

Jornada

Presentación del borrador del ANEJO NACIONAL Español del EUROCÓDIGO 7 de Segunda Generación

Madrid, 19 y 20 de noviembre 2025



EUROCODES

EN 1997

Geotechnical
design

ENTIDADES ORGANIZADORAS

UNE
Normalización
Española



GOBIERNO
DE ESPAÑA

MINISTERIO
DE TRANSPORTES
Y MOVILIDAD SOSTENIBLE

VICEPRESIDENCIA
TERCERA DEL GOBIERNO

MINISTERIO
PARA LA TRANSICIÓN ECOLÓGICA
Y EL RETO DEMOGRÁFICO

CEDEX

Jornada

Presentación del borrador del ANEJO NACIONAL Español del EUROCÓDIGO 7 de Segunda Generación

Parte 1 - Capítulos 5 a 12



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CEDEX

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Contenido

1. Objeto de la presentación
2. Estadística de NDPs
3. Decisiones adoptadas en cada caso
4. Resumen y conclusiones

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1. Objeto de la presentación

EN 1997-1:2024 (Part 1)

- 1 Scope
- 2 Normative references
- 3 Terms, definitions and symbols

4 Basis of design

- 5 Materials
- 6 Groundwater
- 7 Geotechnical analysis
- 8 Ultimate limit analysis
- 9 Serviceability limit states
- 10 Implementation for design
- 11 Testing
- 12 Reporting

ANNEX A + ANNEX B + ANNEX C



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2. Estadística de NDPs

Eurocode 7 — Geotechnical design — Part 1: General rules

Introduction

0.5 National annex for EN 1997-1

National choice is allowed in this document where explicitly stated within notes. National choice includes the selection of values for Nationally Determined Parameters (NDPs).

National choice is allowed in EN 1997-1 through notes to the following clauses:

4.1.2.2(1)	4.1.2.3(3)	4.1.3(1)	4.1.4(2)
4.1.5(1)	4.1.8(3)	4.2.3.2(2)	4.2.4(3)
4.3.2.3(2)	4.4.1.3(1) – 3 choices	4.4.1.3(9) – 2 choices	4.4.1.5(1) – 2 choices
4.5(1)	4.5(4)	5.4(2)	5.5(2)
5.5(3)	7.1.1(7)	7.2(2)	8.1.4.2(3)
8.2(1) – 2 choices	10.2(3)	12.1(4)	A.4(3)
A.4(8) – 2 choices	A.4(11)	C.3(3)	C.3(4)

National choice is allowed in EN 1997-1 on the application of the following informative annexes:

Annex A

Annex B

Annex C

The National Annex can contain, directly or by reference, non-contradictory complementary information for ease of implementation, provided it does not alter any provisions of the Eurocodes.



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3. NDP - 5.4 (2) – Lechada

Lugar en EC7.1:

5.4 Grout

- (1) Grout for **anchors** shall comply with EN 1537.
- (2) The properties of compounds of grout for **rock bolts** should comply with EN 206.

NOTE The National Annex can specify relevant standards giving additional rules for grout for rock bolts.

- (3) Grout for **soil nails** shall comply with EN 14490.
- (4) Grout for **micropiles** shall comply with EN 14199.
- (5) Grout **placed in the ground** shall comply with EN 12715.
- (6) Grout used for **jet-grouting** shall comply with EN 12716.

Propuesta de PDN:

Este Anejo Nacional no especifica otras normas que proporcionen reglas adicionales sobre la lechada a utilizar en los bulones a roca



3. NDP - 5.5 (2) y (3) Hormigón pobre y hormigón armado



Lugar en EC7.1:

5.5 Plain and reinforced concrete

(1) Plain and reinforced concrete for geotechnical structures shall comply with EN 1992-1-1 and EN 206.

(2) Weldable reinforcing steel for reinforced concrete used for geotechnical structures should comply with EN 10080.

NOTE The National Annex can specify relevant standards giving additional rules for reinforcing elements.

(3) Steel reinforcement for wire, wire ropes, and link chains should comply with relevant standards for prestressing steel.

NOTE 1 The National Annex can specify relevant standards for prestressing steel.

Propuesta de PDN:

Este Anejo Nacional no especifica otras normas que proporcionen reglas adicionales sobre elementos de (2) armado o (3) pretensado de estructuras geotécnicas

3. NDP - 7.1.1 (7) Medidas para validar los modelos de cálculo



Lugar en EC7.1:

NOTE 1 The minimum level of validation of calculation models used in geotechnical design is given in Table 7.1 (NDP) unless the National Annex gives a different minimum level.

Table 7.1 (NDP) — Measures to validate calculation models

Geotechnical Category	Level of validation	Measures
GC3	High	All the measures given below for GC2 and, in addition: — calibrate the calculation model for all relevant design situations against another suitable calculation model or site observations.
GC2	Normal	All the measures given below: — confirm that the assumptions underlying the calculation model are relevant for all relevant design situations; — document the assumptions made in the calculation model; — document literature reference that the calculation model has been used for comparable design situations; and — confirm that any calculation model used falls within the limits of application stated in EN 1997-3.
GC1	Low	All the measures given below: — confirm that comparable experience exists showing that the calculation model is suitable for the local conditions; — confirm that any calculation model used falls within the limits of application stated in EN 1997-3.

