Safety & Health Circular No. 23 / 2012
Safety of Excavations

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This serves to draw your alert to ensuring safe work practice for trench excavation, arising from a recent accident involving injuries of site personnel in an excavated trench. Contractors must ensure construction workplace safety, properly supervise and carefully manage operations on site at all levels to prevent such accidents. The ensuing paragraphs outline key points (non-exhaustive) for your attention:-

A. Measures to be taken before carrying out excavation works

1. The requirements in regulations, codes of practice and safety information related to excavations should be identified. These include the ground conditions, underground structures or water courses and the location of existing services, etc. These information should be used during planning and preparation for excavation work.

2. In accordance with paragraph 11 of the Technical Memorandum for Supervision Plans 2009 issued under section 39A of the Buildings Ordinance Cap. 123, a supervision plan is required for excavation works under the following circumstances:

   a. the depth of excavation is 2.5m or above; or

   b. there are roads, buildings, other structures, slopes steeper than 30 degrees or water-mains of 75mm or greater in diameter within the profile described by a line drawn at 45 degrees to the horizontal from the perimeter of the base of excavation to the ground surface.

   The Code of Practice for Site Supervision 2009 gives guidance to authorized persons, registered structural engineers, registered geotechnical engineers, registered contractors and other personnel in the building industry for the preparation of supervision plans.

3. A risk assessment should be conducted to develop, implement and maintain a

system of work in order to ensure safety in or near the vicinity of the excavation area. Aspects to be assessed may include, but are not limited to, the following:

a. Fall or dislodgement of earth and rock.

b. Instability of the excavation or any adjoining structure.

c. Inrush or seepage of water.

d. Unplanned contact with utility services.

e. Placement of excavated material.

f. Falls into excavations.

g. Movement and positioning of heavy plant and equipment.

h. Ground vibration.

i. Vehicle movement.

j. Excessive noise from the operation of machinery and plant.

k. Manual handling injuries.

l. Support of the excavation and all associated protection.

4. Before digging any trench pit, or other excavations, plan and/or method statement should be developed to decide what temporary support systems and safety precautions to be taken.

5. Make sure the equipment and precautions needed (trench sheets, props, baulks etc.) are available on site before work starts.

6. Competent persons with training and experience should been appointed to carry out regular inspections and examinations.

7. The results of inspections and examinations carried out at appropriate intervals should be entered in the prescribed form (Form 4) to prove the competent person had conducted the inspections in 7 day interval or where necessary with his designation and signature.

8. Suitable procedures should be developed to check the effectiveness and thoroughness of the inspection, examination and record keeping.

9. Suitable procedures should be developed to report faults discovered in the inspections and examinations.

B. Measures to be taken during carrying out excavation works

10. Suitable control measures include:

a. The excavation should be adequately shored in accordance with the design of the temporary support systems.

b. Adequate measures should be provided to prevent the fall of person and drowning in excavation, such as suitable guard rails and toe boards inserted into the ground immediately next to the supported excavation side; or using support system itself, e.g. trench box extensions or trench sheets longer than the trench depth.

c. Where, during excavation work, and excavation is likely to collect or retain water, the excavation should be covered or fenced off. Provision of rescue means such as lifebuoys should be considered.

d. Suitable measures should be taken to prevent materials or plant from being stacked or worked too close to edges of excavation. Plant and vehicles close to the sides of excavations can make extra loadings to the sides of excavations more likely to collapse.

e. Loose materials may fall from spoil heaps into the excavation. Edge protection should include toeboards or other means, such as projecting trench sheets or box sides to protect against falling materials.

f. Where there is reason to apprehend danger to persons employed therein from rising water or from an irruption of water or material, adequate means are provided, so far as practicable, to enable such persons to reach positions of safety in the event of emergency.

g. Provision of a safe means of movement between different levels of the excavation. Use of intermediate platforms for deep excavation.

h. Where ladders are used for access, the ladder should be secured at both top and bottom against displacement and must be set up at an angle of 1:4 (75 degree). A safe and adequate sized landing place when stepping off the ladder and stiles of the ladder should be provided and extended at least one metre above the landing place.

i. Where there is a risk of inhalation of harmful airborne substances such as silica dust or contact harmful soil contaminants such as asbestos, a safe system of work including monitoring of airborne contaminants and soil samples should be conducted and specific measures for protection, handling and removing should be taken.

j. Plant and vehicles should not be driven too close to the edge of the excavation area, particularly while reversing causing the sides to collapse.

k. Excavators, loaders and combined excavator/loaders may be used as cranes in connection with work directly associated with an excavation. These machines should be fitted with check valves or other device to prevent the gravity fall of the load, in the event of hydraulic failure.

l. Chains or slings for lifting must not be placed around or on the teeth of the bucket. Lifting gear may only be attached to a purpose made point on the machine.

m. A loadshifting machine must only be operated by a person who has attained the age of 18 years; and holds a valid certificate applicable to the type of load shifting machine to which that machine belongs.

n. Check that excavations do not undermine scaffold footings, buried services or the foundations of nearby buildings or walls. Decide if extra support for the structure is needed before start. Surveys of the foundations and the advice of a structural engineer may be required.

o. Battering the excavation sides to a safe angle of repose may also make the excavation safer.

p. When removal of shoring supports, the support system should be extracted/dismantled in the reverse order of its installation. Person working inside the excavation should work inside the protection of the ground support.

C. Legal Requirements

11. Please refer to the following safety requirements:

a. Chapter 123 Title: Buildings Ordinance

Section 39A Technical Memorandum

b. Chapter 59I Title: Construction Sites (Safety) Regulations

Part VI Excavations on Construction Sites

c. Technical Memorandum for Supervision Plans 2009

d. Code of Practice for Site Supervision 2009

e. A Guide to the Provisions for Excavations and Miscellaneous Safety under the Construction Sites (Safety) Regulations (May 2010) issued by the Labour Department