



2600SEG123 SAFETY STANDARD FOR DEMOLITION OF CIVIL WORKS

1.0 PURPOSE

This standard establishes the occupational safety requirements of the Panama Canal Authority (ACP) to perform demolition of civil works on its installations ensuring that it is done in a safe manner, taking into consideration the stability of the construction and the necessary procedures for the protection of persons, property, and the environment.

2.0 BACKGROUND

There is no background.

3.0 SCOPE

This standard applies to all ACP workers, contractors, and third parties performing demolition of civil works within areas under ACP responsibility.

4.0 LEGAL FOUNDATION

This Standard is established pursuant to Agreement No. 12 of the Board of Directors of the Panama Canal Authority (ACP), Safety and Health Regulations, Chapter 1, Article 7.

5.0 DEFINITIONS

For the purpose of this Standard, the following definitions apply:

5.1 Construction: Act and effect of constructing. Work constructed or erected. For example, a building, a bridge or a tank.

5.2 Demolition: Act and effect of demolishing. A constructed work is partially or totally destroyed following an established plan in a methodical manner.

5.3 Structure: Framework that constitutes the skeleton of something and serves as its support. For example, the structure of a ship, a building, a bridge.

5.4 Installation: Work made up of a series of constructions.

5.5 Competent Person: Is a person able to identify present and potential (danger) hazardous condition on a demolition site as well as working conditions which are hazardous or unhealthy for the workers and the general public, and has the authority to take the necessary action to control them.

5.6 Demolition Plan: Is the document prepared by a competent person that details the demolition range, lists the critical steps, the manner and sequence in which they are to be executed, and identifies the risks and hazards associated with each step, as well as the applicable controls for each risk and hazard identified.

5.7 Safety Zone: Area to which access is granted only to personnel required for the demolition work.

5.8 Safe Distance: Distance established at which workers are protected when the demolition is executed.

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6.0 GENERAL

6.1 Demolition works that could expose workers to hazardous conditions must be studied, planned, undertaken, and documented by a competent person.

6.1.1 Hazard Analysis. Some of the potential hazardous conditions that could arise during the demolition process include: Collision against rigid objects, flying fragments or particles, dust, overstresses, work in confined spaces and work at heights, direct or indirect electrical contacts, and exposure to harmful or toxic substances, vibrations, noise and inadequate lighting.

6.1.2 Demolition work must begin from the top of the construction and follow towards the bottom, if the demolition method allows it.

6.2 Preliminary Operations

6.2.1 Before starting the demolition, the construction shall be inspected on site for the purpose of determining the condition of the walls, floors, and structure. Consideration shall be given to securing unstable parts, particularly if the structure to be demolished has been damaged by fire, or weakened by another cause.

6.2.2 All individuals that could be affected by the demolition shall be previously informed. Photographs of adjacent damaged structures shall be taken before the demolition.

6.2.3 The methodology to be implemented must establish safe work procedures and demolition sequence indicating the order of the elements to be demolished and actions taken, such as bracing, anchorage, obtaining work permits, hygiene or other measures to avoid accidents. All of these measures shall be clearly indicated in a demolition plan that shall be submitted and approved by the Construction Inspector.

6.2.4 On work that is near high voltage electrical lines, the distances or protection indicated in the corresponding safety standard shall be maintained.

6.2.5 Electricity, gas, sewer, running water, or other services shall not be put out of service without complying with the procedures or safety devices required for each case. If any of these services is necessary, they may be temporarily relocated or protected, adopting the required prevention measures.

6.2.6 If the demolition with heavy equipment affects leveling marks, lighting supports, telephone, overhead cables, or other public services, permission shall be requested to the owner of the installation in advance, and the required safety measures taken.

6.2.7 If dangerous chemicals, gases, explosives, flammable or other toxic substances which could cause a dangerous situation have been used or stored on the demolition site or surrounding areas, the safety procedures established in the corresponding standard shall be followed. Whenever necessary, the work site shall be disinfected or fumigated for the protection (sake) of the workers' health before proceeding with the demolition.

6.3 Personal Protective Gear

6.3.1 During work programming, the required personal protective gear must be determined, including warning signs, respirator type, lifelines, ladders, scaffolding, nets, face protection, hearing protection, gloves, and any other type of equipment necessary.

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6.3.2 When demolition work is executed at high altitudes (over 1.8m), the use of scaffolds is mandatory. If, for technical reasons, such scaffold placement would be impractical, the person in charge of the demolition shall set up a fall protection system, in accordance with the pertinent established standard.

6.4 Safe Access to the Demolition Site

6.4.1 A barricade surrounding the demolition site shall be set up, with its respective safety warnings. Access to demolition sites shall be not be permitted, with the exception of those which are controlled and protected.

6.4.2 In cases where a demolition would expose traffic to hazardous conditions, visible precaution signs shall be used. If necessary, workers shall be positioned at either side of the worksite to alert pedestrians of the hazardous condition.

6.4.3 A barricade surrounding the construction to be demolished shall be positioned at a safe distance from the demolition area.

6.4.4 During the demolition, protections such as nets, canvasses, inclined screens, or other barriers shall be positioned to gather the debris or any tools that may fall.

6.4.5 Passageways (such as sidewalks, roads, etc.) through which workers, the general public or vehicular traffic pass being exposed to falling objects and debris, shall be protected by a solid structure.