7 Geotechnical analysis

7.1 Calculation models

7.1.1 General

3. NDP - 7.1.1 (7) Medidas para validar los modelos de cálculo

Lugar en EC7.1:

NOTE 1 The minimum level of validation of calculation models used in geotechnical design is given in Table 7.1 (NDP) unless the National Annex gives a different minimum level.

Table 7.1 (NDP) — Measures to validate calculation models

Geotechnical Category	Level of validation	Measures
GC3	High	All the measures given below for GC2 and, in addition: — calibrate the calculation model for all relevant design situations against another suitable calculation model or site observations.
GC2	Normal	All the measures given below: — confirm that the assumptions underlying the calculation model are relevant for all relevant design situations; — document the assumptions made in the calculation model; — document literature reference that the calculation model has been used for comparable design situations; and — confirm that any calculation model used falls within the limits of application stated in EN 1997-3.
GC1	Low	All the measures given below: — confirm that comparable experience exists showing that the calculation model is suitable for the local conditions; — confirm that any calculation model used falls within the limits of application stated in EN 1997-3.

7 Geotechnical analysis

7.1 Calculation models

7.1.1 General

Propuesta de PDN: Este Anejo Nacional no proporciona medidas para validar los modelos de cálculo diferentes a las recogidas en la Tabla 7.1 (se considera válida la tabla)

Comentario: por carecerse de experiencia previa



3. NDP - Parte 1 / 7.2 Factores de modelo



Lugar en EC7.1:

7.2 Model factors

(1) Model factors should be used to adjust any significant bias and additional uncertainty in a calculation model compared with a reference model.

(2) The value of the model factor should not be less than 1,0.

NOTE 1 Model factors for the reference model already include an allowance for some bias and uncertainty.

NOTE 2 The value of the model factor is 1,0 unless the National Annex gives a different value for a specific calculation model.

Propuesta de PDN:

Este Anejo Nacional proporciona valores diferentes de 1,0 para el factor de modelo a aplicar en los modelos de cálculo en los siguientes casos

Comentarios: (ver parte 3)

3. NDP - Parte 1 / 7.2 Factores de modelo



Lugar en EC7.3: diversos apartados de la Parte 3

Propuesta de PDN:

Este Anejo Nacional proporciona valores diferentes en los factores marcados en azul del siguiente listado

$\gamma_{Rd,bolt}$	model factor accounting for uncertainty in the interface model for rock bolts
$\gamma_{Rd,group}$	model factor accounting for uncertainty in the resistance model for a pile group
$\gamma_{Rd,nail}$	model factor accounting for uncertainty in the pull-out resistance of soil nails
$\gamma_{Rd,pile}$	model factor accounting for uncertainty in the resistance model for a piled foundation
$\gamma_{Rd,piled-raft}$	model factor accounting for uncertainty in the resistance model for a piled raft
$\gamma_{Rd,retain}$	model factor accounting for uncertainty in the resistance model for a retaining structure
$\gamma_{Rd,sys}$	model factor on overall system resistance
$\gamma_{Rd,wm}$	model factor accounting for additional uncertainty owing to extrapolation of measured strengths to the design service life of reinforcing elements

3. NDP - Parte 1 / 8.1.4.2 (3) — Levantamiento hidráulico



Lugar en EC7.1: 8.1.4.2 Hydraulic heave

(3) To prevent an ultimate limit state of hydraulic heave at any depth z (Figure 8.2), it shall be verified, that:

$$\Delta u_d \leq \gamma_{\text{HYD}} (\gamma_{\text{rep}} - \gamma_{\text{w,rep}}) z + \gamma_{\text{pv}} p'_{\text{v,rep}} \quad (8.3)$$

where

Δu_d is the design excess groundwater pressure = $u_d - u_0$;

u_d is the design groundwater pressure in the presence of flow;

u_0 is the groundwater pressure in the absence of flow (hydrostatic) = $\gamma_{\text{w,rep}}(z + h_w)$;

$\gamma_{\text{w,rep}}$ is the representative weight density of the groundwater;

z is the vertical distance of the point in the ground below the ground surface (not including any overlying fill);

γ_{rep} is the representative weight density of the ground;

$p'_{\text{v,rep}}$ is the representative value of any effective overburden pressure at the ground surface;

γ_{HYD} is a partial factor for hydraulic heave;

γ_{pv} is a partial factor on the effective overburden pressure.

NOTE 2 The values of γ_{HYD} and γ_{pv} are both 0,67 unless the National Annex gives different values.

