Lusail Real Estate Development Company

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

Lusail Construction Safety Management Procedure – Walking & Working Surfaces

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Amendment Record

This document is reviewed to ensure its continuing relevance to the systems and process that it describes. A record of contextual additions or omissions is given below:

Rev .No	Description / Comments	Prepared By	Checked By	Approved By	Issue Date
1	(Pg. 1) Company Propriety Information – Not controlled if printed has been added.	HSE Working Group	Michael Ford	Uwe Krueger	1st April 2015
1	(Pg. 2) Revised Amendment Table	HSE Working Group	Michael Ford Michael Ford	Uwe Krueger	1st April 2015

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1. Description

This element of the LCSMP provides requirements for floors, platforms, stairs, and walkways, including guardrail and toeboard systems. This element applies to all Lusail personnel, Contractors, Developers, Consultants and Subcontractors working on the Lusail Development Project.

This element contains supplementary information on fall protection, including guardrail and toeboard system requirements. This element does not cover personal fall arrest or fall restraint systems, which are covered in **LUS-HSE-WG3-446-022**, Fall Protection. This element does not cover scaffolds, which are included in **LUS-HSE-WG3-446-020**, Scaffolding Systems.

2. Definitions

Term	Description
100% Fall Protection	The design and use of a fall protection system so that no exposure to an elevated fall occurs at any time. This may require more than one fall protection system, lanyard, or combination of multiple fall protection systems.
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.
Competent Person	An individual who has successfully demonstrated a thorough knowledge and understanding of fall protection systems and requirements, is capable of identifying deficiencies in systems, and has the authority to take prompt corrective action.
Floor Hole	An opening measuring >1 inch but <12 inches in its least dimension in any floor, roof, or platform through which materials but not persons may fall (e.g., a belt hole, pipe opening, or slot opening).
Floor Opening	An opening measuring 12 inches or more in its least dimension in any floor, roof, or platform, through which persons may fall.
Guardrail System	A physical barrier erected to prevent employees from falling to lower levels. Guard railings consist of top, mid and toe railings with vertical stanchions, and meet specific requirements for deflection, height, and strength.
Handrail	A rail used to provide employees with a handhold for support.
Infeasible	Not possible; that is, it is impossible to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or it is technologically impossible to use any one of these systems to provide fall protection.
Leading Edge	The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) that changes location as additional floor, roof, decking or formwork sections are placed, formed, or constructed. A leading edge is considered to be an “unprotected side and/ or edge.”
Lower Levels	Areas or surfaces to which an employee can fall. Such areas or surfaces include ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

Term	Description
Low-Pitched Roofs	Roof slopes (vertical to horizontal) greater than 4:12.
Mechanical Equipment	All motor- or human-propelled wheeled equipment except for wheelbarrows, mopcarts, robotic thermoplastic welders, and robotic crimpers.
Nose or Nosing	That portion of a stair tread projecting beyond the face of the riser immediately below.
Platform	A walking/ working surface for persons, elevated above the surrounding floor or ground (e.g., a balcony or platform for the operation of machinery and equipment).
Roof	The exterior surface on the top of a building. The roof does not include floors or formwork which, because a building has not been completed, temporarily becomes the top surface of a building.
Roofing work	The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.
Runway	A passageway for persons, elevated above the surrounding floor or ground level (e.g., a footwalk along shafting or a walkway between buildings).
Safety Monitoring System	A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards, which utilizes no additional material fall protection systems.
Stair Platform	An extended step or landing breaking a continuous run of stairs.
Stairrail System	A vertical barrier erected along the unprotected sides and edges of a stairway to prevent employees from falling to lower levels. The top surface of a stairrail system may also be a “handrail.”
Stairs or Stairways	A series of steps leading from one level or floor to another, or leading to platforms, pits, boiler rooms, crossovers, or around machinery, tanks, and other equipment that is used more or less continuously or routinely by employees or only occasionally by specific individuals. A series of steps and landings having three or more risers constitutes stairs or a stairway.
Standard Railing	A vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.
Standard Strength and Construction	Any construction of railings, covers, or other guards that meets the requirements of this LCSMP element.
Toe Board	A low protective barrier that is attached to a guard rail system at floor or slab level that prevents rolling or sliding materials and equipment from falling to lower levels.
Tread Depth	The horizontal distance from front to back of tread (excluding nosing, if any).
Unprotected Sides and Edges	Any side or edge (except at entrances to points of access) of a walking/working surface (e.g., floor, roof, ramp, or runway) where there is no wall or guardrail system at least 39 inches (1.0 m) high.

Term	Description
Wall Opening	An opening at least 30 inches high and 18 inches wide in any wall or partition through which persons may fall (e.g., an opening for a window, yard arm, doorway, or chute opening).
Walking/Working Surface	Any surface, whether horizontal or vertical, on which an employee walks or works, including floors, roofs, ramps, bridges, runways, formwork, beams, columns, trusses, and concrete reinforcing steel. Walking/working surfaces do not include ladders, vehicles, or trailers on which employees must be located in order to perform job duties.
Warning Line System	A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and that designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.
Work Area	That portion of a roof where roofing work is being performed.

