Property, Development & Retail Management

Hole Protection

Mandatory - January 2014

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Way

One Best Way

Essential information about our Health & Safety Standards.

Property, Development & Retail Management

Hole Protection

Overview

The consequences of falling through a poorly protected hole or void during construction, refurbishment, maintenance or demolition can be extremely serious. Similar dangers can arise from materials and/or debris falling through such holes. Designers and specifiers have a responsibility under the CDM regulations to try to eliminate the need for potentially hazardous holes and voids in a structure. (For example, they may relocate services and service risers or may detail the use of temporary cast-in structural mesh in riser shafts or specify post pour core drilling of structural floors or apply more comprehensive solutions). Failing that, designers can reduce the risk by designing in either permanent or temporary protection. However openings in slabs will be required for the lift shafts, escalators, stairs etc.

During the construction phase these openings may serve a secondary function purpose for ventilation, plant hoist, access, moling operations etc. During construction, Landsec contractors must ensure that all holes or voids are protected and that protection is maintained to the highest possible standard. This OBW Standard for Hole Protection and Management contained within this document shall apply to holes, openings in floors, floor slabs, risers, inspection chambers, valve chambers, lift shafts, stairwells, manholes, storage tanks or any other type of opening where there is a risk of persons and/or materials falling through.

The size and type of holes will determine the type of protection to be used and the need to place loads or traffic plant or vehicles over holes will require additional protection measures. These must be approved by the Temporary Works coordinator.

Planning

To avoid forming holes in slabs, where possible, the design should be reviewed by the design team and the project team, with the assistance of the CDM coordinator.

Programmes must be reviewed to minimise periods when voids have to remain open. The Contractor must ensure the coordination of hole and void protection involving the Temporary Works Co-ordinator and the Duty Holder.

Hole protection and management procedure

Management

The Contractors Project Director / Manager will formally appoint and record the names of those persons appointed to take responsibility for the on-site management of the procedures i.e. identifying location, hazards associated with the installation/removal of protection, on-going inspection and maintenance of the protection.

These people shall be appointed in writing and recorded as duty holders. There will be a "hole register" system used on the Project which will identify the number, size and location of holes/openings and the agreed protection solution. On-going maintenance of protective measures is vital. Hole protection must be inspected daily by the Duty Holder or nominated deputy (permissible for this inspection duty to be delegated to a Supervisor nominated for an area) and any deficiencies must be rectified immediately. (See later for more information on maintenance). Records of inspection will be formally recorded. A suggested 'Hole / Duct / Shaft Opening Inspection Sheet' is provided at the end of the Procedure Appendix A.

When access through holes is required, specific arrangements must be made by the supervisor for the removal / modification / replacement of the protection as necessary, ensuring that holes are never left unprotected. (Any Method Statement and Risk Assessment for an operation must cover the removal and replacement process).

All persons must be warned at induction not to interfere with any protective measures and to immediately report any damaged or missing protection to their Supervisor. This should be reinforced in subsequent toolbox talks.

Where risers etc. are handed over to another contractor or trade, there must be a clear handover of responsibilities with protection standards specified and understood. The controls established must be detailed in the Construction Health and Safety Plan, communicated and agreed with those involved in the work.

Holes in reinforced concrete slabs

a) Where detailed reinforcement is not continuous across a hole, then, as a general rule a steel plate will be placed over the hole to guard against fall and should be properly stencilled to indicate the Safe Working Load, Hole ID reference and the requirement for a permit to Remove/Protect/Replace.

b) Holes in profiled metal deck permanent formwork will be 'run through' and perforated at a later date. Until the opening is cut in the metal decking the area will be barriered off – once cut a metal plate will be placed covering the hole.

