



TECHNICAL MEMORANDUM 009

CONCRETE ENCASED STEEL BEAMS USED AS GROUND BEAMS AS PART OF FOUNDATIONS OR BRIDGING BEAMS OVER A DRAIN RUN (DWELLING HOUSES LESS THAN 2 STOREYS)

Introduction.

This memorandum note highlights key expected features when a builder needs to use steel “I” shaped beams within foundations. This note relates only to domestic buildings not exceeding two storeys in height.

This guidance does not seek to over-ride your structural engineers design, and provides only guidance. You must confer with your own structural engineers if you have a query relating to your structural design proposals. Our basic expectations for this type of encased steel arrangements are as follows -

1. Only beams with equal flanges may be designed as cased beams when the following conditions are fulfilled:
 - a) The steel section is of a single web and “I” form or of double channel form with the webs not less than 40mm apart.
 - b) The beam being placed in the ground is un-painted and is solidly encased in ordinary dense concrete, with 10mm aggregate (unless solidity can be obtained with larger aggregate), and a cube strength of not less than 21N/mm² at 28 days when tested in accordance with BS 1881-124:2015 Testing concrete, “Methods for analysis of hardened concrete”.
 - c) The minimum width of solid casing is equal to b+100mm.
 - d) The surfaces and edges of the flanges of the beam must have a concrete cover of not less than 50mm.
 - e) The concrete casing surrounding the beam is effectively reinforced with wire complying with BS 4482:2005 Steel wire for the reinforcement of concrete products. The wire shall be at least 5mm diameter and the reinforcement shall be in the form of stirrups at not more than 200mm pitch centres, and so arranged as to pass through the centre of the covering to the edges and soffit of the lower flanges or binding (i.e. **D49** wrapping mesh)

Please refer to image 1 and image 2 on the following page :

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Image 1 - Typical example : Un-painted steel beams positioned in the ground, wrapped in structural D49 mesh

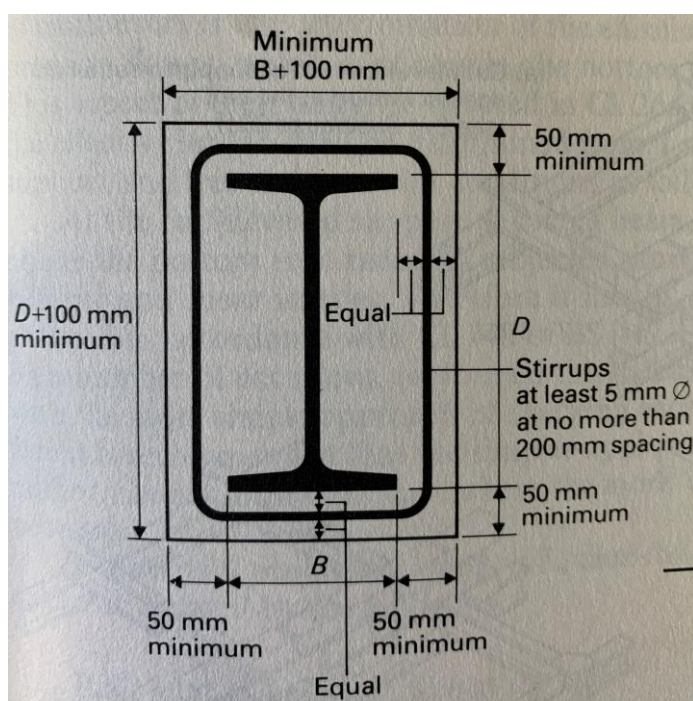


Image 2: Un-painted steel beam with 5mm dia. steel stirrups and concrete encasement