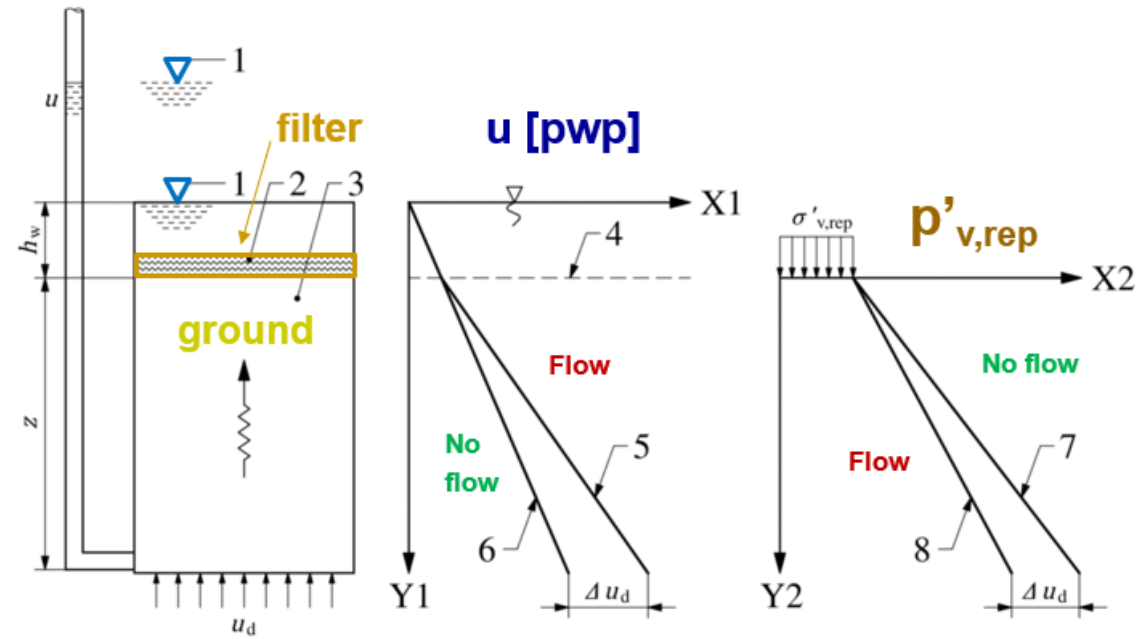
3. NDP - Parte 1 / 8.1.4.2 (3) — Levantamiento hidráulico



Lugar en EC7.1: 8.1.4.2 Hydraulic heave

Key

- 1 water level
- 2 filter
- 3 ground
- 4 $\gamma_{gw,rep} h_w$
- 5 u_d (in presence of flow)
- 6 u_0 (in absence of flow)
- 7 $\sigma'_{v,0}$ (in absence of flow)
- 8 $\sigma'_{v,d}$ (in presence of flow)
- 9 h_w vertical distance from the surface water level to the ground
- X1 water pressure u
- Y1 depth below surface water
- X2 effective vertical stress σ'_v
- Y2 depth



3. NDP - Parte 1 / 8.1.4.2 (3) — Levantamiento hidráulico



Lugar en EC7.1: 8.1.4.2 Hydraulic heave

$$\Delta u_d \leq \gamma_{HYD} (\gamma_{rep} - \gamma_{w,rep})z + \gamma_{pv} p'_{v,rep}$$

(8.3)

Δu_d is the design excess groundwater pressure = $u_d - u_0$;

u_d is the design groundwater pressure in the presence of flow;

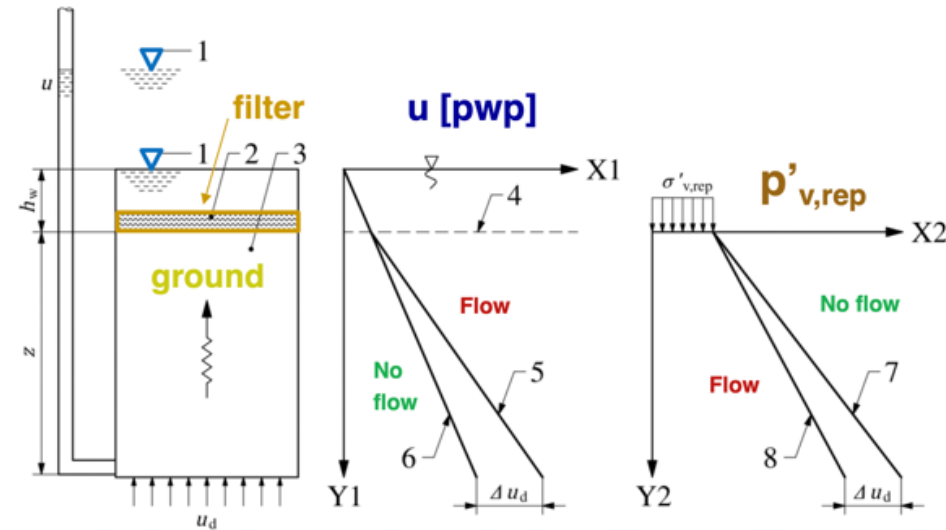
u_0 is the groundwater pressure in the absence of flow (hydrostatic) = $\gamma_{w,rep}(z + h_w)$;

