BUILDING CAPACITIES FOR ELABORATION OF NDPs AND NAs OF THE EUROCODES IN THE BALKAN REGION

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European Commission

EN 1995 – Elaboration on NA

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Member of Croatian:

-TC 165 Timber structures-material and products

-TC 548 SC5 Timber structures

-Member of CEN TC 250 /SC5

-CEN TC250 WG2 Assesment and reinforcement of existing structures

-- CEN TC 250 WG3 Glass structures

Eurocod 5 (EN 1995) Subcommitee TC548/SC 5, *Structural Eurocodes Eurocode 5: Design of timber structures*		
-Translation and lectoring (translators and CSI(HZN)		
-Revision and acceptance of translations (group for translation + PO5)		
-Determination of the procedure for NDPs (PO5 + group for NDP)		
-implementation of procedures for determination of NDPs (experts)		
-determination of the NDPs (PO5 + expert group for NDPs)		
-determining the text for public discussion (PO5)		
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Public disscussion (CSI (HZN)		
-analysis and discussion of comments (PO5 + TO)		
-finalization of text (HZN + chairmans of PO5 and TC548)		
- publication in the official gazzete-journal of the CSI (HZN)		

- National Parametars or certain procedures for the analysis within standard EN 1995-1-1: 2008 should be apply in conjunction with that standard

The norm EN 1995-1-1: 2008 is permitted, at national level, to make decisions about the values of certain parameters or certain calculation procedures. Thus, specific values or methods called "nationally determined parameters‟- NDP). These values and procedures applicable to design buildings that are performed in the Republic of Croatia.

Nationally determined parameters – NDPs in HRN EN 1995-1-1: 2.3.1.2(2)Load duration class

(2)P Actions shall be assigned to one of the load-duration classes given in Table 2.1 for strength and stiffness calculations

Original

Table 2.2 – Examples of load-duration assignment

Load-duration class	Examples of loading
Permanent	self-weight
Long-term	storage
Medium-term	imposed floor load, snow
Short-term	snow, wind
Instantaneous	wind, accidental load

- Table 2.2.HRN NA

1		2
Opterećenja		**Razred trajanja opterećenja**
Gustoće i površinska opterećenja		stalno
Vertikalna uporabna djelovanja na stropove, krovove, stube i balkone		
A za	Krovne ploštine, stambene ploštine i prostorije boravak	srednje
B	Uredske prostorije, radne prostorije, predvorja	srednje
C mogu služiti kategorija A, B, D i E)	Prostori, prostori za okupljanja i ploštine koje za okupljanje osoba (sa izuzetkom utvrđenih	kratko
D	Prodajni prostori	srednje
E prilazi,	Tvornice i radionice, staje, skladišni prostori, ploštine sa znatnim okupljanjem ljudi	dugo
F (ukupno	Prometne ploštine, parkirališta za lagana vozila opterećenje ≤ 25 kN), pristupne rampe	kratko
G	Ploštine s teškim pogonom	srednje
H uobičajenih	Neprohodni krovovi (s izuzetkom provedbe postupaka održavanja i popravaka)	kratko
J (ukupno	Prometne ploštine, parkirališta za lagana vozila opterećenje ≤ 30 kN), pristupne rampe	srednje

Nationally determined parameters – NDPs in HRN EN 1995-1-1: 2.3.1.2(2)Load duration class

1		2
Loads		**Load duration class**
Density and sufrace load		permanent
Vertical servicibility load on floors, roofs, stairs and balconies		
A	Roof areas, living space	mid-term
B	Offices, workrooms, lounges	mid-term
C	Spaces and areas for people gathering (with the exception of the established categories A, B, D and E)	short-term
D	Outlets	mid-term
E	Factories and workshops, stables, storerooms, approaches, areas with considerable gathering of people	long-term
F	traffic areas, parking for light vehicles (total load ≤ 25 kN), an access ramp	short-term
G	Traffic areas with heavy loads	short-term
H	Impassable roofs (with the exception of the implementation of common procedures for maintenance and repairs)	short-term
J	traffic areas, parking for light vehicles (total load ≤ 30 kN), an access ramp	mid-term

Examples of sorting loads in load duration classes - table 2.2. is made much more detailed than the proposed in original

Nationally determined parameters – NDPs in HRN EN 1995-1-1: 2.3.1.2(2)Load duration class

