



# Ground bearing slabs

## Introduction

Ground bearing floor slabs are most commonly found within industrial installations, such as warehouses or factories. Nevertheless, they can also be installed in all types of structures where there is no basement, provided that ground conditions are suitable. The design and detailing of these slabs is an involved process, as the interaction between the natural and/or made-ground and the rigid concrete floor slab presents challenges with respect to cracking, movement and flatness. The last aspect is of utmost importance to factory floors and warehouses where the plant requires the floor to be extremely flat and level in order to function properly.

This Technical Guidance Note provides an introduction to ground bearing floor slabs, touching on the slabs' reinforcement by considering both historical use of mesh as well as current plastic and steel fibre reinforcement methods.

## ICON LEGEND

- Ground bearing slab
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Figure 1 Components of a ground bearing slab

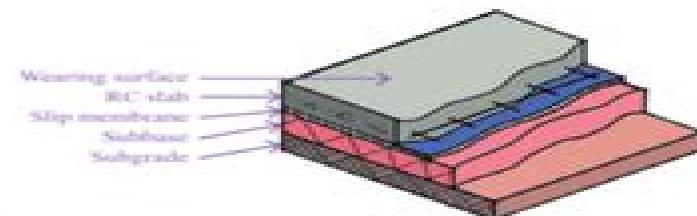
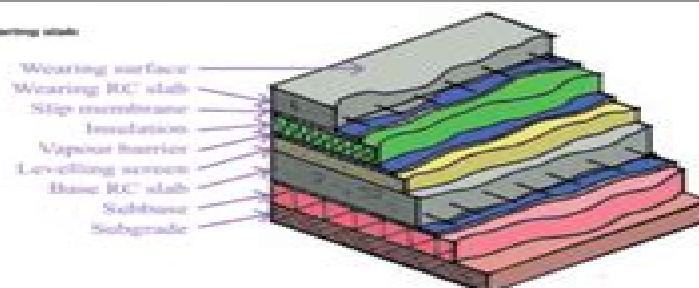


Figure 2 Components of a three-layered ground bearing slab



## Ground bearing slabs

When concrete floor slabs are cast directly onto the ground they rely on their rigidity and the interaction between the underlying soil to perform as intended. For larger floors, there is a need to have joints within them in order to avoid the development of cracks within the floor slabs. This topic has been covered before in Technical Guidance Note 205 (Level 1: Cracking in concrete). Another factor that influences the design and specification of ground bearing concrete floors is the nature of the load that they have to support. If it is non-specific human occupancy for example, it is assumed that a nominal load is applied to the floor and the only criterion is the need to create a relatively flat surface that rests on the

ground. For industrial floors this is not the case, as they typically have to support racking and heavy machinery that is moving or being used to transport items, e.g. via a forklift. In these instances, careful provision needs to be made to accommodate the high point loads and very flat and level floor finish. Additionally the location of joints within the slab impacts on the location of supports to plant and storage racks.

### Floor slab components

A typical ground bearing floor slab has five components, assuming it is of a single layer construction. These are listed from bottom to top in Figure 1 and can be summarised as:

- Subgrade – the soil against which the ground bearing slab construction is placed, but not cast

- Subbase – a graded material, usually made from broken masonry and/or rocks
- Slip membrane – provides a plane against which the concrete slab can flex independently of the subbase. This can also act as a against ground-borne gases such as methane, radon or carbon dioxide and/or moisture
- Reinforced concrete slab – the floor slab that contains either a square fabric mesh or fibres and is sometimes laid onto a bedding layer of compacted sand
- Wearing surface – the exposed surface of the floor, which typically receives some sort of surface treatment, be it a paint, sealant or a screed

In some instances an insulation layer is installed; its location would be similar to that shown in Figure 2.

