



# Lusail Real Estate Development Company

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

### Lusail Construction Safety Procedural Forms/Checklists – Support Systems

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## Support Systems

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The competent person selects the design of support systems, shield systems, and other protective systems to be constructed in accordance with one of the following options.

### **Option 1: Designs Using OSHA Criteria**

Use timber shoring and aluminum hydraulic shoring in accordance with OSHA criteria.

### **Option 2: Designs Using Manufacturer's Tabulated Data**

Construct support systems, shield systems, or other protective systems (e.g., trench boxes), drawn from manufacturer's tabulated data, and use them in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer are allowed only after the manufacturer issues specific written approval.

Manufacturer's specifications, recommendations, and limitations—and manufacturer's approval to deviate from the specifications, recommendations, and limitations—must be kept in written form at the jobsite during construction and use of the protective system. After that time, this data may be stored off the jobsite, but a copy must be available to consultant and Lusail upon request.

### **Option 3: Designs Using Other Tabulated Data**

Select the designs of support systems, shield systems, or other protective systems in accordance with tabulated data, (e.g., tables and charts) and construct them accordingly. The tabulated data must be in written form and must include all of the following information:

- Factors that affect the selection of a protective system drawn from such data
- Limits of use of the data
- Information needed by the user to select the correct protective system from the data

At least one copy of the tabulated data, identifying the registered professional engineer who approved the data, must be maintained at the jobsite during construction and use of the system. After that time the data may be stored off the jobsite, but a copy of the data must be made available to the consultant or Lusail upon request.

### **Option 4: Design by a Registered Professional Engineer**

Support systems, shield systems, and other protective systems not using the options detailed in Options 1, 2, or 3 above must be approved by a registered professional engineer. Designs must be in written form and must include the following:

- A plan indicating the sizes, types, and configurations of the materials to be used in the protective system
- The identity of the registered professional engineer approving the design

At least one copy of the design must be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design must be available to the consultant and client upon request.

### ***Materials and Equipment***

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Materials and equipment used for protective systems must be free from damage or defects that might affect their proper function.

Manufactured materials and equipment used for protective systems must be used and maintained in accordance with the recommendations of the manufacturer, and in a manner that prevents employee exposure to hazards.

If material or equipment used for protective systems is damaged, the competent person must ensure that these systems are examined by a qualified person to evaluate its suitability for continued use. If the competent person cannot assure the material or equipment can support the intended loads or is otherwise suitable for safe use, then such material or equipment must be removed from service. These materials or equipment must be evaluated and approved by a registered professional engineer before they are returned to service.

### ***Installation and Removal of Support***

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Members of support systems must be securely connected together to prevent sliding, falling, kickouts, or other potential hazards.

Support systems must be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

Individual members of support systems cannot be subjected to loads that are greater than those they were designed to withstand.

Before temporary removal of individual support members begins, additional precautions must be taken as directed by the competent person to ensure the safety of employees. These precautions could include the installation of other structural members to carry the loads imposed on the support system.

Removal of support systems must begin at, and progress from, the bottom of the excavation. Members must be released slowly. If there is any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation, the work must be halted until it can be examined by the project manager.

Backfilling must progress together with the removal of support systems from excavations.

Additional requirements for support systems for trench excavations are as follows:

- Excavation of material to a level no greater than 2 feet below the bottom of the members of a support system is allowed, but only if the system is designed to resist the forces calculated for the full depth of the trench. While the trench is open, there must be no indication of a possible loss of soil from behind or below the bottom of the support system.
- Installation of a support system must be closely coordinated with the excavation of trenches.

***Shield Systems***

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Shield systems cannot be subjected to loads that are greater than those they were designed to withstand.

Shields must be installed in a manner that restricts lateral or other hazardous movement of the shield that could occur during cave-in or unexpected soil movement.

Employees must be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

Employees are not allowed in shields when shields are being installed, removed, or moved vertically.

In trench excavations, excavation of material to a level no greater than 0.6 meters (2') below the bottom of the shield system is allowed, but only if the system is designed to resist the forces calculated for the full depth of the trench. While the trench is open, there must be no indication of a possible loss of soil from behind or below the bottom of the shield system.