	K Roof area for helicopter landings T Stairways and platforms Z Access areas and the balconies	short-term
	Horizontal servicibility loads	
	Horizontal servicibility loads caused by man for fences, parapetes and other structures which are put for reservation	short
3	Horizontal loads to achieve of sufficient longitudinal and transverse stiffness	short
	Horizontal loads on the roof areas for helicopters	
	Horizontal loads	short
	for protection from crossing outside the marked area	instant
4	**Wind load**	short
	Snow load and ice	
5	Structure on the hight above the sea NMV ≤ 1 000 m	short
	Structure on the heigt above the sea NMV > 1 000 m,	mid-term
6	**Impact load**	instant
7	**Horizontalna load from portal crane and cranes**	short

Examples of sorting loads in load duration classes - table 2.2. is made much more detailed than the proposed in original

CEN TC 124 TIMBER STRUCTURES - PRODUCTS

Wood classes according to EN 338 for soft wood	C 14	C 16	C 18	C 20	C 22	C 24	C 27	C 30	C 35	C 40
Strength	14,0	16,0	18,0	20,0	22,0	24,0	27,0	30,0	35,0	40,0
Tensile || $f_{t,0,k}$	8,0	10,0	11,0	12,0	13,0	14,0	16,0	18,0	21,0	24,0
Tensile ⊥ $f_{t,90,k}$	0,4	0,5	0,5	0,5	0,5	0,5	0,6	0,6	0,6	0,6
Compression || $f_{c,0,k}$	16,0	17,0	18,0	19,0	20,0	21,0	22,0	23,0	25,0	26,0
Compression ⊥ $f_{c,90,k}$	2,0	2,2	2,2	2,3	2,4	2,5	2,6	2,7	2,8	2,9
Shear and torsion $f_{v,k}$	1,7	1,8	2,0	2,2	2,4	2,5	2,8	3,0	3,4	3,8
Modulus										
Mid E modul || $E_{0,mean}$	7,00	8,00	9,00	9,50	10,0	11,0	11,5	12,0	13,0	14,0
Characteristic E modul || $E_{0,05}$	4,70	5,40	6,00	6,40	6,70	7,40	7,70	8,00	8,70	9,40
Mean E modul ⊥ $E_{90,mean}$	0,23	0,27	0,30	0,32	0,33	0,37	0,38	0,40	0,43	0,47
Mean shear modul G_{mean}	0,44	0,50	0,56	0,59	0,63	0,69	0,72	0,75	0,81	0,88
Density ρ_k	290	310	320	330	340	350	370	380	400	420
ρ_{mean}	350	370	380	390	410	420	450	460	480	500

2.3.1.3(1)P Servicibility classes

1)P Structures shall be assigned to one of the service classes given below:

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(2)P Service class 1 is characterised by a moisture content in the materials corresponding to a temperature of 20°C and the relative humidity of the surrounding air only exceeding 65 % for a **few weeks** per year.

In service class 1 the average moisture content in most softwoods will not exceed 12 %.

HRN NA

In service class 1 the average moisture content in most softwoods will not exceed 12 %. Service class 1 is characterised by a moisture content in the materials corresponding to a temperature of 20°C and the relative humidity of the surrounding air only exceeding 65 % for **a two** weeks per year.

All structures in heated and closed areas are in service class 1.

2.4.1(1)P (Table 2.3) Parctial factors γ_M for material properties and resistance

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Table 2.3 – Recommended partial factors γ_M for material properties and resistances

Fundamental combinations:	
Solid timber	1,3
Glued laminated timber	1,25
LVL, plywood, OSB,	1,2
Particleboards	1,3
Fibreboards, hard	1,3
Fibreboards, medium	1,3
Fibreboards, MDF	1,3
Fibreboards, soft	1,3
Connections	1,3
Punched metal plate fasteners	1,25
Accidental combinations	1,0

HRN NA

Table 2.3(HR) – Parctial factors γ_M for material properties and resistance

1 **Fundamental combinations**	
1.1 **Solid timber and timber based materials (products)**	1,3
1.2 **Steel in joints**	1,25
- For doweled type connectors , ultimate limit state bending	1,1
- For the parts/elements subjected to tension and shear	1,25
- Punched metal plate fasteners	1,25
2 Accidental combinations	1,0

