

معهد أبحاث البناء

٦٢٣٢ ١٢ يناير ١٩٦١

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مركز أبحاث البناء
المركزية

مشروع المواصفات والاشتراطات الخاصة بالأعمال والقوى
المنفصلة في تصميم وتركيب المنشآت الخرسانية والفلزية

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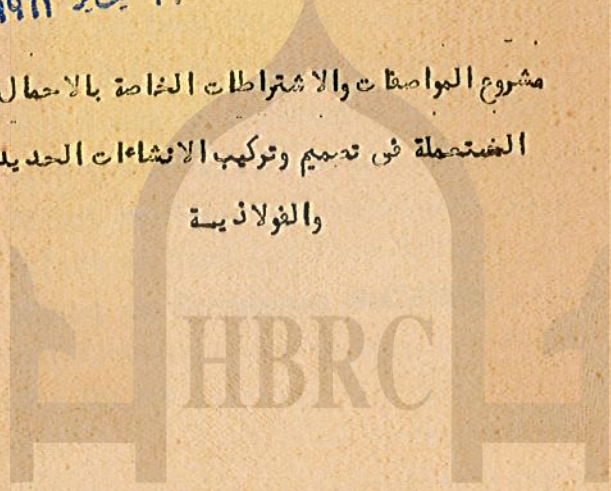
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العضوية في تصميم وتركيب الانشاءات الحديدية
والفولاذية



المركز القومي لبحوث الإسكان والبناء
Housing & Building National Research Center

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C O N T E N T S.

CHAPTER I.

Loads and Forces for Design

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ARTICLE I.

General Application.

The loads and forces herein specified shall apply for the statical calculation and the design of all bridges and structural buildings made of iron, steel, plain concrete, reinforced concrete, stone masonry and timber.

ART. 2

Dead Load. - Weight of Materials.

The dead load carried by a girder or member shall consist of that portion of the weight of the superstructure and the permanent loads fixed thereon which is supported by the girder or member (including its own weight), the following unit weights of materials (kg per m³), or the actual ascertained unit weights where available, being used in determining the load :

Steel (rolled or cast)	7850
Wrought Iron	7700
Cast Iron	7250
Aluminium	2750
Bronze	8500
Copper (rolled)	8900
Zinc (rolled)	7200
Lead	11400
Concrete (cement, plain)	2200
Concrete (cement, reinforced)	2500
Concrete breeze, pumice (1/2 sand)	1500
Brickwork (solid)	1800
Sandstone masonry	2000
Granite masonry	2700
Limestone masonry	2500
Asphalt (compressed)	2150
Asphaltic bitumen	1500
Timber (soft)	800
Timber (hard)	1000
Macadam	2500
Basalt sett paving	2700

The following items may vary in weight, but the average values indicated below (kg per m³) are given for the dry materials and may be used for preliminary computations:

Coal	1000
Cement (in bags)	1600
Sand	1400
Earth, loam { dry	1800
{ wet	2100
Gravel	1700

Sand and gravel (mix)	2000
Flour (in bags)	500
Salt (in bags)	1000
Sugar	750
Potatoes	750
Cotton	1250
Paper	1100

The following items for roof coverings are minimum values (kg per m²) related to the inclined area of roofs :

Tiles	75
Slates	70
Corrugated iron sheets	25
Corrugated asbestos sheets	15
Glazing (with supports) { Ordinary (5 mm)	25
{ wire woven (6 mm)	40
Bituminous felt	35

The dead load should be checked after the design is made and the design should be revised if the dead load is found to be seriously in error.

ART. 3.

Live Load for Railway Bridges.

For the calculation of railway bridges, the rolling live load shall be that type of load designated in the special Specification as one of the three Train-types (D), (H), (L), shown in Appendix No. 1., or any other loading which may be specified.

Two locomotives with tenders are to be assumed followed on one side only by any number of loaded and / or unloaded wagons, the own weight of each unloaded wagon being 16 tons. Different positions of the live load shall be tried so as to realise the worst conditions.

For bridges on curves, provisions shall be made for the increased proportion of the live load carried by any truss, girder or stringer due to the eccentricity of the said load.

If two tracks are loaded at the same time, only 90% of the specified loads for each track are used. In case of three tracks, only 80% of the specified loads are used. In case of four tracks or more, only 75 % of the specified loads are used.

ART. 4.

Live Load for Road and Foot Bridges.

(a) The main girders & floors of all bridges on main roads shall be proportioned for truck concentrated axle loads of the standard type shown in appendix No. 2 and lane distributed loads as specified hereunder.

As to the axle loads two lanes only 3.0 m wide each shall be assumed covered with the trucks moving in the same direction and parallel to the axis of the bridge.

As to the distributed loads, the superficial area of the bridges including the side-walks shall be assumed to carry 400 kg/m².

In case a bridge carries electric railway traffic producing stresses in excess of those due to the live loads considered above, these stresses shall be duly accounted for in proportioning.

For 1st Class & special roads the design shall also be checked for a 70 t trailer towed by a 20 t tractor followed by same loads with a clear spacing of 25 ms. unloaded distance of the type shown in appendix No. 3.

The elements of the side walks proper shall be proportioned for the maximum stresses produced by a uniformly distributed load of 500 kg/m².

(b) For bridges on secondary roads the loads taken shall be 3/4 of the loads specified for main roads.

If the height of the curb is less than 20 cms (thus allowing a mounting over of a vehicle), the elements of the side-walks shall also be checked for the effect of a vertical point load of 4 tons (including dynamic effect) in the position giving the maximum stress and in this case the working stresses may be increased by 25 percent.

(c) The live loads for bridges to be built under other types of roads shall be specified according to local official requirements.

(d) All parts and elements of foot bridges inaccessible to vehicular traffic shall be proportioned for a uniformly distributed load of 400 kg per m² to which shall be added the dynamic effect (Art. 8). Side-walks, if any, shall be designed as under (a).

ART. 5.

Superimposed Loads On Structural Buildings.

1 - For the purpose of calculating the loads on structural buildings parts and their foundations, the minimum superimposed loads on each floor shall be taken as equivalent static loads (kg per m²) estimated as indicated below and in the Special Specification. Floors shall also be capable of carrying in any position concentrated loads as specified.

- (a) Dwellings 200
- (b) Offices, class-rooms, staircases, dwelling balconies, entrance halls 300
- (c) Public rooms, retail shops, restaurants, assembly rooms with fixed individual seatings.. 400
- (d) Cinemas, theatres, dancing halls, amphitheatres, libraries, file rooms, bookshops, Courts 500
- (e) Assembly rooms without fixed seatings, passenger platforms 600
- (f) Baggage rooms, storerooms, garages 750
- (g) Warehouses 1000
- (h) Freight platforms and houses, cotton loading platforms 1500

In designing columns, walls and foundations carrying several floors, the following reductions in assumed total superimposed floor loads shall be taken:

Number of floors carried by the member under consideration	Per cent reduction of superimposed load on all floors carried by the member under consideration
1	0
2	0
3	10
4	20
5	30
6 or more	40