



Lusail Real Estate Development Company

Health, Safety, Security, Environment, Logistics & Quality Department

Lusail Construction Safety Management Procedure – Risk Assessments

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1. Description

This LCSMP element describes the requirements for the identification of health and safety hazards and environmental impacts, development of a risk and impact assessment process and development of risk controls for the management of identified hazards in order to minimize undesirable incidents, damage and losses.

The main focus of this procedure is on the protection of people, the environment, plant and property. This element applies to all Contractors and subcontractors on Lusail property.

2. Definitions

Term	Description
Job Hazard Analysis (JHA)	A process used to identify hazards or potential hazards associated with each step of a job or work plan to uncover hazards and eliminate, control, or remove them before the work is started.
Risk Assessment	The process of hazard, aspect, impact, identification, assessment of the risk, and identification of the controls required to manage the risk to an acceptable level to ensure the health and safety of those affected by the activity and the protection of the environment from harm.
ALARP	As Low As Reasonably Practicable
Analysis	Describe the likelihood of an event arising and its consequences. These can be adapted or adjusted to suit the
Consequence	The outcomes of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain.
Frequency	A measure of the rate of occurrence of an event expressed as a number of consequences of an event in a given time. See also Likelihood and Probability.
Hazard	Source or situation with a potential for harm in terms of injury or ill-health, damage to property, damage to the workplace environment, damage to the natural environment, or a combination of these.
Hazard Identification	Process of recognizing that a hazard exists and defining its characteristics.
HAZOP Study	Examination of a task or process by a team of people familiar with the process to identify actual and potential hazards in the operations , so that they may be eliminated or mitigated.
Likelihood	Used as a qualitative descriptor of probability or frequency
Probability	The likelihood of a specific outcome, measured by the ratio of specific outcomes to the total number of possible outcomes. Probability is expressed as a percentage between 0% and 100%, with 0% indicating an impossible event or outcome and 100% indicating an event or outcome is certain.

Term	Description
Quantitative Analysis	This uses numerical values (rather than the descriptive scales used in qualitative analysis) for both consequence and likelihood using data from a variety of sources. The value of the analysis depends on the accuracy and completeness of the numerical data used.
Residual Risk Number (RRN)	A risk level number generated from an assessment of the likelihood and severity of injuries arising from a hazard with mitigating controls in place.
Risk	The chance of something happening that shall have an impact upon objectives.
Risk Register	A register that summarizes all of the risk assessments and can act as a management tool for the monitoring and updating of risk assessments.
Risk Evaluation	The process used to determine risk management priorities by comparing the level of risk against predetermined standards, target risk levels or other criteria.
Risk Factor Number (RFN)	A risk level number generated from an assessment of the likelihood and severity of injuries arising from a hazard.
Risk Management	The culture, processes and structures that are directed towards the effective diverse management of potential opportunities and adverse effects.
Severity	Used as a qualitative descriptor of an undesirable outcome.
Tolerable Risk	Risk that has been reduced to a level that can be endured by all impacted parties having regard to legal obligations and 'Occupational Health and Safety' and 'Environmental' policy
HSE	Health Safety and Environment

3. Responsibilities

The Contractor is fully responsible for the pre-planning, development of Method Statements, Job Hazard Analysis, overall safe work planning and implementation. The Contractor's Project Management is responsible for the assurance that all work is planned and conducted according to the pre-planning document, Contractor and Lusail Health Safety & Environment (HSE) procedures and the Qatar Construction Specifications 2010. Should a conflict occur between procedures/standards or requirements the more stringent will apply.

4. Procedure

4.1 Risk Management Process

There are a number of processes used to manage HSE risk at various stages of a project, from development, design, and construction, through to operation and maintenance (see **Appendix A**).

An effective risk management system should comprehensively cover all parts and processes of the project and shall address all identified potential risks to a particular project. As an example of identified risks, all the risks below need to be considered:

- a) Natural disasters;
- b) Deliberate acts;
- c) Hazardous events in the vicinity of the project; and
- d) Unusual, atypical or abnormal events and conditions.