6.4.3(8) Double tappered trapezoid, curved and saddle girders

ORIGINAL

(8) The greatest tensile stress perpendicular to the grain due to the bending moment should be calculated as follows:

$$\sigma_{t,90,d} = k_p \frac{6 M_{ap,d}}{b h_{ap}^2} \tag{6.54}$$

or, as an alternative to expression (6.54), as

$$\sigma_{t,90,d} = k_p \frac{6 M_{ap,d}}{b h_{ap}^2} - 0,6 \frac{p_d}{b} \tag{6.55}$$

where:

p_d is the uniformly distributed load acting on the top of the beam over the apex area;

b is the width of the beam;

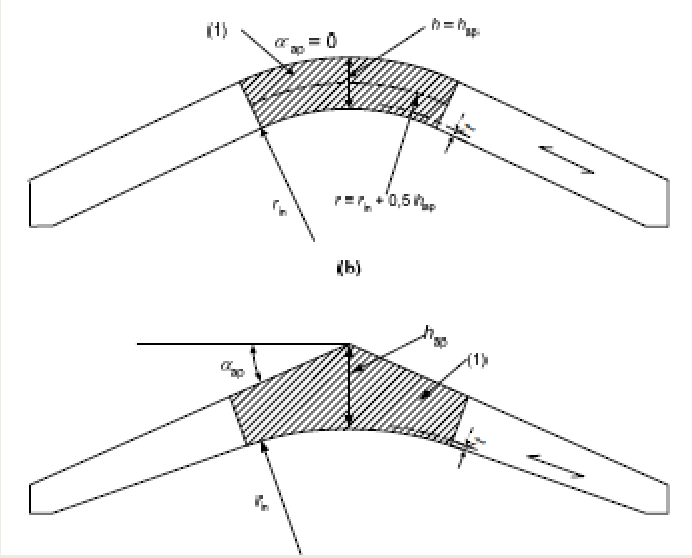
$M_{ap,d}$ is the design moment at apex resulting in tensile stresses parallel to the inner curved edge;

with:

$$k_p = k_5 + k_6 \left(\frac{h_{ap}}{r}\right) + k_7 \left(\frac{h_{ap}}{r}\right)^2 \tag{6.56}$$

HRN NA

Sustained expression of the recommended 6:54 from item 6.4.3 (8) of EN 1995-1-1 for the determination of the maximum tensile stress perpendicular to the fibers in a double trapezoid, curved and saddle girders.



7.2.(2) (tablica 7.2) Limiting values of deflections

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NOTE: The recommended range of limiting values of deflections for beams with span is given in Table 7.2 depending upon the level of deformation deemed to be acceptable. Information on National choice

May be found in the National annex. For cantilevered beams, the values may be doubled.

HRN NA

Limit value of the horizontal displacement, $HT_{net, fin}$, which is accepted, according to Figure 7.1 of the standard EN 1995-1-1 does not exceed H / 300. Limit the value of H / 300 can lower when it requires manufacturers specifications for covering. The symbol H is given in Figure A1.1 of EN in 1990.

Table 7.2 – Examples of limiting values for deflections of beams on two supports

w_{inst}	$w_{net,fin}$	w_{fin}
$\ell/300$ to $\ell/500$	$\ell/250$ to $\ell/350$	$\ell/150$ to $\ell/300$

7.2.(2) (table 7.2) Limiting values for deflections of beams, HRN NA

Structure	w_{inst}	$w_{net,fin}$	w_{fin}
Main girders	l/350 [1)]	l/300	l/200
Purlines and secondary girdes	-	l/200	l/150 [2)]
Girders with special geometry shape and/or purpose in structure	l/300 – l/500	l/250 – l/350	l/150 – l/300

1) For ceiling girders it should adopt a threshold value w_{inst} = l / 400 system.
2) Based on the structural elements with precamber axis and with a curved or angled relative to the suports bond line, in other cases, the limit value should be adopted wfin = l / to 200.

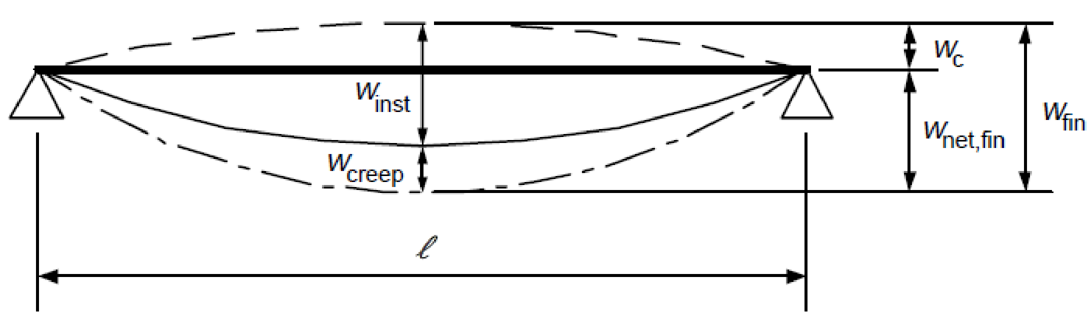


Figure 7.1 – Components of deflection

7.3.3(2) Vibration – limiting values for vibration of the residential floor/ceilings

