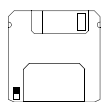# EUROCODES
SPREADSHEETS
Structural Design

Carlo Sigmund
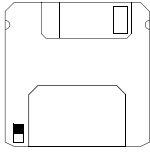
January 2018

User's Guide
to Excel® spreadsheet file
LIST OF AVAILABLE FILES
- REFERENCES -

F. A. Clignett Photography Delft - Copyright© 2006

Edited and published by:
Carlo Sigmund

The sponsoring editor for this document and the production supervisor was Carlo Sigmund.

_____

Cover Art from: F. A. Clignett Photography Delft - Copyright© 2006.
The Cover Art (optimized electronically) is a mirror image of the original picture.

Have not been able to contact the owner of the photograph to give full consent to the publication. The author is at the disposal of the beneficiaries.

Bridge: Erasmus Bridge
Location: Rotterdam, Netherlands
Length/ main span: 802 m/284 m
Pylon: 139 m
Designer: Architects Ben van Berkel, Freek Loos, UN Studio.

_____

Note: ["Calculus"] means implemented entirely on the spreadsheet.

Section 1   List available Excel® Spreadsheet files - Juanuary 2018

1.1 General notes

Our EUROCODES Spreadsheets require at least:

— Microsoft Windows® 2000 Service Pack 3 (or greater), Windows XP;

— 128 MB of free RAM;

— 800 x 600 Super VGA Monitor, but higher resolutions are recommended;

— Pentium 233 Mhz or higher.

Obviously, you must have an internet connection. Please note that the spreadsheets will not necessarily work with previous versions of Excel (e.g. '95, 5.x etc) or other spreadsheet programs. This is due to incompatibility between software and backward incompatibility between versions.

The Excel spreadsheets need the Solver (Tools) installed and do automatically the calculations providing macros have not been switched off.

Our EUROCODES Spreadsheets will be shipped in .EXE format.

If you discover that you are missing any necessary files, either use your original Microsoft Office installation disks or CD-ROM to install them, or ask your system administrator for help.

1.2 Source files in .xls format - January 2014

UnitConversion.xls - (Tools)

Conversions between:

[psi, ksi, MPa, N/m^2, MN/m^2], [in, mm, cm, m, ft], [in^2, mm^2, cm^2, m^2, ft^2], [lb, kips, N, kN, MN],

[in-lb, ft-k, Nmm, MNm, kNm, kNmm].

Conversion: S.I. Units to U.S. customary units.

Conversion: U.S. Customary units to S.I. units.

(furthermore) Conversion factor used commonly in Environmental Engineering.

EN1990.xls - EN 1990 Eurocode 0: Basis of Structural Design

Target reliability index ["Calculus"]

Approach for calibration of design values (section C7 - EN1990 ["Calculus"])

Ψ_0 factors (section C10.EN1990) ["Calculus"]

Assessment via the characteristic value ["Calculus"]

Standard evaluation procedure (Method (a)) ["Calculus"]

Standard evaluation procedure (Method (b)) ["Calculus"]

EN1991-1-1.xls - Eurocode 1: Actions on structures - Part 1-1: General actions

Sec. 6 - Imposed loads on buildings - From Sec. 6.3 Characteristic values of imposed loads to Sec. 6.4 Horizontal loads on parapets and partition walls acting as barriers. ["Calculus"]

Annex A - Informative - Tables for nominal density of construction materials, and nominal density and angles of repose for stored. ["Calculus"]

Annex B - Informative - Vehicle barriers and parapets for car parks. ["Calculus"]

EN1991-1-2_(a).xls - Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire

From Sec. 3.1 to Sec. 3.3

Sec. 3.2 Nominal temperature-time curves ["Calculus"]

Sec. 3.2.1 Standard temperature-time curve ["Calculus"]

Sec. 3.2.2 External fire curve ["Calculus"]

Sec. 3.2.3 Hydrocarbon curve ["Calculus"]

Annex A - Informative - Parametric temperature-time curves. ["Calculus"]

EN1991-1-2_(b).xls - Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire

Annex B - Informative - Thermal actions for external members - simplified calculation method ["Calculus"]. Sec. B.4 Characteristics of fire and flames. Sec. B.4.1 No forced draught ["Calculus"]. Sec. B.4.2 Forced draught ["Calculus"].

