

**AMENDMENTS TO OPSS 930 (MAY 94) –
CONSTRUCTION SPECIFICATION FOR STRUCTURE REHABILITATION –
CONCRETE PATCHES AND OVERLAYS ¹**

OPSS 930.04.02.02 is amended by the addition of the following subsection:

930.04.02.02.04 Silica Fume Concrete

The Contractor is responsible for the mix designs. The Contractor shall submit to the Commissioner, in writing, the proposed mix proportions, and the test results of a trial batch of the proposed mix three weeks prior to concrete production. The details submitted with the trial batch test results shall include the sources of aggregates, location of batch plant, and the location of the backup batch plant. Once the test results have been accepted, no other plants or sources of aggregate may be used. No concrete shall be placed until the proposed mix has been proven by test results, and written authorization to proceed has been issued by the Commissioner.

The Contractor shall also submit a letter from his concrete supplier that the proposed mix design is operational for its intent and purposes. Should there be any doubt that the mix is suitable for such, the Contractor shall perform such tests as necessary to convince himself that the mix is indeed operational.

OPSS 930.05.02.01 is superseded by the following:

The concrete shall conform to OPSS 1301 and as specified by the Contract Documents.*

OPSS 930.05.04 is deleted and replaced by the following:

930.05.04.01 Filter Fabric

Filter Fabric for curing shall be “Terrafix-27OR” white in colour.

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- 1. All references to OPS specifications that have been amended (as noted in LIST T1) are superseded by references to the replacement City of Toronto specifications (as given in LIST T1).**

* Note to Designer: Provide this information in the form of a Special Provision.

930.05.04.02 Burlap

Burlap shall conform to OPSS 1306.

OPSS 930.05 is amended by the addition of the following subsection:

930.05.05.01 Silica Fume Cement

The silica fume cement shall be pre-blended supplied from a manufacturer approved by the Commissioner.

OPSS 930.05.06 is amended by the addition of the following:

930.05.06.03 Silica Fume Concrete Overlays

For silica fume concrete overlays the bonding agent shall be a cement-sand mixture as specified in 930.05.06.01 or a grout made from silica fume concrete with the large pieces of aggregate removed. The consistency of the mixture shall be such that it can be applied with a stiff brush to the existing concrete in a thin even coating that will not run or puddle.

The silica fume concrete mix for the overlay shall have the following properties:

- Silica fume content - 8-9½% by mass
- Type 10 S.F. cement - 355 kg/m³ min.
- Aggregate - 13mm limestone
- On exposed concrete decks the aggregate shall be 12 mm trap rock
- Slump at discharge - maximum 75 mm without superplasticizer
- Minimum strength at 7 days - 35 Mpa
- Air entrainment 7% ± 1%

Admixtures containing calcium chloride shall not be permitted.
Slag shall not be permitted as a supplementary cementing material.

OPSS 930.06.09 is superseded by the following:

Consolidating equipment shall conform to TS 904.

OPSS 930.07.04 is amended by the addition of the following:

Place Silica Fume Concrete Overlay.

OPSS 930.07.04.01 is amended by the addition of the following:

The sixth paragraph is deleted and replaced by:

Do not place concrete when air temperature exceeds 30°C and/or concrete temperature exceeds 25°C. Do not use calcium chloride under any circumstances.

The Contractor is responsible for monitoring on site temperature, wind velocity and relative humidity. Silica fume concrete shall not be placed when the surface evaporation rate exceeds 0.5 kg/(m²-hr). Figure D1 in Appendix D of CSA A23.1-94 shall be used to determine evaporation rates.

OPSS 930.07.04.02 is superseded by the following:

930.07.04.02 Minimum Thickness of Overlay

The minimum thickness of the overlay shall be 50 mm for the concrete overlay or silica fume concrete overlay, or as indicated on the drawings.**

OPSS 930.07.04.03 is amended as follows:

Before the first paragraph, add:

Abrasive blast cleaning shall be carried out with 'low free silica' abrasive not more than 48 hours before placement of new concrete. All concrete surfaces that require abrasive blast cleaning shall be thoroughly blast cleaned. The abrasive blasting shall be of such an extent to expose and clean the coarse aggregate and remove all dirt, laitance and hardened concrete slurry. Any oil or grease on the surface of the concrete shall be removed by hand chipping.

OPSS 930.07.04.07 is superseded by the following:

A thin coating of the bonding agent shall be brushed into the prepared surface. All vertical and horizontal surfaces against which the overlay will be placed shall receive a thorough even coating with no excess of bonding agent in any areas. Excess fine aggregate separated from the bonding agent mixture after application shall be removed from the deck surface. The rate of application of the bonding agent shall be such that the brushed material does not become dry before it is covered with overlay. At no time shall the bonding agent be placed more than 2 m in front of the overlay placement. Bonding agent not used within 30 minutes after mixing shall not be used.

The overlay shall be placed on the deck and struck off slightly above final grade using concrete rakes.

** Note to the Designer: Provide this information in the drawings.

In the event of an interruption in the placing of the overlay, the exposed edge of the overlay shall immediately be covered with wet burlap. If the delay in placing exceeds 10 minutes, the bonding agent already applied to the deck shall be removed.

