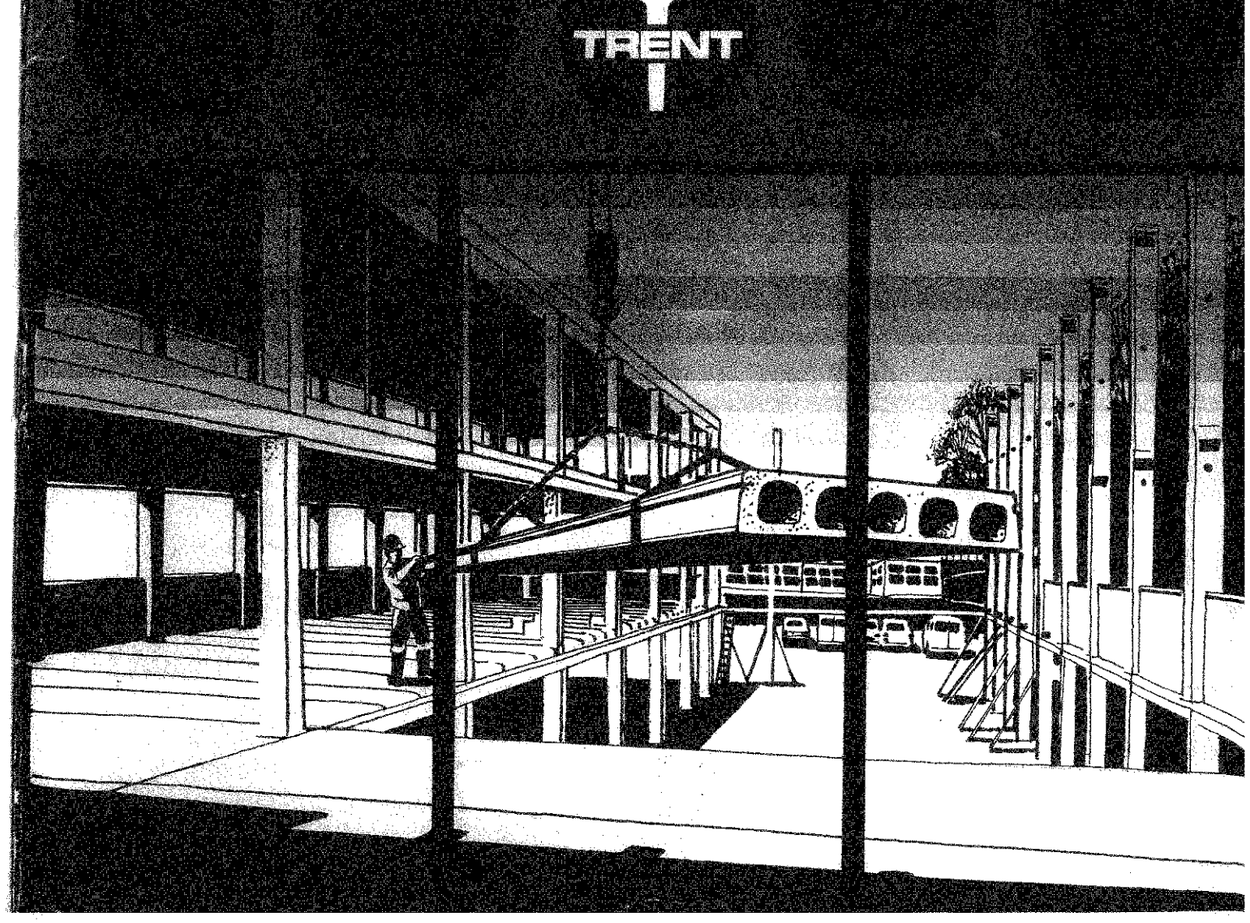
December 1975

The Trent Space-Span Range
of prestressed concrete floor and roof units

TRENT



TRENT
A member of Dobson Park Industries Limited

Trent Concrete Limited

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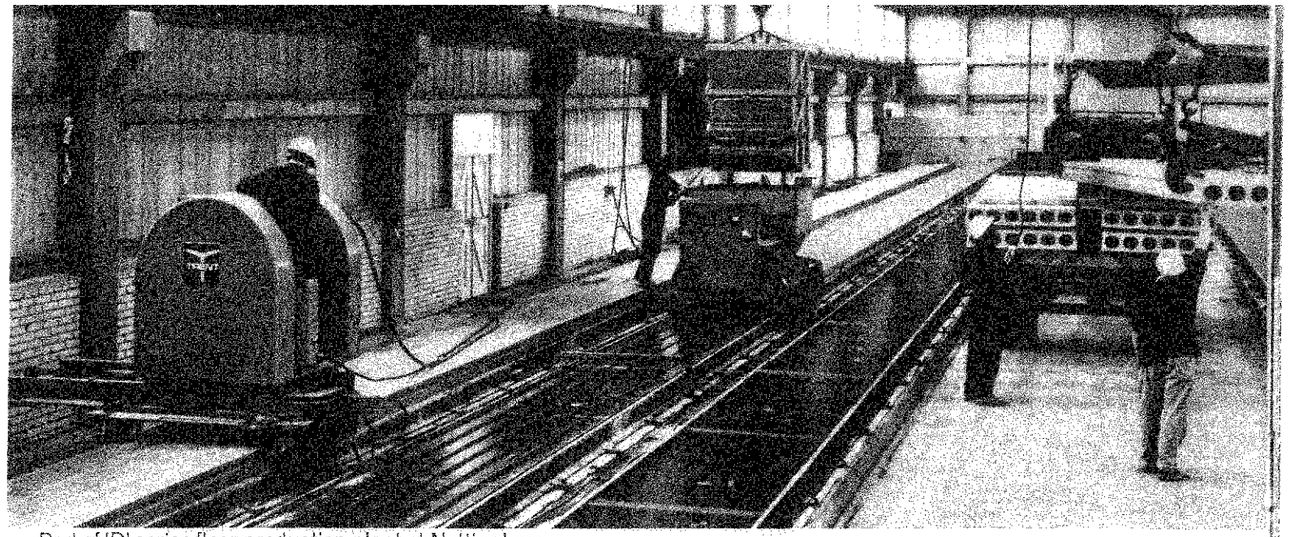
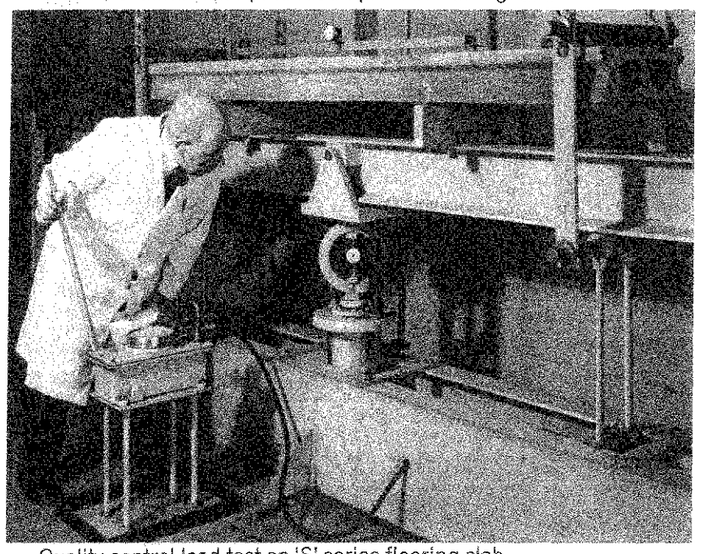
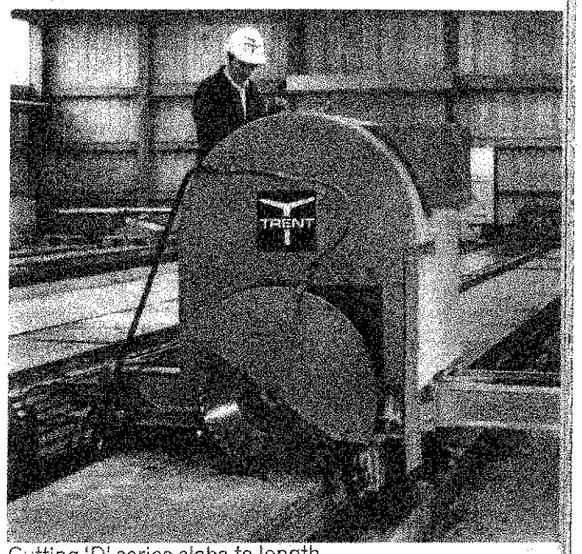