$\gamma_{w,rep}$ is the representative weight density of the groundwater;

z is the vertical distance of the point in the ground below the ground surface (not including any overlying fill);

γ_{rep} is the representative weight density of the ground;

$p'_{v,rep}$ is the representative value of any effective overburden pressure at the ground surface;



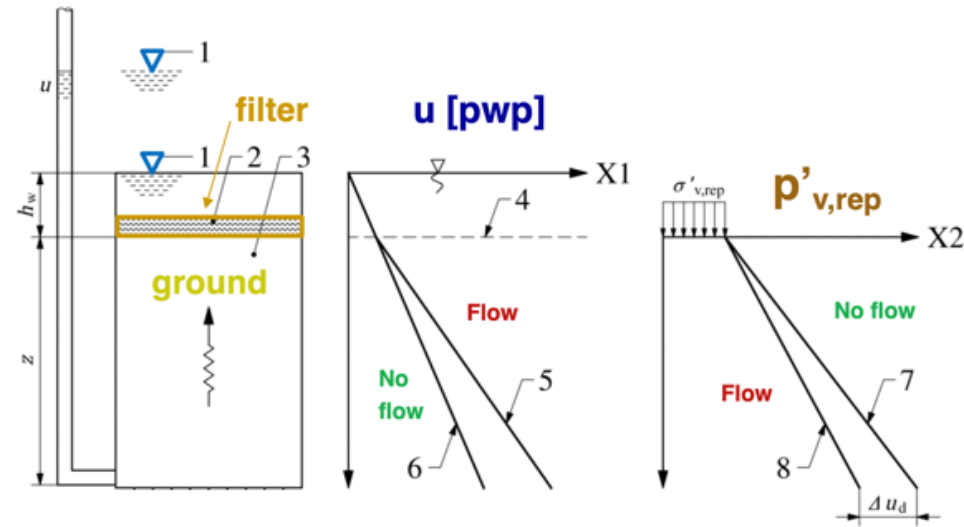
3. NDP - Parte 1 / 8.1.4.2 (3) — Levantamiento hidráulico

Lugar en EC7.1: 8.1.4.2 Hydraulic heave

$$\Delta u_d \leq \gamma_{HYD} (\gamma_{rep} - \gamma_{w,rep})z + \gamma_{pv} p'_{v,rep} \quad (8.3)$$

γ_{HYD} is a partial factor for hydraulic heave;

γ_{pv} is a partial factor on the effective overburden pressure.



NOTE 2 The values of γ_{HYD} and γ_{pv} are both 0,67 unless the National Annex gives different values.



3. NDP - Parte 1 / 8.1.4.2 (3) – Levantamiento hidráulico

Lugar en EC7.1:

$$\Delta u_d \leq \gamma_{HYD} (\gamma_{rep} - \gamma_{w,rep})z + \gamma_{pv} p'_{v,rep}$$



NOTE 2 The values of γ_{HYD} and γ_{pv} are both 0,67 unless the National Annex gives different values.

Propuesta de PDN:

Este Anejo Nacional no propone valores diferentes a 0,67 para esos dos factores

Comentarios:

En el EC7 vigente se emplean dos factores: uno de mayoración [1,35] para las presiones de agua (o para las presiones de filtración) y otro de minoración [0,90] para la presión vertical total (o para la presión vertical sumergida) – cálculos en presiones totales (o en efectivas)

En el nuevo EC7 el valor considerado [0,67] para los dos factores parciales es, en la práctica, equivalente a los dos factores que se emplean en el EC7 vigente [$0,67 = 0,90 / 1,35$], no habiéndose encontrado un motivo para modificarlo en este Anejo Nacional



3. NDP - 8.2 (1) — Procedimiento para modelos numéricos



Lugar en EC7.1:

8.2 Procedure for numerical models

(1) For geotechnical structures, verification of ultimate limit states by numerical models should be verified using both of the following factoring approaches:

- **Input factoring**, using:
 - factors on actions γ_F from Verification Case 3 and;
 - factors on material properties γ_M from Set M2;
- **Output factoring**, using:
 - factors on effects-of-actions γ_E from Verification Case 4 and;
 - factors on material properties γ_M from Set M1.

NOTE 6 The National Annex can specify cases where ultimate limit states can be verified by **input or output factoring alone**.

NOTE 7 The procedure for verification of ultimate limit states with numerical models is given in **Table 8.1 (NDP)** unless the National Annex gives a different procedure.

Propuesta de PDN:

Este Anejo Nacional no especifica casos en los que se pueda verificar los estados límite último únicamente mediante o el método “input factoring” o el método “output factoring”.