Recommended range limit values for a and b, and their relationship, shown in the diagram in Figure 7.2 in Section 7.3.3 (2) of EN 1995-1-1 are sustained. Accepted recommended values a and b are related to the requirements of paragraph 7.3.3 (2) of EN 1995-1-1 that apply to the ceilings of residential buildings in which the fundamental frequency greater than 8 Hz (f1> 8 Hz).

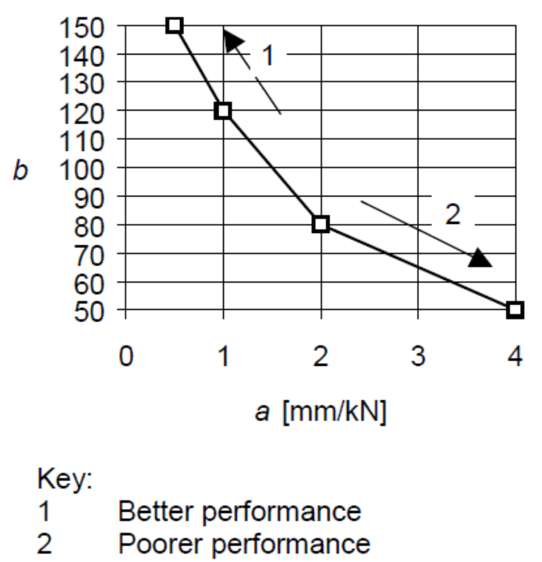


Figure 7.2 — Recommended range of and relationship between *a* and *b*

8.3.1.2(4) Nailed timber-to-timber connections

Recommendations set out in point 8.3.1.2 (4) of EN 1995-1-1 and the rule is given in Section 8.3.1.2 (3) of EN 1995-1-1:

(3) Smooth nails in end grain should not be considered capable of transmitting lateral forces are accepted.

The rule excludes the application of laterally loaded smooth nails when transferring loads in frontal sections.

Note: Examples of species sensitive to splitting are fir (abies alba), Douglas fir (pseudotsuga menziesii) and spruce (picea abies). It is recommended to apply 8.3.1.2(7) for species fir (abies alba) and Douglas fir (pseudotsuga menziesii). The National choice may be specified in the National annex.

8.3.1.2(7) Timber species especially sensitive to splitting

- Recommended equation 8.19 was accepted in HRN NA from part 8.3.1.2(7) of the norme EN 1995-1-1.
- (7) Timber of species especially sensitive to splitting should be pre-drilled when the thickness of the timber members is smaller than

$$t = \max \begin{cases} 14d \\ (13d - 30)\dfrac{\rho_k}{200} \end{cases}$$

9.2.4.1(7) Analysis of wall diaphragms

- Simplified method for calculation of wall diaphragms recommended in Section 9.2.4.1 (7) of EN 1995-1-1 is accepted.

