



Calculation report: Pioneering home WikiHouseNL in Almere: calculation main load-bearing structure

Report code: 16.0462-3

Date: 24 July 2017

Report code: 16.0462-3

Date: 24 July 2017

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Keywords: Portal frame, not fully connected bar sections, Finnish spruce plywood

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1 Introduction

'Het Woningbouw atelier' based in Almere has indicated to perform the structural calculations for the newly to be built WikiHouseNL pioneering home in Almere. The building project is part of the 'BouwEXPO Tiny Housing' building plan in Almere Poort.

The structural calculations have been performed in accordance with the Eurocodes. The structural overviews are included in section 5. The structural calculations are included in the annexes.

2 Structural design

2.1 Introduction

WikiHouse is a construction concept developed in the United Kingdom in London. The construction method was based on the following five principles when it was being developed:

1. Affordability
2. Ecological
3. Knowledge sharing
4. Choice freedom
5. Self-build

From a practical perspective, the building method consists of wooden plywood that is milled to size using a CNC router after which they are put together on site through self-build. This principle also has challenges in addition to restrictions. With regard to the construction: the plywood has dimensions of at most 1,220 x 2,440 mm while the structure has dimensions that are several times larger. By connecting the plywood to each other in a specific manner, a composite structure is created with which the requirement moments can be transferred. A completely new procedure has been started because the structural calculations of already implemented projects abroad are not being released: from developing the connections up to and including the calculation method. The construction and calculation methods are explained in the following sections. An overview of the architectural design is included in Figure 1 on the next page.



Figure 1a – 3D overview of the WikiHouse pioneering home.

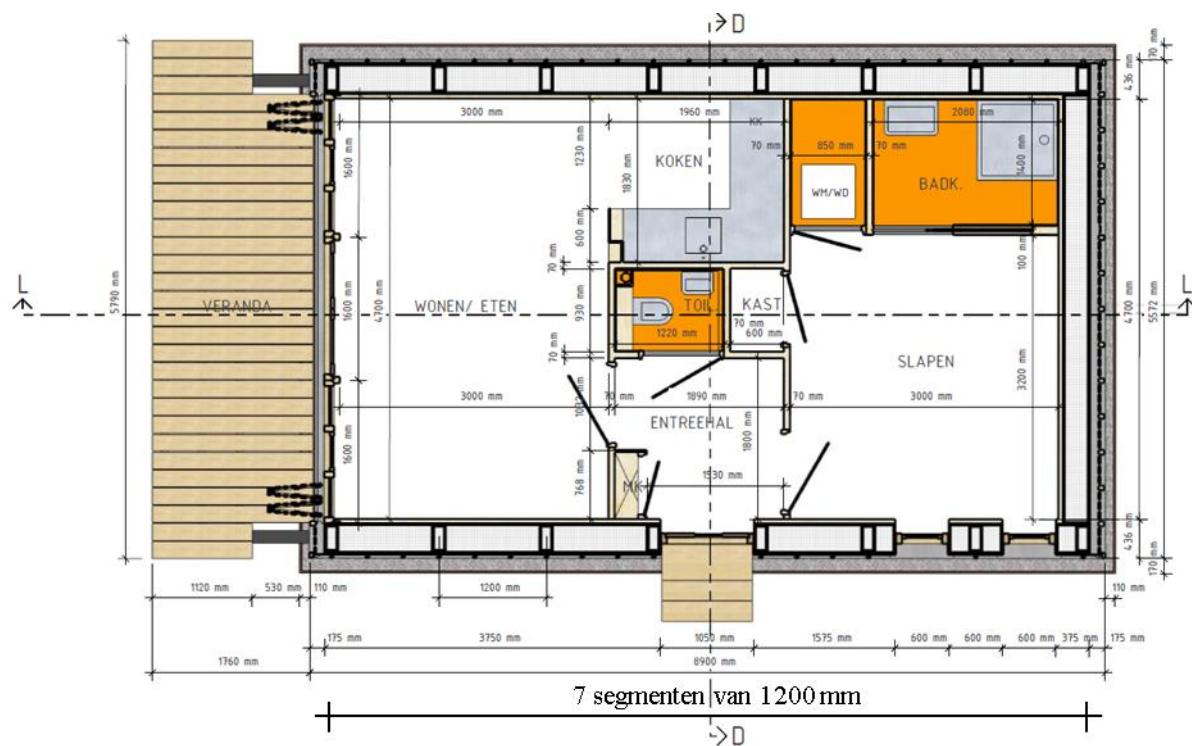


Figure 1b – WikiHouse pioneering home floor plan.

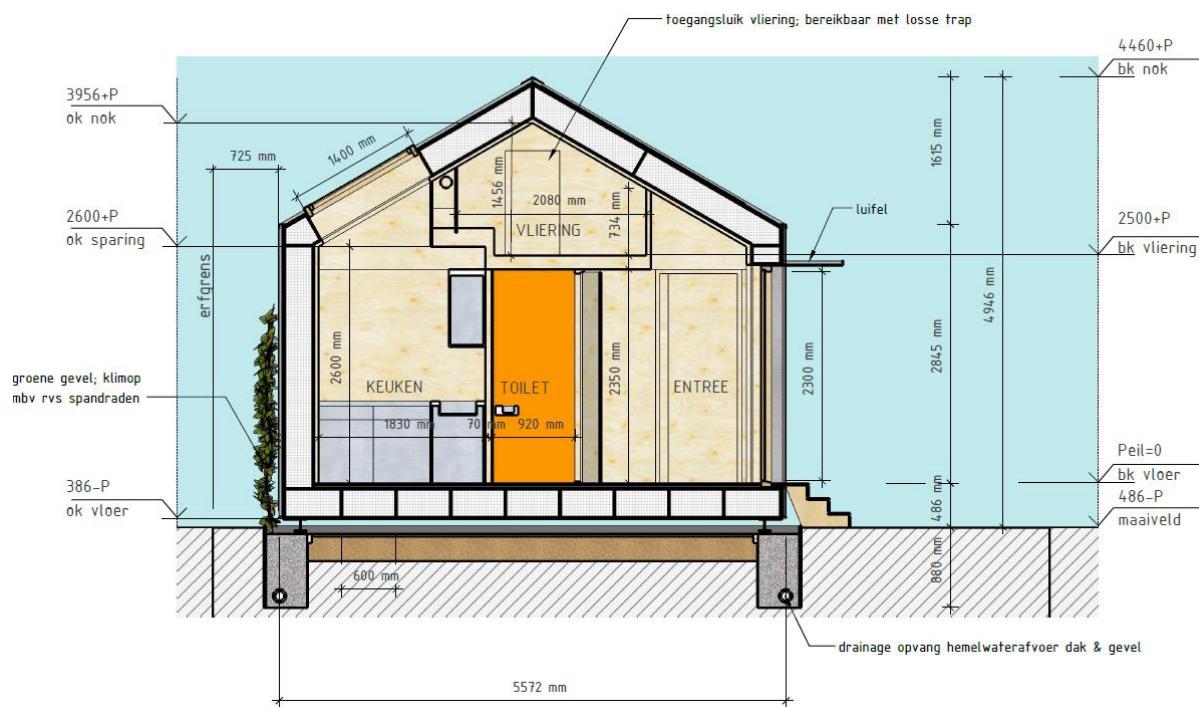


Figure 1c – WikiHouse pioneering home cross-section.