3. NDP - 8.2 (1) — Procedimiento en modelos numéricos

Lugar en EC7.1:

Table 8.1 (NDP) — Procedure for verification of ultimate limit states with numerical models

Propuesta de PDN:

Este Anejo Nacional no modifica la Tabla 8.1
sobre procedimientos de verificación de
estados límite mediante modelos numéricos
(ver presentación de José Estaire)

Table 8.1 (NDP) — Procedure for verification of ultimate limit states with numerical models

		Factoring approach - See 8.2(1)		
		Output VC4 + M1	Input VC3 + M2 (Recommended)	Input VC3 + M2 (Alternative)
		See 8.2 (1), (9), (10)	See 8.2 (1) and (6)	See 8.2 (1) and (7)
Construction Stage 1 (CS1)	Step 1 ^c Representative Step		Step 1 ^c Representative Step	Step 1 ^c ---
	Input	Piezometric level or groundwater pressure	Representative values	
		Ground properties	Representative Values	
		Structural element properties	Representative Values	
		External actions	Representative Values	
	Output	Movements	a	
		Structural forces	a	
	Step 2 ULS Verification Step		Step 2 ULS Verification Step	Step 2 ULS Verification Step
	Input	Piezometric level or groundwater pressure	Design level ^b	Design level ^b
		Ground properties	Design values by M1 combination	Design values by M2 combination
		Structural element properties	Representative values	Representative values
		External actions	Design values by VC4 combination	Design values by VC3 combination
Output		Verification of ground failure	See 8.2(9) and (10)	ULS verified if equilibrium is attained in the ground with no failure of the structure
		Verification of structural failure	Design values (E_d) obtained by applying γ_E to calculation results See 8.2(9) and (10)	Design values (E_d) obtained directly from calculation results
CS2	Continue in the same way through any subsequent stage (CS2, CS3, etc.)			

^a These output values can be used for SLS verifications.
^b "The design piezometric level" can be obtained by applying a deviation to the representative piezometric level as stated in 6.5.1 (1), second bullet.
^c The start of Step 1 of any given Construction Stage continues from the end of Step 1 of the preceding Construction Stage.
^d Usually in this step, a strength reduction procedure is performed and the ULS verification is checked, as set in 8.2 (6). If a strength reduction procedure cannot be performed, or if different material factors cannot be applied to different geotechnical units, then Step 2 also continues from Step 1 of the preceding Construction Stage using design material properties determined with partial factors from Set M2.



3. NDP - Parte 1 / 10.2 (4) – Informes de índole geotécnica; sobre los mínimos en extensión y en nivel de detalle

Lugar en EC7.1:

12 Reporting

12.1 General

(4) The extent and details of the reporting should be appropriate for the type of geotechnical structure and the Geotechnical Category.

NOTE 1 Guidance on specific reporting for different geotechnical structures is given in EN 1997-3.

NOTE 2 The minimum extent and level of detail of reporting is given in Table 12.1 (NDP) unless the National Annex gives a different minimum extent and level of detail.





3. NDP - Parte 1 / 10.2 (4) – Informes de índole geotécnica; sobre los mínimos en extensión y en nivel de detalle

Lugar en EC7.1:

Table 12.1 (NDP) — Extent and level of detail of reporting appropriate for each Geotechnical Category

Geotechnical Category	Extent and level of detail
GC3	All the items given below for GC2 and, in addition: — more extensive documentation should be included, covering all aspects of the design as outlined in Annex B; — the extent of the documentation and the degree of detail should make it possible for a third party to obtain similar results from check analyses of the design.
GC2	All the items given below for GC1 and, in addition: — the documentation should cover all critical aspects of the design; — the extent of the documentation for items that are not critical may be reduced or excluded provided justification is given.
GC1	— the documentation should cover the main design assumptions with justification; — the extent of the documentation for each heading, as outlined in Annex B, may be reduced to a record with bullet-points of what has been done.
NOTE An example of a reduced GDR for GC1 is given in C.4.4.	

Propuesta de PDN:

Este Anejo Nacional no proporciona recomendaciones relativas a la extensión mínima y nivel de detalle en los informes de índole geotécnica diferente a la recogida en la Tabla 12.1 (se considera válida)





3. NDP - Parte 1 / 10.2 (4) – Informes de índole geotécnica; sobre los mínimos en extensión y en nivel de detalle

Lugar en EC7.1:

Table 12.1 (NDP) — Extent and level of detail of reporting appropriate for each Geotechnical Category

Geotechnical Category	Extent and level of detail
GC3	All the items given below for GC2 and, in addition: — more extensive documentation should be included, covering all aspects of the design as outlined in Annex B; — the extent of the documentation and the degree of detail should make it possible for a third party to obtain similar results from check analyses of the design.
GC2	All the items given below for GC1 and, in addition: — the documentation should cover all critical aspects of the design; — the extent of the documentation for items that are not critical may be reduced or excluded provided justification is given.
GC1	— the documentation should cover the main design assumptions with justification; — the extent of the documentation for each heading, as outlined in Annex B, may be reduced to a record with bullet-points of what has been done.
NOTE An example of a reduced GDR for GC1 is given in C.4.4.	

