Crane Operator/ Lifting Equipment Operator		
Rigger		
Signalman		
Others (please state)		

6. Physical and Environmental Consideration (please include any details in the space provided)

Ground conditions	Is the ground made safe (e.g., placing steel plate)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Are the outriggers evenly extended?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Obstacles	Are there any overhead obstacles such as power lines?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Are there nearby buildings or structure, equipment or stacked materials that may obstruct lifting operation from being carried out safely?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Lighting	Is the lighting condition adequate?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Demarcation	Has the zone of operation been barricaded (with warning signs and barriers) to prevent unauthorised access?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Environment	Do not proceed with the lifting operation under the following circumstances: <ul style="list-style-type: none"> <input type="checkbox"/> Thunderstorm and lightning strikes in the area. The ground condition must be checked after a thunderstorm. <input type="checkbox"/> Strong winds that may sway the suspended load. <input type="checkbox"/> Other circumstances (please specify). 	

7. Sequence / Special Precautions

8. Sketch of the Zone of Operation:

(It is recommended that you include the initial location of the load, the final location and path of the load. It is also important to indicate any obstructions or equipment that may obstruct the lifting operation).

Applied by: Name:	Signature:	Date: Time:
Prepared by: Name:	Signature:	Date: Time:
Assessed by: Name:	Signature:	Date: Time:
Approved by: Name:	Signature:	Date: Time:

Note:

This is only a sample lifting plan / PTW, the content is by no means comprehensive. Users would have to include key critical document and information such as load capacity chart, range diagram, rigging method, sling angle, etc to ensure safe lifting operations

END