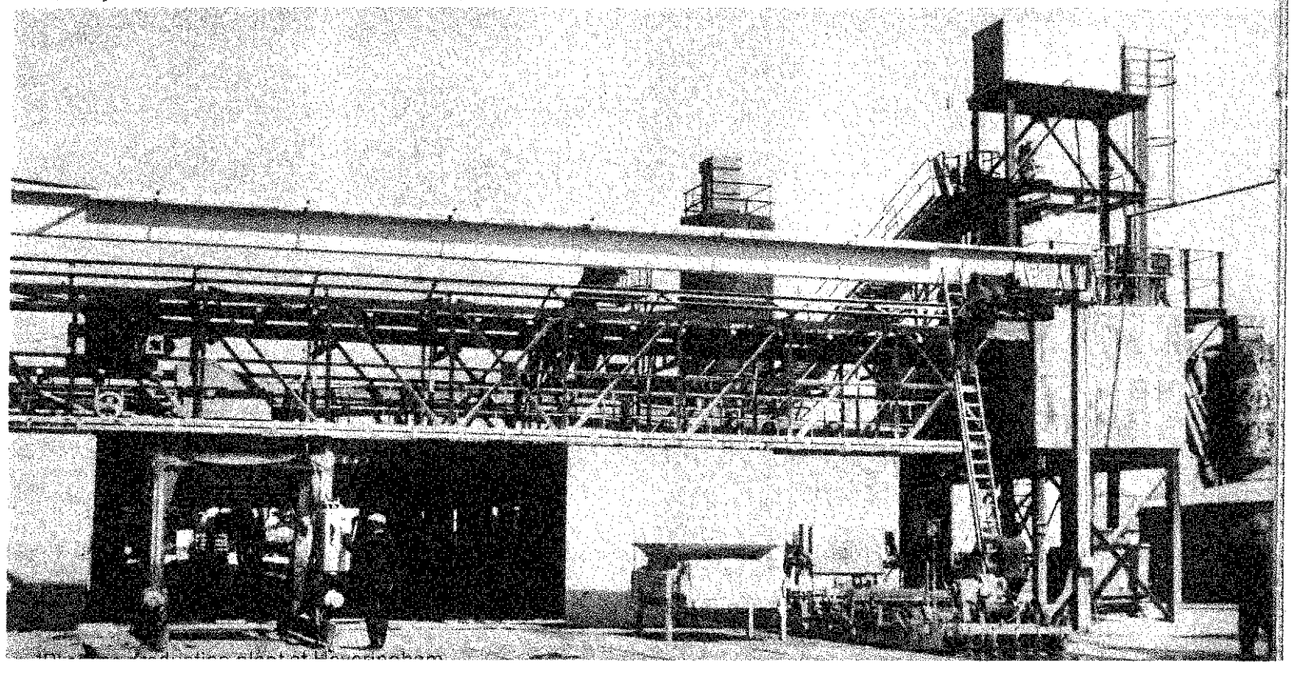
Part of 'D' series floor production plant at Nottingham.



Quality control load test on 'S' series flooring slab.



Cutting 'D' series slabs to length.



The Trent Space-Span Range

No one type of precast concrete floor is suitable for every situation but the Trent extended range of components provides an answer to most user requirements.

Three types of floor are manufactured at our four factories situated in the Midlands and the North of England. This booklet will give guidance as to which floor is likely to be most suitable for any particular situation along with a range of typical working details. Extracts from relevant Building Regulations and Codes of Practice have been included as a convenient reference.

Before making a decision that might affect critical details, however, it is advisable to contact one of our representatives who are based throughout Great Britain, to discuss the matter. Alternatively, our Design Offices, the addresses of which are given at the back of this booklet, can be contacted direct.

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4	Introduction to the Range of Components.
6	Specification. "R" Series Beam and Block Components.
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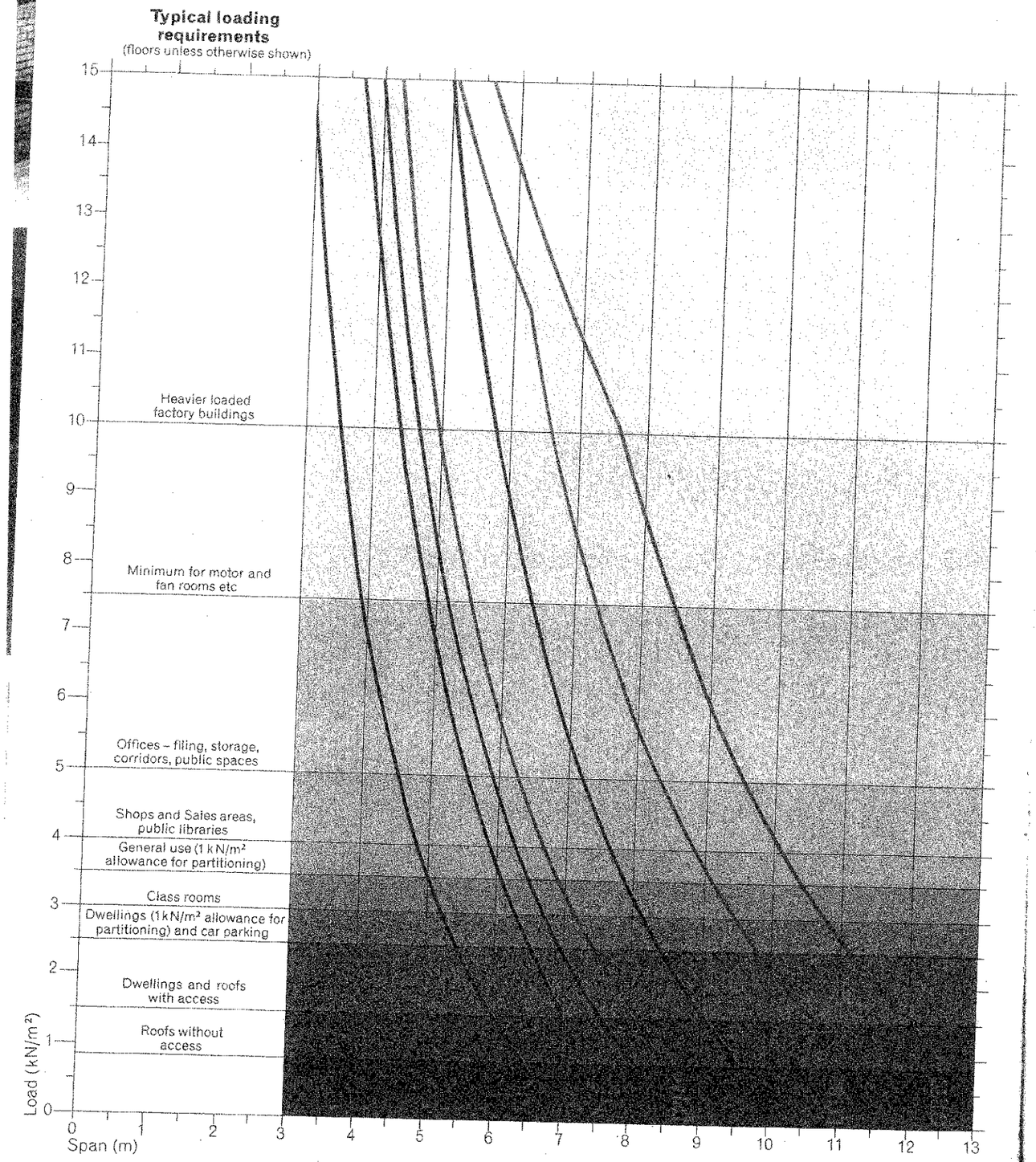
20	Typical Working Details, "S" and "D" Series Components.
26	Extract from CP110 Additional Fire Protection to Floors.
	Extracts from Building Regulations.
27	Thermal Insulation.
30	Sound Insulation.
31	Other Trent Products.