Propuesta de PDN:

Este Anejo Nacional, por no haber experiencia previa, no proporciona recomendaciones relativas a la extensión mínima y nivel de detalle en los informes de índole geotécnica diferente a la recogida en la Tabla 12.1 (que se considera válida)



3. NDP - Parte 1 / ANEXO A – Procedimiento de determinación de los valores característicos

Lugar en EC7.1:

Annex A **(informative)**

Characteristic value determination procedure

A.1 Use of this annex

(1) This informative annex provides complementary guidance to 4.3.2 on characteristic values of ground properties.

NOTE National choice on the application of this informative annex is given in the National Annex. If the National Annex contains no information on the application of this informative annex, it can be used.

Propuesta de PDN:

Este Anejo Nacional no modifica el ANEXO A, manteniendo asimismo su carácter informativo

Comentario: por carecer de experiencia previa



3. NDP - Parte 1 / ANEXO A.4 (3) – Procedimiento de determinación de los valores característicos

Lugar en EC7.1:

A.4 Description of the determination procedure

- (1) The determination procedure described in this Annex should be used to calculate the characteristic value of a ground property by statistical methods.
- (2) The derived values of the ground property presented in the Ground Investigation Report, should be used for the determination of the characteristic value of the ground property.
- (3) The procedure described in this Annex may be applicable for the determination of the characteristic value of a ground property, considered as an estimate of either:
 - the mean value [Type A]; or
 - the inferior (5 % fractile) or superior (95 % fractile) value [Type B].

NOTE 1 The ratio of the scale of fluctuation to the extent of the failure surface can be used in the determination of the characteristic values.

NOTE 2 Alternative determination procedures can be given in the National Annex.

Propuesta de PDN:

Este Anejo Nacional no modifica el ANEXO A, manteniendo asimismo su carácter informativo

Comentario: por carecer de experiencia previa





3. NDP - Parte 1 / ANEXO A.4 (8) – Procedimiento de determinación de los valores característicos

Lugar en EC7.1:

(4) The procedure in this Annex shall be used to evaluate the different terms in the following formula [repeated from Formula (4).5]:

$$X_k = X_{\text{mean}} [1 \mp k_n V_x] \quad (\text{A.2})$$

V_x is the coefficient of variation of the ground property X [$V_x = (\text{standard deviation})/(\text{mean value})$];

(5) The determination procedure may be applied for three different cases:

- Case 1 “ V_x known”;
- Case 2 “ V_x unknown”; and
- Case 3 “ V_x assumed”.

(8) Case 3 should be applied when indicative values are used for ground properties or for test parameters.

NOTE 1 Indicative values for ground properties are given in Table A.1 (NDP) and for test parameters in Table A.2 (NDP) unless the National Annex gives different values.



3. NDP - Parte 1 / ANEXO A.4 (8) – valores indicativos del coeficiente de variación

Lugar en EC7.1:

Table A.1 (NDP) — Indicative values of coefficient of variation for different ground properties

Soil / Rock Type	Ground property	Symbol	Coefficient of variation, V_x (%)
All soils and rocks	Weight density	γ	5–10
Fine-grained soils	Shear strength in total stress analysis	c_u	30–50
All soils and rocks	Peak or residual effective cohesion	c'_p or c'_r	30–50
All soils and rocks	Coefficient of friction	$\tan \varphi$	5–15
All soils and rocks	Shear strength at failure	τ_f	15–25
All soils and rocks	Unconfined compressive strength	q_u	20–80
All soils	Modulus of deformability ^a	E or G	20–70
Fine-grained soils	Vertical or horizontal consolidation coefficient	c_v or c_h	30–70
All soils	Hydraulic conductivity ^b	K	70–250

^a This refers to the different moduli of deformation whose symbols appear EN 1997-2:2024, 3.2.1.
^b Given the high value of the coefficient of variation for the hydraulic conductivity, this procedure should not be used.

Propuesta de PDN:

Este Anejo Nacional no modifica la Tabla A.1 del ANEXO A, que se considera válida

Comentario: por carecer de experiencia previa



3. NDP - Parte 1 / ANEXO A.4 (8 y 11) – valores indicativos del coeficiente de variación

Lugar en EC7.1:

Table A.2 (NDP) — Indicative values of coefficient of variation for different test parameters

Soil/Rock Type	Test parameter	Symbol	Coefficient of variation, V_x (%)
Coarse soils	SPT blowcount	N_{SPT}	15–45
All soils	Pressuremeter limit pressure	p_l	5–15
All soils	Cone resistance	q_c	5–15
All soils	Sleeve friction	f_s	5–15

(11) For Case 2, the value of V_x should be calculated by:

$$V_x = \frac{s_x}{X_{\text{mean}}} ; s_x = \sqrt{\frac{\sum_{i=1}^n (X_i - X_{\text{mean}})^2}{n-1}} \quad (\text{A.4})$$

where

s_x is the standard deviation of the sample derived values.