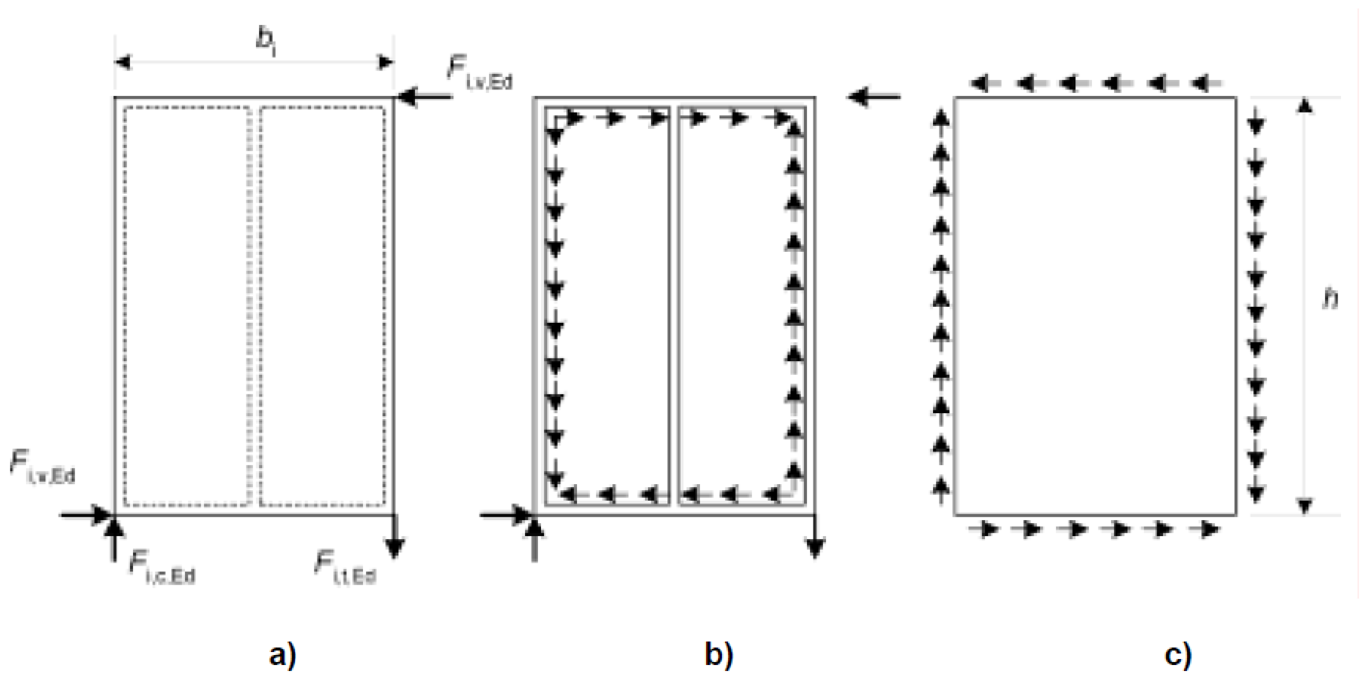
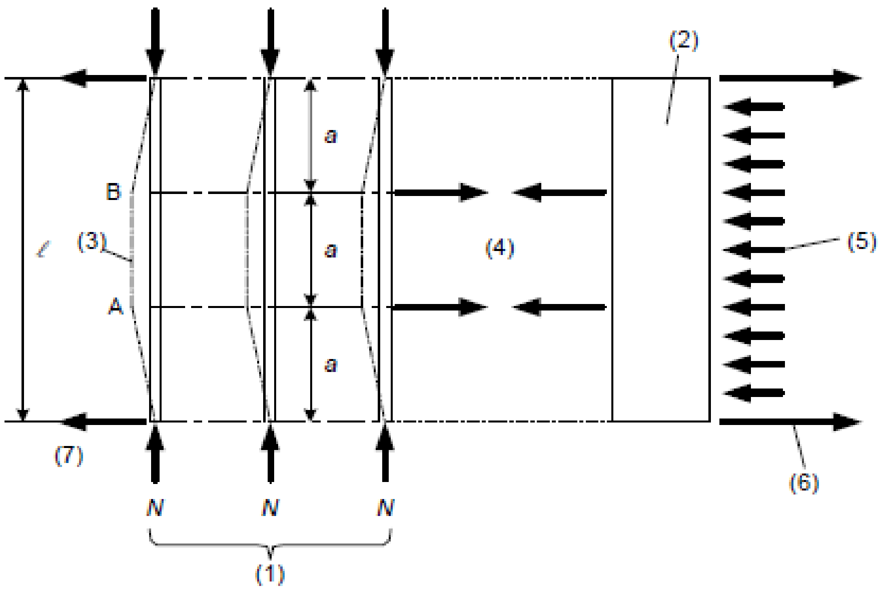


Figure 9.5 – Forces acting on:
a) wall panel;
b) framing;
c) sheet

9.2.5.3. Bracing of beam and truss system



Key:
(1) *n* members of truss system
(2) Bracing
(3) Deflection of truss system due to imperfections and second order effects
(4) Stabilizing forces
(5) External load on bracing
(6) Reaction forces of bracing due to external loads
(7) Reaction forces of truss system due to stabilizing forces