2.2 Assembly of the structure.

In principle, the preference has been expressed to design a self-load-bearing freestanding structure in which indoor walls are not used for stability purposes. It concerns a pioneering home and this principle, naturally, benefits the development of new projects. The structure is assembled as what is commonly referred to as a 'box-frame construction' that consists of a bottom flange, two webs and a top flange as shown in figure 2. The moment and shear force can be transferred by having the gaps of the different parts alternate.

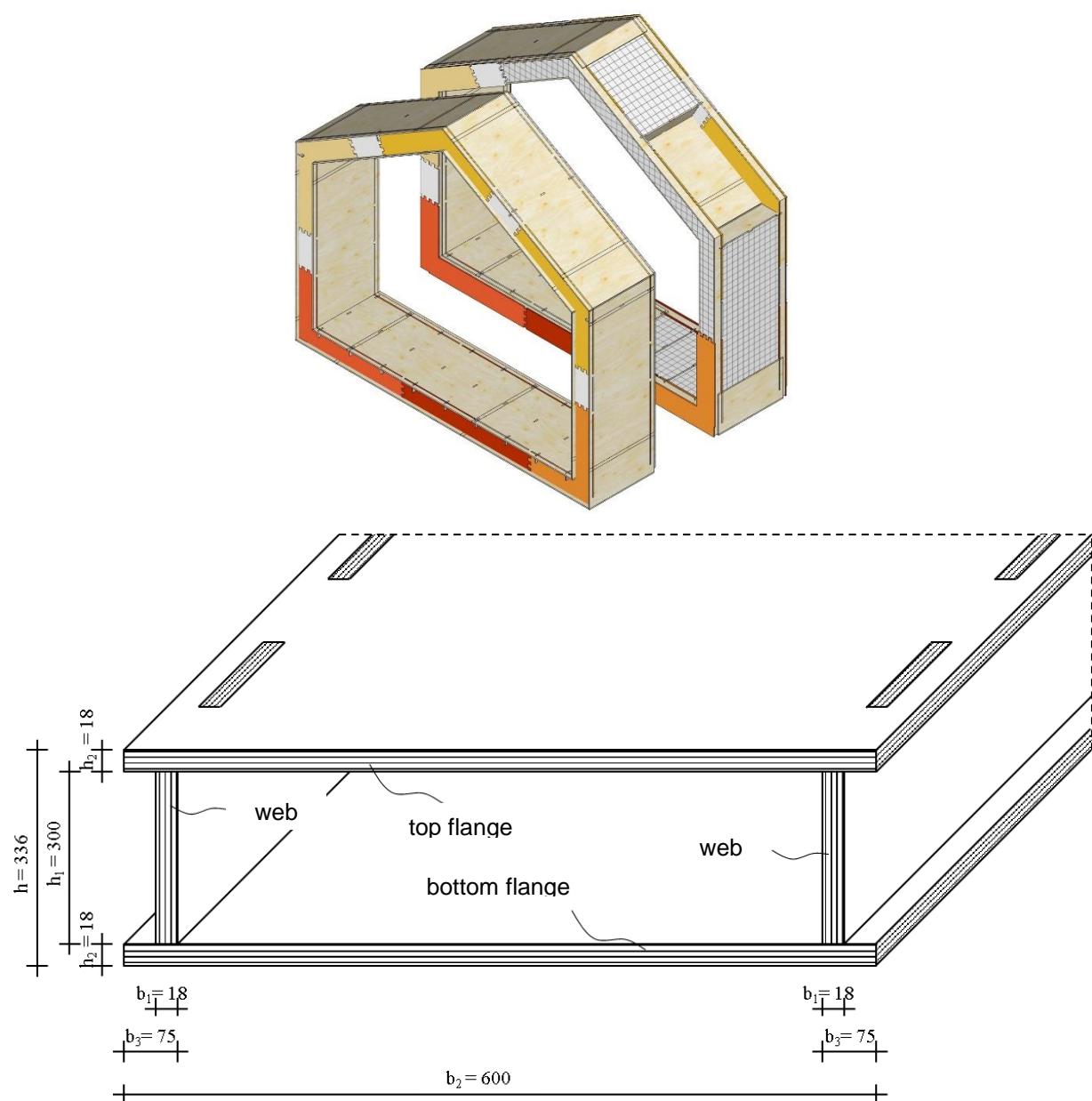


Figure 2 – Structure of the construction (below) and 3D overview (top).

The bottom panel and top panel slides into the web through pegs. The moment can be transferred from 'the web' to the 'top and bottom panel' through upset forces on the contact areas. Both, after all,

are interrupted regularly by the gaps. The web must be able to absorb the moment where the gaps are in the bottom and top panels. The bottom and top panels must be able to absorb the moment where the gaps are in the web. The structure consists of the following parts:

- Continuous ongoing full strength moment connection portal frame with a grid width of 1200 mm. In total, 7 portals are positioned one after the other.
- The top and bottom panels of the structure are connected using dovetail joints to increase stiffness. As a result of this, the corners deviate since no dovetail joints are installed here. For this, it has been computationally determined that the connection of the floor with the wall must be strengthened with additional webs. See the further elaboration included in section 5.1.

The top panels are connected using dovetail joints to increase rigidity. The webs are connected to each other through a comb joint for transferring the shear force. An opening with a diameter of Ø80 mm has also been included for the pass-through for pipes and cables in addition to this joint. Images are included in figure 3 of the described joints.

