

CADS SMART ENGINEER Templates

Analysis Tools

Beam
Cantilever – Left
Cantilever – Right
Continuous Beam
Encastre Beam
Frame
Influence Lines
Propped Cantilever – Left
Propped Cantilever – Right
Sub-Frame
Truss

General

Natural frequency of a framework
Section Properties – Channel
Section Properties – General Section
Section Properties – I
Section Properties – RHS
Section Properties – Tee
Section Properties – Zed
Statistics – Mean, Variance, S.D. etc. of a data set
Section Properties – Four angles back to back
Section Properties – Four angles toe to toe
Section Properties – Channels back to back
Section Properties – Angles back to back
Section Properties – Pair of I sections
Section Properties – Star angles
Section Properties – Channels toe to toe
Section Properties – I section with plates
Section Properties – I section with channel and plate Text only

Loadings

Load cover sheet – Suspended floor
Load cover sheet – Ground slab
Load cover sheet – Roof
Load run down – Maximum 7 levels
Imposed roof and snow loads
Wind loads – Standard method – rectangular building
Wind loads – Directional/hybrid method – rect building
Wind loads – Surface pressures and loads
Loadings on lintel to BS 5977-1

Eurocode load factors are added in analysis and design templates.

Steelwork – Simple Connections

Double cleat – Beam to beam web
Double cleat – Beam to column flange
Double cleat – Beam to column web
Full depth end plate – Beam to beam web
Full depth end plate – Beam to column flange
Full depth end plate – Beam to column web
Fin plate – Beam to beam web
Fin plate – Beam to column flange
Fin plate – Beam to column web
Part depth end plate – Beam to beam web
Part depth end plate – Beam to column flange
Part depth end plate – Beam to column web
UB column splice – Bearing
UB column splice – Non bearing
UC column splice – Bearing
UC column splice – Non bearing

Steelwork – Simple Connections BS 5950:2000

Beam splice
Double cleat – Beam to beam web
Double cleat – Beam to column flange
Double cleat – Beam to column web
Full depth end plate – Beam to beam web
Full depth end plate – Beam to column flange
Full depth end plate – Beam to column web
Fin plate – Beam to beam web
Fin plate – Beam to column flange
Fin plate – Beam to column web
Part depth end plate – Beam to beam web
Part depth end plate – Beam to column flange
Part depth end plate – Beam to column web
UB column splice – Bearing
UB column splice – Non bearing
UC column splice – Bearing
UC column splice – Non bearing

Steelwork – BS 5950 Checks

CHS direct compression check
CHS direct tension check
RSA direct compression check
RSA direct tension check
RSC bending check – Simply supported beam
RSC direct compression check
RSC direct tension check
RSJ bending check – Simply supported beam
RSJ column check – In simple construction
RSJ direct compression check
RSJ direct tension check
RSJ section subject to axial load and moments
SHS/RHS bending check – Simply supported beams
SHS/RHS direct compression check

SHS/RHS direct tension check
UB column check – In simple construction
UB direct compression check
UC direct tension check
UC section subject to axial load and moments
CHS bending check – Simply supported beams
UB bending check – Simply supported beams
UC bending check – Simply supported beams
Floor plates subject to uniform load
Floor plates subject to central point load
RSJ castellated beam – Simply supported compact section
UB castellated beam – Simply supported compact section
UC castellated beam – Simply supported compact section
RSJ web opening check
UB web opening check
UC web opening check

Steelwork – BS 5950:2000 Checks

CHS direct compression check
CHS direct tension check
Cold formed CHS direct compression check
Cold formed CHS direct tension check
RSA direct compression check
RSA direct tension check
RSC bending check – Simply supported beam
RSC direct compression check
RSC direct tension check
RSJ bending check – Simply supported beam
RSJ column check – In simple construction
RSJ direct compression check
RSJ direct tension check
RSJ section subject to axial load and moments
SHS/RHS bending check – Simply supported beams
SHS/RHS direct compression check
SHS/RHS direct tension check
Cold formed SHS/RHS bending check – ss beams
Cold formed SHS/RHS direct compression check
Cold formed SHS/RHS direct tension check
UB column check – In simple construction
UB direct compression check
UB direct tension check
UB section subject to axial load and moments
UB asymmetric cellular beam – ss compact section
UB symmetric cellular beam – ss compact section
UC column check – in simple construction
UC direct compression check
UC direct tension check
UC section subject to axial load and moments
UC asymmetric cellular beam – ss compact section
UC symmetric cellular beam – ss compact section
CHS bending check – simply supported beams
Cold formed CHS bending check – simply supported beams
UB bending check – simply supported beams
UC bending check – simply supported beams
Floor plates subject to uniform load
Floor plates subject to central point load