Covers to holes up to 350mm, not subject to vehicle/ plant movement:

Subject to the approval of the Temporary Works Coordinator and then to be shown detailed on the Temporary Works cover plates drawing 19mm plywood cover secured to a frame of 50mm battens fabricated as follows:

- The frame of the made-up cover shall fit into hole to be covered.
- The plywood covering the frame shall be at least 150mm wider than the void on all sides to provide bearing outside of the hole and must be firmly secured.
- The ply must be either new or in very good condition and carefully checked to ensure it is structurally sound and with no damage or de-lamination.

The hole shall be identified with signage, minimum size of sign 300 mm x 300. Clearly identifiable as a hole cover, e.g. brightly painted and marked **"WARNING - HOLE BELOW"** usually in black on a yellow background.

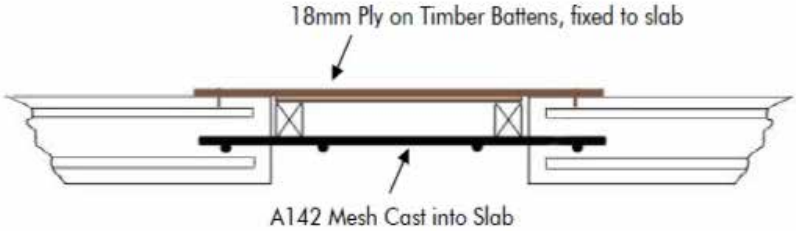
- Trim pieces also to be painted yellow and must not present a trip hazard.

Covers to holes subject to vehicle/ plant movement:

Special consideration must be given to the protection of holes that may be trafficked by plant and vehicles e.g. scissor lifts, cherry pickers, forklift trucks.

Steel plate of sufficient strength to support the maximum load imposed must be secured across any holes that will be trafficked by plant and vehicles. This must be checked and approved by the Temporary Works Co-ordinator. The hole shall be identified with signage detailing the Safe Working Load, the requirement for a permit to Remove/Protect/Replace, the contact number of the Duty Holder.

Holes such as newly built manholes or access chambers must also have temporary covers fixed to prevent falls of people or traffic, until the permanent covers are fixed in place. Full consideration must also be given to possible loads or tendency to displacement due to traffic in both the temporary and permanent conditions.



Hole Warning Spray Paint Template

Hole Warning Spray Paint Template

Large holes which are required to remain open:

- Proprietary system or scaffold double guardrail with 1m high top rail, toe-boards and brick guards securely fixed around all open sides of the hole.
- Toe-boards must be a minimum height of 150 mm (225mm recommended) and no gap between boards or rails may exceed 470 mm.
- Debris netting should be placed across the hole at every floor.
- Fall prevention netting must be placed across the hole at every floor level if mesh and edge debris guarding cannot be incorporated.
- The hole shall be identified with signage as previously stated.

For fuller protection debris nets directly under the void or brick guards to the scaffold should be used.

Typical proprietary temporary lift shaft

Vertical openings to lift Shafts & risers

Vertical holes and openings such as lift shafts and access to risers should be fitted with permanent doors as early as possible. Where this is not possible, lockable temporary doors must be installed, preferably covering the full height of the opening and must be secured and marked. Where scaffolding is used as a short-term solution the vertical opening must be protected by the following measures:

— 4 guardrails (minimum) to a height of 2m including a minimum 150mm toe board (recommended 225mm) must be solidly fixed to the opening entrance.

— Brick guards must be fitted to the guardrails to prevent the insertion of heads or limbs into the hole or shaft. Signage stating "Warning - Open Shaft!" must be securely fixed to the guardrails. Minimum size of sign 300mm x 300mm. For large risers, ducts or shafts a specific permit system for entry will be necessary to limit uncontrolled access.

Holes used for lifting operations

Where holes in slabs etc. are required to be left open for lifting operations then they must be protected by guardrails to a minimum height of 1m, with intermediate rails at spacing not exceeding 470mm, toe boards of minimum 150mm, (225mm recommended). This barrier should be fully meshed with brick guards or similar.