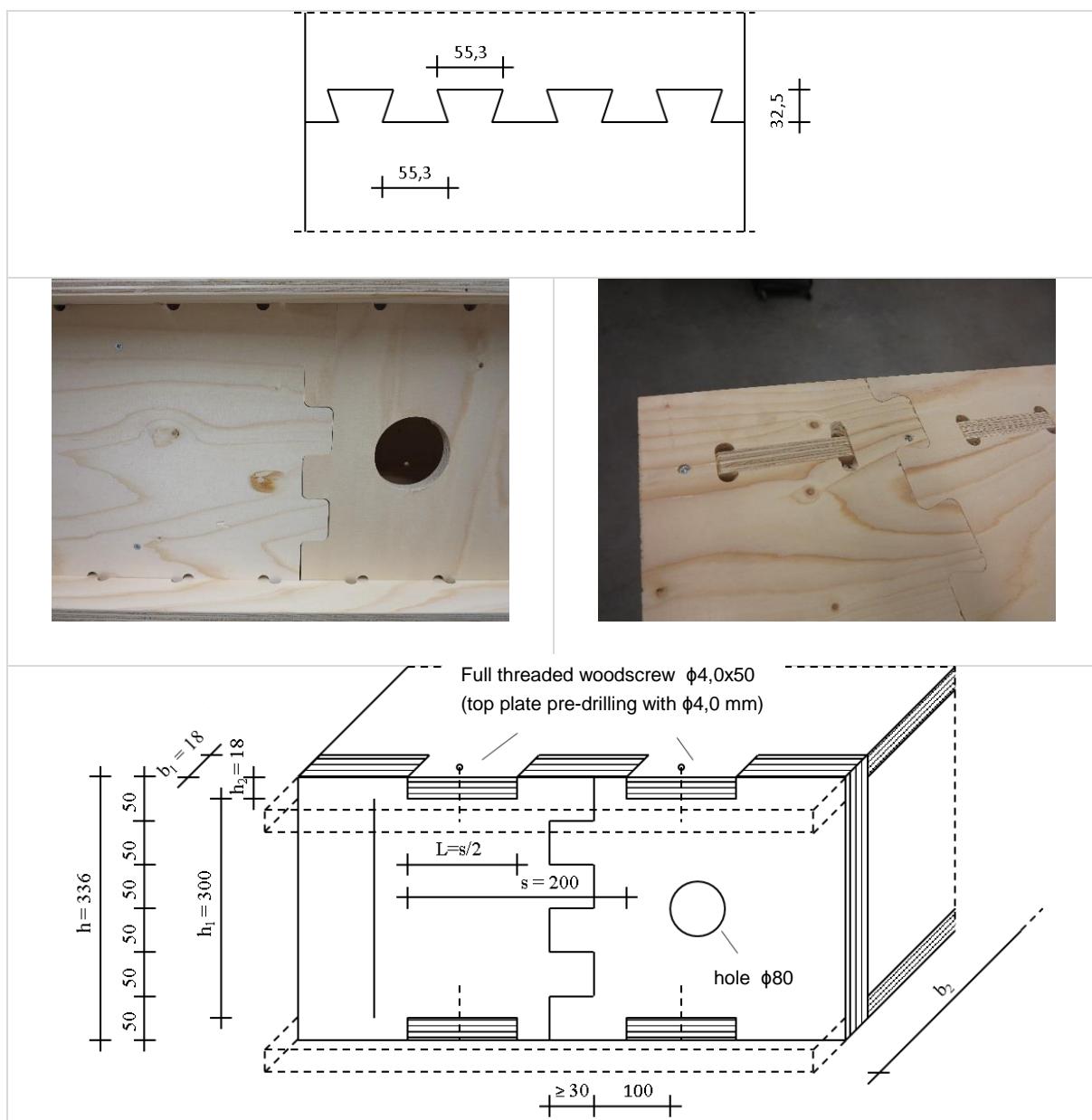


Figure 3 – Details of the joints: cover plates (left) and webs (right).

By connecting the different parts in accordance with figures 2 and 3 with each other, an assembled 'box-frame construction' is created that can transfer the moment and shear force. Subsequently, a continuous portal frame has, thus, been designed in the shape of the cross-section of the building. The wall, sloping roof and floor are built up in an identical manner in accordance with the same construction principle. This ensures that a continuous full strength moment connection portal frame is created. In contrast to, for example, a three-hinge frame, the moments are distributed over all the nodes and, therefore, the maximum moment in the total cross-section is as low as possible. This ensures that the design possibilities are the most possible. The design of the structure is based on ensuring that moments and shear forces can be transferred over the total length. An idealization of the structure is shown in figure 4.

