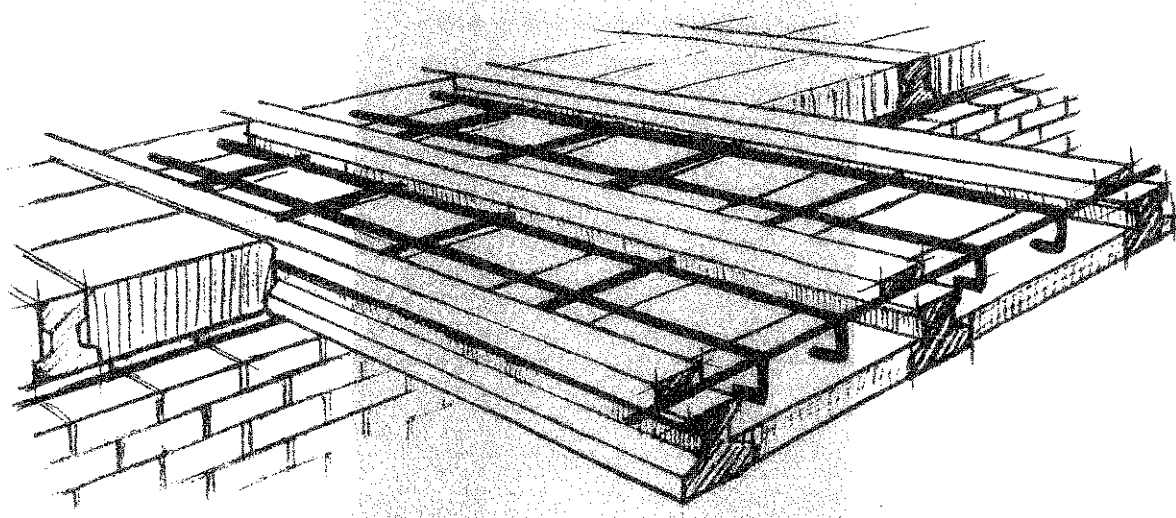


# PRECAST FLOORING

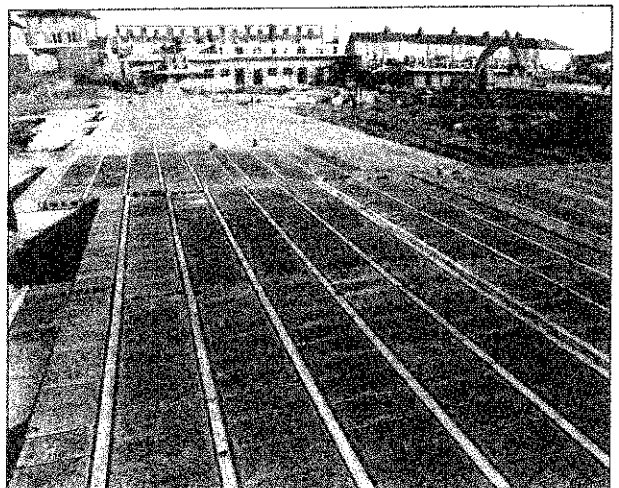
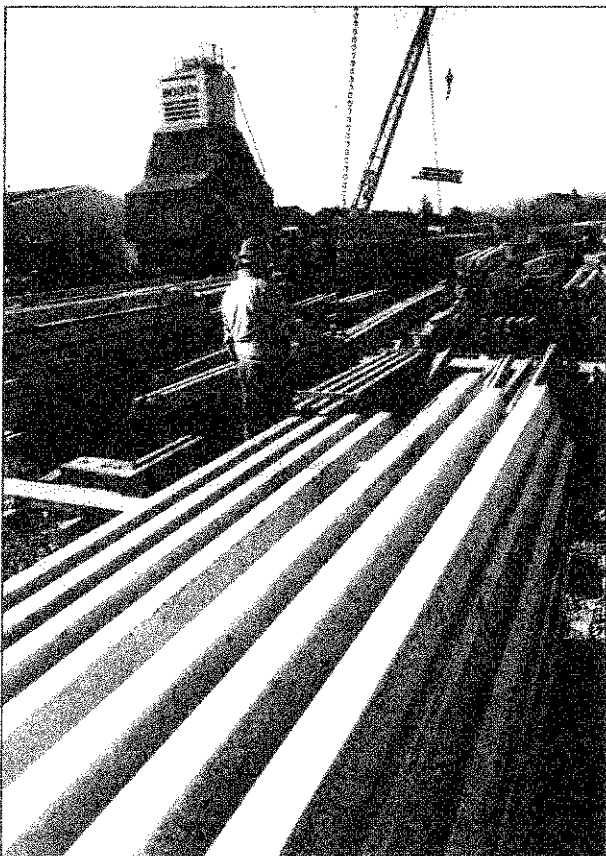
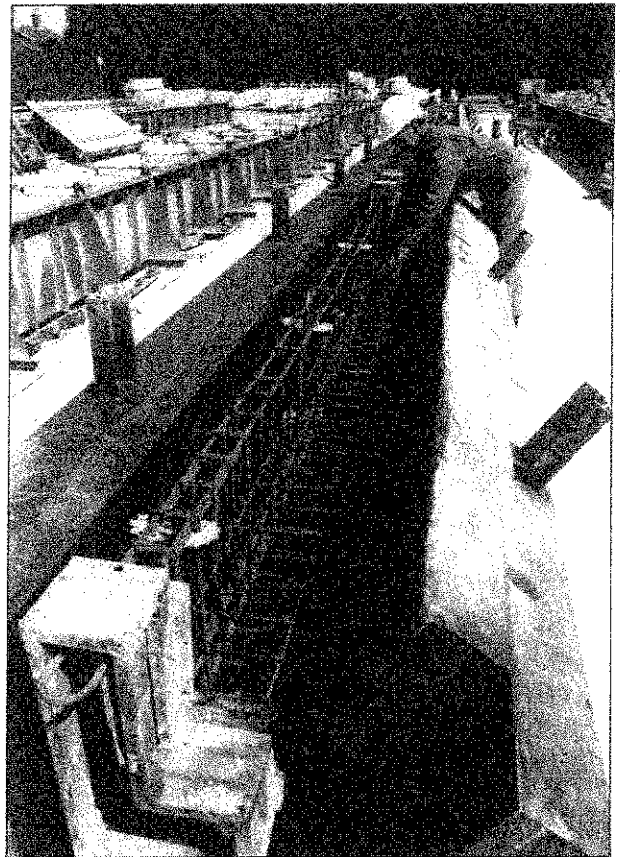
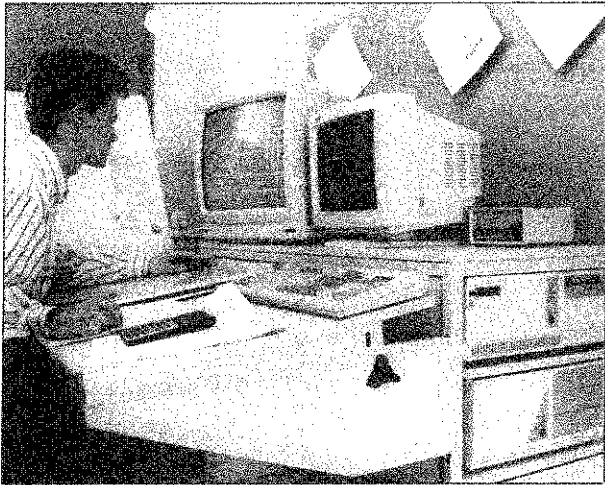


# BOOTH

TECHNICAL BROCHURE



Certificato n. 5



**BOOTH**

# Introduction

## The product

This brochure presents technical details of the Booth Concrete precast flooring systems. All incorporate the versatile beam-and-block type of flooring, and the majority of components are manufactured by our company under quality-assured conditions.

## The purpose of this brochure

The brochure gives specific information on the best and most cost-effective uses of our flooring systems – from the earliest design stage right through to site fixing.

We hope you will find the brochure – and the span/load charts at the back – helpful.

## Product specification

Booth prestressed concrete joists are manufactured in steel moulds on the long line principle. Accelerated curing by controlled heating of the prestressing wires or by hot water in the mould cores achieves characteristic concrete strengths of  $40\text{N/mm}^2$  minimum at 14-16 hours and  $60\text{N/mm}^2$  at 28 days.

In-filler blocks are manufactured from a blend of lightweight and normal aggregates to produce a material of cube strength  $15\text{-}20\text{N/mm}^2$  at 28 days.

For construction details and product properties, see page 20.

## Notes

All the recommendations made in this brochure are based on experience accumulated over many years. While such guidance is offered in the belief that it will assist in providing good specifications, Booth Concrete Ltd cannot accept any liability for work which it does not carry out.

It has not been possible to cover every aspect of the joist-and-block floor in this brochure, as developments are continually taking place in the design of our products. Information is liable to alteration without notice, it is therefore advisable to check with us for the latest details. While the company does its best to ensure that information is accurate, it can accept no liability or responsibility whatsoever.

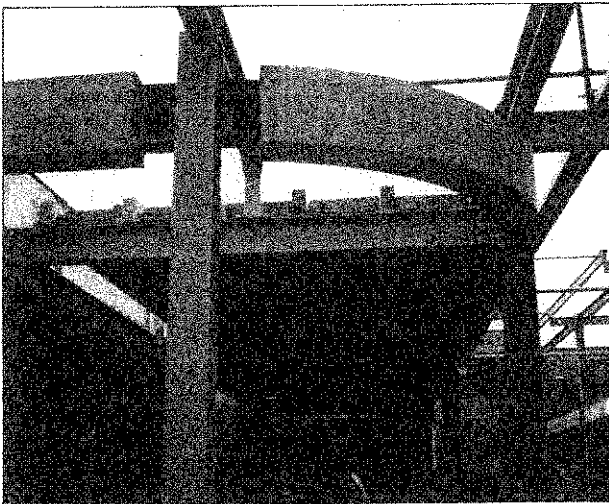
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A feature of modern construction practice is the large proportion of each project designed and produced by specialist suppliers and contractors. Such specialist work can account for 75 per cent of a typical building and calls for innovation in design, quality in production and dedication to delivery schedules.

Group Five Industries plc is dedicated to supplying to the construction industry specialist products of high quality to meet the needs of today's market. These products are marketed by Booth Concrete Ltd, Luda Concrete Products Ltd and Booth Engineering Services. Product details are available from the appropriate sales literature.

The Group was formed as the result of a management buy-out by Booth Concrete early in 1986, and is now a highly-successful business owned by its management team.



