

Ladders – Types

Choosing the right ladder for the job is a critical part of working safely in NCC T&D's operations, which include substations, overhead transmission lines, and underground cables. Ladders must be able to support the weight of the worker, along with any tools or equipment, and be long enough to safely reach the work area or access the next level. This section outlines the types of ladders commonly used in construction and maintenance, along with their specific requirements and safety considerations, tailored to Saudi Arabian regulations and client-specific standards.

Regulatory and Safety Standards

In Saudi Arabia, the use of ladders must comply with relevant HSE regulations and, where applicable, the specific standards of clients such as Saudi Electricity Company (SEC) and Saudi Aramco (SA). These regulations require:

- Ladders to be free from defects and maintained in good condition.
- Proper setup and securing of ladders to prevent movement or slippage.
- Compliance with NCC T&D IMS HSE standards and any additional client-specific requirements.

Types of Ladders

Ladders used in NCC T&D projects range from portable ladders to fixed access ladders. The most common materials for ladders are aluminum, wood, steel, and fiberglass-reinforced plastic. Each type of ladder has specific applications and safety considerations:

Portable Ladders

Aluminum Ladders:

- Lightweight and durable, but conductive to electricity.
- Must not be used near electrical hazards, such as overhead transmission lines or substation equipment.

Fiberglass-Reinforced Plastic Ladders:

- Non-conductive and resistant to corrosion, making them ideal for electrical work.
- Heat-sensitive and may deteriorate with prolonged exposure to direct sunlight, common in Saudi Arabia's climate.

Wooden Ladders:

- Non-conductive but susceptible to damage from moisture and rough usage.
- Must be free of defects, such as loose knots, splinters, or cracks, and should not be painted in a way that obscures the wood grain.

Step Ladders

- Self-supporting ladders with a hinged design.
- Must have legs fully spread and spreaders locked before use.
- Workers must not stand on the top cap, top step, or pail shelf.

Trestle and Platform Ladders

- Used for accessing elevated work areas, such as scaffolding or temporary platforms.
- Must be stable and secured to prevent movement.

Fixed Access Ladders

- Permanently installed ladders, commonly used in substations or on transmission towers.
- Must have rest platforms at intervals not exceeding 9 meters and be offset at each platform.
- Safety cages are required for ladders more than 5 meters above ground, except on structures like towers or chimneys with alternative fall protection devices.

Special Purpose and Job-Built Ladders

- Custom-designed ladders for specific tasks, such as accessing underground cable trenches or confined spaces.
- Must meet design and safety standards, including rung spacing and side rail dimensions.

Portable Ladder Specifications

Portable ladders used in NCC T&D projects must meet the following requirements:

Design and Performance:

- Must comply with recognized standards, such as CSA Z11-12 or equivalent Saudi Arabian standards.
- Grade 1, 1A, or 1AA ladders are recommended for heavy-duty industrial use.

Rung and Side Rail Specifications:

- Rungs must be spaced 30 cm apart, with side rails at least 30 cm apart.
- Maximum side rail length should not exceed 9 meters.

Wooden Ladders:

- Must be made of straight-grained wood, free from defects.
- Rungs must be braced by filler blocks at least 1.9 cm thick.

Double-Width Wooden Ladders:

- Must have three evenly-spaced rails and rungs extending the full width of the ladder.
- Width should be between 1.5 and 2 meters.

Fixed Access Ladder Requirements

Fixed ladders, such as those installed in substations or on transmission towers, must meet the following requirements:

- Vertical Alignment:
- Must be vertical and securely anchored.

Rest Platforms:

- Required at intervals not exceeding 9 meters.
- Must be offset at each platform to prevent continuous vertical falls.

Safety Cages:

- Required for ladders more than 5 meters above ground, except on structures with alternative fall protection devices.
- Cages must start no more than 2.2 meters above ground and extend at least 90 cm above the top landing.

Rung Specifications:

- Rungs must be at least 15 cm from the wall and spaced at regular intervals.
- Side rails must extend 90 cm above the landing surface.

Landing Surfaces:

- Must be clear of obstructions at both the top and bottom of the ladder for safe access and egress.

NCC T&D Project Leaders Key Responsibilities

Under NCC T&D IMS HSE regulations and client-specific requirements, NCC T&D Project Leaders must:

- Ensure the correct type of ladder is selected for each task, considering factors such as height, load capacity, and electrical hazards.

- Provide training to workers on the proper selection, inspection, and use of ladders.
- Conduct regular inspections of ladders to ensure they are free from defects and maintained in good condition.
- Ensure fixed ladders are installed and maintained in compliance with Saudi Arabian HSE standards.

Training Requirements

Workers who use ladders must receive training that includes:

- The hazards of working with ladders, particularly in NCC T&D's operational context (e.g., transmission towers, substations).
- Proper selection, setup, and use of different types of ladders.
- Inspection procedures to identify defects or damage.
- Emergency procedures in case of a fall or ladder failure.

Additional Considerations for NCC T&D Projects

Given the high-risk nature of NCC T&D's operations, the following measures are recommended:

- Conduct pre-work hazard assessments to identify ladder-related risks, particularly during maintenance of overhead transmission lines or work in substations.
- Use non-conductive ladders (e.g., fiberglass) when working near electrical hazards.
- Ensure all workers are equipped with appropriate PPE, including slip-resistant footwear and fall protection harnesses when necessary.

For more information, refer to NCC T&D's relevant IMS procedures or consult our HSE Department for expert guidance and training resources aligned with Saudi Arabian regulatory requirements.