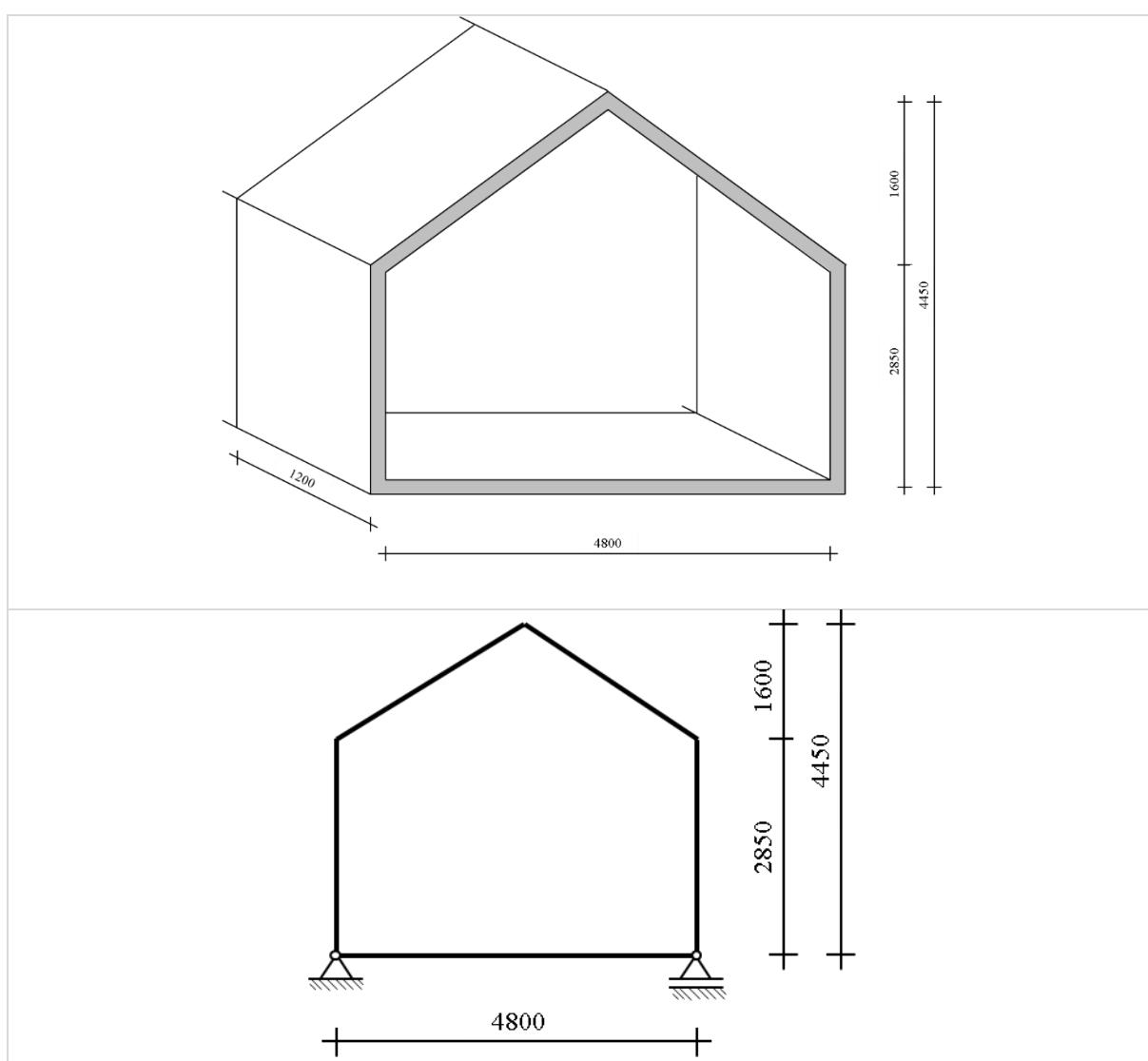


Figure 4 – Pioneering home cross-section (top) with idealization of the structure with a portal frame construction with full strength moment connections (bottom).

Laboratory tests have been performed to determine the cross-section properties of the assembled structure; see section 3. The structural overviews are included in section 4. The related structural calculations are included in annexes 4 and 5.

3 Laboratory tests

NEN-EN 1990, annex D, allows the structural design to be based on tests. The following properties have therefore been determined by using laboratory tests.

- Characteristic bending moment (M_k);
- Characteristic shear force (V_k);
- Characteristic bending stiffness (EI_{mean}).

The test method and the results that ensue from this are described in the following sections. The pioneering home has been designed on a grid width of 1200 mm (panel width). All tests have been performed on test pieces with a width of 600 mm due to the width of the test bench.

3.1 Moment & bending stiffness

Four-point bending tests have been performed analogue to EN 408. The dimensions of the test set-up are given in figure 5 (series M1, number of test pieces: 11) and 6 (series M2, number of test pieces: 11). An image of the performance of the tests is included in figure 7.

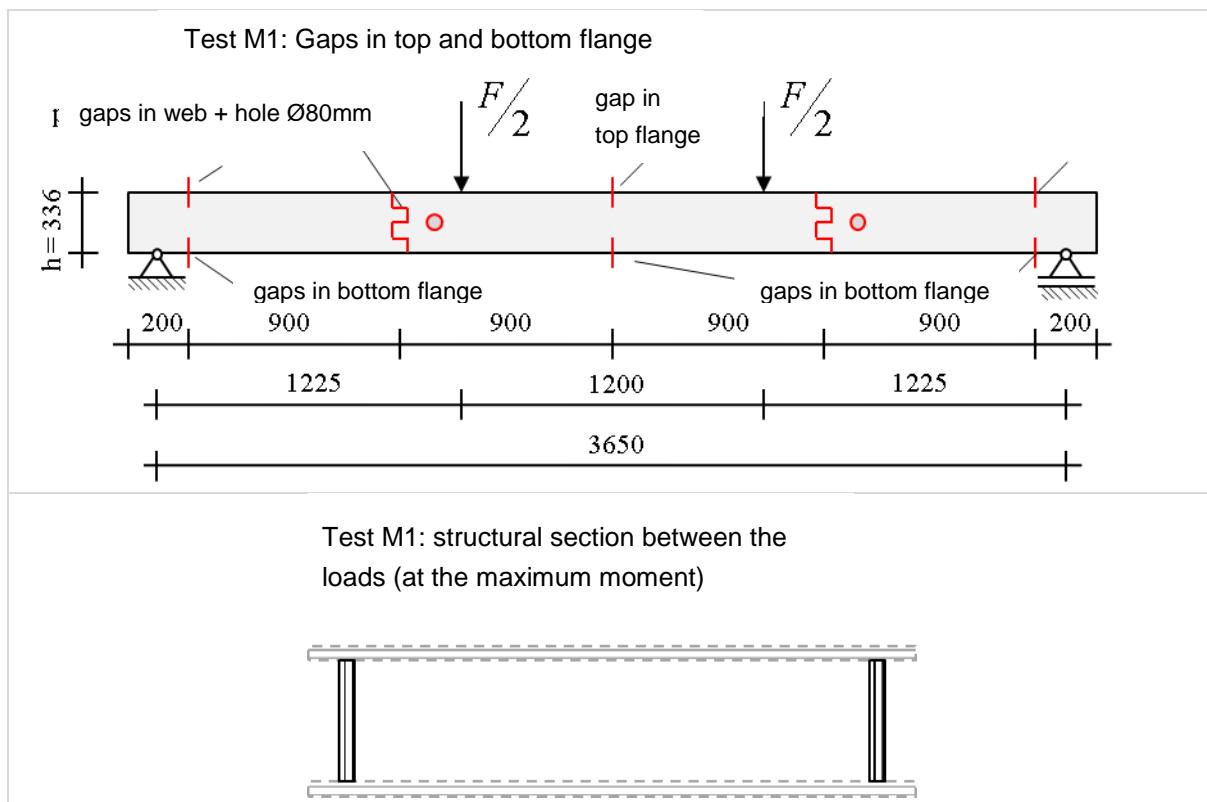


Figure 5 – Dimensions of the four-point bending tests on bending, series M1 (top and bottom flange interrupted).