### **The Booth foundation-to-floor package**

With land suitable for traditional foundation design becoming scarce, Booth Concrete developed and introduced a pile/pad, ground beam and flooring package to meet the needs of difficult ground conditions.

Booth Concrete is now nationally recognised as the market leader in this form of precast foundation system. Our package comprises responsibility for design, manufacture or supply and installation of piles, precast ground beams and prestressed flooring.

Our expertise in this field can result in a simplified design, faster progress on site, and hence greater cost effectiveness. We will also design and manufacture precast staircases and balconies in conjunction with our flooring to your specifications.

Booth Concrete also manufactures ground beams, staircases and balconies to outside engineers' designs. For further details, please contact the Customer Services Department at our St Neots office.

Void ventilators for suspended ground floors can also be supplied.

### **Steel beam encasement**

Booth Concrete carries out steel encasement contracts in controlled factory conditions, using standard steel moulds and purpose-made timber moulds for special items.

Our quick efficient service does away with the need for large quantities of steel on site and all the uncertainties of in-situ concrete work.

For further information, please contact our Customer Services Department or ask us to visit you to discuss your project.

# Booth services

Booth Concrete will design, manufacture, deliver to site and fix flooring units. Alternatively, Booth Concrete will design, manufacture and deliver to site; crane offload is available at extra cost.

## Estimating

To enable our estimating department to prepare accurate design schemes and estimates, please provide the following information with your enquiry:

- 1 Site location plan giving details of access.
- 2 Fully-dimensioned plans of areas where flooring, roofing or precast units are needed, showing clearly:
  - ▶ Design loadings.
  - ▶ Types and positions of all walls, partitions and other items to be supported by flooring units.
  - ▶ Details of all walls, joists or steels on which the floor will be bearing.
  - ▶ Details of all finishes to floors and soffit.
  - ▶ For roofs, the magnitude and direction of fall.
  - ▶ Sizes and positions of all service holes.
  - ▶ Fire rating and sound insulation requirements.
  - ▶ Structural stability requirements affecting the design of the flooring.
  - ▶ Any other special requirements that may be important in the choice of product.
- 3 Indication of delivery and building programme requirements if known.

The following additional information is needed for Booth ground-beam packages:

- ▶ A soil report (preferably based on boreholes rather than trial pits).
- ▶ Drainage runs and invert levels.
- ▶ Existing ground levels and structural slab levels.
- ▶ Anticipated start date for piling.

## Site work

Fixing is quick and simple. Our professional fixing teams operate a service throughout the country; alternatively, the general contractor may fix the floor.

The joists are placed on bearings at the design centres and in-fill blocks are inserted from above. After brush-grouting (where applicable) the floor is ready for finishes applied by others.

Joists can be hoisted direct from lorries on to their

bearings, and in-filler blocks hoisted on to timber platforms over the joists ready for placing after the crane has left the site.

For further information about site fixing, refer to our separate leaflet.

## Notes

- 1 Stacks of in-filler blocks should not exceed four in height and should be contained within the first quarter of the floor span.
- 2 Propping and strutting are not required unless specifically shown on our drawings.
- 3 Operatives are advised to proceed with caution over the flooring while it is still in an ungrouted state. Floors do not provide a suitable platform for general foot traffic until grouting has been completed.
- 4 Planking must be provided by the general contractor for barrow runs, stacking areas, scaffold support and intensive working areas until the final finishes have been applied.

## Access to site

Units are delivered to site on articulated lorries approximately 16 metres long unless specially ordered otherwise. A six-metre-wide access is normally sufficient. The gross laden weight varies between 24 and 32 tonnes. Our fixing gangs use mobile cranes to transfer the units direct from the lorries on to their bearings. It is, therefore, necessary to provide suitable approaches with hard surfaces and hardstanding adjacent to the building. Unless stated otherwise, our estimate assumes that these facilities will be provided. Should double handling become necessary because site conditions are inadequate, this will be regarded as extra and charged accordingly.

## Bearings

The general contractor should ensure that all bearings are level, mature and stable prior to fixing flooring units, and that any open frogs in the brickwork are filled.

*Please note that authority to make contractual commitments on behalf of Booth Concrete Ltd is the responsibility of certain named individuals.*

# Booth Concrete flooring systems

Booth concrete floors and roofs consist of standard pre-stressed joists and purpose-made in-filler blocks. Units are designed to conform with the Building Regulations and the British Standard Codes of Practice current at the time of design.

The joists, of various depths, are centred to suit standard Booth in-filler blocks, dictated by span and load conditions (see span/load charts).

The joist finish is ex-steel mould with an as-cast top or bottom surface depending on the type of unit. Purpose-manufactured in-filler blocks have an open texture finish. Floors or roofs are completed with non-structural finishes to the top and soffit by others.

In some cases, structural concrete toppings will allow floors to carry additional loads.

The illustrations shown in the body of this brochure are diagrammatic only.

We pride ourselves on the personal service we extend to all our clients. Our technical sales personnel are available to help you at any time; for further information, contact our Customer Services Department at St Neots.

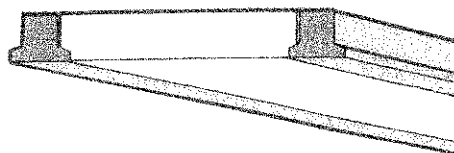
Booth Concrete floors consist of pre-stressed concrete joists and full-depth in-filler blocks.

The BC/LC number refers to the depth of the joist in millimetres. The joists are designed to be used at various centres to suit Booth purpose-made in-filler blocks. The depths and centres of the joists are dictated by span and load conditions (see charts). All units are designed to comply with British Standard Codes of Practice.

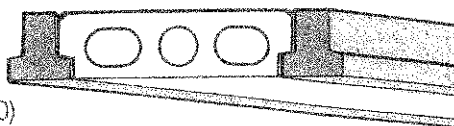
## Joist specifications

Booth Concrete joists are designed and manufactured to BS8110. In normal circumstances, they will have an upwards camber no greater than  $(\text{Length}/300)\text{mm}$ , and allowance for this should be made for finishes and levels. Please note that this camber may be affected by prolonged storage.

BC 100



BC LWT (150)



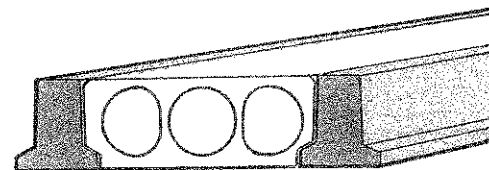
BC 150



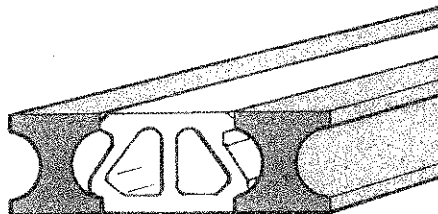
BC HWT (150)



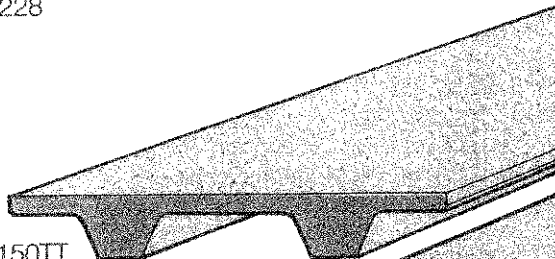
BC 200



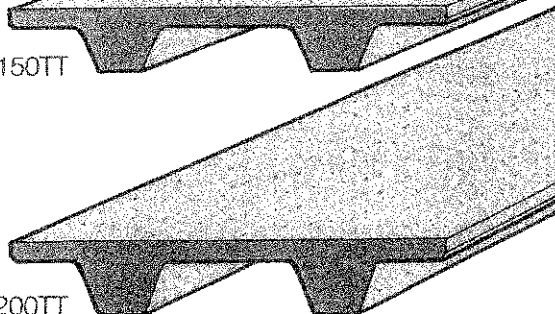
BC 228



LC 150TT

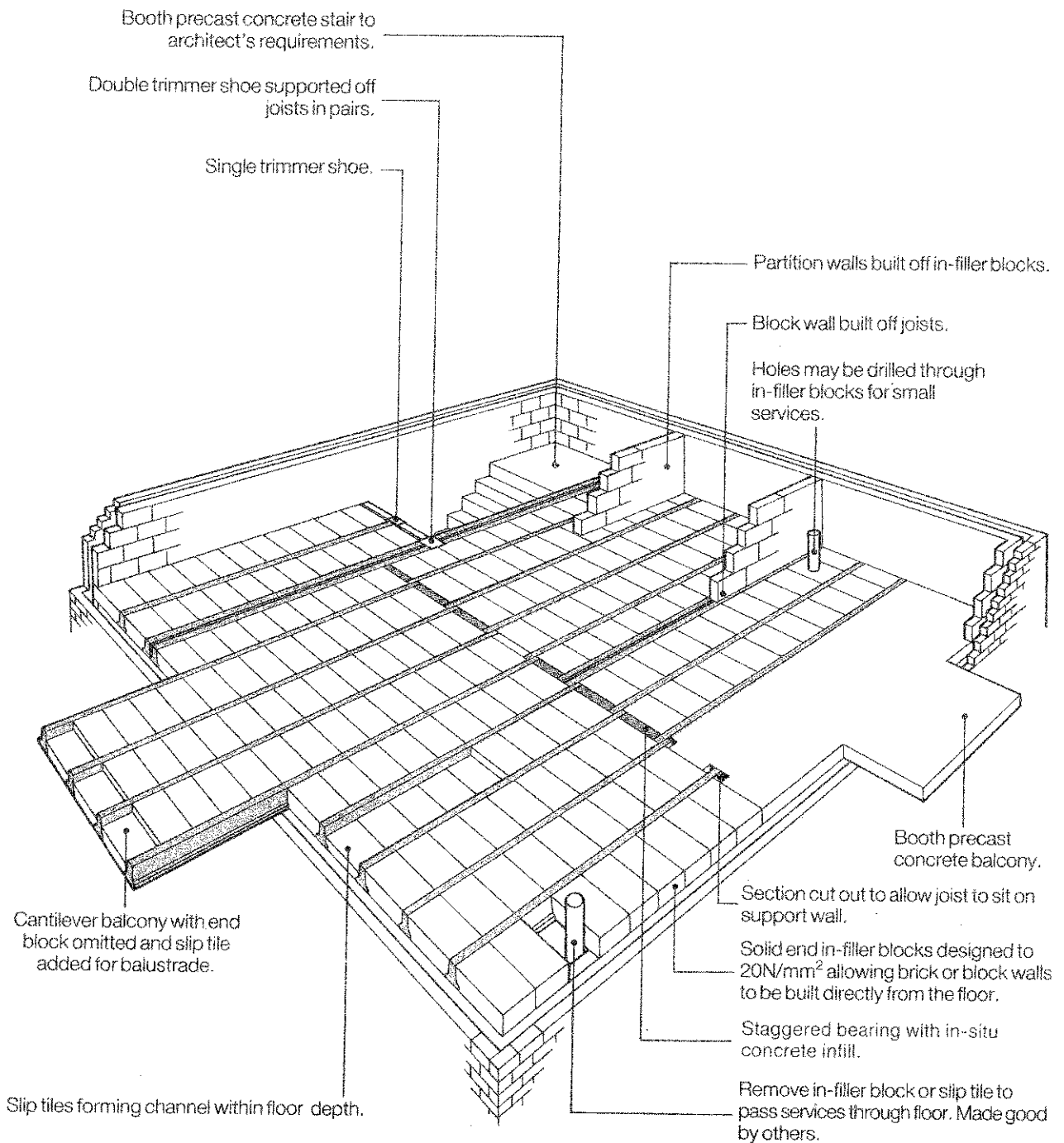


LC 200TT





### A typical floor construction



## Drawings

We provide full working drawings showing the joist layout for use on site. Four copies of each approved drawing will be issued; extra copies will be charged at cost. Approval should be obtained from our engineers if any variations are required.