Steelwork – BS 5950 Design

CHS bending design – Simply supported beams
CHS direct compression design
CHS direct tension design
RSA direct compression design
RSA direct tension design
RSC bending design – Simply supported beam
RSC direct compression design
RSC direct tension design
RSJ bending design – Simply supported beam
RSJ column design – In simple construction
RSJ direct compression design
RSJ direct tension design
SHS/RHS bending design – Simply supported beams
SHS/RHS direct compression design
SHS/RHS direct tension design
UB bending design – Simply supported beams
UB column design – In simple construction
UB direct compression design
UB direct tension design
UC column design – In simple construction
UC direct compression design
UC direct tension design
UC bending design – Simply supported beams
Baseplate (circular sections) – axial load only
Baseplate (rectilinear sections) – axial load only
Floor plates subject to uniform load
Floor plates subject to central point load
RSJ castellated beam – Simply supported compact section
UB castellated beam – Simply supported compact section
UC castellated beam – Simply supported compact section

Steelwork – BS 5950:2000 Design

CHS bending design – Simply supported beams
CHS direct compression design
CHS direct tension design
Cold formed CHS bending design – Simply supported beams
Cold formed CHS direct compression design
Cold formed CHS direct tension design
RSA direct compression design
RSA direct tension design
PFC bending design – Simply supported beam
PFC direct compression design

PFC direct tension design
RSJ bending design – Simply supported beam
RSJ column design – In simple construction
RSJ column design – In simple multi-storey construction
RSJ direct compression design
RSJ direct tension design
SHS/RHS bending design – Simply supported beams
SHS/RHS direct compression design
SHS/RHS direct tension design
Cold formed SHS/RHS bending design – ss beams
Cold formed SHS/RHS direct compression design
Cold formed SHS/RHS direct tension design
UB bending design – Simply supported beams
UB column design – In simple construction
UB column design – In simple multi-storey construction
UB direct compression design
UB direct tension design
UC column design – In simple construction
UC column design – In simple multi-storey construction
UC direct compression design
UC direct tension design
UC bending design – Simply supported beams
Baseplate (RHS, CHS sections) – Axial load only
Baseplate (UB, UC, RSJ, PFC sections) – Axial load only
Floor plates subject to uniform load
Floor plates subject to central point load

Steelwork – BS 5950 Torsion Checks

Closed sections (RHS,SHS) subject to torsion
Open sections (UB,UC) subject to torsion

Runway beams – BS 2853:1957

RSJ runway beam design
RSJ runway beam check
UB runway beam design
UB runway beam check
UC runway beam design
UC runway beam check

Composite – BS 5950 (3.1): 1990 Checks

UB plastic moment capacity – Profiled sheet deck slab
UB plastic moment capacity – Plain/haunched solid slab
UB serviceability checks for:
propped beam with profiled deck slab
propped beam with solid slab
unpropped beam with profiled deck slab
unpropped beam with solid slab
UC plastic moment capacity – Profiled sheet deck slab
UC plastic moment capacity – Plain/haunched solid slab
UC serviceability checks for:
propped beam with profiled deck slab
propped beam with solid slab
unpropped beam with profiled deck slab
unpropped beam with solid slab
RSJ web opening check
UB web opening check
UC web opening check

Concrete – BS 8110: 1985 Checks

RSC direct tension check
RSJ bending check – Simply supported beam
RSJ column check – In simple construction
RSJ direct compression check
RSJ direct tension check
Beam – flanged (L) – Moment Capacity
Beam – flanged (L) – Shear Capacity
Beam – flanged (T) – Moment Capacity
Beam – flanged (T) – Shear Capacity
Beam – rectangular – Moment Capacity
Beam – rectangular – Shear Capacity
Slab – rectangular solid – Moment Capacity
Slab – rectangular solid – Shear Capacity
Slab – ribbed – Moment Capacity
Slab – ribbed – Shear Capacity
Staircase – Moment Capacity
Staircase – Shear Capacity

