



# Lusail Real Estate Development Company

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

### Lusail Construction Safety Management Procedure – Demolition

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## 1. Description

This element of the LCSMP details Lusail Construction HSE requirements for demolition activities such as plant decommissioning. This element applies to all Lusail personnel, Contractors, Developers, Consultants and subcontractors working on the Lusail projects.

Each client is responsible for the overall safety and environmental control of a site until demolition is completed, even though Lusail Construction HSE typically performs most of the work.

## 2. Definitions

Term	Description
Job Hazard Analysis (JHA)	A process used to identify the hazards or potential hazards associated with each step of a job or work plan to uncover hazards and then eliminate, control, or remove them before the work is started.
Hazard Analysis Team	May consist of qualified Construction HSE or third-party consultant personnel. Such persons provide required detailed knowledge about electrical services, isolation systems, drains, methods of cleaning or inerting contaminated plants, and interaction with third parties.

## 3. Responsibilities

The Contractor is fully responsible for the pre-planning, development of Method Statements, Job Hazard Analysis, overall safe work planning and implementation. Project Management is responsible for the assurance that all work is planned and conducted according to the pre-planning documents; 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 shall apply.

## 4. Surveys

Before a demolition plan can be developed, the Contractor hazard analysis team surveys the site to determine the nature and extent of any hazards and to facilitate the creation of an appropriate demolition plan which adequately accounts for all known and potential hazards which may be encountered during each phase of the demolition activities. During this and subsequent phases of a project, hazard analysis teams are assisted by personnel familiar with demolition operations, equipment to be used, and order of demolition steps.

An engineering survey must be performed by qualified engineers. The survey must include the following elements:

- Condition of the structure to be demolished as it pertains to framing, floors, and walls
- Risk of unplanned collapse
- Condition of any adjacent structure where workers may be exposed to risk
- Hazardous substances

A demolition survey must be performed by a certified building inspector and a trained lead inspector to identify asbestos and lead building materials in accordance with [LUS-HSE-WG3-446-035](#), Toxic & Hazardous Substances.

At a minimum, survey reports must answer the following questions:

- What plans for plant, or site and surrounding areas, are available that show access roads, services to the site, relationship of any pipelines to nearby third-party sites, and modifications or alterations to the original arrangements?
- Does the location of the demolition site affect the neighborhoods (e.g., noise, dirt, vibration, or risk of collapsing structure)?
- What are the electrical zone classifications for adjacent areas where operations may continue during demolition?

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- Is access to the plant or site for initial inspection safe, both above and below ground?
  - Has the plant or site been adequately decommissioned or otherwise made safe? What records are available?
  - Have tanks and systems intended to contain hazardous process materials been cleaned out, purged, and/or rendered inert? What is the frequency of checks for flammable or toxic materials during the project? Are the roofs of floating roof tanks adequately supported? What safety requirements are provided for entry into columns or vessels?
  - Does any plant require specialist attention to deal with residual toxic materials such as asbestos and lead compounds?
  - Have hazardous substances/residues collected in any areas? Do any vessels have separate linings that might release flammable or toxic residues on demolition or heating? Is there evidence of soil or surfaces contaminated with oil or other hazardous deposits?
  - What is under the ground? Does the site include locations where heavy loads cannot be placed safely? Is there a requirement to provide new access roads? Do any conditions limit excavation?
  - Do any height conditions restrict operations, especially overhead power lines?
  - Can the plant or site be easily isolated from all external services? Must some services be retained or diverted, such as electricity, air, water, steam, or sewage? Can these services be adequately identified? Have utility companies been notified?
  - Are the existing provisions for firefighting and emergency medical services adequate? If not, how is adequate coverage provided? Is adequate telephone communication to outside emergency services available?
  - Must external authorities be notified? Who is responsible for such notification?
  - Must adjacent plant or property be protected from the effects of demolition such as ground vibration, dust, and missiles? Have property owners of adjacent properties been notified of scheduled demolition activities?
  - Will demolition affect the integrity of an adjacent plant or property? Could land slip occur? Will people have to be evacuated? Could leakage or hazardous substance emissions occur, offsite?
  - How are safe areas defined for cutting, cleaning, storing, or handling dismantled materials without posing danger to site operators or other personnel?
  - Could the local climate or weather (wind, heat, cold, snow, tides, waves) adversely affect the safety of a demolition project?
  - What security arrangements are required to protect any adjacent plant or property?
  - How is the removal of commercially valuable scrap metals (e.g., nonferrous metals and mercury) being controlled and monitored to protect the interests of the client and contractor?