## Bearings

The general contractor must ensure that bearings are level, solid, mature and stable, and that any open frogs in brickwork are filled, prior to fixing the flooring units.

## Dimensions

Our units will be manufactured to approved lengths based on the designed building dimensions, and we cannot undertake site measurements unless otherwise agreed at the estimating stage. It is assumed that the supporting structure is designed and built to tolerances in accordance with appropriate British Standards and Codes of Practice.

## Tolerances

Booth Concrete units are manufactured to tolerances given in BS 81 10:1985. Cumulative building tolerances (Clauses 5.2 & 6.11) should be allowed for. The upward camber of prestressed products can be affected by prolonged storage and we therefore programme our manufacture to keep storage time to a minimum. Our engineers will be pleased to provide information for any specific contract or scheme.

It is most important that, where building tolerances are critical, appropriate allowance is made for processes such as screeding; see page 8.

Floor finishes should take camber into account. The designed-for camber (in mm) of our floors prior to the application of finishes is based on:

$$\text{Span (mm)/300}$$

## Cover to prestressing wires

BS 81 10, Clause 7.3 allows 5mm variation in concrete cover to wire. Our production methods control the wire positions in such a way that variations to cover are well within the 5mm allowed.

## Fixing

Fixing is quick and simple. The joists are placed on bearings at the designed centres and in-filler blocks are inserted from above. After brush grouting (where applicable) the floor is ready for the application of finishes by others.

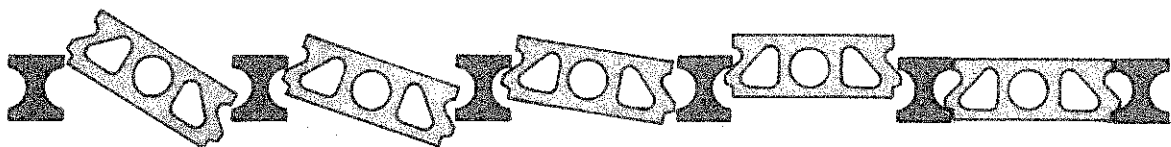
Joists can be hoisted direct from lorries on to the bearings, and in-filler blocks hoisted on to timber platforms over the joists ready for placing after the crane has left the site.

Joists are to be lifted at their ends, the top surface remaining uppermost at all times. They should be positioned at the designed centres before the in-filler blocks are inserted. If joists have to be stacked prior to fixing, they should be supported on bearers placed at their ends. As the joists are prestressed, they have an upward camber which varies with length (within normal tolerances). Differences should be evened out during fixing; occasional packing during fixing may be necessary.

Stacks of in-filler blocks should not exceed four in height, and must be contained in the first quarter of the floor span.

Propping and strutting are not needed unless specifically shown on our drawings.

All in-filler blocks are placed from above once joists are in position. For BC 228 floors, they are positioned as illustrated.





Operatives are advised to proceed with caution over the flooring while it is still in an ungrouted state. The floor is not suitable for general foot traffic until grouting is complete.

Where we carry out fixing, the general contractor shall provide either complete access scaffolding, or safety rails to the external perimeters of upper floors, as required by safety legislation, together with all necessary access ladders. The provision of guards or safety rails to all open edges of floors, including designed openings, as required by safety legislation, is the responsibility of the general contractor. Planking is to be provided by the general contractor for barrow runs, stacking areas, scaffold supports and intensive working areas until the final finishes have been applied. The provision of any trestles and staging required by safety legislation is the responsibility of the general contractor. Movable towers will be needed where storey heights exceed 2.8m.

The working surface below the level being fixed should be left clear and unobstructed so that work can be carried out in safety.

Our fixers are equipped with power tools for cutting in-filler blocks on site to complete floor layouts. Hammers and chisels should not be used for cutting in-filler blocks.

### **Supports**

The supporting structure should be designed to carry the loading from the precast units and to provide suitable seatings at levels appropriate to their depth and camber. Typical bearing dimensions are given on pages 6 & 7, and due consideration must be given to manufacturing and site construction tolerances – see BS 8110:1985, Clause 5.2.4.

### **Differential movement of structural members**

It is common practice to utilise both factory-made high-grade concrete members and site-cast reinforced concrete members in the same structure. When such members are adjacent – as in the junction of floor unit and edge beam – the architect or consulting engineer should detail the joint to allow for the natural differential movement. Alternatively, details should be agreed with our engineers which will avoid differential movement. This is important irrespective of the type of floor being used.

### **Service holes**

Where service holes are required, they can be provided by others by drilling in-filler blocks or removing whole blocks. Making good is to be by others.

### **Trimmed joists**

Trimmer shoes should be properly concreted in. It is important to ensure that trimmed joists are propped during construction, while the voids between their ends and the supporting joists are solidly concreted. The props should remain in position until the concrete has reached the required strength.

### **Grouting**

All Booth Concrete floors must be properly grouted unless a structural screed is to be applied. The purpose of the grout is to stabilise the blocks by filling the joints in the top surface. Grouting should be carried out as follows:

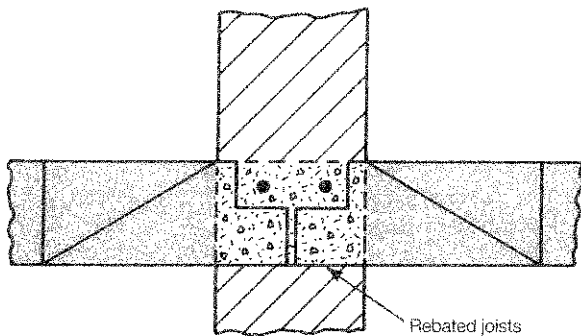
- 1 Brush the floor area to be grouted to give a clean surface.
- 2 Wet the floor thoroughly, preferably with a hose.
- 3 Mix sharp sand and cement in the proportions 6:1 by volume with water. The grout should never be leaner than this and in wet weather, or where sharp sand is not available, the mix should preferably be 4:1.
- 4 The grout should first be spread over the floor with a brush in the direction of the joists; then brushed in the opposite direction.
- 5 Where a floor finish is specified for sound insulation, particular care should be taken to fill all gaps in the top surface.

When structural screeds are to be laid, the best bond will be obtained if the screed is laid directly on to a clean, ungrouted construction.

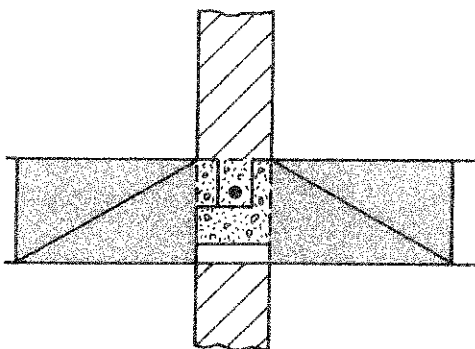
## Introduction

The following details illustrate the versatility of Booth flooring systems where there are special structural requirements of floors or roofs. Special requirements of the floor should be specified by the person responsible for the overall structural stability of the building.

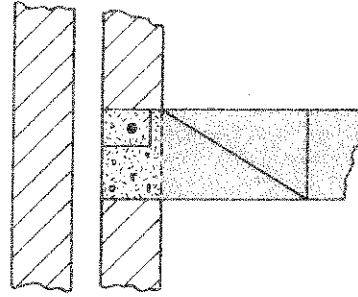
### 1 Internal and external ties



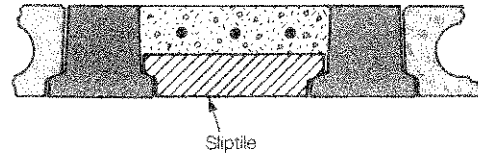
Internal ties on 160mm or greater brick or block walls



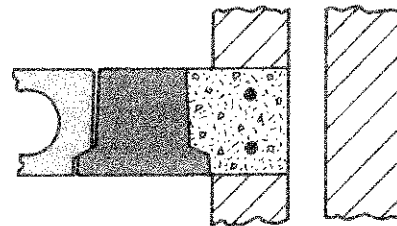
Internal tie on a wall less than 160mm where the joists are staggered to obtain sufficient bearings on the wall



External ties to cavity walls



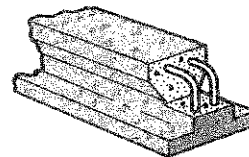
Internal tie or peripheral tie (within floor edge) parallel to span



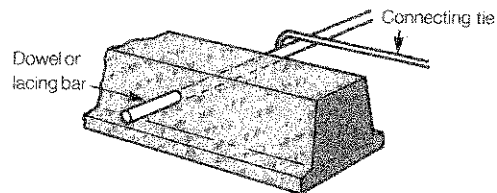
Peripheral tie parallel to span

### 2 Physical connection to internal/external ties

To suit the requirements of BS 8110 Clauses 2.2, 3.12.3, 5.1



End links in the unit to pick up internal/external ties (I beams only)



Holes through web to obtain physical connection using dowel or lacing bars. First hole 300mm from end of joist; subsequent holes at 450mm minimum centres.