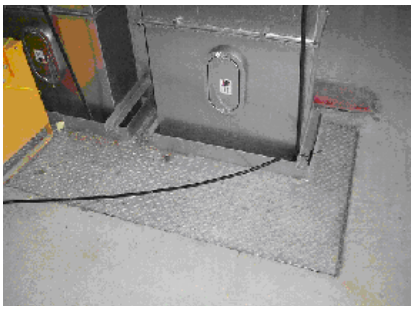
Removal of guardrails for the passage of materials will only be acceptable on the basis that a risk assessment is in place, which addresses how guardrails are to be removed, how those involved in the operation will be prevented from falling, how people not involved will be prevented from accessing the area, how those below will be protected from the possibility of falling materials and how the location will be made safe once the lifting operation is completed.

Main service risers

If the design can be challenged early enough and the position of the services installation is finalized within a riser shaft, we can optimise the size of the service hole and install a permanent metal deck floor to reduce the risk. The following photographs show how permanent holes may be formed including the provision of thin gauge metal perimeter up stands.

The perimeter up stand can be a means for fixing protection and assist in the prevention of adjacent material falling through. Prior to permanent services being installed a plywood cover with 100mm x 50mm timbers can be tightly fitted over the up stand with the ' Hole Below' warning painted on top.

The above process lowers the risk of working within the riser shaft, making temporary plywood hole protection removal much simpler and increasing safe access to install the permanent services and future Client maintenance.



Removable protection to concrete placing boom holes in slab

Temporary removable covers of sufficient strength to support 1.5 X the maximum load imposed must be placed across any holes that will be trafficked by light plant and vehicles. This must be checked and approved by the Temporary Works Coordinator.

The cover must have a bearing surface around the holes and have locating lugs which allow it to be firmly secured in place.

Protection of roof slab openings

Designed joists and plywood fitted at top of up stand to roof void with temporary weathering protection in place and handrails protection.

Maintenance of protection

Materials can be damaged, de-laminate, fixings loosen or warning paints fade. The nominated Duty Holder for Hole Protection must inspect the hole protection on a daily basis recording their findings and immediately rectifying any faults found. All holes must be uniquely numbered and identified on drawings to ensure that the protection measures are effectively managed.

See Appendix A for a suggested inspection check sheet

Daily inspection by Duty Holder

The Duty Holder shall inspect daily for deficiencies to be rectified immediately. All holes should have unique reference numbers, any hole and required cover plate protection can be identified immediately from the drawing/reference number and used to implement correction of deficiencies. The checklist in Appendix A can be used with the Temporary Works cover plate drawings.

Action to be taken:
17 January 2014

Status:
Mandatory

Further help & contacts:
If you need any further information or guidance please contact any member of the Health, Safety & Security Team.

Appendices

Appendix 1 – Suggested 'Hole / Duct /Shaft Opening Inspection Sheet'

Appendix A - Typical weekly hole / duct / shaft opening inspection record sheet

Project:	RECORDS OF ONCE/TWICE WEEKLY/DAILY INSPECTIONS													
Area:	MON		TUE		WED		THU		FRI		SAT		SUN	
Week Commencing:	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	
Are all holes (incl manholes & voids) identified on drg?														
Has A142 or similar mesh been cast in as necessary?														
Do all protective covers meet following standards?														
- Secured in position?														
- Marked 'Warning Hole Below'?														
- Strong enough to support persons or possible plant?														
Are barriers to the following standard?														
- Double guard rails and toe boards?														
- Brick guards where materials could fall on people?														
Any work adjacent to openings where falls possible?														
Are temp manhole covers to NO 3 standard & secure?														
Are vertical faces of all shafts & risers fully protected?														
Location of any Defects Identified & details of Actions Taken to Rectify Problems: *(list below)*														

Key: ✓ Protection measures in good order x Protection inadequate/ missing/defective

Signed: Date:

Name: Position:

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