

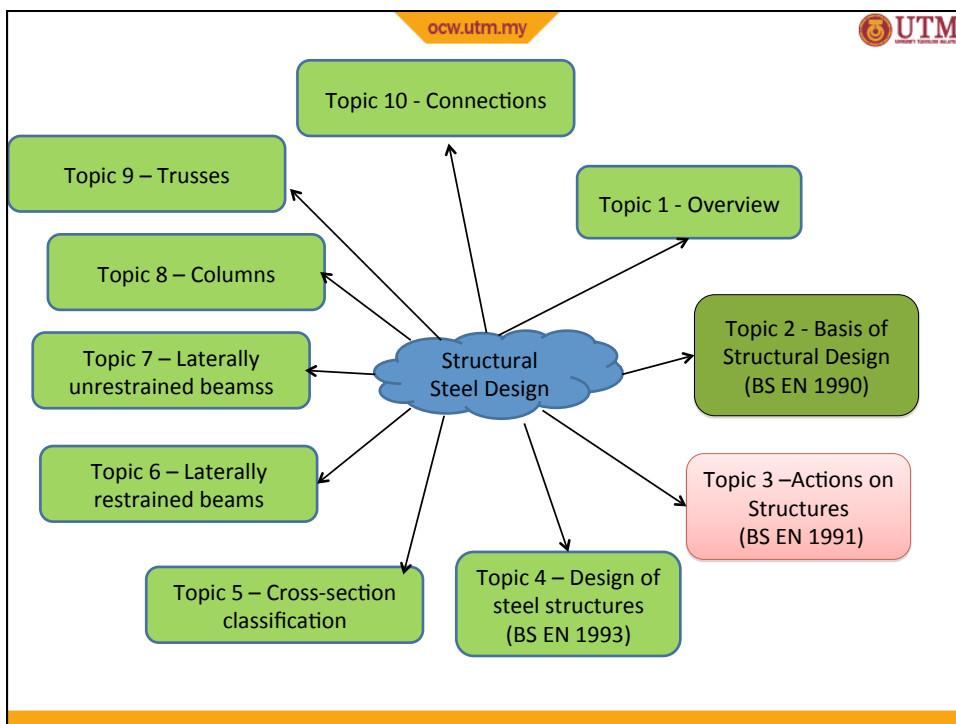
UTM UNIVERSITI TEKNOLOGI MALAYSIA **OPENCOURSEWARE**

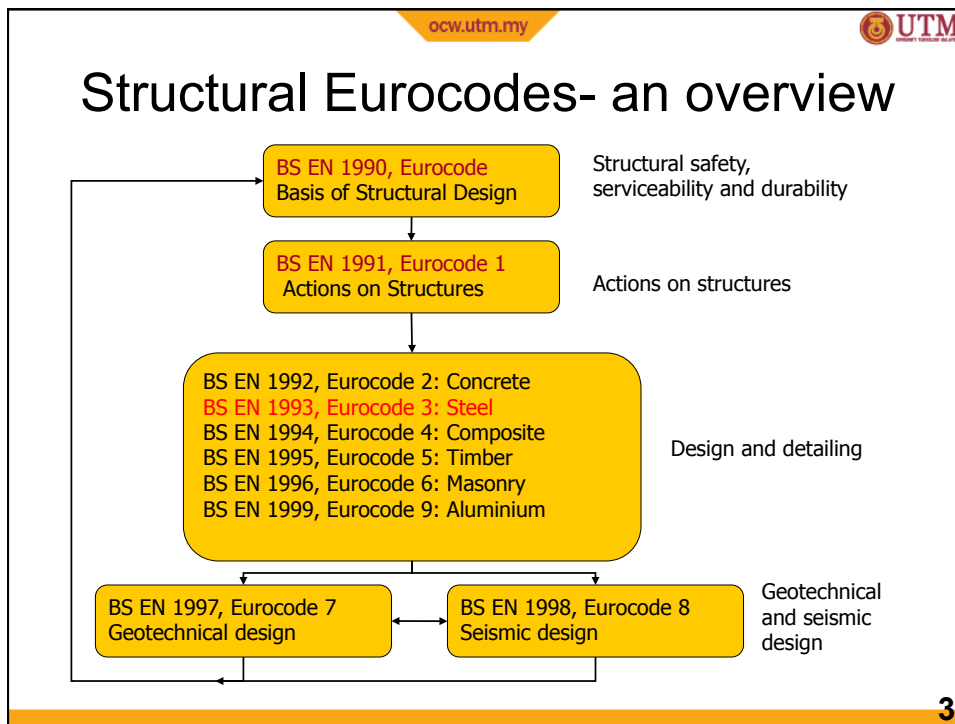
Structural Steel and Timber Design SAB3233


Topic 3 Actions on Structures (BS EN 1991)

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Actions on Structures. Part 1-1: General actions - Densities, self-weight, imposed loads for buildings (BS EN 1991-1-1:2002) or EC-1