3. Responsibilities

The Contractor is fully responsible for the pre-planning, development of Method Statements, Job Hazard Analyses, 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 shall apply.

4. Fall Protection

Before permitting employees to enter areas where fall hazards exist, the Project Manager and HSE Representative ensures that 100% fall protection is provided in accordance with **LUS-HSE-WG3-446-022**, Fall Protection.

Conventional fall protection systems, defined as a personal fall arrest system, fall restraint, guardrail systems, or safety nets, are required for employees working in the following areas:

- 1.8 m (6') or higher above a lower level
- At the edge of excavations greater than 6 feet deep where excavations are not readily seen because of plant growth or other visual barrier, or that require employees to enter, travel, or work on the vertical wall of the excavation or on any other structure in the excavation
- On access ways or work platforms over water, machinery, or dangerous operations
- On runways from which they may fall 1.2 m (4') or more

JHAs, prepared for jobs or tasks where means of access to work areas are used, must resolve the following issues:

- Design, construction, and maintenance of the means of access
- Provision of fall protection for users
- Erection and dismantling procedures

5. Floors and Platforms

5.1 Weight Capacity

A qualified engineer designated by the Contractor assigns a maximum approved load rating to all elevated floors or platforms that could cause injury due to collapse. Floors that could be overloaded must be posted with the maximum approved load rating in languages understood by all workers.

5.2 Floor Openings and Holes

The Contractor shall ensure that workers creating holes or openings in walking and working surfaces are adequately barricaded or covered using one of the following methods:

- Standard guardrail
- Removable guardrail of standard construction
- Floor cover of standard strength and construction

Floor Openings: Floor openings are large enough to permit a person to fall through.

Floor Holes: Floor holes are greater than 1 inch in the least dimension but are not large enough to permit a person to fall through. Floor holes are tripping hazards.

- If a floor hole cover is removed, or if other uncovered temporary floor holes exist, ensure that the openings are constantly attended or protected by a standard guardrail.
- All guardrails provided around floor holes and openings shall be provided with standard toe boards.
- Protect hatchways and chutes by a hinged floor opening cover or railings that are fixed on at least two sides and removable on two or fewer sides.
- Guard skylight openings by a standard skylight screen or a fixed standard railing on all exposed sides.
- Equip walkways and bridges over excavations with standard guardrails. Provide adequate barriers at all excavations. Barricade or cover all wells, pits, shafts, etc.

5.3 Wall Openings and Holes

Wall Openings: Wall openings are large enough to permit a person to fall through. Every wall opening from which there is a drop of more than 1.2 m (4') must be protected to prevent accidental falls and injuries from falling objects. Use one of the following methods to protect a wall opening:

- Standard guardrail
- Removable guardrail of standard construction
- Rail, roller, picket fence, half door, or equivalent barrier

Wall holes: Wall holes are greater than 1 inch in the least dimension but are not large enough to permit a person to fall. If materials can fall through a wall hole, and the lower edge of the hole is less than 4 inches from the floor or platform, use one of the following methods to protect workers below from falling objects:

- Toe board
- Enclosing screen of solid construction

5.4 Open-Sided Platforms or Floors

- All open-sided platforms or floors more than 4 feet above the adjacent level must be guarded with standard guard railings.
- Provide toe boards if there is potential for falling tools or materials to strike workers below.
- If an open-sided platform or floor is adjacent to dangerous equipment (e.g. open chemical tanks), protect it with a standard guardrails, regardless of the elevation above the adjacent level.

5.5 Floor Covers

- Floor covers must cover all pit and trapdoor floor openings, and manhole floor openings.
- Covers must be capable of supporting, without failure, at least twice the maximum load expected to be placed on the cover at one time.
- Covers cannot project more than 1 inch above the floor level. The edges of all covers must be angled at thirty 30 degrees or less. All hinges, handles, bolts or other parts must be flush with the floor or cover surface.
- To prevent accidental displacement by the wind, equipment, or employees, Contractors shall secure all covers when they are installed.

- Ensure that all covers are color coded or are marked with the words “HOLE” or “COVER” and “DO NOT REMOVE” to warn of the hazard. This requirement does not apply to standard manhole covers or steel grates used in roadways.

5.6 Temporary Work Platforms/ Walkways

Contractors shall make every effort to ensure that all temporary platforms/ walkways, scaffolds, etc., regardless of height, are equipped with solid decks free of openings and with standard guardrail systems.

Personnel working from temporary work platforms or walkways not equipped with guardrail systems must wear approved personal fall arrest or restraint systems and have their lanyards properly secured to approved anchorage points at all times. Personnel who must lean through or over protective railings must also utilize additional fall protection.