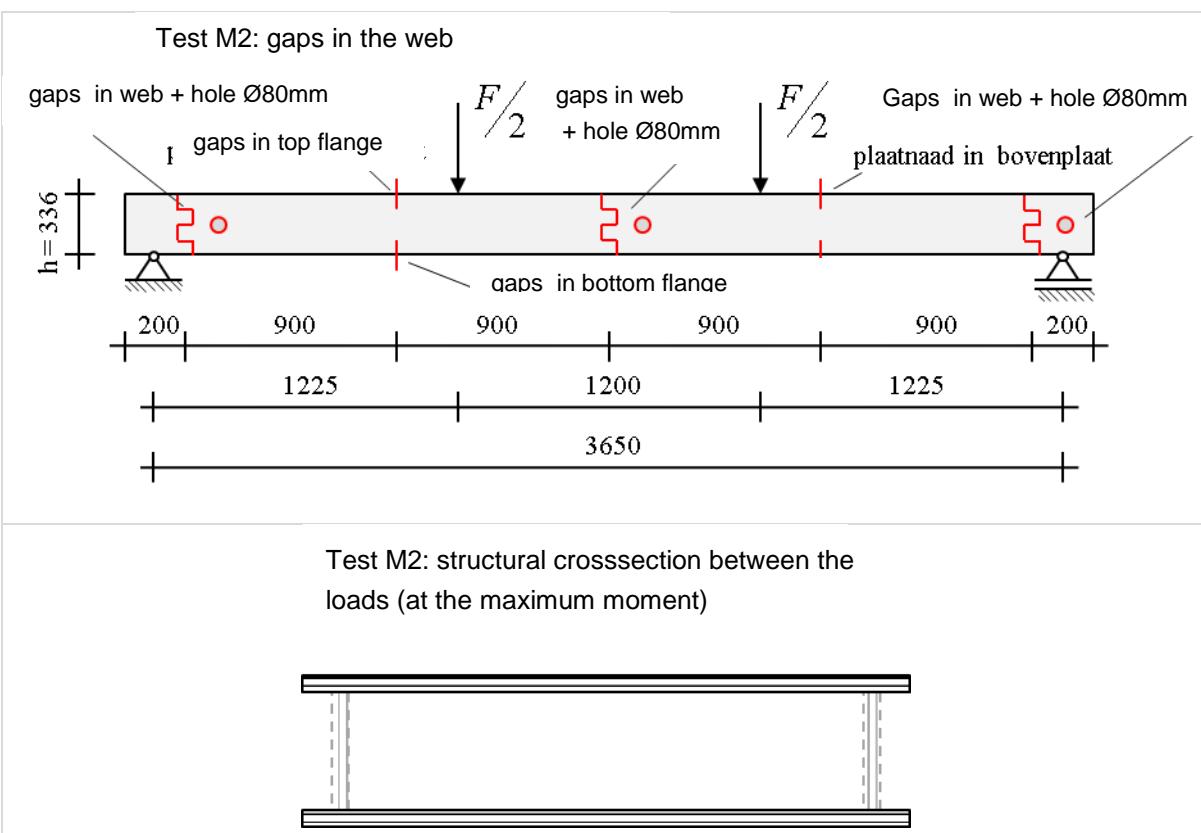


Figure 6 – Dimensions of the four-point bending tests on bending, series M2 (webs interrupted).

A test series has been performed where the bottom and top flanges are interrupted at the location of the maximum moment (series M1) and a test series has been performed where the two webs are interrupted (series M2). The maximum moment per test piece has been determined using the maximum force. The bending stiffness per test piece has been determined by using the measured displacement in the centre of the cross section. The characteristic properties of the cross-section have been determined by using the statistical processing in accordance with EN 1990, annex D, as included in annex 3. They are briefly shown here:

- Characteristic bending moment (M_k) = 19.3 kNm
- Characteristic (average) bending stiffness (EI_{mean}) = $1.20996 \cdot 10^{12} \text{ N/mm}^2 \times \text{mm}^4$

The determined properties are based on test pieces with a width of 600 mm and based on the total test piece quantity of 22.



Figure 7 – Execution of the four-point bending tests on bending.

3.2 Shear force

Four-point bending tests have been performed analogue to EN 408. In contrast to the bending tests for determining the moment, a shorter span has been used. This results in collapse based on shear force. The dimensions of the test set-up are given in figure 8 (series D1, number of test pieces: 10). An image of the performance of the tests is included in figure 8.

Test D1: gaps in the webs between the loads and the supports

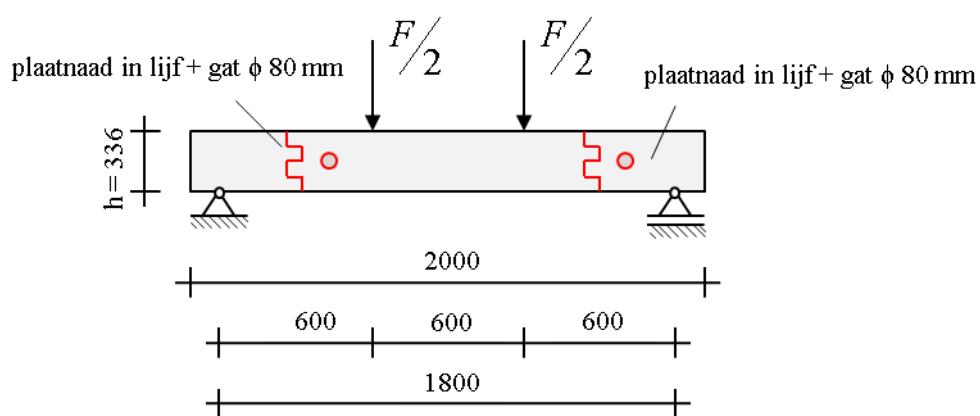


Figure 8 – Dimensions of the four-point bending tests on shear force, series D1.

The maximum shear force per test piece has been determined using the maximum force. The characteristic properties of the cross-section have been determined by using the statistical processing in accordance with EN 1990, annex D, as included in annex 3. They are briefly shown here:

- Characteristic shear force (V_k) = 24.0 kN.

The determined properties are based on test pieces with a width of 600 mm and based on a test piece quantity of 10.



Figure 9 – Execution of the four-point bending tests on shear force.

4 Structural calculations

The structural calculation is further explained in this section. The calculation of the main load-bearing structure is included in annex 4. The calculations of the details are included in annex 5.