An effective risk management system shall also provide a process to:

- a) Assess such risks in a quantitative manner (if possible) based on collected data (in order to minimize guesswork);
- b) Ensure regulatory compliance;
- c) Aim for risk elimination, or, at the very least, reduce risk to a tolerable risk; and
- d) But most of all, an effective risk management system shall protect people, the environment, property and as a result of that, the Project.

4.1.1 Timing of Risk Assessments

Risk assessments shall be conducted as and when necessary, including:

- a) Project Start Up (before work activities begin);
- b) As part of a change management programme;
- c) As part of incident investigation close outs
- d) Upon introduction of new workers
- e) In the presence of a high level of risk associated with a specific work activity; and
- f) When legislative obligations (including regulations) change

4.1.2 Risk Assessment

All HSE risk assessments shall be documented and tracked using a Risk Register (Attachment [LUS-HSE-FM4-446-083](#)). The outcomes of risk assessments shall then be communicated as Procedures, Project Instructions, Method Statements, JHA's and Work Checklists as required.

The Risk Assessment Register gives an overview of the hazards associated with tasks involved in a project and should be specific enough to accurately determine which tasks need closer examination.

On completion of a Risk Assessment the record shall then be used to supply the following information to the relevant persons at risk:

- a) Hazard/risk/impacts
- b) Preventative and protective measures
- c) Emergency procedure
- d) Name of emergency wardens or incident controllers
- e) Instruction and training to carry out the work safely

All activities undertaken under the Risk Assessment (and controls therein) shall be monitored to ensure that the assessment is both suitable and sufficient and is being worked to.

Any changes in work must be notified to the competent person who has developed the Risk Assessment and must result in a review of the assessment and if necessary a revised assessment produced.

4.1.3 Risk Assessment Procedure

The risk assessment procedure can be addressed systematically in five steps:

- 1) Identify the hazards;
- 2) Identify who may be harmed or what may be damaged, and how;
- 3) Evaluate the risk level;
- 4) Determine additional control measures (if required) and implement; and
- 5) Monitor and review effectiveness of the control measures.

4.2 Hazard Identification

4.2.1 Identification of Hazards

The first step in risk management is to identify hazards. There are many methods which can be employed for hazard identification. These include:

- a) Inspect and assess the workplace to identify what could reasonably be expected to cause harm. This may arise from work activities, plant and machinery or known hazards;
- b) Review existing incident reports and near miss reports from the actual workplace or from similar activities on other projects;
- c) Consult with management, workers and stakeholders to bring together different areas of expertise to identify hazards/risks that are not immediately obvious to everyone;
- d) Visit regulatory agency websites or contact HSE trade associations for practical guidance on where hazards occur and how to control them. Information may be available on the hazards that might affect the organisation;
- e) Check manufacturers' instructions or data sheets for chemicals and equipment as they can be very helpful in spelling out the hazards and putting them in their true perspective;
- f) Review accident, injury and ill-health records to help identify the less obvious hazards;
- g) Assess long-term hazards to health (such as high levels of noise or exposure to harmful substances) as well as safety hazards; and
- h) Make judgements based on experience and records, flow charts, brainstorming, systems analysis, scenario analysis and systems engineering techniques

Other important considerations while identifying hazards are:

- a) The more input / data, the better the result. This can include: hazard information, drawings, inspection reports, industry bulletins, and records of incidents, illnesses and disease);
- b) There are particular risks associated with each life cycle phase of the project (design, procurement, construction (and subcontracting), commissioning, operation (and maintenance) and decommissioning);
- c) Hazards/risks can arise from sources both internal and external to the Project, and may affect any levels/contexts/work processes within the Project.

4.2.2 Identification of Who/What is at Risk of Harm/Damage

For each hazard it is vital to be clear about who or what might be harmed or damaged, as it will help identify the best way of managing the risk. This involves identifying groups of people (e.g. 'people working in the storeroom' or 'passers-by'), objects (e.g. plant/machinery) or sensitive/ protected environmental areas (e.g. wetlands or forests).