Concrete – BS 8110: 1997 Checks

Beam – flanged (L) – Moment Capacity
Beam – flanged (L) – Shear Capacity
Beam – flanged (T) – Moment Capacity
Beam – flanged (T) – Shear Capacity
Beam – rectangular – Moment Capacity
Beam – rectangular – Shear Capacity
Slab – rectangular solid – Moment Capacity
Slab – rectangular solid – Shear Capacity
Slab – ribbed – Moment Capacity
Slab – ribbed – Shear Capacity
Staircase – Moment Capacity
Staircase – Shear Capacity

Concrete – BS 8110: 1997 Design

Beam – flanged (L) – Single span
 Beam – flanged (L) – Multi-span
 Beam – flanged (T) – Single span
 Beam – flanged (T) – Multi-span
 Beam – rectangular – Single span
 Beam – rectangular – Multi-span
 Slab – rectangular solid – Single span
 Slab – rectangular solid – Multi-span
 Slab – ribbed – Single span
 Slab – ribbed – Multi-span
 Staircase – Single span
 Staircase – Multi-span
 Column – rectangular
 Crack width calculation for beams in bending
 Torsion design for L-beams
 Torsion design for T-beams
 Torsion design for rectangular beams
 Corbels and ribs
 Circular column under axial load
 Annular short column
 Deep beam – Kong's method

Concrete Advanced Design

Solid slab – Two way spanning – restrained
 Solid slab – Two way spanning – simply supported
 Solid flat slab – One way spanning to clause 3.7.2.7
 Solid flat slab – Internal column shear check
 Solid flat slab – Corner column shear check
 Solid flat slab – Edge column shear check
 Solid slab strip – One way spanning to clause 3.5.2.4

Concrete BS 8007: 1987 Design

Crack width calculation for sections in bending
 Crack width – Restrained shrinkage/heat of hydration
 Solid wall or slab – Multi-span
 Solid wall or slab – Single span

Timber – BS 5268: 1991 Checks

Columns – Axial compression and moments
 Columns – Axial compression only
 Floor joists
 Ties – Axial tension and moments
 Ties – Axial tension only
 Trimmer joists and lintels

Timber – BS 5268: 1996 Checks

Columns – Axial compression and moments
 Columns – Axial compression only
 Floor joists
 Ties – Axial tension and moments
 Ties – Axial tension only
 Trimmer joists and lintels
 Ply web I beam
 Ply web box beam

Timber – BS 5268: 2002 Checks

Columns – Axial compression and moments
 Columns – Axial compression only
 Floor joists
 Ties – Axial tension and moments
 Ties – Axial tension only
 Trimmer joists and lintels
 Couple roof
 Collar – Tie roof
 Lean – To roof
 Rafter or sloping beam
 Trussed beam
 Fire design of timber beam
 Racking of timber panels

Timber – BS 5268: 1996 Design

Columns – Axial compression and moments
 Columns – Axial compression only
 Floor joists
 Ties – Axial tension and moments
 Ties – Axial tension only
 Trimmer joists and lintels

Timber – BS 5268: 2002 Design

Columns – Axial compression and moments
 Columns – Axial compression only
 Floor joists
 Ties – Axial tension and moments
 Ties – Axial tension only
 Trimmer joists and lintels

Timber – Flitched Beams BS 5268:1996

Flitched beam: Type1 – Plates at both top & bottom
 Flitched beam: Type2 – Plate in between two timber beams
 Flitched beam: Type3 – Plates on either side of beam
 Flitched beam: Type4 – Plates are sandwiched

Timber – Flitched Beams BS 5268:2002

Flitched beam: Type1 – Plates at both top & bottom
 Flitched beam: Type2 – Plate in between two timber beams
 Flitched beam: Type3 – Plates on either side of beam
 Flitched beam: Type4 – Plates are sandwiched

Timber – Flitched Connections

BS 5268-2:2002 Checks
 Flitched apex connection
 Flitched eaves connection
 Flitched intermediate connection

Timber – Connections BS 5268: 2002

Bolted joint – Single shear connection
 Nailed joint – Single shear connection
 Screwed joint – Single shear connection
 Shear-plate connector joint – Single shear connection
 Split-ring connector joint – Single shear connection
 Toothed-plate connector joint – Single shear connection
 Splice joint
 Bolted joint – Double shear connection
 Nailed joint – Double shear connection
 Shear-plate connector joint – Double shear connection
 Split-ring connector joint – Double shear connection
 Toothed-plate connector joint – Double shear connection
 Floor plates subject to uniform load
 Floor plates subject to central point load