# Design Guide For Ground Bearing Slabs

**Ravindra Dhir, Peter Hewlett**

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*Advanced Concrete Technology Set* John Newman, B S Choo, 2003-11-06 Based on the Institute of Concrete Technology's advanced course this new four volume series is a comprehensive educational and reference resource for the concrete materials technologist An expert international team of authors from research academia and industry has been brought together to produce this unique reference source Each volume deals with different aspects of the properties composition uses and testing of concrete With worked examples case studies and illustrations throughout this series will be a key reference for the concrete specialist for years to come Expert international authorship ensures the series is authoritative Case studies and worked examples help the reader apply their knowledge to practice Comprehensive coverage of the subject gives the reader all the necessary reference material

## **Design and Construction of Joints in Concrete Structures** M. N. Bussell, R.

Cather, 1995 This title provides advice on provision specification and construction of joints in in situ concrete construction It aims to help structural designers make informed decisions about the provision of joints in concrete structures

## Guide to Building Control

Anthony Gwynne, 2013-02-25 To clarify the practical requirements of the Building Regs and help you meet their requirements first go all the information contained in the building regulations 2010 and approved documents is presented here in an easy to understand format clear concise and fully illustrated Guidance is given for domestic buildings of up to three storeys in England and Wales including extensions loft conversions new dwellings conversions garages basements and barns and upgrading of existing buildings including the use of natural lime mortars plasters renders and paints There are clear explanations of how the technical design and construction requirements of the Building Regs can be met with sufficient information to draw up an effective specification and design to be developed Guide to Building Control illustrates the design and construction of the various building elements and explains the principles and processes of the building regulations and approved documents including structure fire safety contaminates sound insulation ventilation water efficiency drainage systems combustion appliances stairs and guarding energy conservation green building issues disabled access safety glazing electrical safety materials and workmanship The Guide contains up to date examples of everyday practices and procedures gained by the author a practicing building control surveyor from years of responding to requests from property professionals builders property owners and students for clarification of the practical requirements of the building regulations Accompanied by detailed diagrams tables and text offering an enlightened understanding of the complexities of building regulations the Guide is both an authoritative reference for use at planning stage and a practical handbook on site Students and professionals will find it an essential easy to use resource for building control surveyors building designers building contractors self build and others working in the construction industry

**ICE Handbook of Concrete Durability** Marios Soutsos, 2023-10-24 ICE Handbook of Concrete Durability second edition is a comprehensive practical reference for professionals involved in design and maintenance of concrete structures of all types It is an invaluable

guide for construction professionals including design engineers consultants and contractors as well as postgraduate students

*Structural Foundation Designers' Manual* W. G. Curtin, Gerry Shaw, Gary Parkinson, J. Golding, Norman

Seward, 2006-12-04 This manual for civil and structural engineers aims to simplify as much as possible a complex subject which is often treated too theoretically by explaining in a practical way how to provide uncomplicated buildable and economical foundations. It explains simply clearly and with numerous worked examples how economic foundation design is achieved. It deals with both straightforward and difficult sites following the process through site investigation, foundation selection and finally design. The book includes chapters on many aspects of foundation engineering that most other books avoid including filled and contaminated sites, mining and other man made conditions. It features a step by step procedure for the design of lightweight and flexible rafts to fill the gap in guidance in this much neglected yet extremely economical foundation solution. It concentrates on foundations for building structures rather than the larger civil engineering foundations. It includes many innovative and economic solutions developed and used by the authors' practice but not often covered in other publications. It provides an extensive series of appendices as a valuable reference source. For the Second Edition the chapter on contaminated and derelict sites has been updated to take account of the latest guidelines on the subject including BS 10175. Elsewhere throughout the book references have been updated to take account of the latest technical publications and relevant British Standards.

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**ACI Manual of Concrete Practice** ,2005 *Design Guide for Strapping and Tying of Load-bearing Brickwork in Low-rise Construction* British Ceramic Research Association. Structural Ceramics Research Panel. Structural Ceramics Advisory Group,1977 *Avery Index to Architectural Periodicals. 2d Ed., Rev. and Enl* Avery Library,1986 British Humanities Index ,1986 **Guide for Construction of Concrete Floors on Grade** American Concrete Institute. Committee 332,1962 **BRE Digest** ,1998 **Reinforced Concrete Designer's Handbook** Charles Edward Reynolds,James Cyril Steedman,1976 *AJ Handbook of Building Enclosure* Maritz Vandenberg,Albert Joseph Elder,1975

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