EN1991-1-2_(c).xls - Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire

Annex C - Informative - Localised fires ["Calculus"].

Equations (net heat flux vs Theta-m @ time "t") ["Calculus"]

Annex E - Informative - Fire load densities. Sec. E.4 Rate of heat release Q ["Calculus"].

EN1991-1-2_(d).xls - Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire

Annex F - Informative - Equivalent time of fire exposure ["Calculus"].

Annex G - Informative - Configuration factor (for the calculation of temperatures in external members) ["Calculus"].

Annex B (Sec. B.5, taken from Annex B), Sec. B.5 Overall configuration factors ["Calculus"].

EN1991-1-3_(a).xls - Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads

Sec. 5 - Snow load on roofs

Sec. 5 Roof shape coefficients. Sec. 5.3.2 Monopitch roofs ["Calculus"]. Sec. 5.3.3 Pitched roofs ["Calculus"]. Sec. 5.3.4 Multi-span roofs ["Calculus"]. Sec. 5.1 Nature of the load. Sec. 5.3.5 Cylindrical roofs ["Calculus"]. Sec. 5.3.6 Roof abutting and close to taller construction works ["Calculus"].

Sec. 6 - Local effects - Sec. 6.2 Drifting at projections and obstructions ["Calculus"]. Sec. 6.3 Snow overhanging the edge of a roof ["Calculus"]. Sec. 6.4 Snow loads on snowguards and other obstacles ["Calculus"].

EN1991-1-3_(b).xls - Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads

Annex A - Normative - Design situations and load arrangements to be used for different locations ["Calculus"].

Annex B - Normative - Snow load shape coefficients for exceptional snow drift ["Calculus"]. Sec. B.2 Multi-span roofs ["Calculus"]. Sec. B.3 Roofs abutting and close to taller structures ["Calculus"]. Sec. B.4 Roofs where drifting occurs at projections and parapets ["Calculus"].

EN1991-1-3_(c).xls - Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads

Annex C - Informative - European ground snow load maps ["Calculus"].

(Expression characteristic snow load on the ground vs Climatic region). Sec. 4.3, Sec. 5.2 - Snow load on roofs (Sec. 5.2(3)P) ["Calculus"].

Annex D - Informative - Adjustment of the ground snow load according to return period ["Calculus"].

EN1991-1-4_(a).xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 4 - Wind velocity and velocity pressure

Sec. 4.2 Basic values ["Calculus"]. Sec. 4.3 Mean wind ["Calculus"]. Sec. 4.3.2 Terrain roughness ["Calculus"]. Sec. 4.3.1 Variation with height ["Calculus"]. Sec. 4.4 Wind turbolence ["Calculus"]. Sec. 4.5 Peak velocity pressure (basic velocity pressure, exposure factor) ["Calculus"].

EN1991-1-4_(a)_2.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7.2 - Pressure coefficients for building

Sec. 7.2.2 Vertical walls of rectangular plan buildings ["Calculus"]

UK National Annex - Fundamental value of the basic wind velocity ["Calculus"].

EN1991-1-4_(a)_3.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Pressure and force coefficients

Sec. 7.2 Pressure coefficients for building. Sec. 7.2.2 Vertical walls of rectangular plan buildings ["Calculus"].

Sec. 7.12 Asymmetric and counteracting pressure and forces ["Calculus"].

EN1991-1-4_(a)_4.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.2 Pressure coefficients for buildings. Sec. 7.2.3 Flat roofs ["Calculus"].

EN1991-1-4_(a)_5.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.2 Pressure coefficients for buildings. Sec. 7.2.4 Monopitch roofs ["Calculus"].

EN1991-1-4_(a)_6.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.2 Pressure coefficients for buildings. Sec. 7.2.5 Duopitch roofs ["Calculus"].

EN1991-1-4_(a)_7.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.2 Pressure coefficients for buildings. Sec. 7.2.6 Hipped roofs ["Calculus"].