### 3 Composite construction

Composite action between a structural (concrete) screed reinforced with a steel mesh of size to suit the loading and certain types of Booth floors will normally:

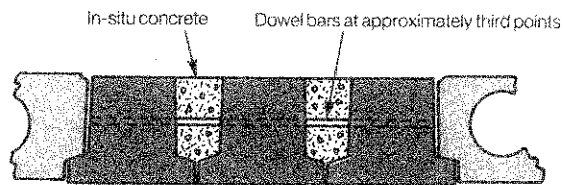
- ▶ increase the span/load capability of the flooring system.
- ▶ provide a floor capable of acting as a plate. (Other methods are available for achieving this – contact our Technical Department.)
- ▶ accommodate reinforcement for internal and external ties, where required for the floor, in the in-situ topping, simplifying perimeter details, particularly on buildings over five storeys.

In certain cases increased fire resistance can be achieved from the composite action.

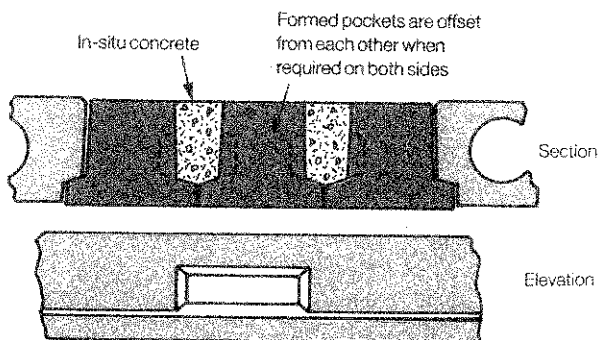
#### 4 Special details

##### Load sharing

Where two or more beams are required to carry line loads, the joists must be concreted together in order to achieve a satisfactory distribution of loading. Where the joists are I section, the shape of the units will ensure load sharing; however, special details are required with inverted T section beams.

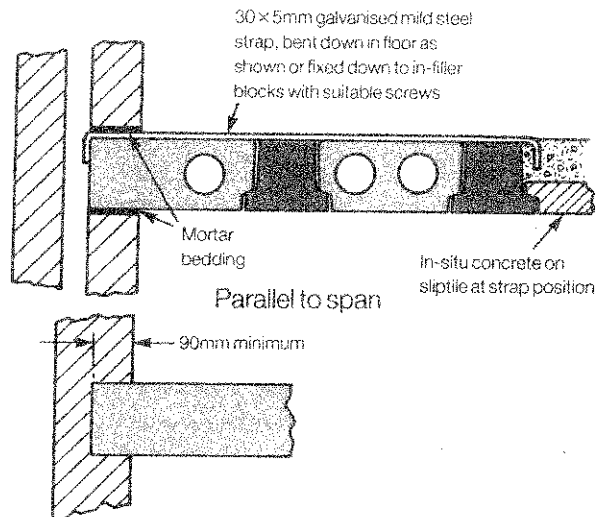


Holes drilled through the web, steel dowel bars placed to ensure a physical lock between joists, and in-situ infill.



Formed pockets will be offered where suitable and available as an alternative to drilling and dowelling. The pockets are cast in the units at approximately third points and achieve load sharing through shear across the in-situ concrete.

These formed pockets can also be used at the ends of cantilevers, which allow in-situ infill to lock the ends of joists together, avoiding differential movement between joists.

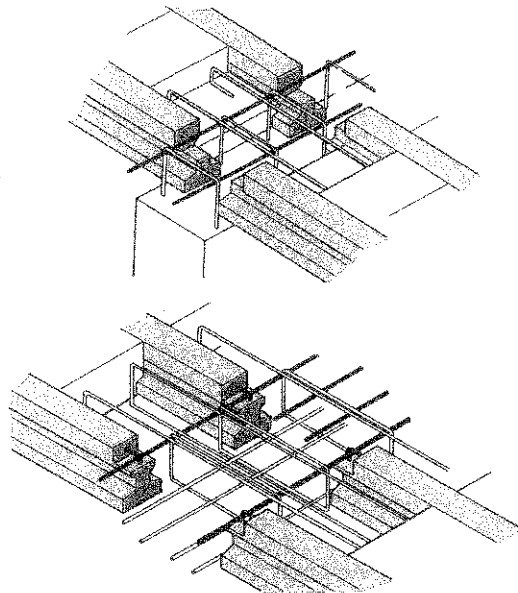


Joist bearing detail (to provide required wall restraint)

#### 5 Wall ties

Wall ties may be necessary to satisfy the Building Regulation A1/2.C35. These are normally supplied and placed by others as shown in the details. Strap centres (not more than 2m) to engineers' specification.

#### 6 Special considerations T & L beams



The versatility of Booth Concrete flooring systems allows for T and L beam design of the supporting reinforced concrete or steel beams.

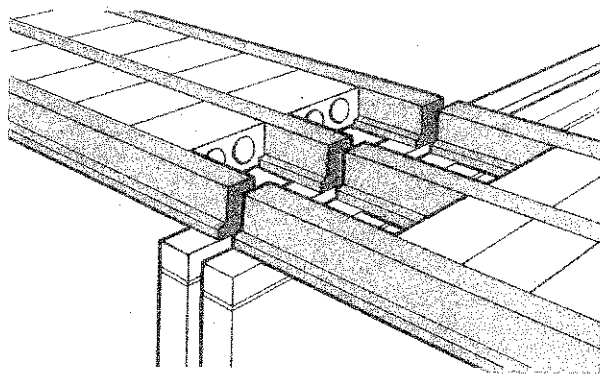
#### Flat slab connections

Flat slab connections are designed to engineers' specifications. The ends of the joist are normally assumed to be partially fixed and both joist and lapping reinforcement are designed to carry support movement.

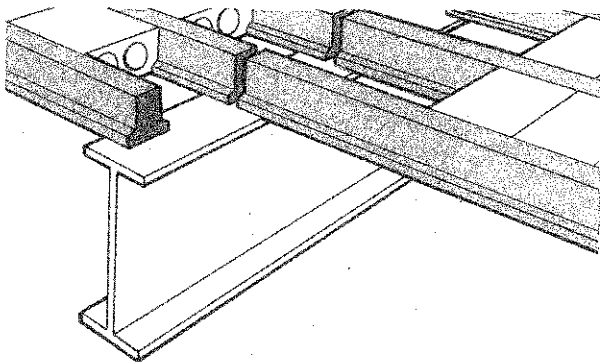
#### Cantilever design

Additional reinforcement can be placed between joists within the floor depth to enhance the cantilever capability of the standard flooring system. Where greater depths of slab are necessary, a structural screed appropriately reinforced can be used in conjunction with the floor system.

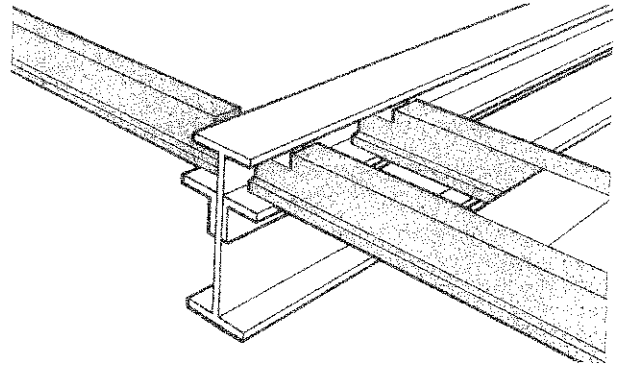
# Typical details



**1 Cavity brickwork or blockwork**  
100mm nominal seating allowed.



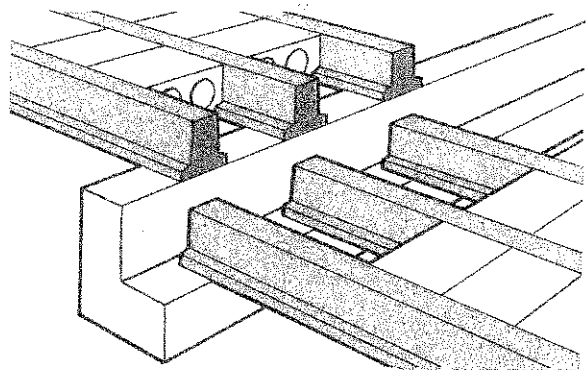
**2 Top flange of steelwork**  
Normally 75mm seating allowed.



### 3 Ledger angles on steelwork

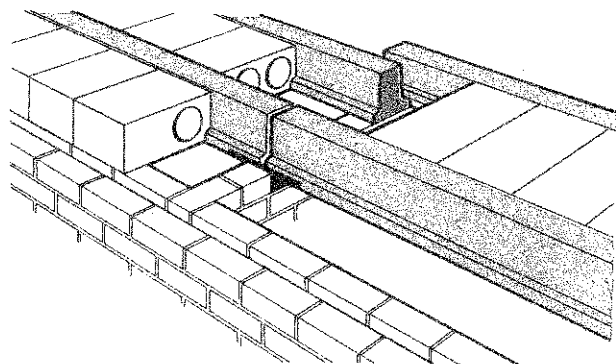
100mm seating allowed to give 75mm minimum. The ledger angle must project 25mm beyond the flange.

Standard rebates	Lmm	Dmm
BC LWT (150)	75	50
BC 150	75	62
BC HWT (150)	75	62
BC 200	75	70
BC 228	75	95



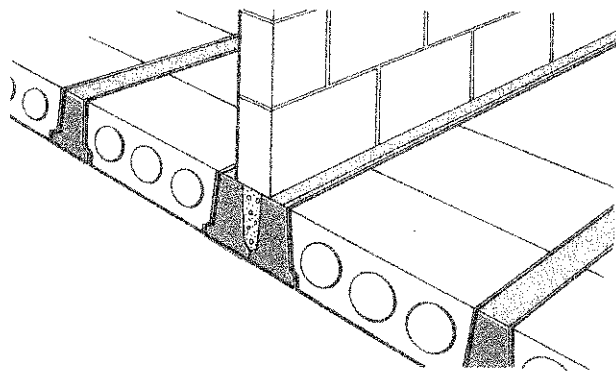
### 4 Reinforced concrete boot beam

100mm seating allowed to give 75mm minimum.



### 5 Staggered bearings on single brick or block walls

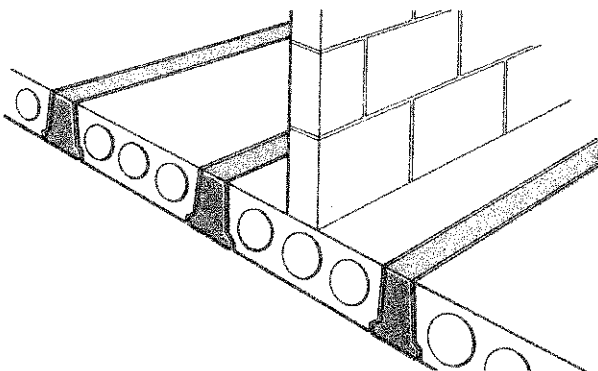
100 to 105mm thick to achieve full bearing. Full bearing obtained by all joists in each bay. In-situ concrete over slip tiles where necessary to stabilise the seating of the special bearing plate at first and last joists.