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Eurocode 1: Actions on Structures (Loadings)

Eurocode 1	Title	Standards superseded
BS EN 1991-1-1	Densities, self-weight and imposed loads	BS 6399: Part 1 and BS 648
BS EN 1991-1-2	Actions on structures exposed to fire	
BS EN 1991-1-3	Snow loads	BS 6399: Part 2
BS EN 1991-1-4	Wind actions	BS 6399: Part 3
BS EN 1991-1-5	Thermal actions	
BS EN 1991-1-6	Actions during execution	
BS EN 1991-1-7	Accidental actions	
BS EN 1991-2	Traffic loads on bridges	BD 37/01 / BS 5400 Part 2
BS EN 1991-3	Actions induced by cranes and machinery	
BS EN 1991-4	Silos and tanks	

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EN 1991-1-1 gives design guidance and actions for the structural design of buildings and civil engineering works, including the following aspects:

- densities of construction materials and stored materials ;
- self-weight of construction elements, and
- imposed loads for buildings.

EN 1991-1-1 is intended for clients, designers, contractors and public authorities.

EN 1991-1-1 is intended to be used with EN 1990, the other Parts of EN 1991 and EN 1992 to EN 1999 for the design of structures.

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Section 1 to 5 – Descriptives

Section 6 Imposed loads on buildings

Table 6.1 Categories of use
Table 6.2 Imposed loads in buildings

Annex A Tables

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Table 6.1 - Categories of use

Category	Specific Use	Example
A	Areas for domestic and residential activities	Rooms in residential buildings and houses; bedrooms and wards in hospitals; bedrooms in hotels and hostels kitchens and toilets.
B	Office areas	
C	Areas where people may congregate (with the exception of areas defined under category A, B, and D ¹⁾)	<p>C1: Areas with tables, etc. e.g. areas in schools, cafés, restaurants, dining halls, reading rooms, receptions.</p> <p>C2: Areas with fixed seats, e.g. areas in churches, theatres or cinemas, conference rooms, lecture halls, assembly halls, waiting rooms, railway waiting rooms.</p> <p>C3: Areas without obstacles for moving people, e.g. areas in museums, exhibition rooms, etc. and access areas in public and administration buildings, hotels, hospitals, railway station forecourts.</p>

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Selected bulk density of materials (from Eurocode 1, Part 1-1)

Material	Bulk density (kN/m ³)
Normal weight concrete	24.0
Reinforced normal weight concrete	25.0
Wet normal weight reinforced concrete	26.0

Table 6.2 - Imposed loads on floors, balconies and stairs in buildings

Categories of loaded areas	q_k [kN/m ²]	Q_k [kN]
Category A		
- Floors	1,5 to <u>2,0</u>	<u>2,0</u> to 3,0
- Stairs	<u>2,0</u> to 4,0	<u>2,0</u> to 4,0
- Balconies	<u>2,5</u> to 4,0	<u>2,0</u> to 3,0
Category B	2,0 to <u>3,0</u>	1,5 to <u>4,5</u>
Category C		
- C1	2,0 to <u>3,0</u>	3,0 to <u>4,0</u>
- C2	3,0 to <u>4,0</u>	2,5 to 7,0 (<u>4,0</u>)
- C3	3,0 to <u>5,0</u>	<u>4,0</u> to 7,0


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Table NA.2 — Categories for residential, social, commercial and administration areas including additional sub-categories for the UK

Category of loaded area	Specific use	Sub-category	Example
A	Areas for domestic and residential activities	A1	All usages within self-contained dwelling units (a unit occupied by a single family or a modular student accommodation unit with a secure door and comprising not more than six single bedrooms and an internal corridor) Communal areas (including kitchens) in blocks of flats with limited use (see Note 1). For communal areas in other blocks of flats, see A5, A6 and C3
		A2	Bedrooms and dormitories except those in self-contained single family dwelling units and in hotels and motels
		A3	Bedrooms in hotels and motels; hospital wards; toilet areas
		A4	Billiard/snooker rooms
		A5	Balconies in single family dwelling units and communal areas in blocks of flats with limited use (see Note 1)
		A6	Balconies in hostels, guest houses, residential clubs and communal areas in blocks of flats except those covered by Note 1
		A7	Balconies in hotels and motels
B	Office areas	B1	General use other than in B2
		B2	At or below ground floor level

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Table NA.3 — Imposed loads on floors, balconies and stairs in buildings

Category of loaded area		q_k kN/m ²	Q_k kN
Category A	A1	1,5	2,0
	A2	1,5	2,0
	A3	2,0	2,0
	A4	2,0	2,7
	A5	2,5	2,0
	A6	Same as the rooms to which they give access but with a minimum of 3,0	2,0 (concentrated at the outer edge)
	A7	Same as the rooms to which they give access but with a minimum of 4,0	2,0 (concentrated at the outer edge)
Category B	B1	2,5	2,7
	B2	3,0	2,7

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