EN1991-1-4_(a)_8.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.2 Pressure coefficients for buildings. Sec. 7.2.7 Multispan roofs ["Calculus"].

EN1991-1-4_(a)_9.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.2 Pressure coefficients for buildings. Sec. 7.2.8 Vaulted roofs and domes ["Calculus"].

EN1991-1-4_(a)_10.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.2 Pressure coefficients for buildings. Sec. 7.2.9 Internal pressure ["Calculus"].

EN1991-1-4_(a)_11.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.2 Pressure coefficients for buildings.

Sec. 7.2.10 Pressure on walls or roofs with more than one skin ["Calculus"].

Sec. 7.3 Canopy roofs ["Calculus"].

EN1991-1-4_(a)_12.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.4 Free-standing walls, parapets, fences and signboards ["Calculus"]. Sec. 7.4.2 Shelter factors for walls and fences ["Calculus"]. Sec. 7.4.3 Signboards ["Calculus"]. Sec. 7.5 Friction coefficients ["Calculus"].

EN1991-1-4_(a)_13.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.6 Structural elements with rectangular sections ["Calculus"]. Sec. 7.7 Structural elements with sharp edged section ["Calculus"].

Sec. 7.8 Structural elements with regular polygonal section ["Calculus"].

EN1991-1-4_(a)_14.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.9 Circular cylinders. Sec. 7.9.1 External pressure coefficients ["Calculus"]. Sec. 7.9 Circular cylinders. Sec. 7.9.2 Force coefficients ["Calculus"].

EN1991-1-4_(a)_15.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.9 Circular cylinders. Sec. 7.9.3 Force coefficients for vertical cylinders in a row arrangement ["Calculus"]. Sec. 7.10 Spheres ["Calculus"].

EN1991-1-4_(a)_16.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.11 Lattice structures and scaffoldings ["Calculus"].

EN1991-1-4_(a)_17.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 7 - Sec. 7.12 Flags ["Calculus"]. Sec. 7.13 Effective slenderness and end-effect factor ["Calculus"].

EN1991-1-4_(a)_18.xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Sec. 8 Wind actions on bridges. Sec. 8.3 Force coefficients ["Calculus"]. Sec. 8.3.1 Force coefficients in x-direction (general method) ["Calculus"]. Sec. 8.3.2 Force in x-direction - Simplified Method ["Calculus"]. Sec. 8.3.3 Wind forces on

bridge decks in z-direction ["Calculus"]. Sec. 8.3.4 Wind forces on bridge decks in y-direction ["Calculus"].

EN1991-1-4_(b).xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Annex A - Informative - Terrain effects

Sec. A.2 Transition between roughness categories 0,I,II,III and IV ["Calculus"]. Sec. A.4 Neighbouring structures ["Calculus"]. Sec. A.5 Displacement height ["Calculus"].

EN1991-1-4_(c).xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Annex B - Informative - Procedure 1 for determining the structural factor $c_s c_d$ ["Calculus"]. Sec. B.1 WInd turbulence ["Calculus"]. Sec. B.2 Structural factor ["Calculus"]. Sec. B.3 Number of loads for dynamic response ["Calculus"]. Sec. B.4 Service displacement and accelerations for serviceability assesments of a vertical structure ["Calculus"]. Sec. 6.3 Detailed procedure (from Sec. 6 - EN 1991-1-4) ["Calculus"]. Sec. 6.3.1 Structural factor $c_s c_d$ ["Calculus"].

EN1991-1-4_(d).xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Annex C - Informative - Procedure 2 for determining the structural factor $c_s c_d$ ["Calculus"]. Sec. C.1 Wind turbulence - Procedure 2 for determining the structural factor $c_s c_d$ ["Calculus"]. Sec. C.2 Structural factor ["Calculus"]. Sec. C.3 Number of loads for dynamic response ["Calculus"]. Sec. C.4 Service displacement and accelerations for serviceability assesments of a vertical structure ["Calculus"]. Sec. 6.3 Detailed procedure (from Sec. 6 - EN 1991-1-4) ["Calculus"]. Sec. 6.3.1 Structural factor $c_s c_d$ ["Calculus"].