### 6 Walls supported on floors – no increase in depth

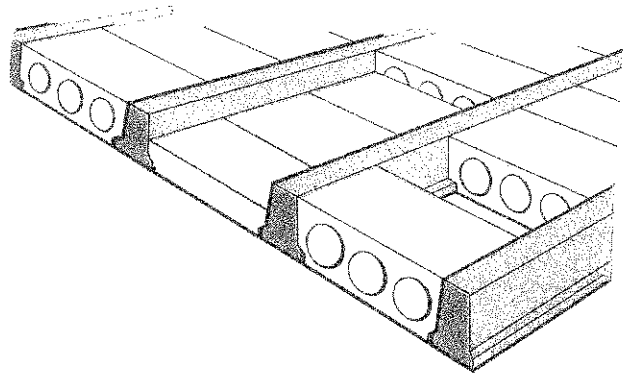
Where necessary, we provide joists with side notches to key local concreting and ensure lateral distribution of applied loads.

By putting one or two extra joists within the floor, walls may be supported on the floor without increasing floor depth. C30 in-situ concrete between joists.



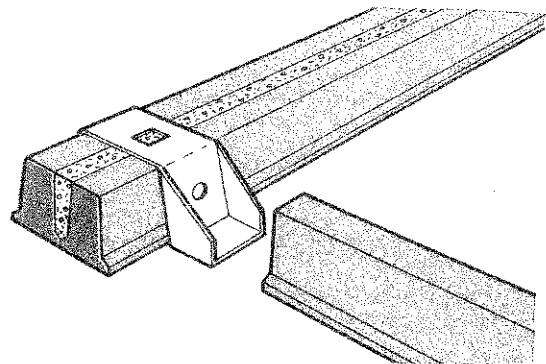
### 7 Partition walls built on in-filler blocks

Partition or studwork walls up to 7.3kN/m may be built on in-filler blocks – provided that the joists have been designed to carry the imposed load.



### 8 Channels within floor

Channels may be formed within the floor depth to provide anchorage for wall ties and service ducts, or as a permanent shuttering for tie beams. We make provisions at design stage for all service holes in our flooring layouts. Small services may be incorporated into the floor by simply omitting in-filler blocks. Larger holes can be accommodated by using steel trimmer shoes. All making good is to be carried out by the general contractor.

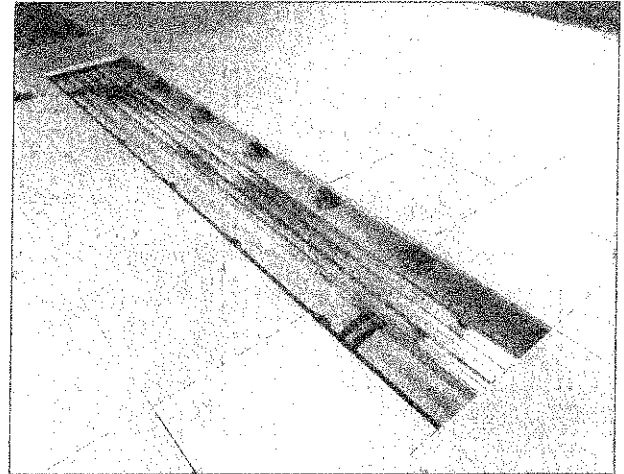


### 9 Trimmer shoes

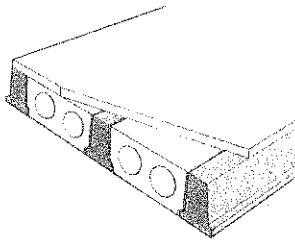
The detail shows an arrangement of joist and trimmer shoe for trimming roof light holes within the depth of units. It is important that the joists are propped during construction and until the concrete in the voids between the ends of the joists has reached the required strength.

#### Fire rating of trimmer shoes

Important: the soffit of the trimmer shoes may require additional treatment to achieve particular fire ratings; see technical brochure for further details.



Raised floors supported on pedestals either direct to the floor or screed finish according to design requirements.

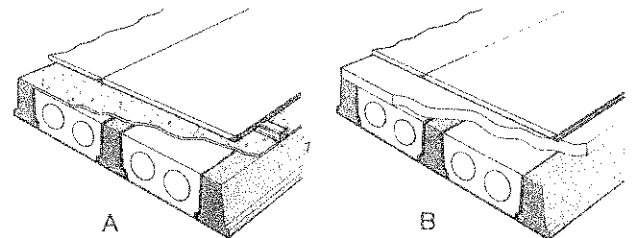


### 1 Sand-and-cement screed

A sand-and-cement screed may either be applied direct to a clean grouted construction where a bond to the floor will be achieved, or be applied over a separating material such as a damp-proof membrane or insulation layer.

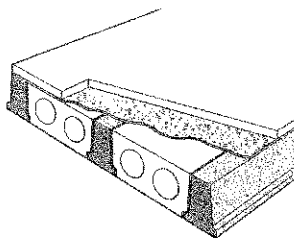
Where the use of the floor requires higher loadings, a light steel-wire fabric should be included (see Table of uses – page 10).

Both DPM and thermal insulating materials are often specified for ground floors; see page 10.



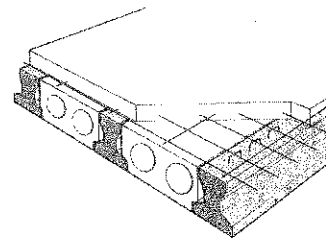
### 3 Floating timber floors

Timber floor laid over sound or thermal insulating material, such as quilt (A) or polystyrene (B), to provide impact sound resistance. Density of material should be not less than  $36\text{kg/m}^3$ .



### 2 Floating screeds

For floors where Class 1 impact sound insulation is required and a floating screed is to be used, it is recommended that a 65mm minimum thickness of screed is laid over an appropriate sound insulating material of not less than  $36\text{kg/m}^3$  density. This screed thickness would also normally apply to screeds laid over insulating materials used to improve the thermal resistance of the construction.



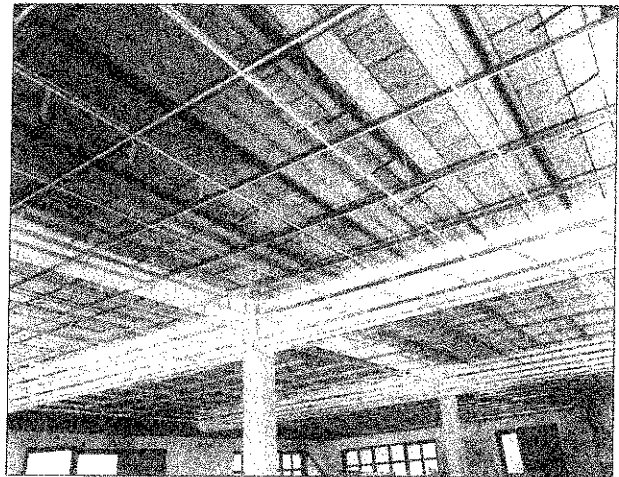
### 4 Structural screeds

These should be specified where the category of loading is such that heavy line and point loads occur and an ordinary screed would be damaged in use. In such situations, a light steel-wire fabric is recommended to control any induced stresses (see Table – page 14).

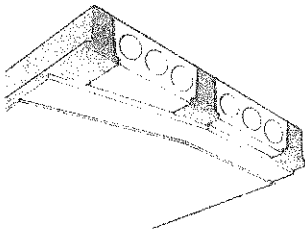
Reinforced, structural screeds (toppings) may also be designed as composite constructions used with some products to enhance the load-carrying capacity of the floor. Composite constructions will often also provide effective horizontal ties and plate action of the floor to accommodate wind loading on adjacent walls.



# Ceiling finishes

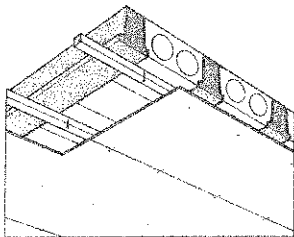


A typical tab-hanger suspended ceiling system in an office.



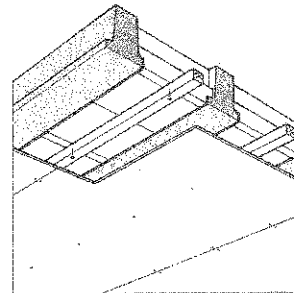
### 1 Direct finish

Carlite bonding finished with Artex or Carlite finishing plaster in accordance with manufacturers' specifications.



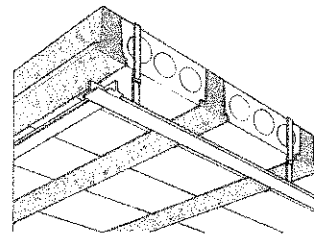
### 2 Plaster board on batten

For fixing battens to units, drill, plug and screw into the in-filler block shoulders.



### 3 Timber inserts

We can supply inserts to fit between in-filler blocks if, for example, battens have to run parallel to the span. Battens may be nailed or screwed to the inserts.



### 4 Tab hangers

Galvanised metal strips provide fixing for any proprietary suspended ceiling system. The positions of hangers are dependent on the in-filler joints and joist centres.

### Note

#### Ceilings and floors

Drilling or shot firing to provide fixings into the joists is not permitted. Joists should never be cut without the prior approval of our engineers.

# Suspended ground floors

Booth floors are designed to comply with Building Regulation C4 and, where applicable, the NHBC requirements.

A damp-proof membrane is not required over the flooring providing:

- 1 There is a 75mm void beneath the floor.
- 2 The air space is ventilated by openings providing at least 3000mm<sup>2</sup> of effective opening per metre run of wall.
- 3 The soil level under the floor is lower than the surrounding ground level and is adequately drained.