Detailed written demolition survey reports shall be filed with the Project Manager. The survey reports become the basis for developing a project demolition plan.

## 5. Health Safety & Environmental Review

Contractors shall be required to conduct a formal review to determine that, as far practicable, all aspects of the work relating to health, safety and environmental management have been adequately considered and included in the surveys and pre-planning process.

The review team includes members of the Lusail HSE Department and the Supervising Consultant who have as much direct experience of and familiarity with a particular operation or site as possible. The review includes the following activities:

- Precisely define the scope of demolition work.
- Identify each plant process material or service to be isolated and specify the method of isolation. All pipe work, ducting, and cables, both above and below ground, must be taken into account.
- Identify all hazardous substances likely to be encountered during demolition or dismantling. Methods of handling and disposal, and personnel protection, must take into account, as well as applicable statutory requirements for transport and disposal.

- If practical, remove all hazardous/toxic substances before demolition commences. Specialist contractors may be required to safely remove asbestos, lead compounds, and sludge in accordance with [LUS-HSE-WG3-446-035](#), Toxic & Hazardous Substances.
- Critically examine systems and procedures for controlling hot work.
- Note any limiting conditions or circumstances that the Contractor might have to be aware of to perform the demolition safely. Such conditions include limits on work hours, permit system operation, and special environmental considerations.
- Specify requirements for initial medical examination of all Contractor employees, especially if site cleanup involves burning lead or lead-coated materials.

These precautions are intended to place most of an installation into a clean state, free from oil, gas, and other hazardous substances, and reduce the possibility of incident occurrence.

Activities containing environmental issues to be considered include:

- Disposal of demolition debris or potential spillage of hazardous materials
- Identifying potential traffic hazards while in transit
- Disposing of hazardous waste
- Cutting up and removing plant components
- Burning wood and other combustibles, taking into account possible toxic fume release
- Draining lakes and reservoirs and pumping out sumps, tanks, and drains
- Filling shafts, pits, trenches, sumps, and tunnels
- Removing or making safe underground pipe work, cabling, foundations, and pilings
- Removing superstructure and pilings from jetties
- Landscaping, grading, and reinstating land or fences for cross-country pipelines
- Transporting or towing heavy plant or structures to another site or location for demolition

## 6. Contractor Selection

To protect the interests of Lusail and/or the plant owner, demolition Contractor selection criteria must include the Contractor's ability to manage the health, safety and environmental impact of its operations, in accordance with the Lusail Construction Safety Management Procedures Manual. When possible, arrange visits to sites where demolition Contractor candidates are currently working to assess their programs.

Criteria to be used when selecting demolition Contractors includes:

- Is the candidate Contractor a member of a national federation of dismantling and demolition contractors or of an appropriate regulatory body? Is each candidate familiar with recognized standards for demolition?
- What is the Contractor's previous experience?
- Are contract bidder's being required to submit outlines of planned demolition sequences and methods to be used?
- What is the Contractor's policy and organization for health, safety and environmental control? Does the Contractor have formalized safety management procedures? What are the Contractor's accident and injury statistics?
- To what extent will work be delegated to subcontractors? What is the Contractor's experience with handling subcontractors in various disciplines? What types of contracts and methods of reimbursement will be used?
- Does the Contractor have special procedures for dealing with identified hazards?
- Is the Contractor aware that its HSE performance will be formally monitored by Lusail?

When possible, the principal Contractor identifies the proposed subcontractors he will use before a tender is accepted. Although Lusail may not directly control the selection of subcontractors or specialist equipment, they have a duty to determine safe work practices on behalf of employees and all others on the site or living nearby.

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If an unavoidable change of subcontractors occurs during the period of contract performance, the principal Contractor must inform the Lusail Representative in advance of any potential problems.

Qatar statutory requirements may regulate the use of explosives, underwater work, or other operations, and Contractor site management must be prepared to review and comply with all relevant regulations.

The Contractor HSE Representative is responsible for determining that all Contractor and subcontractor personnel are informed of/ trained on Lusail HSE policies and procedures, site emergency procedures, and that personnel are trained and qualified for the work activities they are assigned.

## 7. Project Demolition Plan

Before a demolition project commences, Lusail, Supervising Consultant, and Contractor Representatives and (where required) regulatory agencies meet to discuss proposed work procedures and address the proposed Project Demolition Plan (Plan). Following these discussions, the Contractor competent persons is required to prepare and submit a draft Plan that summarizes the demolition and HSE procedures which will be adhered to during all phases of demolition.