When undue delays occur, all overlay material ahead of the deck finishing machine shall be removed and a joint formed.

The overall combination of labour and equipment for proportioning, mixing, placing and finishing the overlay shall be capable of finishing a minimum of 4m³ of overlay per hour, and shall be so arranged that not more than 20 minutes elapses between discharge of the overlay from the mixer and the final finishing.

For silica fume concrete overlays, a continuous water fog spray shall be applied to the surface during finishing and before application of curing material.

OPSS 930.07.05.04 is superseded by the following:

**930.07.05.04 Cure Concrete Overlay
Cure Silica Fume Concrete Overlay**

One layer of wet burlap and one layer of filter fabric that have both been presoaked by immersion in water for a period of 24 hours immediately prior to placement, shall be placed on the concrete overlay within 2m from the finishing operation. Strips shall overlap 150mm and shall be held down without marring the surface of the concrete. The curing material shall be covered with a layer of moisture vapour barrier as soon as the moisture vapour barrier can be applied without deforming the surface of the concrete. The moisture vapour barrier shall be lapped a minimum of 150mm. Air flow in the space between the moisture vapour barrier and the curing material shall be prevented by holding the moisture vapour barrier down at the edges and all laps. The curing material shall be kept continuously wet during the curing period by using a soaker hose at the high end of the deck left continuously running for 7 days.

Except as specified for saw cutting construction joints in overlays, labour and equipment shall not be allowed on the overlay for 12 hours after placement. The surface shall receive a wet cure for not less than 7 days. The curing material shall then be removed and the overlay permitted to air dry for not less than 72 hours prior to any application of waterproofing.

OPSS 930.07.06.07 is amended as follows:

The title is revised to:

**930.07.06.07 Concrete Patches
Concrete Refacing**

OPSS 930.07.06.07.05 is superseded by the following:

930.07.06.07.05 Curing Concrete

One layer of wet burlap and one layer of wet filter fabric shall be placed on the surface of the concrete as soon as the surface will support it without deformation. The curing material shall be presoaked by immersion in water for a period of 24 hours prior to placing. A layer of moisture vapour barrier shall be placed immediately on the wet curing material.

The concrete shall be cured using the wet curing material covered with moisture vapour barrier for a minimum period of 7 days. The curing material shall then be removed and the concrete permitted to air dry for not less than 72 hours prior to any application of waterproofing.

When curing concrete placed in substructures, an additional moisture vapour barrier shall be wrapped around formwork for a period of 7 days.

If the formwork is removed before 7 days, curing shall be as specified for curing concrete for the remainder of the 7 day period.

Traffic shall not be permitted on the finished surface until the curing period has elapsed.

OPSS 930.08.01.01.01 is superseded by the following:

Sampling, delivery and testing of specimens shall conform to TS 904.

Samples and tests for slump and air content of the concrete shall be made as specified.

OPSS 930.09.02.02 is deleted and amended as follows:

No measurement will be made for the number of drainage tubes placed. Payment shall be included in installation of expansion joint assemblies or as specified in Contract Documents.*

OPSS 930.09.02.03 is amended by the addition of the following:

930.09.02.03.01 Place Silica Fume Concrete Overlay

* Note to Designer: Provide this information in the form of a Special Provision.

Measurement will be of the volume of silica fume concrete placed in cubic metres as calculated from the drawings based on the theoretical dimensions of the overlay.

The total volume will be calculated to the nearest 0.1 m³.

OPSS 930.09.02.05 is amended to:

**930.09.02.05 Concrete Patches
Concrete Refacing**

OPSS 930.09.03 is deleted.

OPSS 930.10 is deleted and amended by the addition of the following:

930.10 Basis of Payment

**930.10.01 Modification of Deck Drains – Item
Concrete Repair, Substructure - Vertical – Item
Concrete Repair, Substructure - Horizontal – Item
Concrete Repair, Substructure - Soffit – Item
Concrete Repair, Deck, Partial Depth – Item
Concrete Repair, Deck, Soffit – Item
Concrete Repair - Parapets, Outside Face – Item
Concrete Repair - Parapets, Inside Face – Item
Concrete Repair - Beams, Vertical – Item
Concrete Repair - Beams, Soffit – Item
Concrete Overlay – Item
Latex Modified Concrete Overlay – Item
Silica Fume Concrete Overlay – Item
Latex Modified Mortar Patches – Item
Concrete Refacing - Item**

Payment at the contract price for the above tender item shall be full compensation for all labour, equipment and material to do the work. Payment shall be made in the following basis:

- 75% of the unit price bid for the supply and placement of the concrete, as well as to supply all necessary formwork and falsework
- 5% for finishing of the concrete to the requirements of the specifications
- 20% for curing of the concrete to the requirements of the specifications

No payment shall be made for abrasive blast cleaning of concrete surface.

No payment shall be made for use of welded wire steel fabric, payment shall be deemed to be included in the payment for the appropriate concrete item.

Payment at the contract price for the appropriate tender item shall be full compensation for all labour, equipment and material required to do the work.