6.5 Dust and Debris Control

6.5.1 If the dust and debris produced by the demolition causes discomfort to road traffic, equipment or people within the installation, the person responsible for the work shall establish the necessary control measures.

6.5.2 Before starting a demolition, all existing glass, crystals, and loose objects shall be removed from the construction to be demolished.

6.5.3 When feasible, elements shall be moistened prior to being demolished, or controlled by other means to avoid excessive dust to settle in the environment. An attempt shall be made to eliminate or control dust as close as possible from its point of formation.

6.5.4 Debris accumulation at the structure's edge shall be avoided as the structure may begin to collapse. Debris or scrap from the demolition that exceeds the floor load capacity shall not be accumulated. It is preferable to eliminate the rubble daily.

6.5.4.1 The landing of debris or other material on adjacent areas shall be avoided. Such debris shall only be removed during demolition work interruptions.

6.6 Inspection

6.6.1 During the periodic inspection of the demolition, the floors, walls, structural members, and foundations shall be examined, in an attempt to take the required measures to avoid structural collapse.

6.6.2 The demolition shall not affect the stability of the adjacent structures.



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6.6.3 Work shall never be executed on the structure to be demolished.

6.6.4 Work shall never be executed underneath a structure that could collapse.

6.6.5 Areas which have been predetermined as temporary storage for debris shall not affect elements such as safety devices, hydrants, covers and sewer catch basins, plants, trees, luminaries or access to electrical facilities or to other worksites.

6.6.6 Demolition work shall be executed in a continued manner until completed, as it could collapse if left insecurely abandoned.

6.6.6.1 At the end of a workday, no elements shall be left in an unstable condition so that the wind, weather, or other causes could trigger their collapse. The zones or elements that could be affected by rain shall be protected with canvas or plastic.

6.6.7 During the demolition of wooden elements, nails must be pulled or bent.

6.6.8 Ladders, scaffolds or other fall protection systems shall not be (propped) placed against any part of the construction being demolished.

6.6.9 When a structure or a part of it is demolished, the workers must keep a safe distance.

6.6.10 Debris should not be deposited on the scaffolds.

6.6.11 Debris should not be dumped indiscriminately. When it is required that it be lowered from high altitudes, ramps, discharge chutes or any other safe system shall be used.

6.6.12 The openings of the upper floor path from where the material is to be dumped shall all be enclosed with fencing or barriers.

6.6.13 Strong concrete, masonry, or steel structures shall be removed through mechanical means.

6.6.14 Mechanical equipment used during the demolition shall be placed over a floor or structure that can support it.

6.6.15 Structural members supporting loads shall not be removed or cut if the load has not yet been removed.

6.6.16 Once the demolition activity has been completed, the area must be thoroughly cleared, eliminating any existing dangerous condition.

6.7 Fire Protection

6.7.1 Fire extinguishers and emergency procedures shall be available at the worksite.

6.8 Training

6.8.1 Workers shall be instructed regarding safety procedures, and the possible risks that could arise during the demolition.

6.8.1.1 Contractor shall provide training for their own employees



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6.8.2 Personnel executing a demolition within a facility must be knowledgeable regarding the evacuation plan indications of said facility.

6.9 Safe Distance

6.9.1 The conditions, security areas, and other precautions to be adopted shall be established in accordance with the characteristics, work methods, and equipment utilized.

6.9.2 In the case of demolitions by traction, all workers shall keep a safe distance. For the handling of cables and heavy equipment, the established pertinent standard procedures shall be followed.

6.9.3 In the case of demolitions by impact (oscillating weight or wrecking ball), a safety zone must be established around the striking points, in keeping with the probable projection of the demolished materials and the ball or hammer oscillations.

6.9.4 When demolitions are executed with explosives, the established safety distance shall be observed.

6.9.5 When equipment such as power shovels, wrecking shovels, grab buckets, or other similar machines are used, a safety zone around the work areas must be established.

7.0 RESPONSIBILITIES

7.1 The responsibilities to guarantee compliance with this standard are described in Section 1, Paragraph 1.5, of the ACP Safety and Occupational Health Management Standard.

7.1.1 The owner or user of the facility is responsible for assuring the protection of all the individuals that could be affected during the demolition.

8.0 INQUIRIES

Any information or clarification of the content or application of this Standard must be requested in writing to safety and Industrial Hygiene Unit (RHSH).

9.0 EXCEPTIONS

Any requests for changes or temporary exceptions to this Standard must be made in writing to the Safety and Industrial Hygiene Unit (RHSH).

10.0 TERM

This Standard shall remain in force until amended or revised.

11.0 REFERENCES

11.1 ACP Safety and Occupational Health Manual.

11.2 ACP Confined Space Manual.

11.3 ACP Electrical and Aqueduct Division High Voltage Operations Safety Manual.

11.4 Panama's Social Security Regulation for the Prevention of Professional Hazards in the Construction Industry, Panama, 1977.



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11.5 ANSI A10.6-1990 American National Standard for Demolition Operations Safety Requirements.

11.6 2600SEG201 HAZARDOUS MATERIAL INFORMATION STANDARD.

11.7 2600SEG109FALL PROTECTION STANDARD.

11.8 2600SEG124 SAFETY STANDARD FOR CRANE OPERATIONS.