6. Guardrails and Toeboards

6.1 Standard Railing Specifications

A standard guardrail has a top rail, intermediate rail, toe rail, and vertical posts. The standard height of a guardrail is 42 inches from the upper surface of the top rail to the floor. Guardrails must meet the following requirements:

- The ends of the top rail cannot create a hazard by extending beyond the terminal posts. The top rail must have a smooth surface to prevent snagging.
- For wooden railings, all components must be at least 2- by 4-inch stock. Vertical posts may not be spaced more than 1.8 m (6’) apart. If the top rail is made of two right-angle pieces of 1- by 4-inch stock, posts can be spaced 2.4 m (8’) apart.

6.2 Guardrails

- Place guardrails on the open sides of all open-sided platforms, floors, or passageways that are 4 feet or more above the adjacent level.
- Place guardrails on the open sides of all open-sided platforms, floors, or passageways that are above dangerous equipment, regardless of height.
- Guardrails can be removable, but an equivalent approved fall protection/ prevention system must be in place while the railing is not in place.
- When used as falling object protection, ensure that all openings in the guardrail system are small enough to prevent passage of potential falling objects. This may require the addition of screening or netting onto the railings.
- All standard guardrails must be able to withstand 200 lbs applied in any direction along the top rail. Mid rails must be able to withstand 150 lbs applied in any direction.

6.3 Stairway Railings

Every flight of stairs having four or more risers, or rising 30 or more inches, must have a stair railings provided. Install stair railings or handrails in accordance with the following guidelines:

- Stairways less than 44 inches wide must have at least one handrail or railing, preferably on the right side, descending, or the open side.
- Stairways 44 to 88 inches wide must have two handrails or railings.
- Stairways wider than 88 inches must have three handrails or railings: one handrail on each side and one middle stair railing.
- A stair railing is similar to a standard guardrail, except the vertical height is 30 to 34 inches measured from the front of the tread.
- A standard handrail (wall mounted) must be 30 to 34 inches high and smooth surfaced with no projection hazards. The brackets must be spaced no more than 8 feet apart.
- Handrails must be able to withstand 200 pounds.

6.4 Toeboards

If potential exists for materials to fall to lower levels, the Contractor must erect a toe board along the edge of the overhead walking/working surface for a distance sufficient to protect employees below. Toe boards must conform to the following requirements:

- Toeboards must be a minimum of 3½ inches high from the top edge to the level of the walking/working surface.
- Toeboards must have no more than ¼-inch clearance above the walking/working surface.
- Toeboards must be solid or must have openings of no more than 1 inch in the greatest dimension.
- When materials are piled high enough to render a toeboard inadequate, paneling must be provided from the floor to the intermediate rail.
- Toeboards must be capable of withstanding a force of at least 50 pounds.

7. Accessways

Safe access must be provided to all work areas. When a structure has only one means of access between levels, keep that means clear to permit free passage of employees. If work is performed in an area that restricts free passage, provide a second means of access.

Inspect accessways at least once daily and maintain them in a safe manner:

- Where accessways are slippery, apply abrasive material to ensure safe footing.
- Keep accessways free of ice, snow, grease, mud, debris, or any other material or equipment that could obstruct passage or cause a slipping or tripping hazard.
- Ensure that all obstructions or projections into an accessway are removed or conspicuously marked. If an obstruction or projection may cause lacerations, contusions, or abrasions, it must be removed or covered with protective material.
- Do not use access ways that are damaged or weakened until they are repaired or replaced.

7.1 Aisles

- Areas with mechanical handling equipment must have sufficient safe clearance for aisles.
- Aisles must be at least 36 inches wide.
- Inclined walkways or ramps cannot be sloped more than 2H: 10V and must have an adequate antislip surface.
- Permanent aisles and passageways must be appropriately marked.

7.2 Stairways

- Fixed stairways must be provided in the following circumstances:
  - Between floors/ levels following completion of decking and installation of perimeter fall protection at all leading edges and floor openings
  - Where high volume two-way worker travel is required
  - Where hazard assessment indicates that ladder access is inadequate at reducing fall hazards to workers.
- Stairways must be at least 36 inches wide.
- Stairway platforms must be at least the width of the stairs and at least thirty (30) inches long in the direction of travel. Platforms are recommended every 12th step.
- Stairways must be designed to carry five times the intended load or 1,000 pounds, whichever is greater.
- There must be at least seven (7) feet of vertical clearance above the stairway, measured from the leading edge of each tread.
- The slope of a stairway must be between 30 and 50 degrees. Stairway treads must be slip resistant and uniform in height and depth.

8. Training

In accordance with **LUS-HSE-WG3-446-022**, Fall Protection, Section 13, provisions for training for each employee who might be exposed to fall hazards is included in the project fall protection plan.

The HSE Representative shall provide training on this LCSMP element to all site workers. Training shall be documented and retained in project files and archived at the completion of the project.

The HSE Representative shall provide training on this LCSMP element to all site workers. Training shall be documented and retained in project files and archived for a minimum retention time of 10 years from creation date.

9. Reference

Qatar Construction Specifications 2010 Section 11 Part 1.3 “Working at Heights”