The Contractor must ensure that the Plan is prepared in accordance with applicable Qatar laws and Lusail HSE Procedures. The Plan must be approved by the Supervision Consultant overseeing the project and reviewed by the Lusail HSE Department before any demolition work begins.

Proposed modifications to the Plan must be communicated to the Supervising Consultant and Lusail HSE prior to implementation. Any changes made to the demolition sequence, equipment used, order, personnel, etc. must be documented in the Plan.

At a minimum, the project demolition Plan shall include the following information:

- The permit to work system to be used for access, cleaning, removal, and hot work
- Provisions for isolating plant and services
- Job responsibilities, terms of reference, and reporting responsibilities for the contractor's site managers and supervisors
- The contractor's system for managing the health, safety and environmental issues resulting from its operations and those of its subcontractors
- Responsibility for reporting and investigating accidents and near accidents
- Training required for contractor employees involved in demolition activities
- Provisions for managing hazardous substances:
  - Before demolition work can begin, potential hazards in the area (identified through AHAs and the surveys) must be removed or otherwise determined to be safe. To the extent possible, steps will be taken with the support and confirmation of the plant operations personnel during the plant decommissioning phase.
  - Approach to monitoring for hazardous materials and substances, in accordance with LCSMP 09-00, Exposure Identification & Controls
  - How will materials disposal be controlled? Refer to [LUS-HSE-WG3-446-035](#), Toxic & Hazardous Substances.
  - Proposed procedure for removal, handling and disposal of hazardous waste, in accordance with [LUS-HSE-WG3-446-013](#), Construction Hazardous Waste Management & Operations
  - Methods used for demolition work inside confined spaces, in accordance with [LUS-HSE-WG3-446-015](#), Confined Space Entry
  - Methods for sealing off drains that may release toxic or flammable materials, in accordance with [LUS-HSE-WG3-446-023](#), Lockout/Tagout (LOTO)
  - Methods for cutting up debris that has been in contact with asbestos insulating materials and/ or lead compounds, in accordance with [LUS-HSE-WG3-446-035](#), Toxic & Hazardous Substances.
- Provisions for first aid medical facilities, in accordance with [LUS-HSE-WG3-446-002](#), First Aid

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- Provision of temporary services for the demolition crew, including lighting, telephones, power, water, and sewage disposal, in accordance with [LUS-HSE-WG3-446-005](#), Field & Office Facilities
  - The types of PPE to be provided and used by demolition workers
  - Procedures for dealing with emergencies, including site evacuation arrangements, alarm signals, and assembly areas, in accordance with [LUS-HSE-WG3-446-011](#), Emergency Planning & Response.
  - Provision of fire prevention, detection, and extinguishing systems and location of fire alarms and fire points, in accordance with [LUS-HSE-WG3-446-012](#), Fire Protection.
  - Means of defining demolition site boundaries and controlling access of both personnel and vehicles, in accordance with [LUS-HSE-WG3-446-016](#), Signs, Barricades, and Traffic Control.
  - Proposed means of storing and issuing gas cylinders and checking their correct use, in accordance with [LUS-HSE-WG3-446-017](#), Hazardous Material Handling, Transportation, and Storage
  - Provision for utilization of cranes and hoisting equipment during demolition activities, per [LUS-HSE-WG3-446-026](#), Cranes, Hoists, and Lifts
  - Methods for gas cutting or debris, in accordance with [LUS-HSE-WG3-446-028](#), Welding, Cutting, and Brazing
  - Special equipment and techniques such as explosives, thermal lance, water jet cutting, diving, and work in inert atmospheres that may be required
  - Contractor-proposed procedures for demolishing structures

The demolition Contractor is responsible for keeping records indicating the condition of each plant item, the date of preparation for demolition, and the person(s) responsible.

The demolition Contractor removes any serviceable equipment to be retained or sold and places it in a specified storage location after it has been made safe. Lusail shall be consulted shall be consulted with regard to salvage rights or demolition debris.

## 8. Demolition Work Requirements

- Remove floors, walls, masonry sections, chimneys, debris, and steel in accordance with technical specifications.
- Begin demolition of floors and exterior walls at the top of the structure and proceed downward; except for cutting holes in floors for chutes, holes through which to drop materials, preparation of storage space, and similar preparatory work.
- Shore up any weakened or otherwise unstable infrastructure made unsafe by demolition to safely carry the intended imposed load for demolition.
- Protect all workers from falls and falling objects at all times during demolition.