Comparative Load / Span Graph
(1.50 kN/m² allowed for finishes)



Design Features
(for full specification see later sections of the book)

	'R' Series	'S' Series	'D' Series
Type	Beam and Block	Hollow slab	Hollow Slab
Depth	140 mm 190 mm	140 mm 190 mm	140 mm 190 mm 250 mm
Max span up to	8.10 m	9.50 m	12.50 m
Self Weight	1.60 to 2.60 kN/m²	2.50 to 3.09 kN/m²	2.40 to 2.90 kN/m²
Sound Resistance	Self weight of 2.16 kN/m² (220 Kg/m²) can be achieved.	Self weight greater than 2.16 kN/m² (220 Kg/m²) in accordance with Part G4 (2) of the Building Regulations.	Self weight greater than 2.16 kN/m² (220 Kg/m²) in accordance with Part G4 (2) of the Building Regulations.
Fire Resistance	Complies with CP110 requirements.	Complies with CP110 requirements.	Complies with CP110 requirements.
'U' Value without finishes	2.06 – 2.76 W/m² °C	2.51 – 3.09 W/m² °C	2.67 – 3.15 W/m² °C
Service penetration	Very easy and cheap by omitting blocks. Larger openings can be trimmed.	Edge check-outs preformed in factory. Circular holes preferably drilled on site. Larger openings can be trimmed.	Edge check outs preformed in factory. Circular holes preferably drilled on site. Larger openings can be trimmed.
Soffit	Suitable to receive plaster, battens or suspended ceiling.	Suitable for decoration with textured paints or to receive battens or suspended ceiling, can be plastered if bonding agent used.	Suitable for decoration with textured paints or to receive battens or suspended ceiling, can be plastered if bonding agent used.
Top surface	Suitable to receive screeds.	Suitable to receive screeds.	Suitable for screeds or carpet direct.
Ease of fixing	Relatively light components. Ideal for houses, confined sites, restricted access, limited craneage.	Very rapid particularly with 1200 wide units.	Very rapid particularly with 1200 wide units.
Narrow bearings	Beams can be staggered to bear on 100 mm thick walls.	50 mm bearings can be achieved at one end of unit (see detail).	50 mm bearings can be achieved at one end of unit (see detail).
Plan shape	Ideal for regular and irregular plan shapes.	More suitable for regular plan shapes.	More suitable for regular plan shapes.
Propping	Not necessary.	Not necessary.	Not necessary.
Composite design	If required.	If required.	If required.
Factory	Nottingham.	County Durham.	Nottingham.

As the depths of the units are compatible, in many instances it may be desirable to use more than one type on the same contract e.g. with a rectangular office block with a service core and toilets etc. at one end, a combination of wide slab and beam and block for the services area might be preferred.

Fixing service

A significant proportion of our work is carried out on a Design, Manufacture, Supply and Fix basis. We are, however, pleased to work on a Supply Only basis if this is preferred.

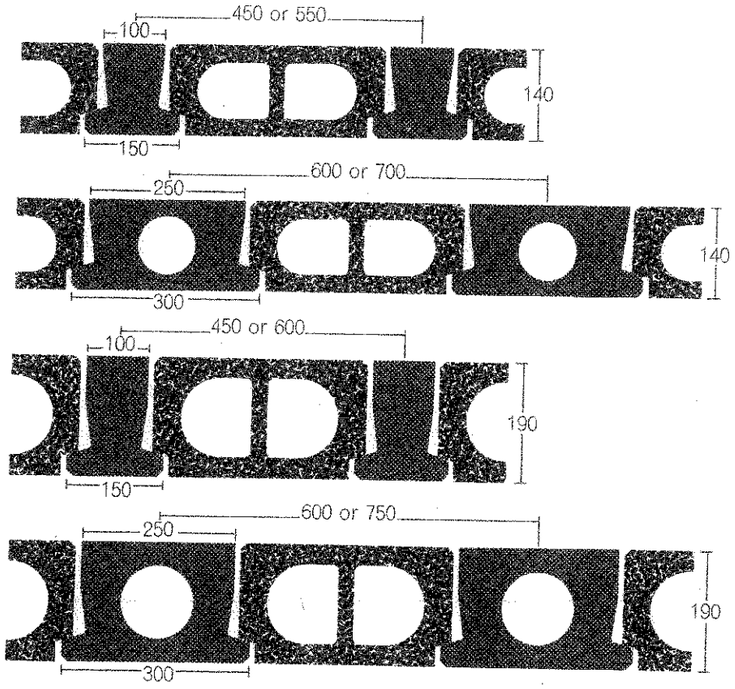
Staircases

We will be pleased to quote for precast concrete staircases on larger contracts where there is an economic number off and the design of them can be standarised. Where there is only a small number of flights involved it is normally cheaper for them to be constructed insitu. In these cases, however, we would be pleased to quote for the design and/or supply of reinforcement.

Insitu concrete

Where insitu concrete make-up strips or other small areas are required, the responsibility for carrying this out will be as defined in the quotation/or working drawings.