In each case, it is very important to determine:

- a) Who faces these hazards (e.g. 'passers-by' or 'marine habitat');
- b) How many are at risk;
- c) How they might be harmed (e.g. what type of injury or ill-health might occur); and
- d) The degree of exposure to that risk.

It is also important to remember that some workers have additional difficulties, such as inexperienced workers, new or expectant mothers and people with disabilities that may put them at particular risk. Extra thought is also needed for some hazards:

- a) Cleaners, visitors, contractors, maintenance workers and similar, who may not be in the workplace all the time;
- b) Members of the public, if they could be hurt by Parsons activities; and
- c) Where Parsons is required to provide its services within a client's or other entity's workplace, or if the workplace is shared with other organisation(s), there should be an assessment of how Parsons work

affects others present, as well as how their work affects Parsons staff, as additional hazards could develop.

4.3 Risk Evaluation

Risk evaluation is about understanding the risk, determining if the risk needs additional controls, and identifying what the most appropriate and effective risk treatment strategy is.

A common method of risk assessment is a semi-quantitative analysis, where the qualitative descriptors of consequence and likelihood are given numerical values which are then used to give a risk rating. Consideration is given to the sources of risk, the resultant consequences and the probability of them occurring.

4.3.1 Existing Risk Controls

When considering risk controls, it is likely that all current work activities use some form of risk control, either documented (such as a JHA), or as accepted industry practice (such as fall protection). Therefore, the objective of a risk assessment should be to ascertain whether these existing risk controls are adequate and what risk controls are necessary to reduce the risk to a tolerable risk.

4.3.2 Evaluating Factors

Additional information or evaluating factors can be obtained from assessing the staff, workplace or environment to determine the relative consequence of a risk.

Environmentally, the evaluating factors from the discharge or emission of a pollutant include:

- a) Toxicity of discharge;
- b) Concentration of chemical / potential dilution;
- c) Duration/persistence of discharge and volume released;
- d) Proximity to water bodies or other sensitive receptors; and
- e) Area of land/marine waters affected.

From a safety and health perspective, evaluating factors can include:

- a) Size, shape, surface character and weight of materials that may be handled;
- b) The distance and heights to which materials have to be moved;
- c) Duration, frequency and locations of activities being undertaken;
- d) Competency of individuals undertaking activities; and
- e) Potential damage to assets (such as plant or premises) from activities.

4.3.3 Determination of Consequence

For a particular event, there may be a range of possible outcomes. For example, a person who slips on wet steps can have differing consequences and resulting degree of injury/illness/disability:

- a) Stagger but not fall; or
- b) Fall, which may result in a: bruise, broken limb or broken neck (death).

For risk assessments, five levels of severity of consequence have been used – insignificant, minor, moderate, major and catastrophic.

Table 4.1 below assigns a number to a consequence level (1-5) and provides definitions as to what that level means for impacts to health and safety, and the environment. Where there is doubt as to which outcome would have the highest risk level, both should be considered, with the highest one being selected.

Table 4.1 – Hazard Consequence.

Level	Descriptor	Health & Safety	Environment
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Level	Descriptor	Health & Safety	Environment
5	Catastrophic	Multiple fatalities or multiple permanent disabling injuries or disease.	Massive pollution with significant recovery work lasting more than 12 months. Global media interest. Significant permanent damage.
4	Major	Fatality or permanent disablement from injuries or disease. Long term absence.	Significant pollution with offsite impact and recovery work requiring 6 – 12 months to fix. Some permanent damage. National and regional media interest
3	Serious	Life threatening injury/major health affect to individual requiring medivac to hospital facilities. Short term absence from work.	Pollution with some offsite impact and recovery work lasting 1 – 6 months. Possible outside assistance required to contain. Some local media interest
2	Medium	Injury and illnesses requiring treatment by medically qualified person. Complete recovery. No lost time.	Minor pollution, slight or negligible impact, negligible remedial / recovery work lasting less than 1 month. Full recovery possible.
1	Minor	Injury which may or may not require first aid treatment. Slight health effect not affecting performance or causing absence.	Minimal pollution affect, contained locally. Complete recovery possible immediately.