Figure 9.10 – Beam or truss system requiring lateral supports

(1) For a series of *n* parallel members which require lateral supports at intermediate nodes A,B, etc. (see Figure 9.10) a bracing system should be provided, which, in addition to the effects of external horizontal load (e.g. wind), should be capable of resisting an internal stability load per unit length *q*.

$$q_d = k_\ell \frac{n N_d}{k_{f,3} \ell}$$

Table 9.2 – Recommended values of modification factors

Modification factor	Range
k_s	4 to 1
$k_{f,1}$	50 to 80
$k_{f,2}$	80 to 100
$k_{f,3}$	30 to 80

10.9.2(3) Erection - special rules for trusses with punched metal plate fasteners: max. bowing

The maximum allowed bowing of the axis of any element of the grid after the execution of the entire roof structure is $a_{bow, perm} = 15$ mm. This restriction is valid provided that the elements in the grid entirely erected roof structure adequately insured, and increasing of the distortion of element's axes are prevented.

ORIGINAL: Note: The recommended range of $a_{bow,perm}$ is 10 to 50 mm. The National choice may be given in the National annex.

The maximum allowed distortion projected in ground plan across the entire length of the truss chord after the erection of the entire roof structure is $a_{bow, perm} = \min (L / 300; 50 \text{ mm})$, where L is the length of the chord.

10.9.2(3) Erection - special rules for trusses with punched metal plate fasteners : max. deviation

The maximum deviation a_{dev} of a truss from true vertical alignment after erection should be

$a_{dev,perm}$ = min(10 mm + H /200; 25 mm).

The permitted value of the maximum deviation from true vertical alignment should be taken as $a_{dev,perm}$.

ORIGINAL: Note: The recommended range of *a*dev,perm is 10 to 50 mm. The National choice may be given in the National annex.

Nationally determined parameters HRN EN 1995-1-2 : NA

2.1 Item 2.1.3. (2) The biggest increase in temperature of the dividing function in parametric fire exposure. Recommended values from section 2.1.2 (2) of EN 1995-1-2 are sustained .

2.2 Item 2.3 (1) P The partial factor for material properties in a fire Sustained recommended value of point 2.3 (1) C of EN 1995-1-2 γM, fi = 1.0.

2.3 Item 2.3 (2) P The partial factor for material properties in a fire Sustained recommended value of point 2.3 (1) C of EN 1995-1-2 γM, fi = 1.0.

2.4 Section 2.4.2 (3) reduction factors for the combination of action Reduction factor for the combination of action, γfi, calculated according to the formula (2.9) of EN 1995-1-2, but is not allowed less than 0.4.

HRN EN 1995 - 2 : NA

1. Wood and wood-based materials	
- Regular checks	
- monolite structural wood	$\gamma_M = 1,3$
- glued laminated timber	$\gamma g_M = 1,3$
- Laminated veneer wood (LFD), cross-layered plywood panels (KUFP)	$\gamma_M = 1,3$
- Fatigue check	$\gamma_{M,fat} = 1,0$
2. Joints	
- Regular checks	$\gamma_M = 1,3$
- Fatigue checks	$\gamma_{M,fat} = 1,0$
3. Steel in composite elements	$\gamma_{M,s} = 1,15$
4. Concrete in composite concrete-wood structures	$\gamma_{M,c} = 1,5$
5. Dowels (modified) the coupling of wood and concrete in composite elements	
- Regular checks	$\gamma_{M,v} = 1,3$
- Fatigue checks	$\gamma_{M,v,fat} = 1,0$
6. Steel elements for prestressing	$\gamma_{M,s} = 1,15$

HRN EN 1995 - 2 : NA

Table 7.1 (HR) - Limits deflection of beams, plates and trusses

Action	Limits deflection
Characteristic traffic load	l / 400
Pedestrian load and small traffic load	l / 300

HRN EN 1995 – National Annex
HRN (hr) (en) Comments on NA
HRN EN 1995

HRN EN 1995-1-1:2013 HRN EN 1995-1-1:2013/NA:2013
nkHRN EN 1995-1-1:2013/A2
(EN 1995-1-1:2004/A2:2014)
DOP 2015-05-31
HRN EN 1995-1-2:2013 HRN EN 1995-1-2:2013/NA:2013
HRN EN 1995-2:2013 HRN EN 1995-2:2013/NA:2013

Red/not done yet
ENQ+FV (*Enquiry + Formal Vote*
UAP (*Unique Acceptance Procedure)*
DOP (*Date of Publication)*

Provisional Schedule for Establishing Project Team (dependent upon FPA)