

The following notes relate to the Sea Wall Works at Llanfairfechan Sea Wall stated in APR 2015 and Drawing 3709/EW006/2/3/001.

The works will be closely supervised by NR's construction Manager Instarmac is designed to be placed to a maximum thickness of 75mm and not 10mm as shown on Drg 3709/EW006/2/3/001. Please adjust this detail as necessary.

Some of the smaller voids in the revetment can be filled with concrete without removing the masonry from the top. The 10mm mix has been developed for the smaller voids as the smaller aggregate will penetrate further.

Mass concrete as shown on Drg 3709/EW006/2/3/001 is a bit vague and may be degraded by sulphate attack in sea water. Please use the following materials.

APPENDIX 17/1: SCHEDULE FOR THE SPECIFICATION OF DESIGNED CONCRETE  
To be in accordance with the Specification for highway works, unless directed otherwise.

Requirement	Schedule	
	Mix A	Mix B
Designed Concrete Ref/ Location to the works	Mix A	Mix B
Intended Working Life of Structure (years)	120	120
Nominal Cover to Reinforcement	-	-
Applicable Exposure Classes (Excluding DC – class)	XS2/3	XS2/3
DC-class (where appropriate)	N/A	N/A
Compressive Strength Class of Concrete	C25/30	C25/30
Minimum Cement (or Combination) Content (kg/m <sup>3</sup> )	340	380
Maximum Free Water/Cement ratio	0.5	0.5
Required Group or Type and Class of Cement or Combination (where a DC-class has not specified)	IIIA, IIIA+SR IIIB, IIIB+SR IIB-V, IIB +SR IVB -B	IIIA, IIIA+SR IIIB, IIIB+SR IIB-V, IIB +SR IVB -B
Maximum Aggregate Size, mm	20	10
Chloride Content Class	CI 0.5	CI 0.5
For Lightweight Concrete, the Density Class or Target Density	N/A	N/A
Consistence Class	S2	S2
Required Source/ Special Type of Aggregate	N/A	N/A
Maximum Cement Content (kg/m <sup>3</sup> )	N/A	N/A
Required Admixture	WRA, Accelerator	WRA, Accelerator
Air Entrainment Required	No	No
Sampling and testing	Min. 3 cubes per 24m <sup>3</sup>	Min. 3 cubes per 24m <sup>3</sup>
Requirements to Control Early Thermal Cracking	N/A	N/A

1. Limit the sulfate content (SO<sub>3</sub>) of the concrete mix to be 3.6% SO<sub>3</sub> to mass of cement

2. Where Portland cement (CEM I) alone is used in UK waters, a maximum of 10% C3A, when determined by the Bogue method
3. Sea water shall not to be used
4. Admixtures shall conform to BS EN 934-2.
5. Admixtures containing chlorides should not be used.

### Rock armour

- Rock armour material to be natural, inert stone with no bedding planes or lines of weakness. complying with bs en 13383-1:2002 (unless stated otherwise):
- Minimum density to be 2500kg/m<sup>3</sup>.
- length to thickness ratio to be greater than 3 for no more than 20% by mass.
- Category A standard heavy grading HMA<sub>300/1000</sub> 300 to 1000 kg average mass 540-690 kg

Mass (Kg)	Percentage (by mass) less than particle mass
1 500	97 to 100
1 000	70 to 100
650	-
300	0 to 10
200	0 to 5

- Mean comprehensive strength of a specimen after striking out of the lowest value from 10 specimens MPa > 60 (category CS<sub>80</sub>)
- Categories for resistance to wear requirement category MDE 20 < 20.
- Rock armour placement stone shall not be dropped into position but carefully placed by machine avoiding segregation, unless with written agreement of the supervisor. All voids in the larger armour are to be generally filled by the smaller armour stone. The final level of the works shall be uniform with a maximum variation in level of ± 300mm

### Mortar

1. Use Conbextra UW or similar written approved for sealing the gap between the concrete beds.
2. All repointed joints are to be raked out to a minimum depth of 25mm and flushed / cleaned to provide a good key. Porous surfaces are to be treated with diluted PVA in accordance with the manufactures instructions.
3. For general re-pointing use mortar designation (ii), compressive strength class M6, Cement: lime: sand mortar 1:½:4 to 4½ cement for mortar shall be: CEM1, Portland cement, strength class 42.5R (high early strength) complying with EN 197-1:2011.

4. Re-pointing material within the tidal or splash zone shall be as stated above but with the addition of an anti-washout grouting admixture such as Fosroc Cebex 250 or similar written approved.
5. All re-pointed fractures greater than 1000mm in length shall have a mortar crack tap applied showing the date of application e.g. 04:15 for April 2015.
6. Stainless steel any stainless steel shall be grade 1.4362 or 316.
7. Sand shall comply with BS EN 1313 and shall be washed sand or natural crushed rock. It shall not be from a marine source. Water shall not contain impurities and shall comply with BS EN 1008. One batch of three No. cubes shall be taken and tested for conformity.
8. Lime shall be high calcium lime, semi-hydraulic lime or magnesium lime complying with BS EN 459-1. Lime is necessary for increased adhesion and improved movement accommodation.
9. All repointing to sea wall joints is to be a maximum of 20mm thick, flush pointed, cut and struck. Any joints wider than 20mm will require a proprietary material or concrete mix B.
10. Pointing is to be by an injection / mechanical means.

### **Ladders**

Ladders are to remain untouched as these form an emergency means of emergency escape for persons trapped during rising tides

### **Re-painting of rock patters plates**

Corroding patters plates shall be abrasively cleaned to a minimum of st3 standard and coated with an M21 Epoxy glassflake paint system comprising items: 7.1.2 (Epoxy blast primer with a minimum dft of 25 microns), 7.2.3 (Epoxy glass flake Intermediate coat with a minimum dft of 400 microns) and 7.3.4 polysiloxane top coat all in accordance with NR/L3/CIV/040 and NR/GN/CIV/002.