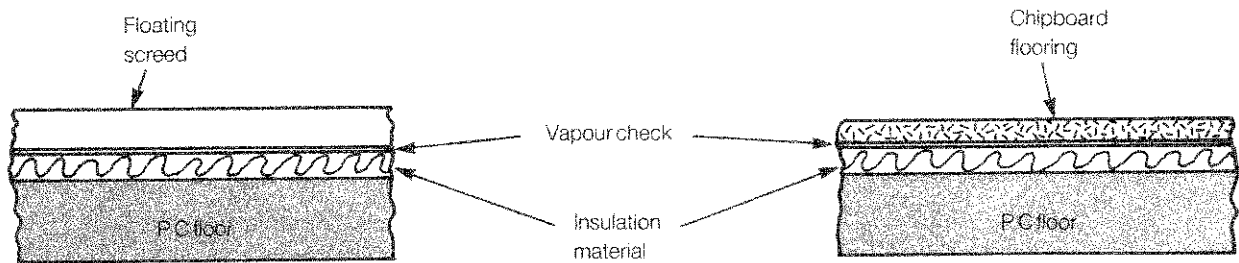
If any of the above conditions is not fulfilled, a damp-proof membrane over the floor will be required. Note: a 75mm void must be provided with certain floor types to allow the in-filler blocks to be placed.

## Underfloor void ventilation

The 1985 Building Regulations C4, together with the NHBC and the British Board of Agrément, require adequate ventilation to combat the dangerous build-up of extraneous gases below suspended ground floors.

The Booth underfloor void ventilation unit provides a permanently effective route for air to ventilate the void beneath suspended timber or concrete ground floors. It has the following advantages:

- ▶ High airflow capacity: 5990mm<sup>2</sup>.
- ▶ High-quality black polypropylene.
- ▶ Periscope adjustment for 4- or 5-brick courses.
- ▶ Bridges cavities of 50–100mm.
- ▶ Ribbed section for keying to mortar.
- ▶ Matches metric brick face of 215 × 65mm.
- ▶ Available in terracotta or buff to match brickwork.
- ▶ Resistant to driving rain.
- ▶ Integral vermin and insect screen.
- ▶ Robust construction.



Typical constructions

## Screed specification – ground and upper floors

### Table of uses

Nature of loading	Screed specification
Domestic dwellings Offices, hotel living accommodation, hospitals, classrooms	Deemed-to-satisfy regulations apply 40mm unreinforced sand-and-cement screed not richer than 3:1 nor leaner than 5:1 by volume.
Pieces of assembly, dance floors, stages, office filing rooms, pedestrian plazas, gymnasia, department store sales areas Areas required to afford effective distribution of partitioning loads	As above but including a light steel-wire fabric
Garages, car parks, boiler plant rooms, warehouses, storage areas, factories, workshops, machinery halls	Structural concrete screed reinforced near the top with a structural welded fabric and designed to span over the joists, the in-filler blocks acting as permanent shuttering

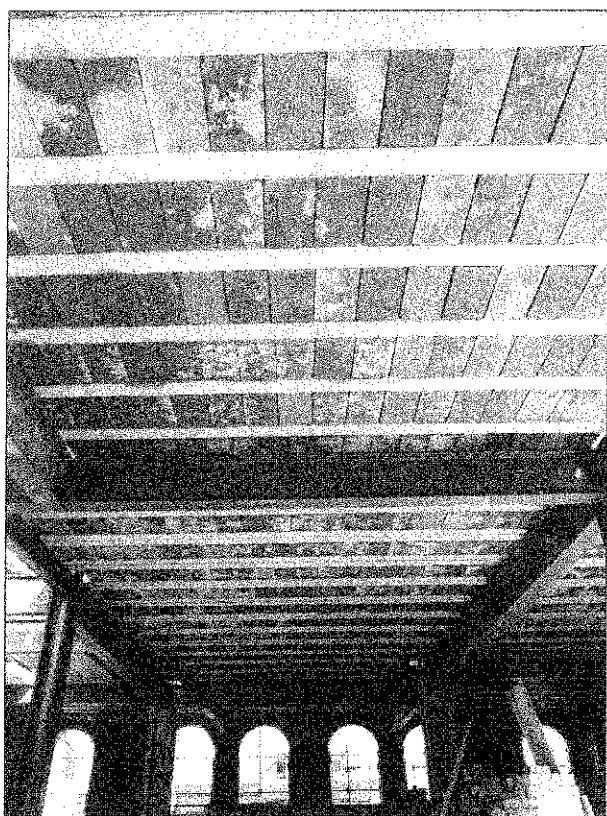
# Direct plastering

## Introduction

Carlite Bonding Coat which, owing to its strength and toughness has a resilience not generally found in other plasters, is the most commonly-used plaster for direct application to the soffit of precast concrete units. Further and more detailed information will be found in *Carlite Premix Plaster* from British Gypsum Ltd.

## Specification

Carlite plaster, 13mm minimum to soffit of Booth Concrete joist and block floors. The work to be carried out in two coats. The floating coat to consist of Carlite Bonding Coat, ruled to an even surface and lightly scratched to form a key. The finishing coat to consist of Carlite Finish Plaster. It is recommended that a rate be given in the Bill of Quantities for dubbing out in stages of 6mm thickness, so as to provide a basis for variation.



A typical soffit prior to plastering.

## Procedure (as recommended by British Gypsum Ltd)

- 1 Mix Carlite pre-mixed plaster with water. Use only clean water if setting times are to be consistent.
- 2 Wet concrete with clean water and a brush 5-10 minutes before plastering; this prevents air being trapped at the interface.
- 3 Trowel Carlite Bonding Coat in a thin layer, squeezing well into and completely filling all gaps between units. Bring the floating coat up to the required thickness (11mm minimum over the in-filler blocks and 8mm minimum over the joists) and scratch to form key.
- 4 Apply 2mm Carlite Finish to give total specified thickness (13mm).
- 5 Dub out if required using Carlite Bonding Coat in a similar manner to the floating coat. Do not use cement.

## Precautions

When a screed finish is not being applied to a floor, and it is intended to use a plastered soffit, our engineers will advise on suitable methods of reducing independent movement of units.

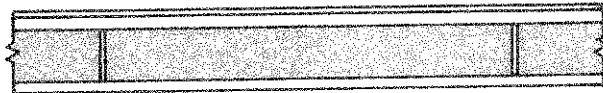
Precast floors do not provide a continuous backing, and any movement usually obtains relief along the lines of the joists. If cracks appear, leave them as long as possible before filling.

Many plastering faults can be attributed to the following causes – which should therefore be avoided as far as possible.

- 1 Thermal movement of the structure due to inadequate thermal insulation (see page 18).
- 2 Floor screeding carried out after the soffit has been plastered.
- 3 Plaster thickness less than the minimum 13mm recommended.
- 4 Plaster not well filled between the units (see procedure 3 above).
- 5 Drying out too rapid because of drying winds, the sudden application of central heating, etc.
- 6 Floor units saturated when plaster applied.

## Type 1 – Concrete base with soft covering

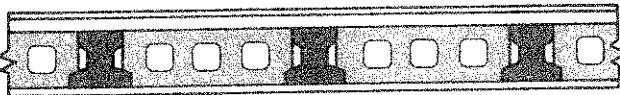
Any of construction type **B**, **C** or **D** with a soft covering of resilient material or a material with a resilient base. The thickness of the material (including any backing) should be at least 4.5mm. A material is resilient if it returns to its original thickness after it has been compressed.



**B/D** Solid or voided slabs



**B** Double-T type

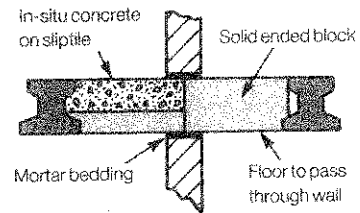


**C** Typical beam and block construction

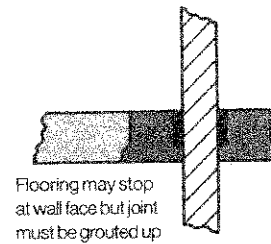
### Note

For all three constructions shown the weight of the structural floor including any bonded screed or bonded ceiling finish should have a mass of at least  $365 \text{ kg/m}^2$ . (The self weight of constructions shown in the table on page 20 should be multiplied by 1.0194 to convert to  $\text{kg/m}^2$ .)

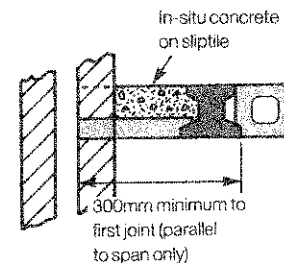
## Details at floor/wall junction



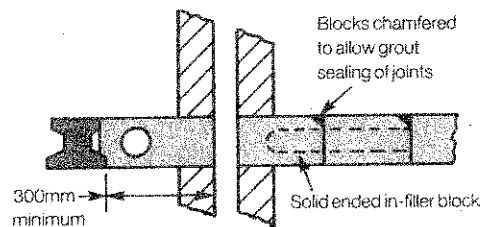
Sound-resisting or internal solid wall of less than  $355 \text{ kg/m}^2$ , inclusive of plaster.



Sound-resisting or internal solid wall of  $355 \text{ kg/m}^2$  or more, inclusive of plaster.



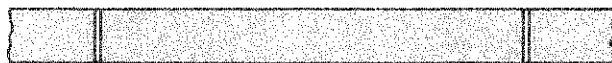
External cavity wall, showing detail of makeup.



External wall or cavity separating wall, showing standard edge and floor bearing details.

**Type 2 – Concrete base with floating layer**

Timber or screed finish on suitable resistant material (where impact sound is to be provided for) over the concrete base.



**B/D** Solid or voided slabs



**B** Double-T type

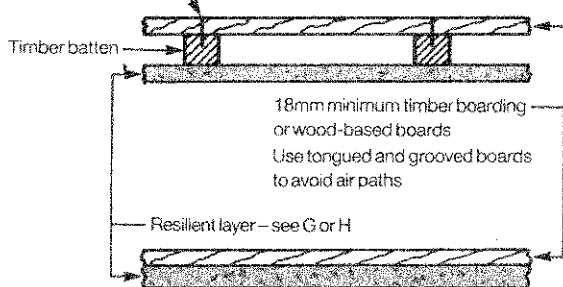


**C** Typical beam and block construction

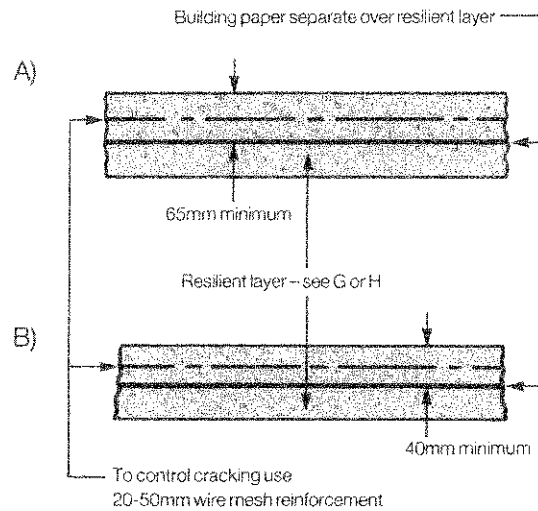
**Note**

All floors with any bonded finishes, i.e. screeds or ceiling finish, to have a mass of at least 220kg/m<sup>2</sup> with any of the following finishes laid upon them.

