**RSS FeH2OLoc Interrupt Water System RS 192-113SA**

**Rehabilicrete™ System Steps & Layers 'Summary Steps'**

Please refer to Manufacturer Technical Data Sheets before application process and refer to the Guide RSG 192-113SA for details of key QA inspection step and tips. See (RSG) for correct Tools also for recommendations and guidance.

**RSS FeH2OLoc Interrupt Water System RS 192-113SA**

This System is dual purpose. It has use as a 'Drained Excavation Support System (Raker or Struts option and tiebacks option). In addition, with High Strength Low Shrinkage Shotcrete (HSLS) it has use as a permanent full perimeter Waterproofing System with a TPH Curtain Seal 'Stop Water' option which can be utilized as permanent final 'below grade Structure floor slabs' are built.

**1-1 INSTALL TEMPORARY SUPPORT PILES**

Install vertical excavation W12 to W24 support piles in .75m to 1.2 m diameter vertical drill holes with 5 to 10 MPA backfill concrete. Pile Spacing to be 2.1 meters for Two Secants (mid bay hole) to 2.7 meters for Three Secants. Ground loss prevention will be ensured by using casing and the correct drilling tools. These are further explained in an installation guide (RSG) which will be available at every installation.

Figure A-1 and A-2 are schematic illustrations which show a typical layout of the support piles with the locations of the proposed final walls and caisson line.

**2-2 INSTALL DRAIN BOARD**

The drain board is to be installed mid bay in 300mm-900mm vertical excavation lifts with a 150mm vertical drain board overlapping a typical splice.

Schematic illustrations, figures A-1 and A-2, show the position of the drain board in relation to the support piles.

**3-3 INSTALL 100mm Steel Mesh c/w 15m horizontal Rebar weld tabs**



Feng

Weld the Tabs so as to stagger them at an R38 or T51 bar. The associated tieback sleeves should be pre welded. Figure A-8 is a schematic illustration showing the assembly of the tieback sleeves.

**4-4 APPLY FIRST STAGE LAYER HDLS (HDLS-1) AT 100mm**

Some of the steel mesh will be spliced to one another. Therefore, one to two steel mesh squares will be left open and not be filled with shotcrete. The mesh splice around the area of the 'Integral Tieback pipe (4.5 inches)' should be removed so as to allow for the 'Anchor Head 3.5 Spigot' to be inserted before HDLS stage one is applied.

Install first layer stage one 25-35MPA HDLS in each excavation step. This will occur on all vertical excavation lifts with 'Feng Feather Joint'. Schematic illustration, Figure A-6, details a Feng Feather Joint with the placement of HDLS layers 1 and 2 as well as the position of the W460 pile.

The most preferable embodiment of the concrete mix will comprise of 300 to 400kg of Portland Cement per m3 as well as additional elements.

The mix may contain Fly Ash with a preferred range of between 30kg and a maximum of 112.5kg.

Alternatively, the mix may contain Slag with a preferred range of between 60kg and a maximum of 225kg.

The most preferable embodiment of the mix will contain between 6kg and a maximum of 40.5kg two-part powder containing micro-silica (powder). The preferred embodiment of the admixture shall also contain between 5kg to a maximum of 36kg of light-burn calcine magnesia (powder). The micro-silica in our preferred admix should have a particle Specific Surface Area (SSA) between 20m2/gr and 200m2/gr. The particle sizes shall average between 15nm and 40nm in order to meet the preferred admix.

The preferred iteration of this mix shall contain from 0.09kg to 0.45 kg of natural rheology modifier and mix stabilizer (Acti-Gel).

The first layer, HDLS-1, shall be reinforced with Spigot B. Schematic illustrations Figures A-9A through A-10B detail Spigot B at different viewpoints.

The first layer, HDLS-1, shall be reinforced with rebar. Schematic illustration, Figure A-8 shows the layout and positioning of the rebar.
Layer 1 HDLS shotcrete shall be float finished.

The foundation wall will be installed in multiple horizontal sections. Sections will be installed from top to bottom.

**Part B Curing**

Post apply colloidal silica spray (SCP327). This will fill the bleed Channels after a Wood Float Finish. This application should take place at each 100mm layer and is required with where any Feng Feather Joint is present.

**5-5 DRILL TIEBACK & INSTALL ANCHOR**

Use the R38 or T51 anchor per Tieback drawings and install under Feng QA Direction. Schematic illustration Figure A-7A shows the pile tieback with the drilled caisson and Spigot Sleeve assembly. Figure A-8 depicts the positioning of the anchor in relation to the rebar.