Specification 'R' Series prestressed beams and hollow lightweight block construction



Type	'U' value without finishes W/m² °C floor (roof)	Properties per metre width: Self weight kN/m² (Kg/m²)*	Service. Moment kN m	Ult. Moment Mu kN m	Ult. Shear V kN	Superimposed loading kN/m² 1.50 kN/m² allowed for finishes: 0.75	1.50	3.00	4.00	5.00	7.50	10.00
						Maximum clear span m						
140/A	2.29 (2.54)	1.60 (163) 2.16 (220)	11.49	17.61	38.36	4.79	4.37 4.12	3.78	3.50	3.27	2.84	2.53
140/B	2.35 (2.60)	1.76 (180) 2.16 (220)	14.04	21.52	46.89	5.19	4.76 4.57	4.14	3.83	5.59	3.12	2.79
140/C	2.41 (2.68)	1.77 (180) 2.20 (224)	19.36	29.46	51.30	6.11	5.60 5.36	4.87	4.52	4.23	3.67	3.28
140/D	2.45 (2.76)	1.92 (196) 2.20 (224)	22.58	34.37	55.57	6.48	5.96 5.79	5.21	4.84	4.53	3.95	3.54
190/A	2.06 (2.28)	2.16 (220)	18.80	29.47	52.12	5.74	5.30	4.65	4.33	4.07	3.57	3.22
190/B	2.14 (2.33)	2.44 (249)	25.07	39.29	69.49	6.44	5.97	5.28	4.93	4.64	4.09	3.69
190/C	2.16 (2.39)	2.27 (231)	32.60	54.37	61.56	7.49	6.93	6.11	5.69	5.35	4.71	4.25
190/D	2.21 (2.45)	2.60 (265)	40.75	67.97	76.95	8.10	7.53	6.68	6.24	5.89	5.20	4.71

* see Sound Insulation for self weight of 220 Kg/m²

Soffit

Suitable to receive plaster, battens or suspended ceiling (see page 11).

Sound insulation

Part G3 (see page 30) of the Building Regulations requires certain floors in dwellings to be constructed in accordance with any of the Specification contained in Part II of Schedule 12 (see page 30).

If Specification 2 of this Schedule is required the average mass of the floor can be increased to 220 Kg/m² (2.16 kN/m²) where necessary.

In these instances heavier blocks are used to increase the self weight of the floor.

Fire resistance

The fire resistance of the floor as specified in Table 57 CP110 : 1972 is 1 hour to 1½ hours dependent upon the pattern of stressing wires used.

This resistance may be improved by the provision of an insulating finish on the soffit or by a suitable suspended ceiling, some examples of which are given in Table 58 of CP110 (see page 26).

Thermal insulation

The 'U' value of a floor is not normally required to meet any particular specification.

It should be noted, however, that Part F of the Building Regulations (see page 27) requires that the 'U' value of any part of a floor or roof which encloses a dwelling and is described in the table to Regulation F3 should not exceed the value specified in that table.

This does not apply to floors between dwellings.

Bill of Quantities

Suggested Bill of Quantities preamble.

(Where standard method of measurement is used to describe spans)

SUSPENDED CONSTRUCTION:
"TRENT" beam and block floor/roof units, designed to support the following loads:-

Superimposed Loading: kN/m²
Finishes and ceiling: kN/m²
either – Partition Allowance: kN/m²
or – Weight of Partitions to be calculated from drawing No(s).....attached.

Section	Calculated Weight of Beams Kg/m
140	36.0
140	72.5
190	48.2
190	95.4

Typical arrangement of 'R' Series Construction

Requirement for Part G3 of the Building Regulations, Sound Insulation in dwellings.

Fig. 1

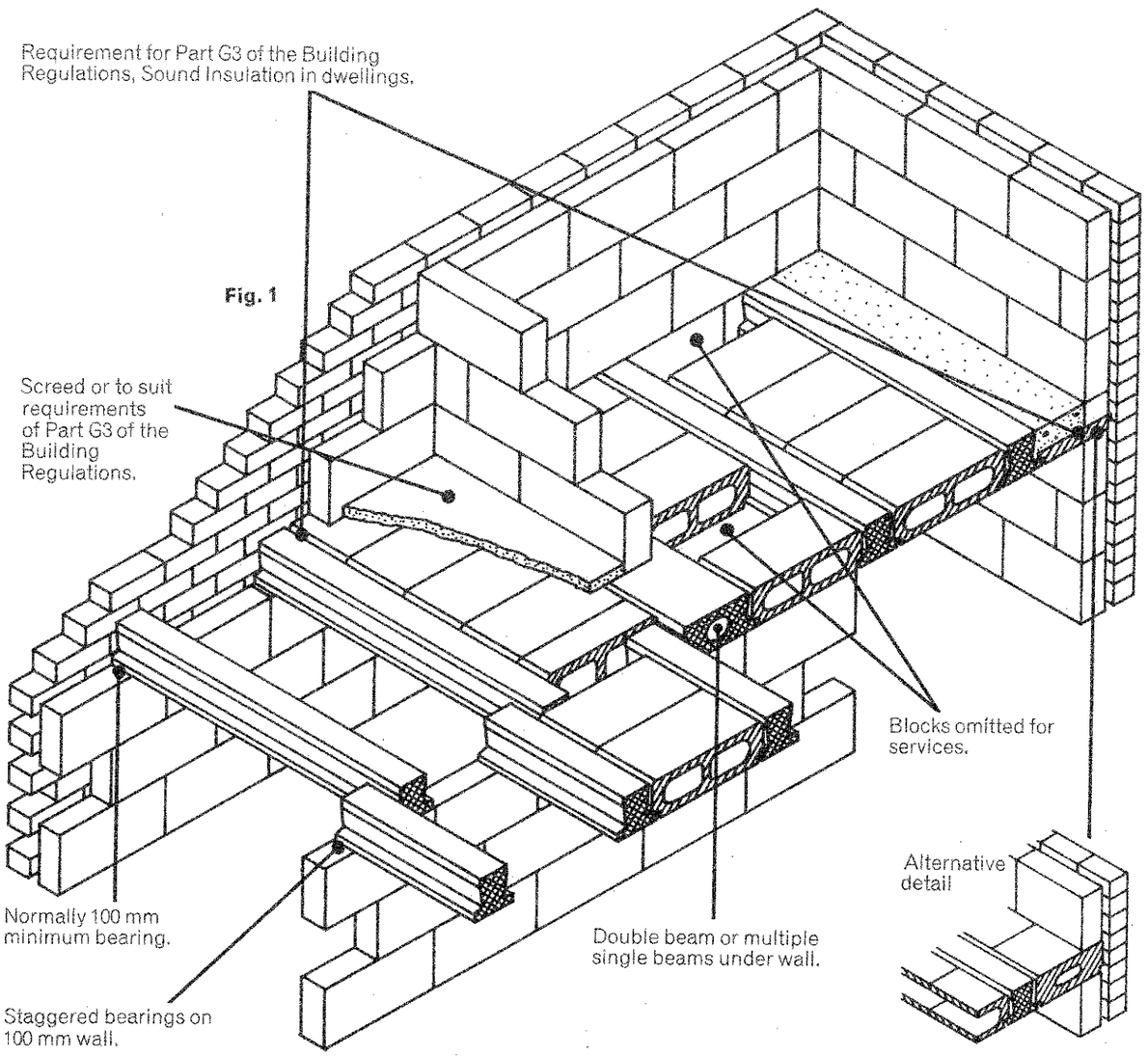


Fig. 1
The requirement of Building Regulation E3 for floors separating dwellings is deemed to be satisfied if the floor extends to the outer face of the inner leaf of any external wall and is tied into (any) adjoining (external wall) or (when) to every adjoining separating wall and every other internal wall which gives support to the floor. *(see page 30).*

Fig. 2

Floor spanning onto a party wall

where the requirements of Part G3 of the Building Regulations apply.

