

Bespoke Product Designs to Eurocodes

Introduction

Eurocodes have now been integrated into most specifications and consequently bespoke designs undertaken by Marshalls Civils and Drainage will be in accordance with Eurocodes. BS-5911-3:2014 'Specification for reinforced and unreinforced manholes' has been revised such that the test loads for standard slabs covered by BS5911-3 are consistent with Eurocode Loadings.

The following summarises the options available for loadings complying with Eurocodes.

Design Standards - Loading

The loading options in Eurocodes are covered by 2 separate parts of Eurocode 1.

Part 1: Covers 'General Loadings including trafficked areas'

Part 2: Specifically covers 'Traffic loads on bridges'.

Loading options

- (1) For Locations such as Pumping Chamber compounds where slabs will not be routinely loaded.

Suitable where the only loading would be accidental apart from maintenance activities.

Designed in accordance with Eurocode: BS EN 1991-2 UK NA.2.38 & 2.43 'Accidental presence of a heavy vehicle'

Axle loads of 115kN and 65kN with wheels at 1.3m centres on each axle.

- (2) Vehicles on buried structures up to 48T gross weight.

Suitable for normal roads, access routes, parking areas. Generally suitable for Non Adoptable applications.

Design in accordance with BS EN1991-2:2003 'Traffic loads on bridges'

Clause NA.2.1 for buried structures

Vehicle Model as Fig NA6, 4 axle loads varying from 115kN - 65kN.

- (3) Heavy Vehicles on Bridges.

Specifically for Road and Rail traffic loading on bridges.

BS EN 1991-2 defines as where 'heavy industrial international traffic is expected' and is intended for 'Highways and Motorways'. However it is generally required for all Adoptable roads i.e. Estate and Main Roads.

Designed in accordance with

Eurocode: BS EN 1991-2 'Traffic loads on Bridges'

Loading: Load Model 1: Multiple axle loads of 300/200 KN

Load Model 2: Single axle load of 400KN.

TECHNICAL ADVICE NOTE

(4) Customer Specific Loading

As customer specifies but could still be designed in accordance with Eurocodes albeit the loading would not be a standard Eurocode load model.

Design Options – Durability

Durability requirements can be determined from Eurocode 2-1-1 'Design of Concrete Structures – General Rules' however UK requirements are more specific in BS8500-1 which is consistent with Eurocodes.

BS 8500-1 'Concrete – Method of specifying and guidance for the supplier' recommends to levels of exposure which can be offered.

Exposure Class: XC3/4 (100 year design life)
Suitable for 'reinforced concrete surfaces sheltered from or exposed to direct rain, alternate wetting and drying and high humidity
*Generally covers most concrete not exposed to de-icing salts.
Concrete cover depth for C40/50 concrete is 40mm (C_{nom} +/- 10mm)*

Exposure Class: XD2/3 (100 year design life)
Covers concrete surfaces exposed to de-icing salts and chlorides other than sea water
*Generally used for highway structures installed in roads whereby XD2 is for cover depths > 1.0 and XD3 < 1.0m
Concrete cover depth for C40/50 concrete is 50 and 55mm (C_{nom} +/- 10mm) for XD2 and XD3 respectively.*

Notes:

Typically a manhole bespoke cover slab would have XD2/3 exposure class on the top face and XC3/4 exposure class on the underside

A more economic design can be produced if XC3/4 is specified.