For Spigot Type B, Install R38 or T51 anchors through web welded connection 4.5 inch pipe. All the anchors should be proof tested until 150% complete with final the hardware left in place. Figure A-9A shows a schematic illustration of the the positioning of the pile to accept the pipe. Figure A-10A also shows the pipe and plate positioning.

Insert at each 115mm ID, which was pre welded to pile, a 115mm steel pipe placed next to a W460 pile web. This will be used to guide the correct placement of ‘Anchor Head 89mm pipe Spigot Internal Chair ‘C’’ to its correct placement in the pile face. For Spigot Type A this should take place after the anchor is installed and during the application of layer 1 HDLS at 100 mm.

Cut anchor bar to be within 5 to 15 mm of anchor head prior to Velosit WP 101 application and after all tensioning/stressing requirements are completed.

Note: Industry Standard Shoring Excavation Monitoring of +/- 2mm on W460 will apply. Until the final structure replaces temporary works all conditions must be monitored.

**6-6 FINISH SHOTCRETE FACE. APPLY SECOND LAYER of HDLS (HDLS-2)**

The final application of HDLS shotcrete shall be float finished. Repeat Step 4-4.

Note; The second HDLS layer shall be applied only after the successful proof testing of each anchor. Cover each anchor Head and use 'RSS Feng Seal Spigot' after proof test and Feng QA to determine lock load on anchor respecting free zone sleeve 3m min. Maintain shotcrete surface heat above 5 degrees for initial set 12-24 hours per Feng QA.

The preferred concrete mix will comprise of 300 to 400kg of Portland Cement.

The preferred embodiment of the mix may contain between 30kg and a maximum of 112.5kg of Fly Ash.

Alternatively, the mix may contain a preferred range of between 60kg and a maximum of 225kg Slag.

The preferred iteration of the mix will contain between 1kg and a maximum of 6kg two-part powder containing micro-silica (powder). This admixture shall also preferably contain between 5kg to a maximum of 36kg of light-burn calcine magnesia (powder). The micro-silica should have a preferred particle Specific Surface Area (SSA) between 20m2/gr and 200m2/gr. The particle sizes shall average between 15nm and 40nm. The mix shall contain between 3kg to a maximum of 30kg of micro-silica with an average Specific Surface Area (SSA) of 20m2/gr.

Our preferred embodiment of the mix shall contain from 0.09kg to 0.45 kg of natural rheology modifier and mix stabilizer (Acti-Gel).

The mix will contain a preferred range from 6kg to 12.5kg of liquid crystalline admixture (Velosit CA 115) which will contain a choice of Melamine, Naphthalene and/or Polycarboxylate as water reducers.

The layer of HDLS-2 shall be reinforced with Microfibres applied from a preferred range 3kg to 4.5kg per cubic meter of concrete.

Figures A-11 through A-14 depict the Typical Elevations and Profiles of single, double and triple anchor rows.

**Part B Curing**

Post Applied colloidal silica spray (SCP327) (to fill bleed Channels after a Wood Float Finish).

Post apply colloidal silica spray (SCP327). This will fill the bleed Channels after a Wood Float Finish. This application should take place at each 100mm layer and is required with where any Feng Feather Joint is present.

**7-7 REPAIR MORTAR 50 MPA OPTIONAL**

Apply repair mortar which cures to 20 MPA in 3 hours to nicely cover final anchor head hardware. Tarping is required with suitable means to hold in the mix Heat. Supplement Heat as required or accelerate actual mix cure.

**8-8 CEMENTITIOUS TOPPING OPTIONAL**

A polymer modified flexible cementitious crack bridging waterproofing slurry shall be applied where required. The topping shall be applied by trowel coat to a thickness of 5mm. The final optional topping may be spray-applied for 2 coats of 2mm each.

**9-9 GROUNDWATER FLOW ANALYSIS / TPH CURTAIN GROUTING CHOICE – PRESCRIPTIVE-OPTIONAL**

As the final structure proceeds to be constructed, determine TPH curtain grouting choice – prescriptive – based on a baseline of 1.0 liter per excavation Bay per minute leakage into site containment area. Flows greater than the baseline shall warrant curtain grouting via TPH solutions technology. After the floor slabs are installed, seal drainage behind the shotcrete. This will provide added water pressure and temperature bracing Equivalent.