4.1 Main load-bearing structure

As indicated before, the floor, wall and roof structure are being implemented as a 'box-frame construction' that consists of 2 webs and top and bottom panels with a 1200 mm grid width. The top and bottom panels have been inserted in the webs through milling-holes, which creates a dimensional stable structure. On the upset areas between the panels, a force can be transferred through pressure, which creates a structure with partly connected built up elements. The stiffness and strength of such a structure can be calculated in accordance with the theory set out by W. Schelling in 1968. The stiffness of the individual parts forms a lower limit and full interaction where all parts are regarded as fully glued forms the upper limit for the stiffness. The interaction between the different parts has been calculated through the theory of W. Schelling by using the stiffness of the assembled cross-section measured by the four-point bending tests. The above assumed a short-lasting load (average testing period of 300 seconds +/- 120 seconds) in combination with the material properties for a short-lasting load. The properties of timber-like structural parts change depending on the load duration due to the nature of the load.

That is why the stiffness has been calculated for four different situations in Technosoft with the following load cases:

1. Continued load;
2. Medium-term load;
3. Short-term load;
4. Limit state design.

Situations 1 to 4 have been calculated separately after which different combinations were made for the performance of the checks:

- Combinations between 1 to 3: for the displacements;
- Combination 4: for checking the strength properties (moment and shear force).

In annex 3, the different properties of the WikiHouse structure cross-section have been determined using laboratory tests. Next, the loads that have an effect on the structure have been determined in annex 4 by using Technosoft. All cross-section checks and detail calculations have been carried out in annex 5. The structure and related basic principles are further explained in the sections that follow.

4.2 Basic principles

Construction site:	Almere
Building height:	7 metres
Wind zone:	Wind area II, undeveloped
Wind dynamic pressure:	$q_{p(z)} = 0.75 \text{ kN/m}^2$
Consequence Class	CC1 (single-family house)

4.3 Weight calculation and changing loads

Roof structure	PV panels	0.15 kN/m ²
	Corrugated sheets	0.10 kN/m ²
	18 mm top panel plywood	0.09 kN/m ²
	18 mm bottom panel plywood	0.09 kN/m ²
	18 mm plywood horizontal girders 1200 mm	0.05 kN/m ²
	12 mm plaster finish	0.14 kN/m ²
	Insulation, battens, etc.	<u>+ 0.03 kN/m²</u>
	$G_{k,roof} =$	0.65 kN/m ²
	$\Psi_2 = 0.0$ (NEN-EN 1990/NB table NB.2)	
	Wind + snow load in accordance with EN 1991 using the Technosoft load generator	
	$Q_{k,roof} =$	1.50 kN at 100 mm x 100 mm
	$\Psi_2 = 0.0$ (NEN-EN 1990/NB table NB.2)	
Wall structure	tongued and grooved with underjoint	0.10 kN/m ²
	18 mm top plywood	0.09 kN/m ²
	18 mm bottom plywood	0.09 kN/m ²
	18 mm plywood horizontal girders 1200 mm	0.05 kN/m ²
	12 mm plaster finish	0.14 kN/m ²
	Insulation, battens, etc.	<u>+ 0.03 kN/m²</u>
	$G_{k,wall} =$	0.50 kN/m ²
	$\Psi_2 = 0.0$ (NEN-EN 1990/NB table NB.2)	
	Wind load in accordance with EN 1991 by using the Technosoft load generator	

Floor on the ground floor	light floating floor	0.26 kN/m ²
18 mm top panel plywood		0.09 kN/m ²
18 mm bottom panel plywood		0.09 kN/m ²
18 mm plywood horizontal girders 1200 mm		0.05 kN/m ²
Floor finish		0.10 kN/m ²
Insulation, battens, etc.	+ 0.02 kN/m ²	
G _{k,floor} on ground floor =		0.61 kN/m ²
People		1.75 kN/m ²
Light dividing walls	+ 0.50 kN/m ²	
G _{k,floor} on ground floor =		2.25 kN/m ²
Q _{k,floor} on ground floor =		3.00 kN at 100 mm x 100 mm
ψ ₂ = 0.3 (NEN-EN 1990/NB table NB.2)		

Load per running metre (load width = 1800 mm)

The tests were carried out on a test piece width of 600 mm. In reality, the structure will be implemented with a width of 1200 mm. In theory, openings can be made in the elements with a maximum width of 600 mm as is the case, for example, with the windows in the bedroom. The structure, however, is being fully interrupted where the front door will be added. In this case, the adjacent members must ensure that the required strength is present. This is why a load width of 1800 mm is used based on a structure width of 1200 mm in the structural calculations. In practice, this means that a full structure must be available on both sides next to an incomplete cross-section, for example, where the front door will be added.

$$G_{k,roof} = 0.65 \text{ kN/m}^2 \times 1.8 = 1.17 \text{ kN/m}^1$$

$$G_{k,wall} = 0.50 \text{ kN/m}^2 \times 1.8 = 0.90 \text{ kN/m}^1$$

$$G_{k,floor} \text{ on ground floor} = 0.61 \text{ kN/m}^2 \times 1.8 = 1.10 \text{ kN/m}^1$$

$$q_{k,floor} \text{ on ground floor} = 2.25 \text{ kN/m}^2 \times 1.8 = 4.05 \text{ kN/m}^1$$

$$Q_{k,floor} \text{ on ground floor} = 3.00 \text{ kN at } 100 \text{ mm} \times 100 \text{ mm}$$

4.4 Schematisation of the structure

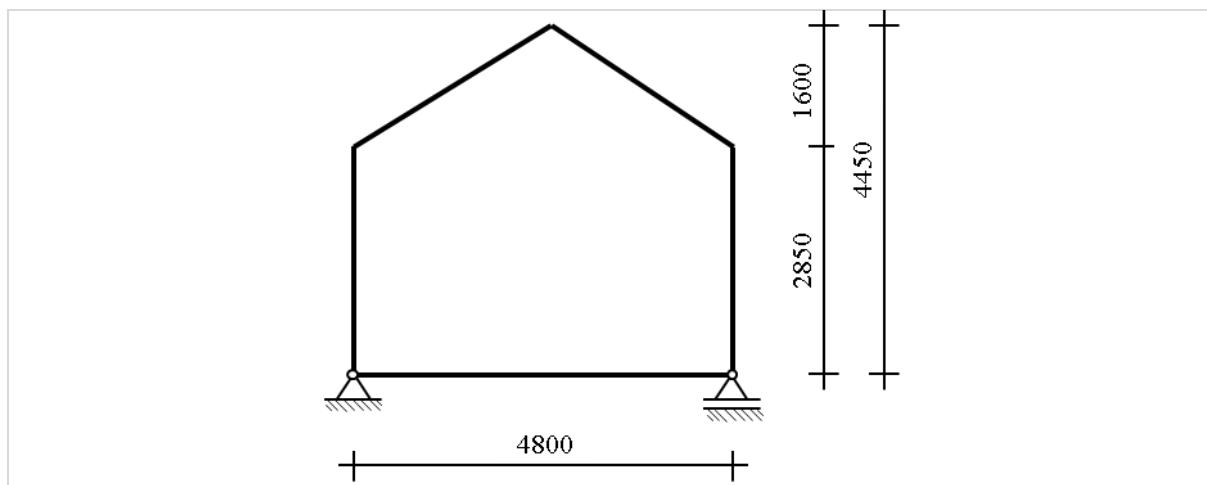


Figure 10 – Schematisation of the main cross-section up to the full strength moment connection portal frame.