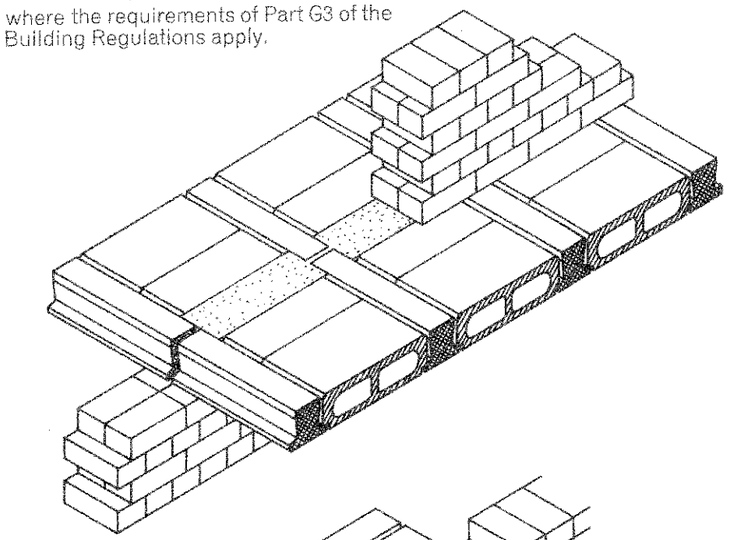
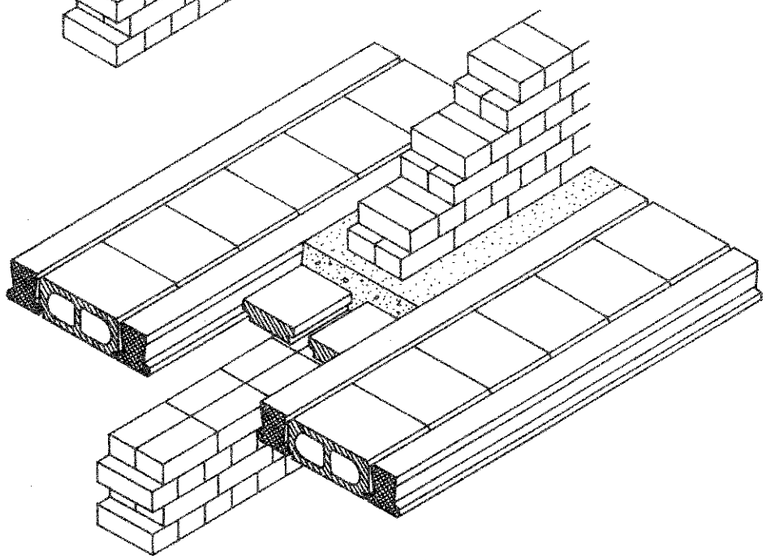


Fig. 3

Floor spanning parallel to a party wall

where the requirements of Part G3 of the Building Regulations apply.



Openings and Balconies

Fig. 4

Typical detail for trimming openings

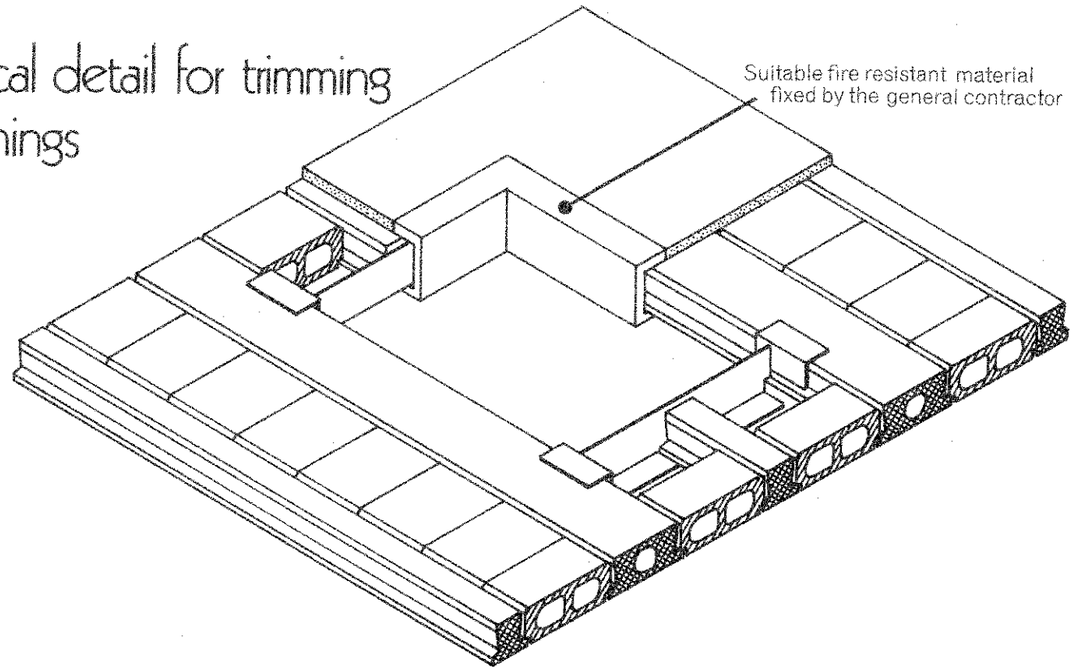
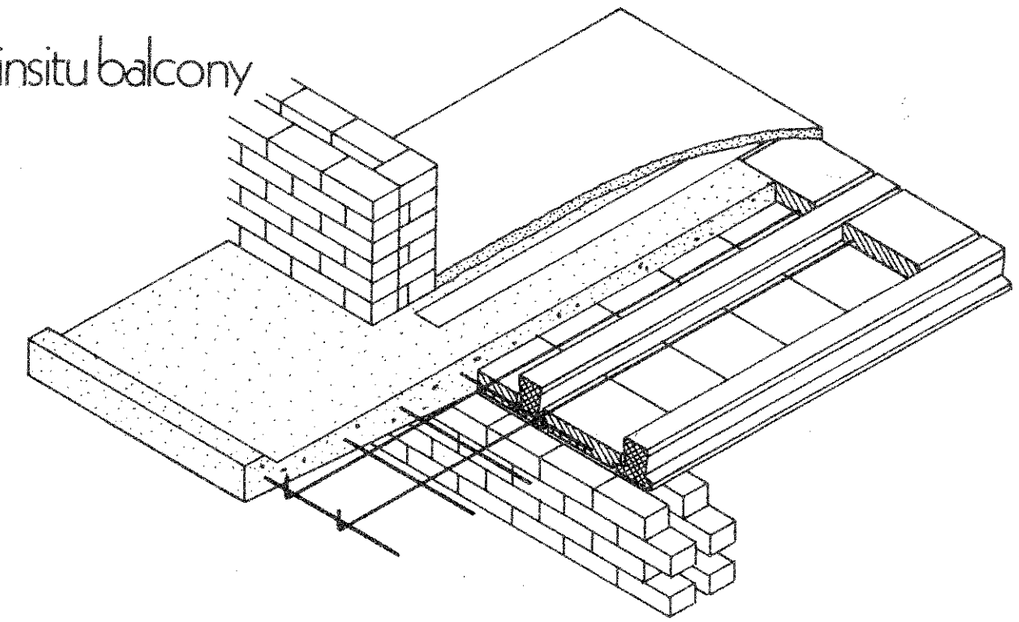


Fig. 5

Typical insitu balcony detail



Ceilings

Fig. 6

Counter battens

Timber insert to receive counter battens.