Fix the board to battens so that the nails do not go through the batten (to maintain isolation)



**E** Timber



- A Sand-and-cement screed
- B Synthetic anhydrite screed
- F Screed

**Resilient layer specification**

- G** Flexible material  
Mineral fibre with a thickness of at least 13mm and a density of at least 36kg/m<sup>3</sup>. Lay with rolls tightly butted to avoid air paths.
- H** Board material (only for floor spec F)  
Pre-compressed expanded polystyrene (impact sound duty grade); lay boards tightly butted.

Please ask our Customer Service Department for information on new (January 1991) sound insulation regulations.

**Note**

Details at floor/wall junctions for Type 2 constructions are the same or similar to those for Type 1 constructions.

### Effect of ceiling finishes (BS 8110 Part 2 1985)

To increase the fire resistance of any construction, subject to satisfying Clause 4.2.5 on overall effective thickness, the average cover to the wires can be increased to the required cover by the use of suitable soffit finishes. Directly-applied finishes should not be thinner than 8mm, or thicker than 25mm, over the joists. The equivalent thickness of concrete may be replaced by one of the following protections:

- 1 Mortar and gypsum plaster  
1.7 × shortfall in concrete cover
- 2 Lightweight plaster or sprayed lightweight insulation  
Up to 2hr – shortfall in concrete cover  
Over 2hr – 0.5 × shortfall in concrete cover, plus thickness up to 2 hours
- 3 Vermiculite slabs on metal supports and metal hangers  
Up to 2hr – shortfall in concrete cover  
Over 2hr – 0.67 × shortfall in concrete cover, plus thickness up to 2 hours
- 4 10mm vermiculite/gypsum plaster to 9.5mm plasterboard nailed to timber battens supported by metal hangers increases the basic floor fire rating by a maximum of 0.5 hours.

Where the protection is applied direct and exceeds 15mm, a light retaining mesh should be incorporated, properly fixed to the soffit of the floor.

### Trimmer shoes

The soffit of steel trimmer shoes may require additional protection to achieve the same fire rating as the floor. This may consist of intumescent paint, fire-resisting board used locally and fixed to in-filler blocks, or other suitable bonded direct material.

The fire resistances of the various types of floors, the average cover to the prestressing wires, and the effective floor thicknesses without finishes are listed in the construction details on page 20.

### Thermal insulation of roofs & floors

As in most forms of construction, roofs must be properly insulated if the undesirable effects of condensation and pattern staining are to be avoided. Attention should also be paid to the position of any vapour barrier.

Due to continued development of materials and products, the thermal resistances of flooring constructions are periodically updated. Please contact our Technical Department for current thermal resistance figures.

### Thermal movement

Excessive changes in temperature in structural members result in movement. Often, such movement is allowed for in design and has no effect but, if excessive, it can give rise to undesirable cracks in walls and ceilings. It may therefore be necessary to prevent heat loss or gain from structural members as well as from rooms. In roofs, this is usually done by providing insulation above or below the screed. If the screed is laid over the insulation, care must be taken to isolate the screed from parapet walls, preferably by leaving a gap around the edges or inserting a compressible fill in order to allow for expansion.

Solar heat gain is reduced to a minimum by providing insulation above the screed, and a covering of white chippings or other reflective surface over the weather-proofing. Black or dark finishes are highly heat absorbent and should be avoided.

Fire ratings are in accordance with BS 8110 Part 2, Section 4, Table 4.4 (shown below), where the thickness is as defined in Clause 4.2.5.

Extract from Table 4.4 BS 8110 Part 2 - Plain soffit floors

Fire rating (hrs)	1/2	1	1 1/2	2	3	4
Thickness (mm)	75	95	110	125	150	170
Nominal cover $C_{req}$ (mm)	20	25	30	40	55	68



# Health & safety

The following material is taken from Booth Concrete Ltd's general statement on health and safety.

The health and safety of all our employees, visitors, contractors, and the general public with whom we come into contact in the course of our business is of great concern to us.

We believe that a consideration of safety precautions is as important an aspect of management control as any other management function. We therefore expect our management and supervisory staff to carry out their duties in the full knowledge that health and safety considerations are an essential part of those duties, and are necessary to prevent ill health or injury.

All our employees, whatever their grade, have duties under the Health & Safety at Work Act 1974 to take care of themselves and others affected by their acts or omissions, and to cooperate with the management team in ensuring that high standards of health and safety are achieved.

## **COSHH regulations**

In compliance with the Control of Substances Hazardous to the Health Act 1988 we will furnish all our customers with a written statement regarding any safety precautions that must be taken while handling our products.

## **Admixtures**

Where the company considers it necessary to use admixtures, these must comply with BS 5075, and must not contain more than 2.0% by weight of chloride ions; calcium chloride shall not be used. We will provide on request details of any admixtures used in our products.



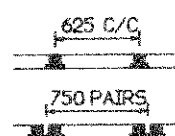
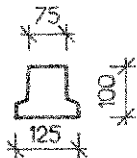

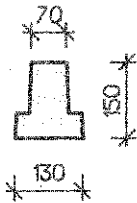


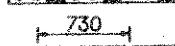


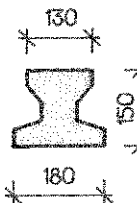
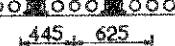




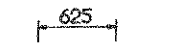
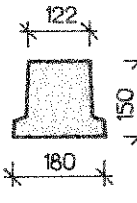
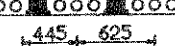
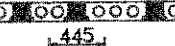


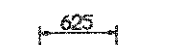
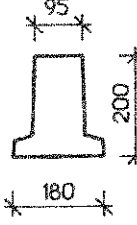
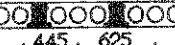



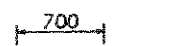
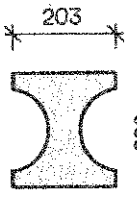




## **Note**

During site work we adhere to strict safety regulations. For details, see Construction Practice – pages 6 and 7, and our separate sheet on *Standard safety, health and welfare attendances required on sub-contracts for the supply and fixing of precast concrete flooring*.