The full structure is constructed from one and the same construction principle that results in a circular portal frame with full strength moment connection corners as shown in figure 10. The implementation of the structure is included in section 5 through construction overviews.

4.5 Panel properties

The properties of the used panels are shown in figure 11.

Table 3-6. Conifer plywood, thick veneers							Characteristic strength						Mean modulus of elasticity			
Type	Section properties						Bending		Compression		Tension		Bending	Tension and compression		
	Nominal thickness	Number of plies	t mean mm	A mm ² /mm	W mm ³ /mm	I mm ⁴ /mm	f _m II N/mm ²	f _m L N/mm ²	f _c II N/mm ²	f _c L N/mm ²	f _t II N/mm ²	f _t L N/mm ²	E _m II N/mm ²	E _m L N/mm ²	E _{t/c} II N/mm ²	E _{t/c} L N/mm ²
9/3-3.0	9	3	8.4	8.4	11.8	49.4	28.6	3.8	19.3	10.7	11.6	6.4	11453	547	7714	4286
9/3-3.2	9	3	9.0	9.0	13.5	60.8	28.7	3.8	19.3	10.7	11.6	6.4	11461	539	7733	4267
12/4-3.0	12	4	11.4	11.4	21.7	123	25.6	8.3	14.2	15.8	8.5	9.5	10250	1750	5684	6316
12/5-2.6	12	5	12.4	12.4	25.6	159	22.8	11.4	17.4	12.6	10.5	7.5	9124	2876	6968	5032
15/5-3.0	15	5	14.4	14.4	34.6	249	22.9	11.3	17.5	12.5	10.5	7.5	9179	2821	7000	5000
15/5-3.2	15	5	15.4	15.4	39.8	304	23.0	11.2	17.5	12.5	10.5	7.5	9201	2799	7013	4987
18/6-3.0	18	6	17.4	17.4	50.5	439	21.4	12.5	19.7	10.3	11.8	6.2	8556	3444	7862	4138
18/7-2.6	18	7	17.6	17.6	51.6	454	20.4	13.0	16.7	13.3	10.0	8.0	8170	3830	6682	5318
21/7-3.0	21	7	20.4	20.4	69.4	707	20.6	12.8	16.8	13.2	10.1	7.9	8222	3778	6706	5294
21/7-3.2	21	7	20.6	20.6	70.7	728	20.6	12.8	16.8	13.2	10.1	7.9	8243	3757	6716	5282
24/8-3.0	24	8	23.4	23.4	91.3	1068	20.4	12.5	22.3	7.7	13.4	4.6	8156	3844	8923	3077
24/9-2.6	24	9	22.8	22.8	86.6	988	19.1	13.6	16.3	13.7	9.8	8.2	7658	4342	6526	5474
27/9-3.0	27	9	26.4	26.4	116	1533	19.3	13.5	16.4	13.6	9.8	8.2	7703	4297	6545	5455
27/11-2.6	27	11	25.6	25.6	109	1398	14.8	16.7	14.8	15.2	8.9	9.1	5903	6097	5906	6094
30/10-3.0	30	10	29.4	29.4	144	2118	18.8	13.7	17.8	12.2	10.7	7.3	7512	4488	7102	4898
30/13-2.6	30	13	30.8	30.8	158	2435	14.7	16.4	14.8	15.2	8.9	9.1	5893	6107	5922	6078

Figure 11 – 18 mm Finnish spruce plywood, 7-layer, properties [Handbook of Finnish plywood].

The image in figure 12 shows that the panels are being applied in accordance with 'EN 636-2 S'. The '-2' designation means that the panels are suitable for use in climate class 2: humidity level mainly ≤ 18%, which is normally indicated as 'outdoor use under a roof'. The entire structure meets this

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qualification in view of the finish with roof and wall cladding and sufficient ventilation at the bottom side. A service life of at least 50 years is guaranteed with this. The 'S' designation that stands for Structural indicates that the panels are suitable for building of structures.



Figure 12 – 18 mm Finnish spruce plywood, 7-layer, properties.

5 Structure overviews

A minimum intermediate distance between the gaps in the external flanges and webs is created because of the panel distribution in the design. It is normative where the corner solution can be found and the minimum transfer length is 900 mm (panel width minus the construction height). This length has also been used when designing the test pieces for performing the laboratory tests. The panel distribution of the entire structure is shown in figure 13.