EN1991-1-4_(e).xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Annex E - Informative [from Sec. E.1 to Sec. E.1.5.2.5] - Vortex shedding and aeroelastic instabilities. Sec. E.13 Basic parameters for vortex shedding ["Calculus"]. Sec. E.1.3.1 Critical wind velocity ["Calculus"]. Sec. E.1.3.2 Strouhal number St ["Calculus"]. Sec. E.1.3.3 Scruton number Sc ["Calculus"]. Sec. E.1.3.4 Reynolds number Re ["Calculus"]. Sec. E.1.4 Vortex shedding action ["Calculus"]. Sec. E.1.5 Calculation of the cross wind amplitude ["Calculus"]. Sec. E.1.5.2 Approach 1 for the calculation of the cross wind amplitudes ["Calculus"]. Sec. E.1.5 Calculation of the cross wind amplitude ["Calculus"]. Sec. E.1.5.2.2 Lateral force coefficient c_{lat} ["Calculus"]. Sec. E.1.5.2.3 Correlation length L ["Calculus"]. Sec. E.1.5.2.4 Effective correlation length factor K_w ["Calculus"].

EN1991-1-4_(f).xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Annex E - Informative [from Sec. E.1.5.2.6 to Sec. E.4.3] - Vortex shedding and aeroelastic instabilities. Sec. E.15 Calculation of the cross wind amplitude ["Calculus"]. Sec. E.1.5.2.6 Number of load cycles ["Calculus"]. Sec. E.1.5.2.7 Vortex resonance of vertical cylinders in a row or grouped arrangement ["Calculus"]. Sec. E.1.5.3 Approach 2, for calculation of the cross wind amplitudes ["Calculus"]. Sec. E.2 Galloping. E.2.2 Onset wind velocity ["Calculus"]. Sec. E.2.3 Classical galloping of coupled cylinders ["Calculus"]. Sec. E.3 Interference galloping of two or more free standing cylinders ["Calculus"]. Sec. E.4 Divergence and Flutter ["Calculus"]. Sec. E.4.3 Divergency velocity ["Calculus"].

EN1991-1-4_(g).xls - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Annex F - Informative - Dynamic characteristic of structures. Sec. F.2 Fundamental frequency ["Calculus"]. Sec. F.3 Fundamental mode shape ["Calculus"]. Sec. F.4 Equivalent mass ["Calculus"]. Sec. F.5 Logarithmic decrement of damping ["Calculus"].

EN1991-1-5_(a).xls - Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions

Sec. 5 Temperature changes in buildings ["Calculus"]

Sec. 5.2 Determination of temperatures ["Calculus"]

Sec. 5.3 Determination of temperature profiles ["Calculus"].

EN1991-1-5_(a)_2.xls - Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions

Sec. 6.1.1 Bridge deck types

Sec 6.1.2 Consideration of thermal actions ["Calculus"]

Sec 6.1.3 Uniform temperature component ["Calculus"]

Sec 6.1.4 Temperature difference components ["Calculus"]

Sec 6.1.5 Simultaneity of uniform and temperature difference components ["Calculus"]

Sec 6.1.6 Differences in the uniform temperature component between different structural elements ["Calculus"].

EN1991-1-5_(b).xls - Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions

Sec. A.1 General - [values of both annual minimum and maximum shade air temperature for height above sea level > 0] ["Calculus"]

Sec. A.2 Maximum and minimum shade air temperature values with an annual probability of being exceeded p other than 0,02 ["Calculus"]

EN1991-1-5_(c).xls - Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions

Annex C (Informative) Coefficients of linear expansion

Annex D (Informative) Temperature profiles in buildings and other construction works [Analysis of temperature distribution within a structural member] ["Calculus"].

1.3 Software shipped in .xls format

BiaxialBending(2)_EC2

This sheet allows for the design of a column section and checks the area of longitudinal steel reinforcement in accordance with EN 1992-1-1:2004 Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings. This sheet gives two interaction charts for moments M_{Edx} and M_{Edy} against axial load N_{Ed} for rectangular sections of "*short columns*" (Sec. 5.8.9, Exp. 5.39) and estimates the approximate moment curvature relationship (elastic and post-peak branch) of columns with concrete strength ranging from f_{ck} = 12 MPa to f_{ck} = 90 MPa confined with steel (e.g. overlapping hoopsets) with yield strength ranging from 400 to 600 MPa using the model proposed by Kent & Park (1971).