4.3.4 Determination of Probability

Probability can be examined with regard to the chance or likelihood that a particular outcome will happen to any of the following:

- a) A single person or member of the general public;
- b) The project (more persons potentially exposed).

Table 4.2 below assigns a number to the probability. As can be seen, probability can be very variable. In order to protect people on a Project, the Likelihood Level for “Project” should be used.

Table 4.2 – Hazard Probability

Level	Descriptor	Health & Safety	Environment
5	Almost Certain	> 1 per week >25%	Continuous or will happen frequently
4	Likely	1 per week – 1 per month 10-25%	5 – 12 times per year
3	Possible	1 per year – 1 per years 1-10%	1 – 5 times per year
2	Unlikely	1 per year – 1 per 10 years 0.1-1%	Once every 5 years
1	Rare	< 1/10 years 0.1%	Less than once every 5 years

4.3.5 Determination of Risk Rating

The level of risk for each individual; hazard is calculated by multiplying the consequence level against the probably of occurrence. This will assist when determining the additional control measures (if required) that are needed.

Table 4.3 below shows a matrix (in the conventional format of consequence on the horizontal axis increasing to the right and probability on the vertical axis decreasing with height) which provides a consistent method of assessment.

Once the risk factor number (RFN) has been determined, the hazard is placed in one of four risk categories based on the score:

- Low Risk (hazard risk rating of 1-4)
- Moderate Risk (hazard risk rating of 5-11)
- High Risk (hazard risk rating of 11-19)
- Extremely High Risk (hazard risk rating of 20-25)

Table 4.3 – Risk Level Matrix

		CONSEQUENCE				
		1 Minor 1 st Aid First Aid Injury 1 < Qr10k	2 Medium MTI Medically Treated Injury Qr10K - Qr20k	3 Serious RWI Restricted Work Injury Qr20k – Qr50k	4 Major LTI Lost Time Injury Qr50k - Qr100k	5 Catastrophic Fatality > Qr100k
LIKELIHOOD	A – Almost Certain > 1 per week (>25%)	MODERATE 11	HIGH 16	EXTREME 20	EXTREME 23	EXTREME 25
	B – Likely 1/week – 1/month (10-25%)	MODERATE 7	HIGH 12	HIGH 17	EXTREME 21	EXTREME 24
	C – Possible 1/month – 1/year (1-10%)	LOW 4	MODERATE 8	HIGH 13	HIGH 18	EXTREME 22
	D – Unlikely 1/year – 1/10 years (0.1-1%)	LOW 2	LOW 5	MODERATE 9	HIGH 14	HIGH 19
	E – Rare < 1/10 years (0.1%)	LOW 1	LOW 3	LOW 6	MODERATE 10	HIGH 15
TOLERABILITY CRITERIA	RESIDUAL RISK RATING (after controls in place)	RESULT			CONTROL LEVEL (Authority)	
	EXTREME	Unacceptable			CEO / COO	
	HIGH	Undesirable			Lusail Project Manager	
	MODERATE	Tolerable, but risk should be reduced if reasonably practical			Supervisory Staff	
	LOW	Broadly acceptable			Procedural Control	

4.4 Risk Management and Control

4.4.1 Risk Management Action

The risk level will determine what corrective action is required in order to manage the hazard at an acceptable and ‘as low as reasonably practicable; (ALARP) risk level, as well as the timeframe for implementation. The higher the risk level, the more senior the management level responsible for risk control action approvals and the more urgent the action timeframe (unless work has not yet started, or has been stopped pending risk control action).

It should be remembered that all incidents must be reviewed in light of the proposed and actual risk controls existing at the time of the incident. Any necessary re-assessment of the risk level associated with that incident shall be communicated to all relevant persons both on and off site.

4.4.2 Risk Treatment

The options for risk treatment are;

- a) **Accept** – accept the risk where the risk level is estimated to be within the tolerable risk range. If some risk remains, it is called retained risk (tolerable risk) and financially may be treated by self insurance;
- b) **Avoid** – by deciding not to proceed with that activity;
- c) **Transfer** – in full, or in part, to another party (i.e. a specialist). However, it is important to note that some liability for that risk may still remain with Parsons. Methods used include transfer by subcontracting the work, obtaining suitable insurance or hedging;
- d) **Reduce** – Reduce the risk level to an acceptable level, either through reducing the consequence, the probability, or (preferably) both. Risk reduction shall utilize the generally accepted hierarchy of risk control.