NOTE 2 For Case 3, indicative values of V_x can be taken from Table A.1, for ground properties, or from Table A.2, for test parameters, unless the National Annex gives different values.

Propuesta de PDN:

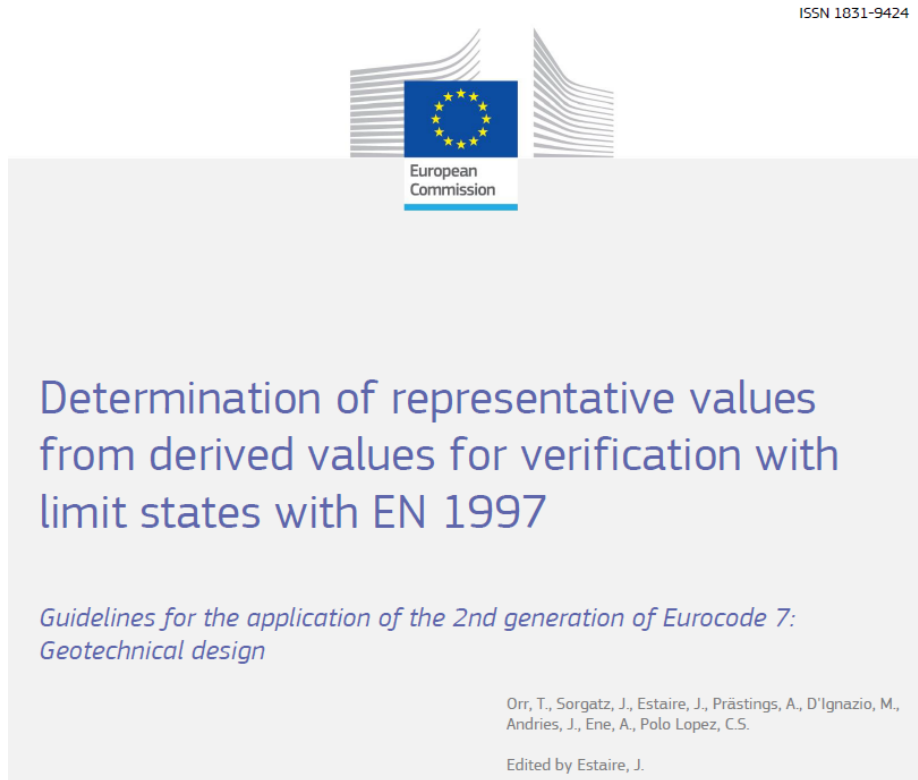
Este Anejo Nacional no modifica la Tabla A.2 del ANEXO A, que se considera válida

Comentario: por carecer de experiencia previa

3. NDP - Parte 1 / ANEXO A — Procedimiento de determinación de los valores característicos

Comentario:

Se consideran de interés, a efectos únicamente informativos, los siguientes documentos publicados por el JRC



CEDEX

UNE

3. NDP - Parte 1 / ANEXO B – Contenido de los informes de índole geotécnica

Lugar en EC7.1:

Annex B **(informative)**

Contents of reports

B.1 Use of this annex

(1) This informative annex provides additional requirements and recommendations to those given in Clause 12, concerning the content and extent of reporting.

NOTE National choice on the application of this informative annex is given in the National Annex. If the National Annex contains no information on the application of this informative annex, it can be used.

Propuesta de PDN:

Este Anejo Nacional no modifica el ANEXO B, manteniendo asimismo su carácter informativo

Comentario: por carecer de experiencia previa



3. NDP - Parte 1 / ANEXO C – Guía para la selección de clases de complejidad geotécnica (GCC's)

Lugar en EC7.1:

Annex C **(informative)**

Guideline on selection of Geotechnical Complexity Class

C.1 Use of this annex

(1) This informative annex provides complementary guidance to Clause 4 for selection of appropriate Geotechnical Complexity Class.

NOTE National choice on the application of this informative annex is given in the National Annex. If the National Annex contains no information on the application of this informative annex, it can be used.

Propuesta de PDN:

Este Anejo Nacional no modifica el ANEXO C, manteniendo asimismo su carácter informativo

Comentario: por carecer de experiencia previa



3. NDP - Parte 1 / ANEXO C — Guía para la selección de clases de complejidad geotécnica (GCC's)



Lugar en EC7.1: C.3 Specific features to consider

(1) The Geotechnical Complexity Class should be selected based on an evaluation of the degree of severity for the design situation of these **general features**:

- uncertainty of the ground conditions;
- variability and difficulty of the ground;
- sensitivity of the geotechnical structure to groundwater and surface water conditions;
- complexity of the ground-structure interaction.

(2) The evaluation of the severity should be based on engineering judgement, with a scale from significant, considerable, high at one end to negligible, uniform, low at the other end of the scale.

(3) If the evaluation in (1) results in a high severity for any of the general features, the GCC should be selected as GCC 3.

NOTE Specific features to include in the evaluation of the severity of the general features is given in Table C.1 (NDP) unless the National Annex gives different specific features.