BiaxialBending_EC2

This sheet allows for the design of a column section and checks the area of longitudinal steel reinforcement in accordance with EN 1992-1-1:2004 Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings. The spreadsheet gives two interaction charts for moments M_{Edx} and M_{Edy} against axial load N_{Ed} for rectangular sections of "short columns" with symmetrical or asymmetrical reinforcement arrangements according to Sec. 5.8.9 "Biaxial Bending", Exp. (5.39).

Flexure_EC2

This sheet allows for the design of a section of solid slab or a rectangular beam section. The spreadsheet calculates the area of longitudinal steel reinforcement in accordance with EN 1992-1-1:2004 Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings.

Shear_EC2

This sheet allows for the design of a section of solid slab or a rectangular beam section. The spreadsheet checks beams or slabs for shear and calculates any shear reinforcement required in accordance with EN 1992-1-1:2004 Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings.

1.4 References

EN 1990:2002 - Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight, imposed loads for buildings. CEN/TC 250 - Structural Eurocodes. BS EN 1990 - Eurocode 0: Basis of structural design, 1 July 2002

EN 1991-1-1:2002 - Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings - CEN/TC 250 - Structural Eurocodes.

BS EN 1991-1-1 Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight and imposed loads - 29 July 2002. (Incorporating corrigenda December 2004 and March 2009).

EN 1991-1-2:2002/AC:2013. Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire. CEN/TC 250 - Structural Eurocodes, February 2013.

BS EN 1991-1-2. Eurocode 1: Actions on structures – Part 1-2: General actions – Actions on structures exposed to fire. 26 November 2002.

EN 1991-1-3:2003/AC:2009. Eurocode 1: Actions on structures - Part 1-3: General actions - Snow loads. Brussels: CEN/TC 250 - Structural Eurocodes, March 2009.

EN 1991-1-3:2003. Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads. Brussels: CEN/TC 250 - Structural Eurocodes, July 2003 (DAV).

EN 1991-1-3 (2003) (English): Eurocode 1: Actions on structures - Part 1-3: General actions - Snow loads [Authority: The European Union Per Regulation 305/2011, Directive 98/34/EC, Directive 2004/18/EC].

EN 1991-1-4:2005/A1:2010. Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions. Brussels: CEN/TC 250 - Structural Eurocodes, April 2010.

EN 1991-1-4:2005. Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions. Brussels: CEN/TC 250 - Structural Eurocodes, March 2005 (DAV).

EN 1991-1-5:2003. Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions. Brussels: CEN/TC 250 - Structural Eurocodes, November 2003 (DAV).

EN 1991-1-5:2003/AC:2009. Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions. Brussels: CEN/TC 250 - Structural Eurocodes, March 2009.

1.5 Further Reading

Gulvanessian, H., Calgaro, J.-A. and Holický, M. (2000) Designer's Guide to EN1990. Eurocode: Basis of Structural Design. Thomas Telford, London.

Ferry-Borges, J. and Casteneta, M. (1972) Structural Safety. Laboratorio Nacional de Engenheria Civil, Lisbon.

International Organization for Standardization (1999) Bases for Design of Structures - Notations - General Symbols. ISO, Geneva, ISO 3898.

Manual for the design of building structures to Eurocode 1 and Basis of Structural Design - April 2010. © 2010 The Institution of Structural Engineers.

EN 1991-1-2 (2002) (English): Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire [Authority: The European Union Per Regulation 305/2011, Directive 98/34/EC, Directive 2004/18/EC]. European Committee for Standardisation.

EN 1991-1-2 (2002) (English): Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire [Authority: The European Union Per Regulation 305/2011, Directive 98/34/EC, Directive 2004/18/EC]. European Committee for Standardisation.

ECSC Project, Development of design rules for steel structures subjected to natural fires in CLOSED CAR PARKS, CEC agreement 210-AA/211/318/518/620/933, Brussels, June 1996.