Foundations - EC7-1:2004 & EC2-1-1: 2004 checks

Combined rectangular/trapezoidal base – simple analysis
 Finite Beam on an Elastic Foundation – Point Load
 Rectangular base subject to biaxial bending
 Rectangular base subject to uniaxial bending
 Retaining wall – Rankine and Coulomb's theories
 Semi-infinite beam on an Elastic Foundation-Point Load
 Pad base stability with in plane loading
 Pad base bearing and stability subject to uniaxial or biaxial bending
 Retaining wall with key and differing soils
 Building near trees to NHBC standards
 Building near trees NHBC 2003
 Pad base – Factor of safety against ultimate bearing failure
 Pad Footing - Bearing capacity, Stability, Sliding, Strength & Settlement

Pilecaps

Two piles
 Three piles
 Four piles
 Five piles

Retaining Walls

RC cantilever retaining walls – Stability check
 RC cantilever retaining wall – Strength check
 Stepped masonry retaining wall – Stability check
 Stepped masonry retaining wall – Strength check

Masonry – BS 5628 Design

Braced masonry column
 Brickwork bearing
 Brickwork column
 Cavity wall panel – Lateral load
 Single leaf panel – Lateral load
 Single leaf wall – Lateral and top loading
 Masonry brick/block bearing and pad stones

Wizards

Preliminary portal sizing
 Preliminary portal sizing – Generic I section
 Kleinlogel – Hingeless rectangular portal frame
 Kleinlogel – Two-hinged rectangular portal frame
 Kleinlogel – Hingeless Gable Frame with vertical legs
 Kleinlogel – Two-hinged gable frame with vertical legs
 Kleinlogel – Hingeless frame with skew corners
 Kleinlogel – Two-hinged frame with skew corners
 Kleinlogel – Two-hinged triangular frame
 Kleinlogel – Twin gable frame (duo pitch portals) hinged feet
 Single storey k-brace designs
 Single storey x-brace designs
 Single storey k-brace designs to BS 5950:2000
 Single storey x-brace designs to BS 5950:2000

Roof Drainage

Gutter/Downpipe sizing – Double pitch roofs
 Gutter/Downpipe sizing – Flat roofs
 Gutter/Downpipe sizing – Single pitch roofs

Below Ground Drainage

Combined Surface/Foul Drainage pipe sizing
 Foul Drainage – Pipe sizing
 Surface Water Drainage – pipe sizing
 Soakaway – Capacity check
 Soakaway – Design
 Soakaway – Soil infiltration rate calculator



Concrete – EC2:2004, UK NA checks

Doubly reinforced – Flanged(L) beam – Moment capacity
 Doubly reinforced – Flanged(T) beam – Moment capacity
 Doubly reinforced – Hollow rectangular beam – Moment capacity
 Doubly reinforced – I beam – Moment capacity
 Doubly reinforced – Rectangular beam – Moment capacity
 Singly reinforced – Flanged(L) beam – Moment capacity
 Singly reinforced – Flanged(T) beam – Moment capacity
 Singly reinforced – Hollow rectangular beam – Moment capacity
 Singly reinforced – I beam – Moment capacity
 Singly reinforced – Rectangular beam – Moment capacity
 Slab – Rectangular solid – Moment capacity
 RC Concrete Design to EC2

Steelwork - EC3: 2005 checks

CHS – Section: Compression, Tension, Shear and Bending
 CHS – Stability: Compression
 CHS – Stability: Compression and Bending
 I – Section: Compression, Tension, Shear and Bending
 I – Section: Tension
 I – Stability: Bending - simply supported beams
 I – Stability: Compression
 I – Stability: Compression and bending
 RHS – Section: Compression, Tension, Shear and Bending
 RHS – Stability: Compression
 RHS – Stability: Compression and Bending
 L – Section: Tension

Wind Loading

Wall and roof wind loading to Eurocode I (EN1991-1-4:2005 + A1:2010 to UK National Annex)

Timber members - EN 1995-1:2004 Checks

Column – axial force and bending
 Floor Joists
 Trimmer Joists and lintels
 Ply web I and Box beam

Timber members - EN 1995-1:2004 Design

Column – axial force and bending
 Floor Joists
 Trimmer Joists and lintels

Timber connections - EN 1995-1:2004 Design

Joint – Single shear connection
 Joint – Double shear connection
 Joint – Plate: Single and double shear connection

More Eurocode templates are being developed. Call us for further information or to request a specific template.