(4) If the evaluation in (1) results in a low severity for all the general features, the GCC should be selected as GCC 1.

NOTE Guideline on specific features to be fulfilled for GCC1 is given in Table C.2 (NDP) unless the National Annex gives different specific features.



3. NDP - Parte 1 / ANEXO C — Guía para la selección de clases de complejidad geotécnica (GCC's)

Lugar en EC7.1: Ejemplos de situaciones específicas a considerar en la selección de GCC's

Table C.1 (NDP) — Examples of specific features to account for in selection of the Geotechnical Complexity Class

General features	Specific feature
Uncertainty in ground condition	— evaluation of uncertainty from the available results from ground investigations; — evaluation of completeness of available results and relevance of ground investigation method with respect to best possible knowledge of the ground conditions; — ground conditions are with high certainty expected to be as interpreted from the ground investigations.
Variability or difficulty of ground condition	— ground with weak layers or zones; — unfavourable discontinuity patterns; — potential pre-existing failure surfaces; — occurrence of ground conditions where geotechnical structure design or execution need detailed assessment. E.g. fine soil sensitive to disturbance, aggressive soil, highly compressible soil, organic soil, creep soil, swelling soil.

General features	Specific feature
Sensitivity to groundwater and surface water conditions	— existence of hydraulic gradient and seepage forces; — exposure to erosion, scour or piping; — potential for water flow; — high groundwater level; — excavation below groundwater level; — variability in water level.
Complexity of the ground-structure interaction	— ongoing ground movements (settlement and/or slope movement); — potential unstable ground; — progressive failure of natural or improved ground; — potentially sensitive adjacent structure or complex interaction with adjacent structures; — sensitivity of the structure to movements and differential movements; — structure subjected to dynamic, cyclic or seismic actions; — highly concentrated loading on part of the geotechnical structure;
	— complexity of the structure itself including geometry, variation in plane and depth; — lack of documented comparable experience for the considered geotechnical structure and execution of it in similar conditions.



3. NDP - Parte 1 / ANEXO C – Guía para la selección de clases de complejidad geotécnica (GCC's)

Lugar en EC7.1: Ejemplos de situaciones específicas para seleccionar Clase 1 de Complejidad Geotécnica

Table C.2 (NDP) — Examples of specific features to select Geotechnical Complexity Class 1

General features	Specific feature
Uncertainty in Ground condition	— documented comparable experience of the ground conditions, — no known information that indicate uncertainty in the ground conditions.
Variability or difficulty of ground condition	— available results from Ground investigations validate simple and uniform ground conditions; — no known weak layers or unfavourable discontinuities; — ground considered as suitable for the specific application without further improvement.
Sensitivity to groundwater and surface water conditions	— no excavation below the ground water level, without comparable experience; — no exposure to erosion, scour or piping or any other water induced transport of soil particles; — minimal potential of water flow through the structure; — low influence from groundwater and/or surface water.

General features	Specific feature
Complexity of the ground-structure interaction	— No records of significant ground movements (settlement and or slope movement); — geotechnical structure insensitive to movements; — horizontal o slightly inclined ground surface; — limited excavation depth; - o e.g. 2 m in fine soil and 3 m in coarse soil — absence of sensitive structures within the zone of influence; — simple loading conditions - o no dynamic, cyclic or seismic actions. - o no concentrated loading. - o permanent loading is restricted to a limited fraction of anticipated bearing capacity of the ground

Propuesta de PDN:

Este Anejo Nacional no modifica el ANEXO C, manteniendo asimismo su carácter informativo

Comentario: por carecer de experiencia previa



Resumen y conclusiones

No se han encontrado motivos para introducir modificaciones en este Anejo Nacional en los capítulos 5 a 12 de la Parte 1 del EC7:

0.5 National annex for EN 1997-1

National choice is allowed in this document where explicitly stated within notes. National choice includes the selection of values for Nationally Determined Parameters (NDPs).

National choice is allowed in EN 1997-1 through notes to the following clauses:

4.1.2.2(1)	4.1.2.3(3)	4.1.3(1)	4.1.4(2)
4.1.5(1)	4.1.8(3)	4.2.3.2(2)	4.2.4(3)
4.3.2.3(2)	4.4.1.3(1) – 3 choices	4.4.1.3(9) – 2 choices	4.4.1.5(1) – 2 choices
4.5(1)	4.5(4)	5.4(2)	5.5(2)
5.5(3)	7.1.1(7)	7.2(2)	8.1.4.2(3)
8.2(1) – 2 choices	10.2(3)	12.1(4)	A.4(3)
A.4(8) – 2 choices	A.4(11)	C.3(3)	C.3(4)

National choice is allowed in EN 1997-1 on the application of the following informative annexes:

Annex A	Annex B	Annex C
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Jornada

Presentación del borrador del ANEJO NACIONAL Español del EUROCÓDIGO 7 de Segunda Generación

Parte 1 - Capítulos 5 a 12



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