Example to EN 1991 Part 1-2: Compartment fire. PART 5a : Worked examples, 2005. P. Schaumann, T. Trautmann. University of Hannover – Institute for Steel Construction, Hannover, Germany.

Derivation of snow load, Technical Guidance Note, TheStructuralEngineer, March 2012. Web resource: www.istructe.org/resources-centre/library.

Eurocode Load Combinations for Steel Structures. The British Constructional Steelwork Association Limited. BCSA Publication No. 53/10. December 2010.

CNR – Advisory Committee on Technical Recommendations for Construction. NATIONAL RESEARCH COUNCIL OF ITALY. Guide for the assessment of wind actions and effects on structures. CNR-DT 207/2008. ROMA – CNR June 11th, 2010.

DESIGN MANUAL FOR ROADS AND BRIDGES. VOLUME 1. HIGHWAYS STRUCTURES, APPROVAL PROCEDURES AND GENERAL DESIGN. Section 3 General Design. BD 49/01. DESIGN RULES FOR AERODYNAMIC EFFECTS ON BRIDGES. May 2001.

JRC Scientific and Technical Reports. Bridge Design to Eurocodes Worked examples. Worked examples presented at the Workshop "Bridge Design to Eurocodes", Vienna, 4-6 October 2010. Support to the implementation, harmonization and further development of the Eurocodes. Y. Bouassida, E. Bouchon, P. Crespo, P. Croce, L. Davaine, S. Denton, M. Feldmann, R. Frank, G. Hanswille, W. Hensen, B. Kolias, N. Malakatas, G. Mancini, M. Ortega, J. Raoul, G. Sedlacek, G. Tsionis.

Implementation of Eurocodes - Handbook 3 - Action effects for buildings. Guide to basis of structural reliability and risk engineering related to Eurocodes supplemented by practical examples. LEONARDO DA VINCI PILOT PROJECT CZ/02/B/F/PP-134007. Aachen 10.2005.

Thermal Actions. Czech Technical University in Prague, Czech Republic. Milan Holický and Jana Marková. 2013.

1.6 References (for software shipped in .xls format)

A Thesis by Madhu Karthik Murugesan Reddiar. Submitted to the Office of Graduate Studies of Texas A&M University in partial fulfillment of the requirements for the degree of Master of Science. Stress-strain model of unconfined and confined concrete and stress-block parameters. December 2009.

BRITISH STANDARDS INSTITUTION. The structural use of concrete – Part 1: Code of practice for design and construction, BS 8110–1:1997

Confinement Reinforcement Design for Reinforced Concrete Columns. P. Paultre, M.ASCE1; and F. Légeron, M.ASCE2. Journal of Structural Engineering © ASCE/May 2008.

EN 1992-1-1:2004. Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings. Brussels: CEN/TC 250 - Structural Eurocodes, December 2004 (DAV)

EN 1992-1-1:2004/AC:2010. Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings. Brussels: CEN/TC 250 - Structural Eurocodes, December 2010

JRC Scientific and Technical Reports. Bridge Design to Eurocodes Worked examples. Worked examples presented at the Workshop "Bridge Design to Eurocodes", Vienna, 4-6 October 2010. Support to the implementation, harmonization and further development of the Eurocodes. Editors A. Athanasopoulou, M. Poljansek, A. Pinto G., Tsionis, S. Denton

Kent, D.C., and Park, R. (1971). Flexural members with confined concrete. Journal of the Structural Division, Proc. of the American Society of Civil Engineers, 97(ST7), 1969-1990.

MPA The Concrete Centre. Worked Examples to Eurocode 2: Volume 1. Practical Design to Eurocode 2. 2013

R. Park, T. Paulay, Reinforced Concrete Structures, Wiley & Sons, London, 1976.

Reinforced Concrete Design to Eurocode, Bill Mosley, John Bungey and Ray Hulse, Palgrave Macmillan. 7th Edition.

1.7 VBa References

Module name: "modPastePicture". Author: STEPHEN BULLEN, Office Automation Ltd - 15 November 1998. http://www.oaltd.co.uk.

Orlando's VBA and Excel Site. http://cpap.com.br/orlando/index.asp