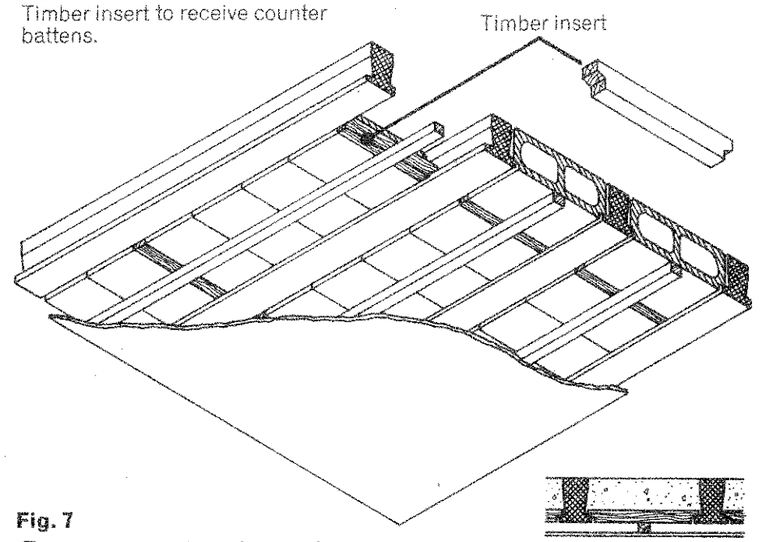
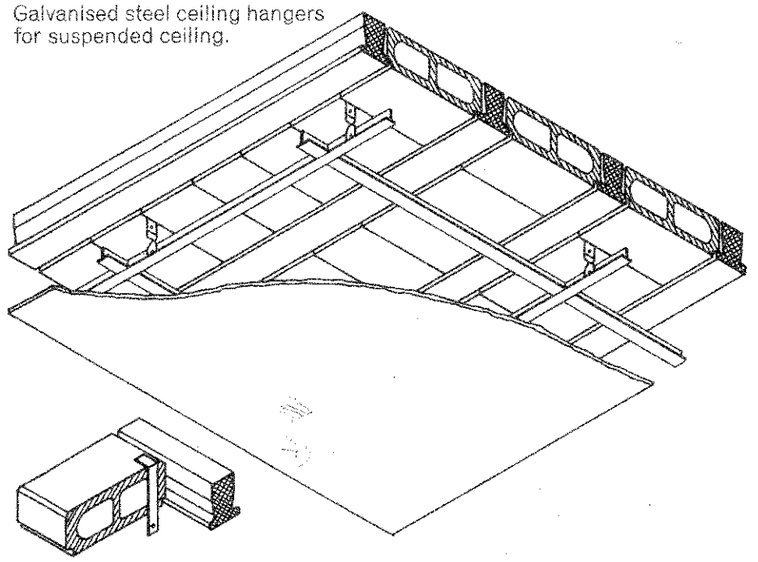


Fig. 7

Suspended ceiling

Galvanised steel ceiling hangers for suspended ceiling.



Provision for Services

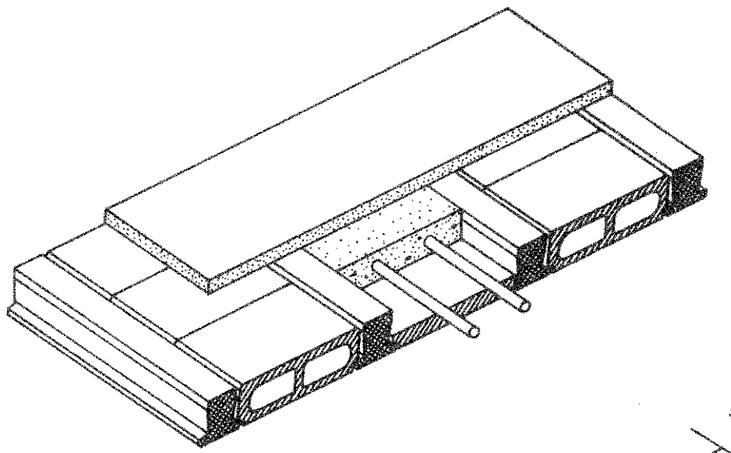


Fig. 8

Soffit units to form duct for services

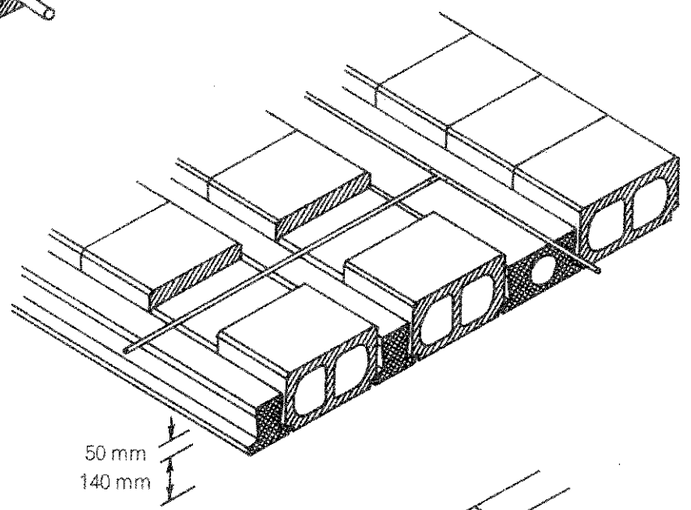


Fig. 9

Additional zone for services

140 mm deep beams used with 190 mm blocks

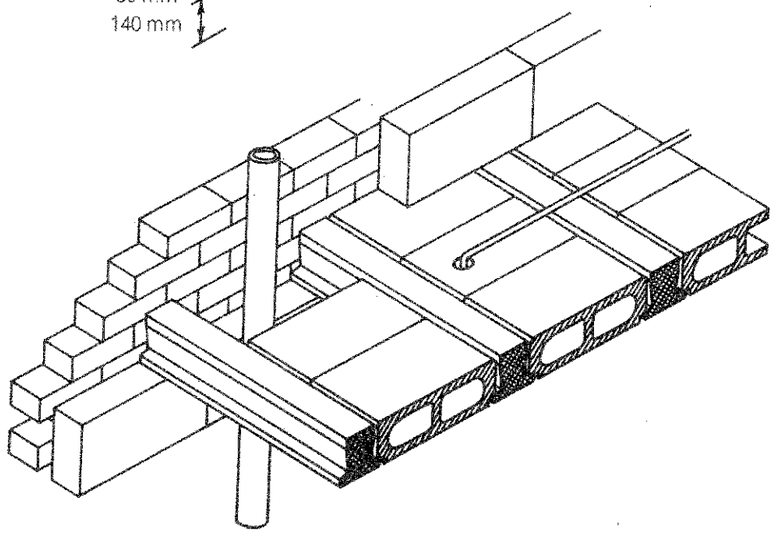


Fig. 10

Vertical services

Infiller blocks drilled to take small conduit etc., or omitted to form small voids where it is necessary to carry services, soil and vent pipes etc., through the floor.