4.4.3 Hierarchy of Risk Control

Control of identified hazards and risks shall, in the first instance, be in accordance with any regulatory authority requirement or mandatory Code of Practice. Where no regulation applies, the basic hierarchy of risk control is shown below, in reducing order of effectiveness.

From a health and safety viewpoint, the hierarchy of control is:

- a) **Elimination** – Eliminate the task or hazard/risk. This is a permanent solution, and the preferred option;
- b) **Substitution** – Substitution refers to the replacement of the source of the hazard / risk with a less hazardous one. This control basically reduces the possible consequence but not the likelihood;
- c) **Engineering controls** – Engineering controls involve some structural change, or re-design (including isolation) to the work process or work environment, to physically prevent, or reduce, exposure to the hazard. Generally, these controls reduce likelihood;
- d) **Procedural controls** – Procedural or administrative controls are dependent on appropriate human behaviour for effectiveness and generally reduce likelihood. These controls include such measures as:
 - i. Job Rotation To Restrict Exposure;
 - ii. Controlled Or Limited Entry To Hazardous Areas;
 - iii. Suitable, And Effective Supervision;
 - iv. Training, Education And Instruction Programs;
 - v. Preventative Maintenance Procedures;
 - vi. Proper Housekeeping; and
 - vii. Warning Signs.
- e) **Personal Protective Equipment (PPE)** – PPE places a barrier on the wearer to prevent exposure to the hazard, the success of which is dependent on: the suitability of PPE selected and used; and ensuring appropriate human behaviour by the wearer;

Wherever possible, elimination of a hazard/risk shall be the preferred control, followed by substitution, then engineering controls. These are permanent solutions, which are not dependent on compliance by people for success. Administrative controls and the use of PPE are the least desirable options, as they are dependent on compliance by personnel, which may necessitate increased levels of supervision

From an environmental viewpoint, the hierarchy of control is:

- a) Avoidance / Source Reduction;

- b) Re-use;
- c) Recycling;
- d) Recovery of energy;
- e) Treatment;
- f) Containment;
- g) Disposal; and
- h) Remediation and clean up.

4.4.4 Residual Risk

Once the appropriate risk control measures have been selected, the new Probability and Consequence of the hazard are reassessed to calculate the Residual Risk level that remains, which is documented on the HSE Risk Register (Attachment [LUS-HSE-FM4-446-083](#)). This Residual Risk shall be assessed and evaluated using the same processes as before.

- a) Where the Residual Risk Number (RRN) is 6 or greater, a detailed Job Hazard Analysis (JHA) for the particular task is to be prepared with controls established to manage the risk.
- b) Where the Residual Risk Number is greater than 15 a hazardous operations (HAZOP) study of the task may be undertaken before the JHA is prepared. The Project Manager shall convene the HAZOP study which shall include supervisory staff responsible for the operation, Contractor's supervisory staff and the Project HSE Representative.
- c) Where the initial Risk Factor Number (RFN) was greater than 6 and is now subsequently reduced to a Residual Risk Number of less than 6 through risk mitigation, a JHA shall be produced and completed to ensure that the mitigating actions are in place and effective.

It requires consideration of different options to ensure risk is reduced to a level whereby the cost or effort for any further reduction is grossly disproportionate to the risk reduction achieved.

4.4.5 Preparation of a Job Hazard Analysis

Job Hazard Analysis (JHA) (Attachment [LUS-HSE-FM4-446-084](#)) shall be prepared for all method statements; however, for individual tasks on the project identified through the risk assessment process as having a Residual Risk Number greater than 6 an individual JHA shall be prepared. They will be undertaken before the task starts and shall be:

- a) In conjunction with a Project HSE Representative; and
- b) Together with workers from the work crew experienced in the task (if possible).

