

## **1.0 GENERAL**

### **1.1 WORK SEQUENCE**

- .1 Remove sound and unsound concrete from structure as described herein.
- .2 Areas of concrete removal and repair to be tested, identified and marked on-site by the Departmental Representative.

## **2.0 PRODUCTS**

### **2.1 EQUIPMENT**

- .1 Equipment shall be capable of efficiently removing sound and unsound concrete while ensuring all reasonable precautions are taken to avoid damaging adjacent areas of the structure.
- .2 Maximum size of hand-held jackhammer: 15 kg. Smaller size shall be used if necessary, in the opinion of the Departmental Representative, to reduce amount of concrete breakage, at no cost to the Departmental Representative. Maximum size of light chipping hammer: 7 kg.
- .3 Compressor and all diesel-powered equipment to be used in enclosed structure to be fitted with diesel exhaust scrubber.

## **3.0 EXECUTION**

### **3.1 PREPARATORY WORK BY CONTRACTOR**

- .1 Approximate locations and extents of concrete delamination repairs are shown on the drawings, and are provided as general guidelines only. Actual concrete removal areas to be designated on site by the Contractor.
- .2 Contractor shall determine, by visual inspection and hammer-sounding, the locations and extent of deteriorated, delaminated and unsound soffit or full-depth slab removal areas to be repaired. The perimeter outlines of the soffit and full-depth slab repair areas shall be marked in chalk by the Contractor. Mark perimeter outlines of full-depth slab delaminations on slab surface, using measurements and a different colour of chalk. Co-ordinate locations of full-depth slab repair areas with results of surface chain-drag testing.
- .3 Notify the Departmental Representative to review and comment on the areas identified for repair. Departmental Representative will review Contractor's

chalk-marked outlines, adjust as required, and mark perimeters of actual repair areas using paint. Do not proceed with concrete removal or demolition until Departmental Representative's review has been completed.

### **3.2 CONCRETE REMOVAL**

- .1 Actual concrete removal areas to be designated on site by the Departmental Representative. Minimum depth of removal to be 150 mm at patch boundaries. Delamination sizes and locations as shown on the drawings are provided as general guidelines only.
- .1 Remove concrete in areas which are already spalled or which produce a hollow sound under a hammer test, indicating concrete delamination. These areas shall be initially located by the Contractor and marked on the concrete surface with a durable red coloured paint. These markings will be reviewed and checked by the Departmental Representative who will then mark out the actual area of concrete to be removed.
- .2 Outline patch area with a 13-mm deep vertical sawcut as close as possible to limits of concrete already removed. Reduce sawcut depth if necessary to avoid cutting reinforcement. Remove concrete to sawcut taking precautions to avoid damaging sawcut edge. Edges with spalls or chips will be rejected and shall be resawcut at Contractor's expense.
- .3 Within designated areas, concrete is to be removed to obtain a minimum of 25mm clearance around all exposed reinforcement exposed in the delamination repair. Minimum depth of removal shall not be less than 50mm which may include sound concrete.
- .4 Upon exposure of visibly corroded or debonded reinforcement, additional concrete removal shall be performed until bars appear to be rust-free and well-bonded for a distance of 75mm, and perimeter of designated area is sound, or until otherwise directed by the Departmental Representative.
  1. This concrete removal shall not proceed until authorized by Departmental Representative.
  2. Contractor shall not receive payment for concrete removals not authorized by and considered necessary to Departmental Representative.
- .5 Excess or unnecessary concrete removal to be at no extra cost to the Contract.
- .6 Call for review by Departmental Representative to confirm acceptability of patch preparation prior to cleaning of reinforcement. After concrete removal has been

complete, a final check adjacent to the areas shall be made by the Contractor to determine any additional spalling or delamination which may have occurred. Contractor shall mark out these areas and notify Departmental Representative to make a review.

- .7 Remove additional concrete required to provide adequate development and/or lap for new reinforcing steel required as directed by the Departmental Representative.
- .8 Where patch removal becomes excessive as deemed by the Departmental Representative, adjacent to vertical surfaces a key is to be chipped into existing columns and walls prior to the concrete placement at these patches. This key is to have a minimum depth of 40 mm into the vertical element. Shoring and bracing shall be installed as required.

### **3.3 SOFFIT AND VERTICAL SURFACE CONCRETE REMOVAL**

- .1 All unsound soffit concrete is to be removed in areas designated by Departmental Representative
- .1 Remove concrete in areas which are already spalled of which produce a hollow sound under a hammer test, indicating concrete delamination. These areas shall be initially located by the Contractor and marked on the concrete surface with a durable red coloured paint. These markings will be reviewed and checked by the Departmental Representative who will then mark out the actual area of concrete to be removed.
- .2 All concrete removal to be achieved using light chipping hammers.
- .3 Within designated areas concrete is to be removed to obtain a minimum of 25-mm clearance around all exposed reinforcement.
- .4 Upon exposure of visibly corroded or debonded reinforcement, additional concrete removal shall be performed until bars appear to be rust-free for a distance of 75mm around the perimeter of a patch or until otherwise directed by the Departmental Representative.
- .5 Excess concrete removal to be at no extra cost to the Contract.
- .6 Outline patch area with a 13-mm deep vertical sawcut as close as possible to limits of concrete already removed. Reduce sawcut depth if necessary to avoid cutting reinforcement. Remove concrete to sawcut taking precautions to avoid damaging sawcut edge. Edges with spalls or chips will be rejected and shall be resawcut at Contractor's expense.

- .7 Call for review by Departmental Representative to confirm acceptability of patch preparation prior to cleaning of reinforcement. After concrete removal has been complete, a final check adjacent to the areas shall be made by the Contractor to determine any additional spalling or delamination which may have occurred. Contractor shall mark out these areas and notify Departmental Representative to make a review

### **3.4 CONCRETE REMOVAL FOR SURFACE SCALING REPAIRS**

- .1 The Departmental Representative will locate and define the extent of repair on site. Approximate areas have been indicated on Drawings.
- .2 Contractor will outline the area with a 13-mm deep vertical sawcut. All patches will be rectangular and perpendicular to grid lines unless directed otherwise by Departmental Representative.
- .3 Remove concrete to sawcut taking precautions to avoid damaging sawcut edge. Edges with spalls or chips will be rejected and shall be re-sawcut at Contractor's expense. Minimum depth of removal: 13 mm.
- .4 Call for review by Departmental Representative to confirm acceptability of concrete removal prior to patching.

**END OF SECTION**