Beams on Steelwork and Composite Support Beams

Fig. 11

Floor units sitting on shelf angles and encased steel beams

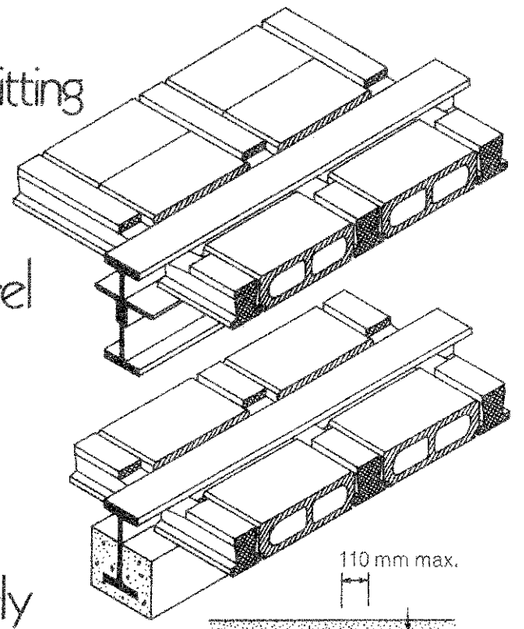
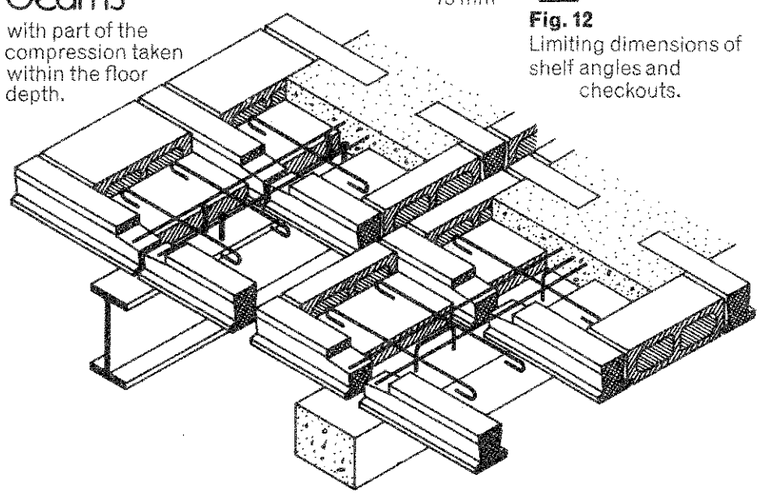


Fig. 13

Compositely designed support beams

with part of the compression taken within the floor depth.



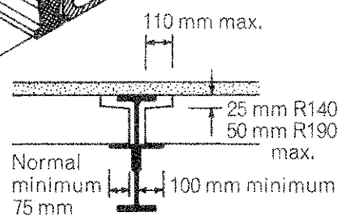
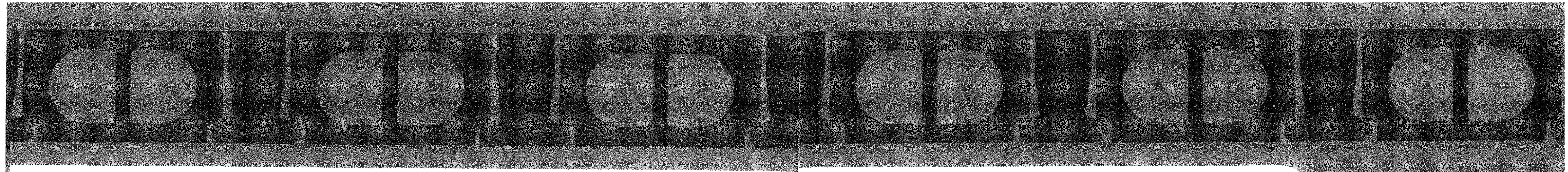


Fig. 12
Limiting dimensions of shelf angles and checkouts.

Figs. 11, 12 & 13 CP110: Part 1 : 197

5.2.4.3. Width of bearings for precast units. The width of bearing of precast units should be sufficient to ensure proper anchorage of tension reinforcement.

Wherever possible precast units should have a bearing of at least 100 mm on masonry or brickwork supports and of at least 75 mm on steel or concrete. This bearing may be reduced at the discretion of the engineer, taking into account relevant factors such as tolerances, loading, span, height of support and the provision of continuity reinforcement. Nevertheless, when reduced bearings are used, precautions should be taken to ensure that collapse of the unit cannot occur due to accidental displacement during erection.



Structural Stability Typical details for compliance with Part D19 of the Building Regulations

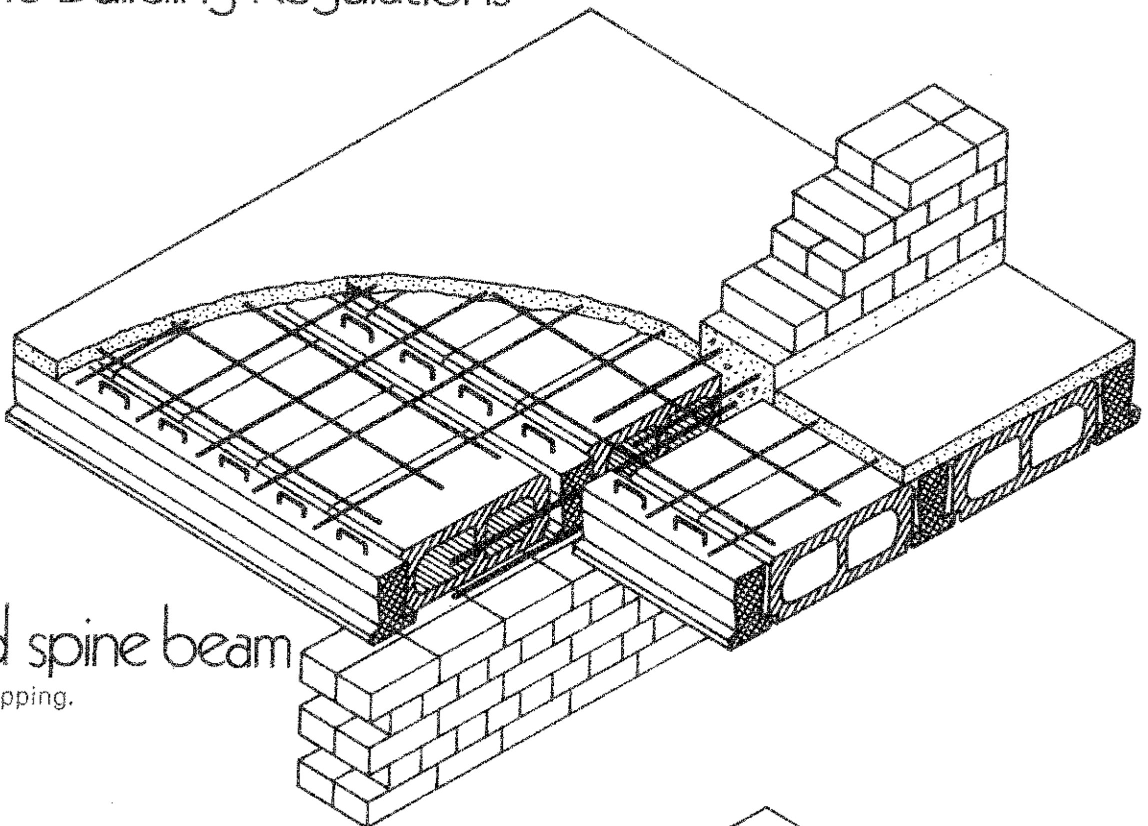


Fig. 14

Insitu upstand spine beam

with mesh in composite topping.