# Span/load charts

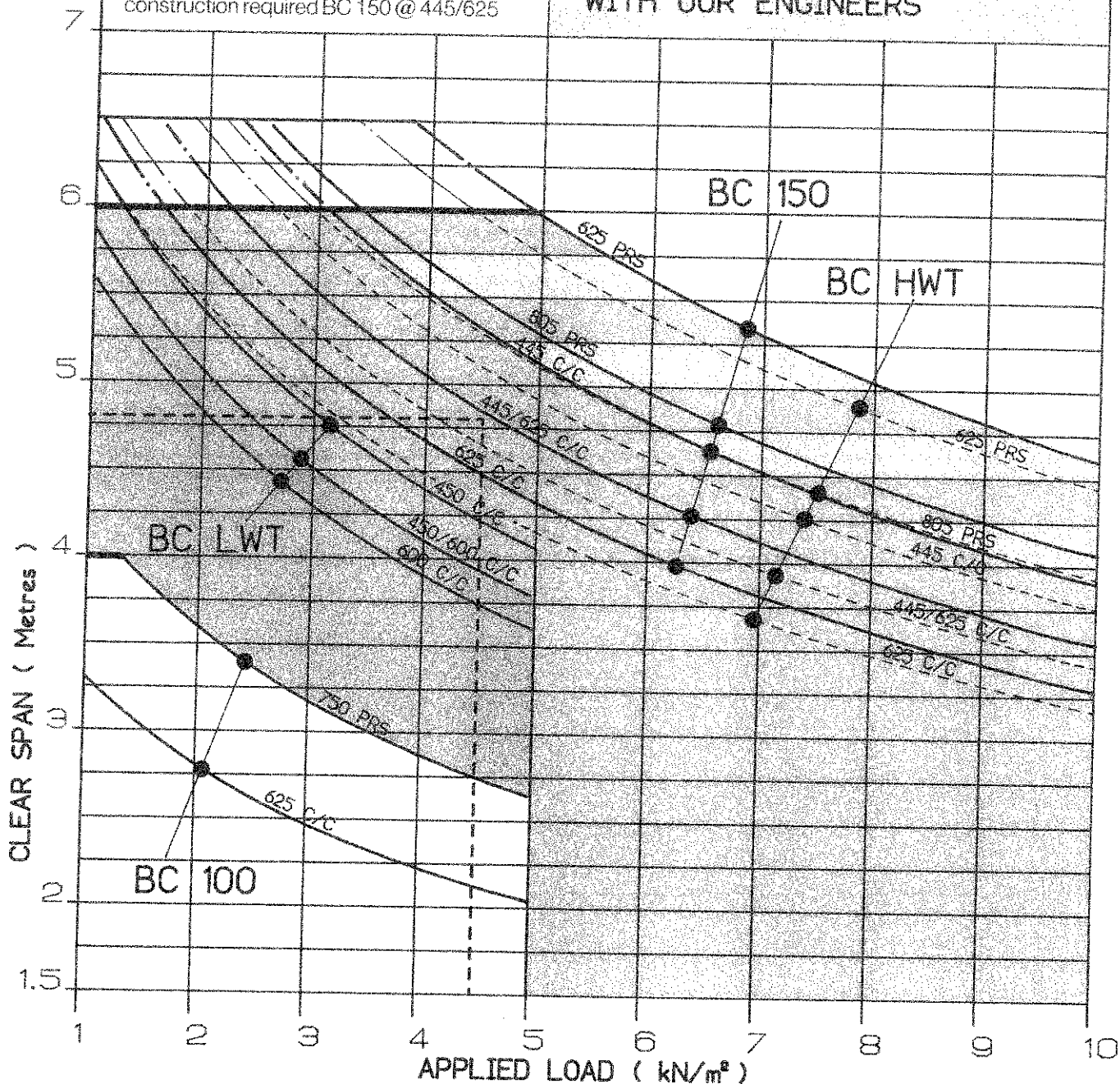
# CONSTRUCTION DETAILS

\*WEIGHTS ASSUME VOID BETWEEN JOISTS FILLED WITH CONCRETE OR STIFF GROUT

	CONSTRUCTION SELF WEIGHT kN/m <sup>2</sup>	FIRE RESISTANCE		PRINCIPAL DIMENSIONS (mm)	BASIC PROPERTIES	
		WITHOUT A SCREED OR SOFFIT FINISH			SERVICE MOMENTS = M <sub>s</sub>	
BC 100		1.70	Average cover to wires = C <sub>av</sub>		Joist weight = 22.07 kg/m	M <sub>s</sub> (kNm) = 2.50
		1.82 *	Effective thickness = t <sub>e</sub> C <sub>av</sub> = 25mm t <sub>e</sub> = 98mm MIN Fire rating = 0.5 or 1.0h			
BC LWT (150)		1.81	C <sub>av</sub> = 20mm t <sub>e</sub> = 121mm MIN Fire rating = 0.5 h		Joist weight = 33.46 kg/m	M <sub>s</sub> (kNm) = 6.85
		1.90				
		2.03				
		2.13 *				
		2.39 *			V <sub>co</sub> (kN) = 23.61	
BC 150		2.16	C <sub>av</sub> = 27.5mm t <sub>e</sub> = 128mm MIN Fire rating = 0.5 or 1.0 h		Joist weight = 43.00 kg/m	M <sub>s</sub> (kNm) = 10.94
		2.19				
		2.22				
		2.49 *				
		2.61 *				
		2.61 *	Special Joists C <sub>av</sub> = 30.6mm Fire rating = 1.5 h		Special cantilever joists Cantilever moment = 6.25 kNm M <sub>s</sub> (kNm) = 6.27	
BC HWT (150)		2.28	C <sub>av</sub> = 30.9mm t <sub>e</sub> = 130mm MIN Fire rating = 0.5, 1.0 or 1.5 h		Joist weight = 50.00 kg/m	M <sub>s</sub> (kNm) = 10.30
		2.32				
		2.37				
		2.57 *				
		2.72 *				
BC 200		2.39	C <sub>av</sub> = 36mm t <sub>e</sub> = 153mm MIN Fire rating = 1.0 or 1.5 h		Joist weight = 55.00 kg/m	M <sub>s</sub> (kNm) = 15.70
		2.49				
		2.63				
		2.92 *				
		3.24 *				
BC 228		2.62	C <sub>av</sub> = 41.5mm t <sub>e</sub> = 173mm MIN Fire rating = 1.5 or 2.0 h		Joist weight = 70.00 kg/m	M <sub>s</sub> (kNm) = 29.86
		2.67				
		2.73				
		2.81				
		2.94				

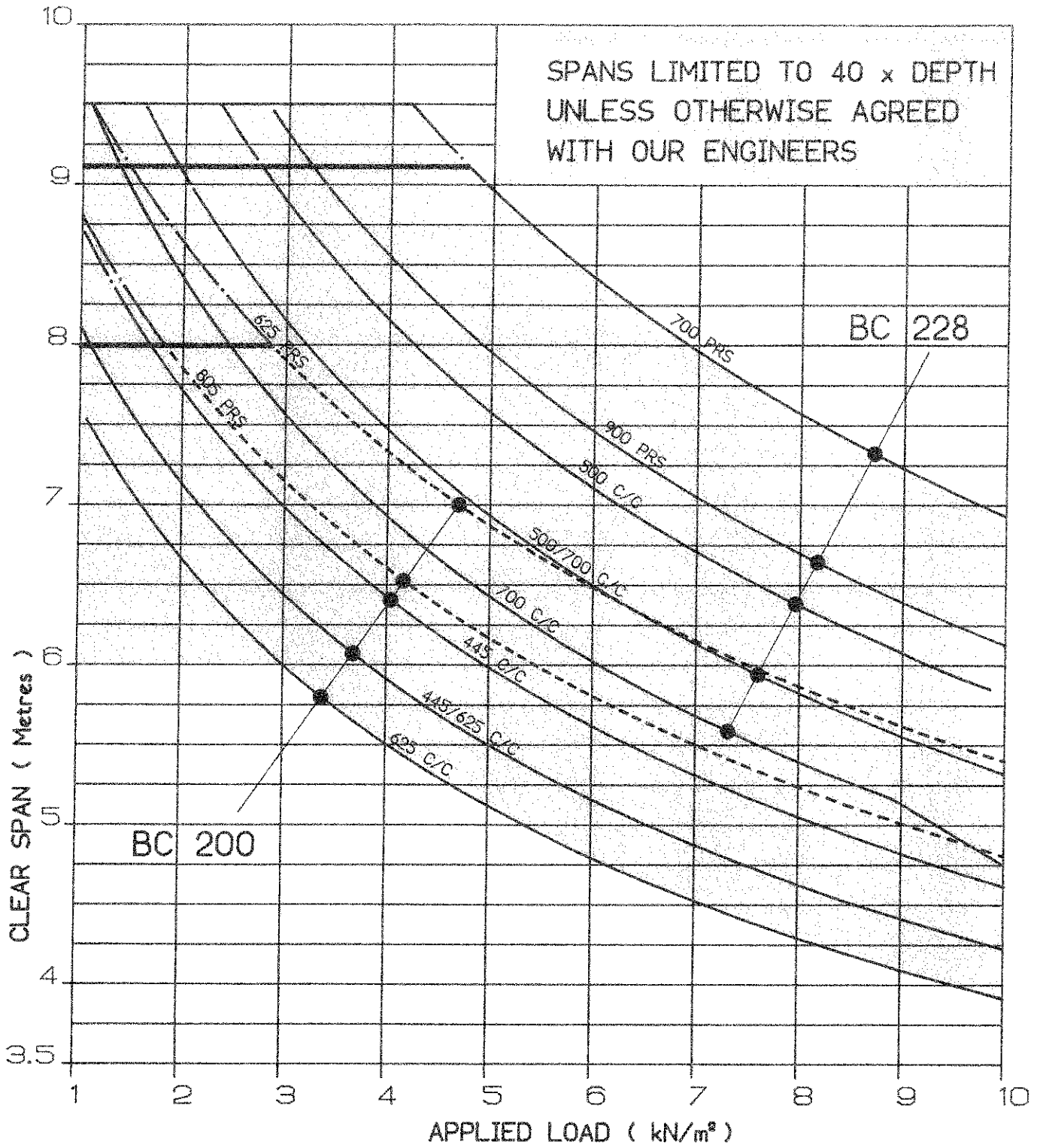
APPLIED LOAD = live load + finishes + partition allowance (service loads)  
 The self weights of the constructions have been taken into account in these charts  
 Example: span 4.8m, applied load 4.5kN/m<sup>2</sup>  
 construction required BC 150 @ 445/625

SPANS LIMITED TO 40 x DEPTH  
 UNLESS OTHERWISE AGREED  
 WITH OUR ENGINEERS



- These charts help you to select suitable floor depths and construction types for particular span/load conditions which will satisfy the design criteria of BS 8110 at both service and ultimate-limit states.
- In preparing the charts, we have assumed a partial safety factor of 1.6 for the applied loads. When the live load is less than 75% of the applied load, a small increase in the permissible clear span may be possible subject to satisfactory deflection checks.
- The calculations used as the basis of these charts have been independently assessed by the British Standards Institution and found to comply with BS 8110 (1985).
- Clear spans shown on these charts are based on designs for Class 2 members with 100mm bearing.
- Span/load capacity of some units can be increased further when designed in composite action with a structural topping.
- Most of our flooring systems can provide cantilever action to accommodate balconies etc.
- A Class 1 design may be provided if required.
- For specialist advice contact our Customer Service Engineers.

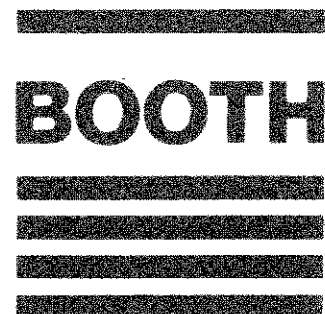
SPANS LIMITED TO 40 x DEPTH  
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Alington Road, St Neots  
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Telephone: (0480) 73421  
Fax: (0480) 72360

A member of Group Five Industries plc



booth

# Quality assurance

The BSI has assessed Booth Concrete Limited under the system for registration of firms of assessed capability BS 5750 Part 1 1987; ISO 9001-1987, and has upgraded our original certificates to this enhanced standard.

Quality assurance in the company covers the management of design, planning, production quality

control, and procedures for testing products. The principal aims are to ensure that the quality of the service and products provided match customers' specifications.



SYSTEM FOR THE REGISTRATION OF FIRMS OF ASSESSED CAPABILITY

## Certificate of Registration

Number FM 05

BSI Quality Assurance hereby grants to  
BOOTH CONCRETE LIMITED  
HAWKESDEN ROAD  
ST NEOTS  
HUNTINGDON  
CAMBRIDGE  
PE19 1NB

(hereinafter called the Firm) the right and licence to be listed in the BSI Register of Firms of Assessed Capability in respect of the goods or services particularly described in the Appendix hereto, bearing the same number as this Certificate. Goods shall be produced by the Firm at, or services shall be offered at or from, only the address(es) given above, all in accordance with  
BS 5750 : Part 1 : 1987 / ISO 9001-1987 / EN 29001-1987 and QAS/2437/1

The Certificate of Registration is granted subject to the Regulations governing the Registration referred to above.

Goods or services in respect of which the Firm is Registered.

1. Design and Manufacture of Structural Precast concrete floor units which are the subject of Load/Span table authentication and end product testing.
2. Design and Manufacture of Structural Precast concrete Building Elements :
  - a) Reinforced concrete (including unreinforced and nominally reinforced).
3. Design and Manufacture of Structural Precast concrete Civil Engineering Elements :
  - a) Reinforced concrete (including unreinforced and nominally reinforced).

Signed on behalf of BSI Quality Assurance

Date

27 February 1989

Director



BSI Quality Assurance PO Box 375 Milton Keynes MK14 6LL

PAD 900086 Issue 3 Apr 1988

BOOTH



**Specialist suppliers**

We are specialist suppliers of precast, prestressed concrete and cast stone products for a wide variety of applications. Please ask for more details.

**Booth service**

We pride ourselves on the personal service we extend to every one of our clients.

The technical staff of our Customer Service Department will be pleased to help you with any further product information you need. Please contact our Head Office at the address below.

**BOOTH**

Booth Concrete Ltd  
Keppel House, Admiral Court  
Alington Road, St Neots  
HUNTINGDON  
Cambs PE19 2UL  
Telephone: (0480) 73421  
Fax: (0480) 72360

**GROUP FIVE INDUSTRIES**



Booth Concrete Ltd, Luda Concrete Products Ltd and Booth Engineering Services are all part of a highly successful business owned by its management team.