The completed JHA shall be reviewed with the Job Hazard Analysis Evaluation Checklist (Attachment [LUS-HSE-FM4-446-084](#)) and approved by the Project Manager and posted on site.

4.4.6 Implementation of Control Measures

When the appropriate control measures are identified, an action plan is formulated to address:

- a) Roles, responsibilities and accountability for hazards;
- b) Training required for the relevant parties;
- c) Communication to relevant parties (workers, members of public, etc) of any changes to existing tasks or activities in light of the risk assessment and the reason why
- d) Timeframes for completing the actions;
- e) Any required changes for the HSE management systems and associated documents/procedures
- f) Procedures for monitoring, maintenance, inspection and quality assurance to check on effectiveness of control measures.

4.5 Monitoring and Reviewing

4.5.1 Monitoring

Ongoing monitoring of the effectiveness of the control measures will be undertaken by the HSE Representative through actions such as observation/inspections, review of maintenance logs, and discussion with workers undertaking the activity

Adequate supervision should be provided to verify that the new control measures are being implemented and used correctly.

4.5.2 Review

The risk management process for a particular task or process shall be reviewed:

- a) As a result of any incident or near miss associated with the works;
- b) Any change in the method of work;
- c) At the end of the task if it is considered that a better method could be employed;
- d) Prior to the task commencing the next time;
- e) As a result of an inspection or audit finding; and/or;
 - i. Prior to the task commencing on the next project.
 - ii. At least once annually for tasks and activities with implementation periods exceeding 12 months.

Where it is considered that a better way or more effective controls could be used, or in the light of any incident, the risk management process shall be reviewed and revised accordingly. Any changes shall be approved by the Project Manager and communicated to all relevant persons both on and off site in a timely manner.

4.5.3 Records

The HSE Risk Register, JHA and shall be kept in a designated file for record and reference purposes by the Project HSE Department.

4.5.4 Audit

The risk management process shall be audited as part of the EHSMS Audit according to the audit schedule and appropriate recommendations made and subsequently implemented as required.

4.6 Communication of Risk Management Controls

Workers and other relevant parties identified through the risk management process as being at risk shall be given suitable information and training in the risk management controls selected and documented on the HSE Risk Register and the JHA. Records of attendance will be kept and maintained.

4.6.1 Communication Tools

The information is usually disseminated is on site through Pre-mobilisation and Tool Box Meetings. Should there be specialist training identified (eg Tag Out/Lock Out, special insurance requirements, etc.), this shall be given by suitably qualified personnel to those people who require it.

The outcomes of risk assessments shall then be communicated as Procedures, Project Instructions, Work Method Statements, JHA's as required and will be posted on site.

4.6.2 Competent Person

Those carrying out risk assessments should be competent to do so as certain situations will require that person to have a high level of knowledge and experience of the subject along with a understanding of the process being assessed.

Parsons will check that the competent person has the appropriate HSE qualification (some of which may be competency based and/or industry specific) or membership of a professional body or similar appropriate organisation to confirm that they have a sufficient level of competence. In certain situations, additional support in the form of an industry expert for complex processes and/or employees who undertake the task in question

4.6.3 Training

Those persons performing, facilitating and reviewing the Risk Assessment processes of the organization or project shall undergo formal training in Risk Assessment methodology. A record shall be kept and maintained of those who attended the training

The Project Manager and/or Project HSE Representative shall carryout site-specific hazard recognition training during the construction phase, when new or unrealized hazards are identified, for all project-based employees that are exposed to potentially hazardous work zone activities and environments, before work commences.

5. Documentation

The Contractor maintains project records at the site for the duration of the project and archives them for a minimum retention time of 10 years from creation date.