### 8.1 Provisions for Mechanical Demolition

- No person is permitted in any area that can be affected by demolition when balling or clamming is being performed. Only those persons necessary for the operations, and who are properly safeguarded, are permitted in these areas at any time.
- The weight of the demolition ball cannot exceed 50% of the crane's rated load capacity, based on the length of the boom and the maximum angle of operation at which the demolition ball is used; or it cannot exceed 25% of the nominal breaking strength of the line by which it is suspended, whichever is less.
- The crane boom and load line must as short as possible.
- Attach the ball to the load line with a swivel connection to prevent twisting of the load line; attach the ball by positive means so that it cannot accidentally disconnect from the line.
- When demolishing walls or portions of walls, cut free all steel members which may affect the manner in which the wall falls creating a hazard.
- Before pulling walls over, remove roof cornices or other ornamental stonework.



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## 8.2 Provisions for Clearing Operations

Brush-clearing crews must stay well ahead of tree-felling operations. Power saw operators must comply with all manufacturers operating instructions, and hand tool and chainsaw requirements in [LUS-HSE-WG3-446-029](#), Tools. Before felling a tree, give ample warning.

Do not operate heavy equipment in the clearing areas until all hand-clearing operations are completed. Operate heavy equipment in accordance with [LUS-HSE-WG3-446-025](#), Motor Vehicles and Heavy Equipment.

Do not use gasoline to start brush fires. Use kerosene or diesel fuel only after obtaining required burning permits and having appropriate firefighting equipment available, in accordance with [LUS-HSE-WG3-446-012](#), Fire Protection. Do not set fires when winds could cause spreading.

## 8.3 Provisions for Tree Removal

Trained workers conducting tree maintenance or removal must be under the direction of a qualified tree worker.

Employees working near electrical equipment or conductors must consider all such equipment or conductors energized with potentially fatal voltage, in accordance with [LUS-HSE-WG3-446-024](#), Electrical. Contractors shall coordinate with utility companies well prior to placing workers in trees where exposure to electrocution exists.

During tree working operations, a second worker in the vicinity maintains communications

- Above a height of 3.6 meters (12')
- Near electrical equipment or conductors

The Contractor is responsible for inspection, maintenance, repair and use of sawing equipment in accordance with the manufacturer's instructions and Lusail Procedures. The Contractor shall ensure that all tree removal workers exposed to falls in excess of 1.8 meters (6" are provided with an approved means of personal fall arrest.

## 9. Project Oversight

After demolition begins, the Contractor, Supervising Consultant, and Lusail Representative must meet at least once each week to monitor progress. Any problems that may have arisen during the previous week are resolved during these meetings. The proposed work plan for the coming week is reviewed and relevant health, safety or environmental control aspects highlighted.

In addition to weekly progress meetings, Lusail HSE will monitor Contractor HSE compliance and performance on a weekly basis (minimum). When necessary, Lusail may implement stop work authority when work activities present imminent danger hazards to workers or adjacent properties and bystanders.

Supervising Consultants will provide the Contractor with day to day project management oversight services. Supervising Consultants will manage the Contractor with full intention of ensuring demolition safety and compliance with Lusail HSE policies and procedures.

## 10. Training

The Contractor shall train all employees exposed to demolition hazards, and associated hazards resulting from demolition. The Contractor shall be responsible for ensuring that all subcontractor workers have received the required training prior to starting work.

The Contractor HSE Representative arranges employee training at the time of initial assignment. Supervisors are responsible for identifying additional employee training needs during safety planning (2-week look-ahead).

Using an acceptable training form, the HSE Representative maintains a record of all training or instruction given to employees.

## 11. Documentation

The Contractor must provide documentary evidence on file in the site office as required by State of Qatar regulatory agencies and Lusail. Examples include:

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- Current and valid inspection and test certificates of cranes and hoisting devices, lifting tackle, air receivers, and other critical equipment
  - Employee training records
  - Incident investigation reports
  - Medical surveillance monitoring
  - Waste transportation and disposal manifests, log books, disposal tickets, etc

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

## **12. References**

Qatar Construction Specifications 2010 Section 11 Part 1.2 “Occupational Health and Hygiene”

Qatar Construction Specifications 2010 Section 2 Part 2 “Building Demolition”