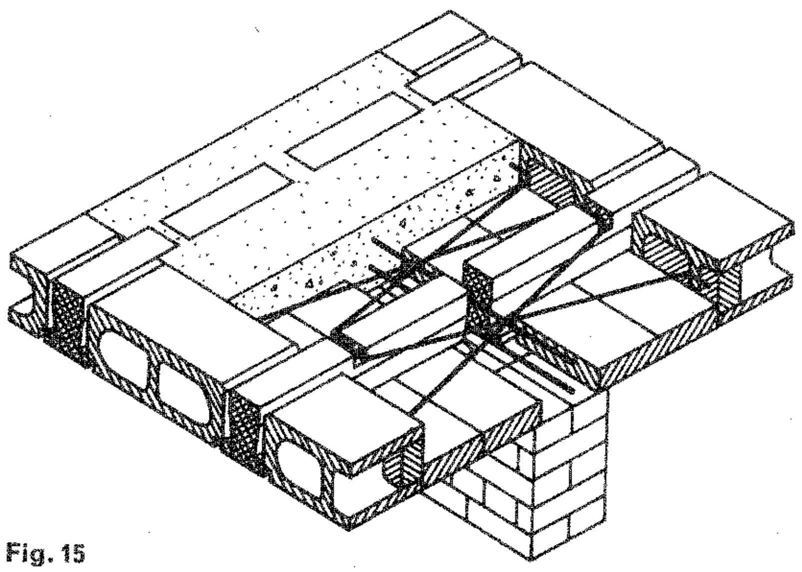


Fig. 15

Flat insitu spine beam

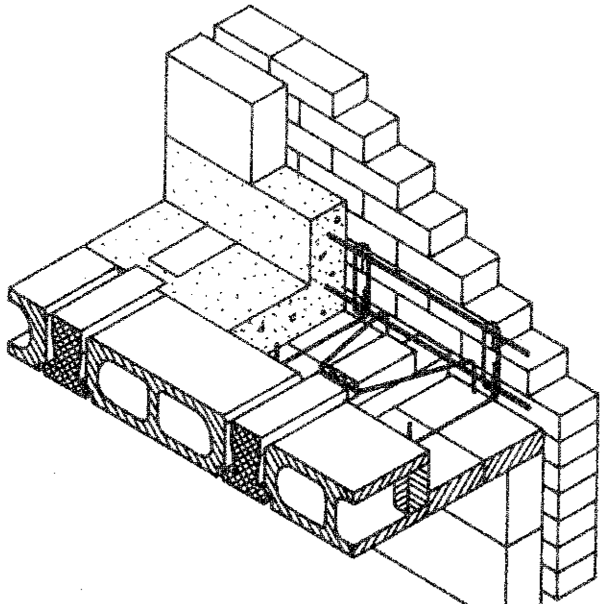


Fig. 16

Insitu upstand edge beam

without composite topping.

Structural Ties

Fig. 17

Brickwork tie to comply with CP111

Structural Recommendations for Load-Bearing Walls.

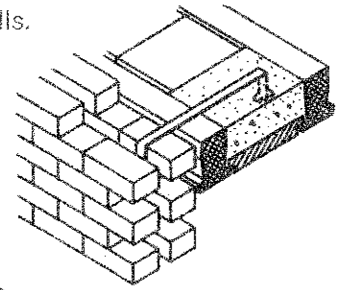
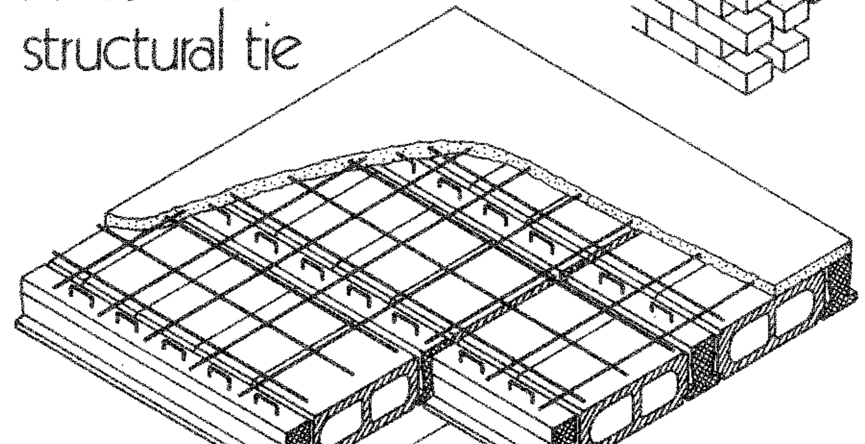


Fig. 18

Mesh in screed to form structural tie



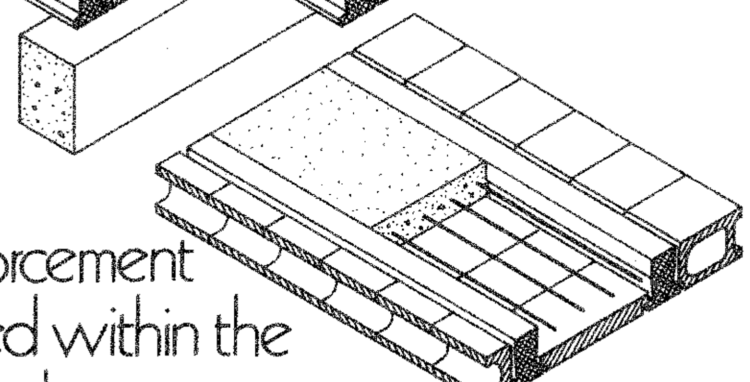


Fig. 19

Tie reinforcement contained within the floor depth

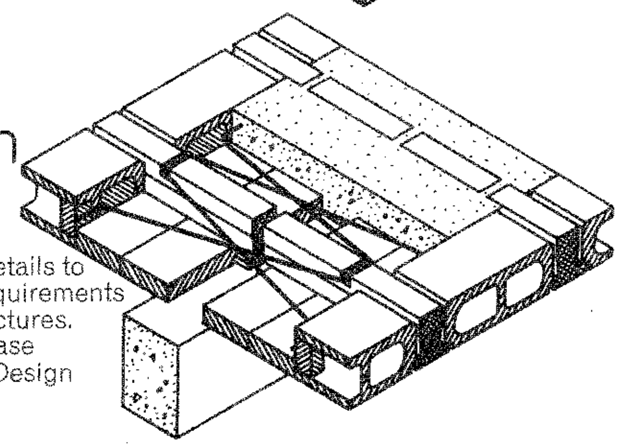


Fig. 20

Ties between floor beams

Figs. 18, 19 & 20 Typical details to satisfy the structural tie requirements of CP110 for **concrete** structures. For further information please contact the nearest Trent Design Office.

Figs. 14, 15 & 16

Part D19 of the Building Regulations requires that buildings having five or more storeys (including basement storeys) shall be so constructed that if any portion of any one structural member (other than a portion which satisfies certain specified design requirements) were to be removed –

a) structural failure consequent on that removal would not occur within any storey other than the storey of which that portion forms part, the storey next above (if any) and the storey next below (if any); and

b) any structural failure would be localised within each such storey.

Fig. 17 CP111 : Part 2 : 1970

304. Lateral support

Where the slenderness ratio is based on effective height and the concrete slabs do not bear on a wall, metal anchorages similar to those illustrated in Fig. 17 should be provided at intervals of not more than 2 m. They should be built into the concrete slab a minimum distance of 500mm.

Figs. 18, 19 & 20 CP110 : Part 1 : 1972

2.2.2.2. Stability. *To accord with the criteria of 2.2.2 the layout of the structure on plan and the interaction between the structural members should be such as to ensure a robust and stable design. It is recommended that:*

(d) all buildings be provided with effective horizontal ties round the periphery and internally. At re-entrant corners or at substantial changes in construction care should be taken to ensure that the ties are adequately anchored or otherwise made effective.