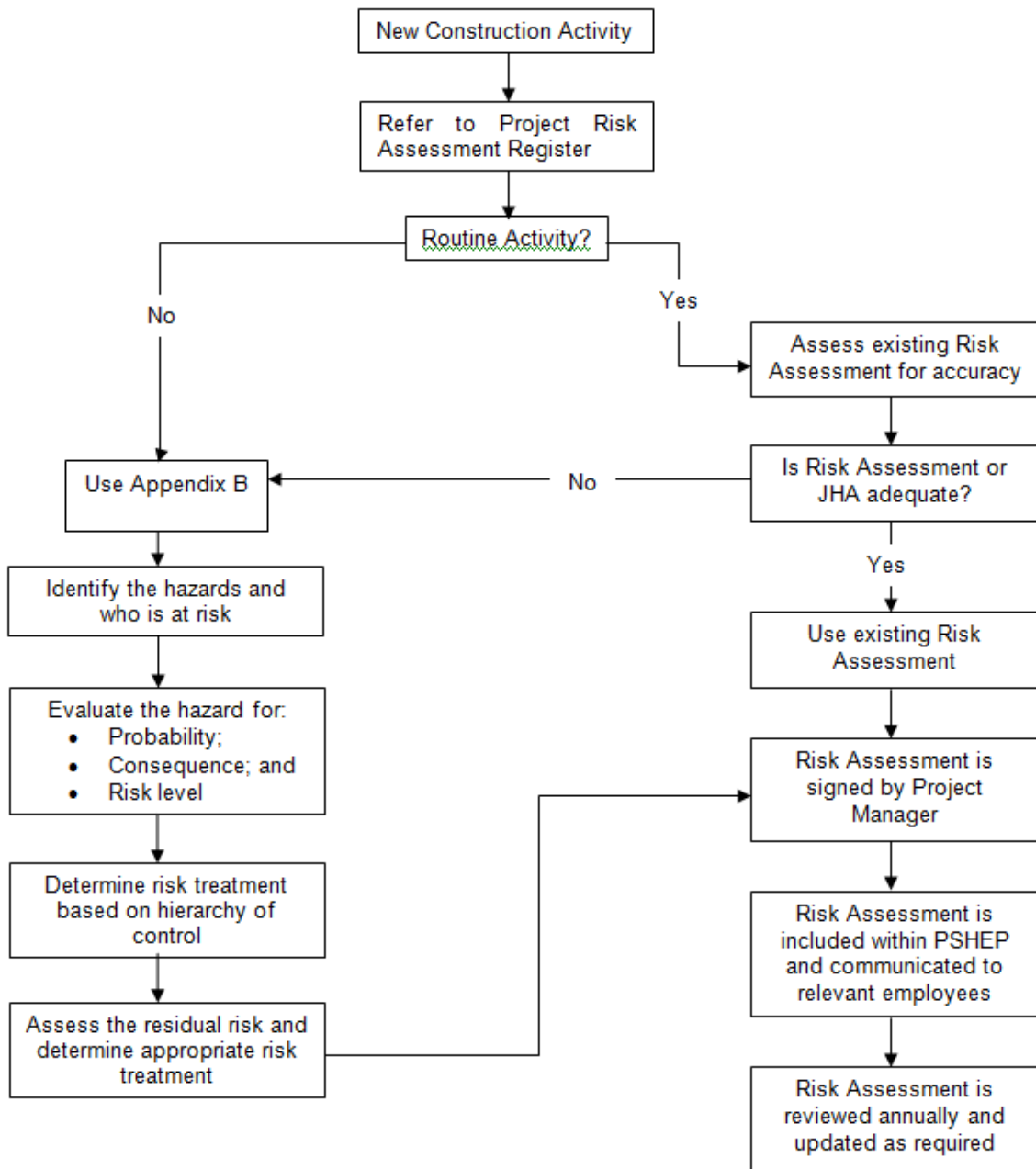
6. References

Qatar Construction Specifications 2010 Section 11 Part 2.3 "Safety, Health And Environment Procedures"

Qatar Construction Specifications 2010 Section 11 Part 2.4 "Risk Assessment Guides"

7. Appendix

Appendix A – Risk Assessment Flowchart



8. Attachments

[LUS-HSE-FM4-446-083](#)

HSE Risk Register

[LUS-HSE-FM4-446-084](#)

Job Hazard Analysis Form

[LUS-HSE-FM4-446-085](#)

Job Hazard Analysis Evaluation Checklist