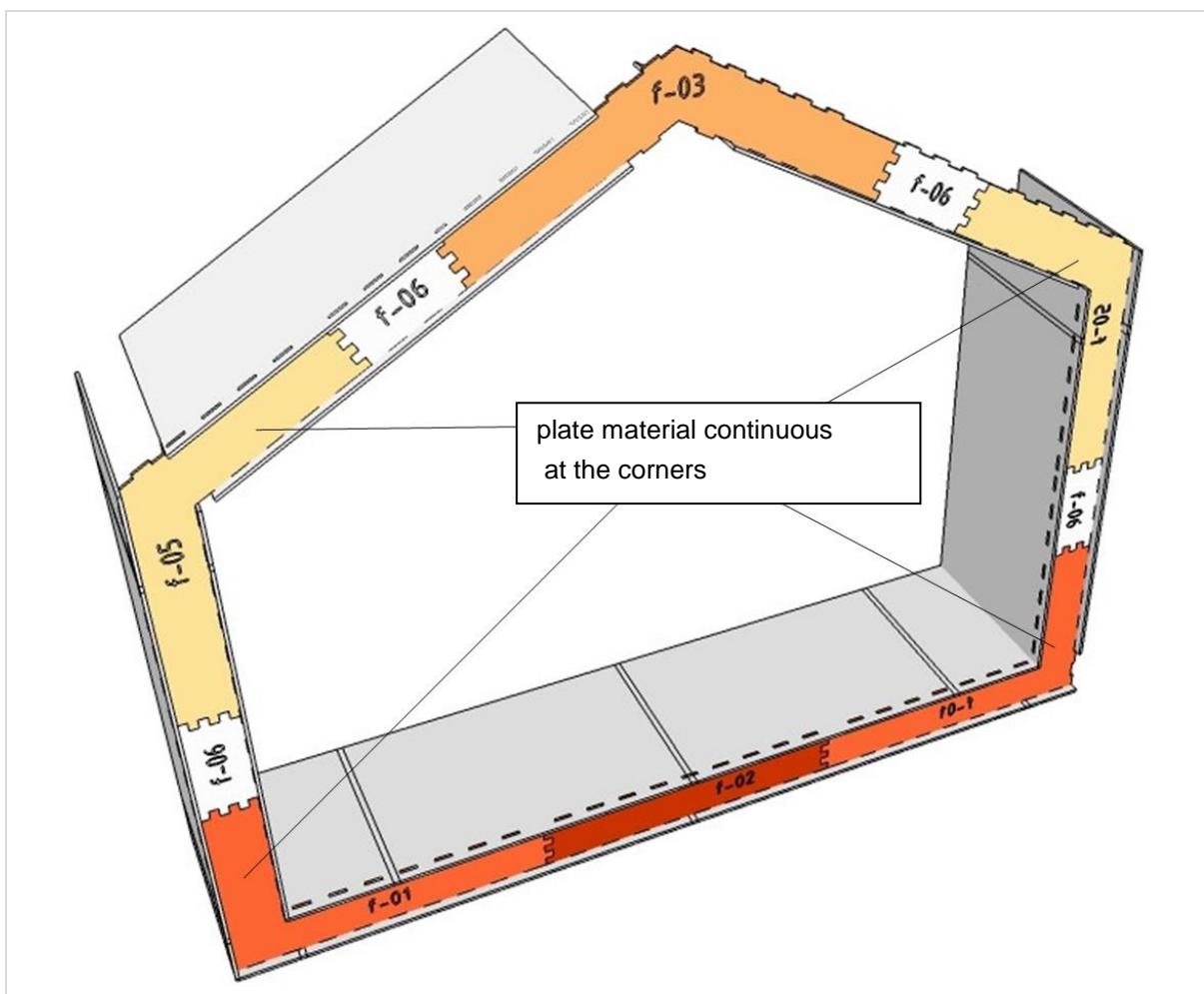


Figure 13 – Panel distribution of the portal frame with continuing webs where the corners can be found and a minimum transfer length of 900 mm.

5.1 Strengthening where the bottom corners can be found

The largest moment is exercised in the floor structure. The second largest moment is exercised in the corners. The bottom and top panels cannot be connected through dovetail joints where the corners are. This is why additional calculations were made that show that extra strengthening where the bottom corners can be found is required.

Standard: Every 1800 mm of grid width: **3 x web 18 x 300 mm**, Finnish spruce plywood, 7-layers.

In the bottom corners: Implement additional for every 1800 mm of the grid width: **3 x web 18 x 300 mm**, Finnish spruce plywood, 7-layers.

The three cross-sections are present as standard in the regular cross-section. 3 additional ones are being implemented. This results in 6 webs every 1800 mm.

The regular structural cross-section contains 3 cross-sections every 1800 mm as standard. The reinforcements are indicated in figure 14. The minimum transfer length is also 900 mm.

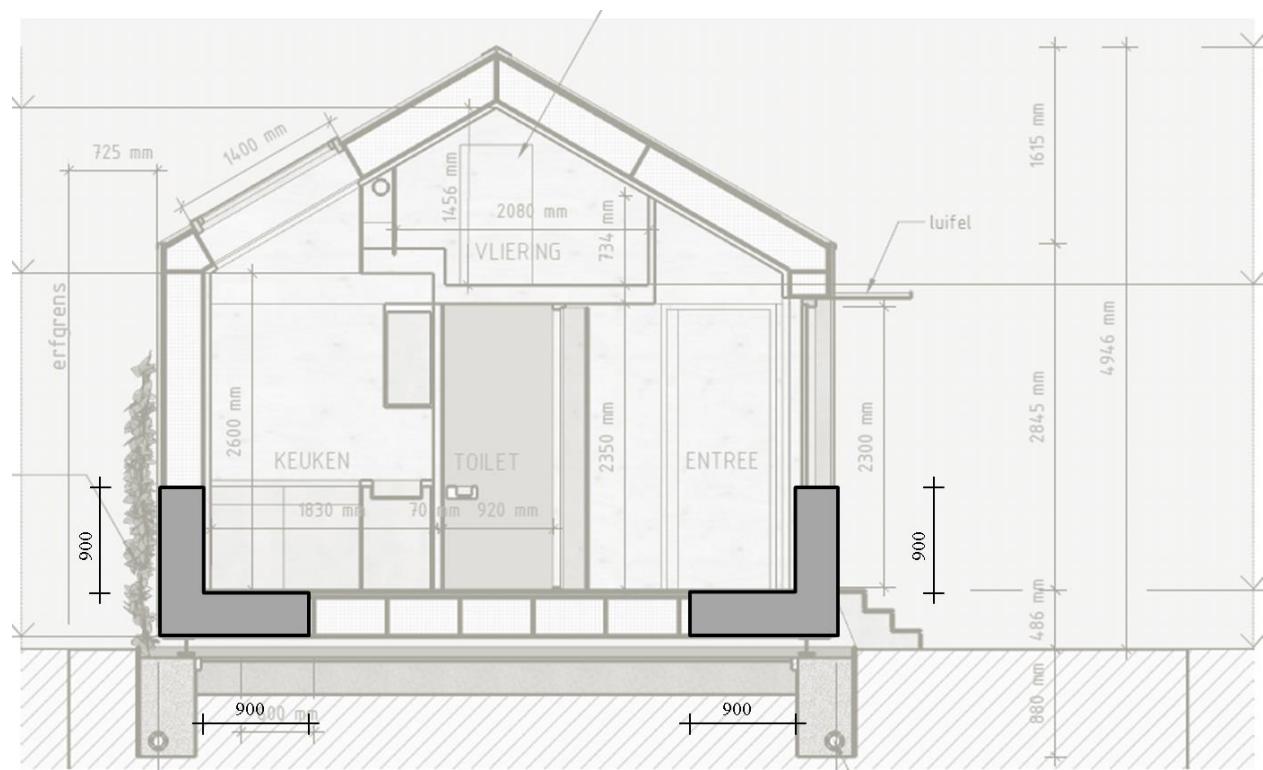
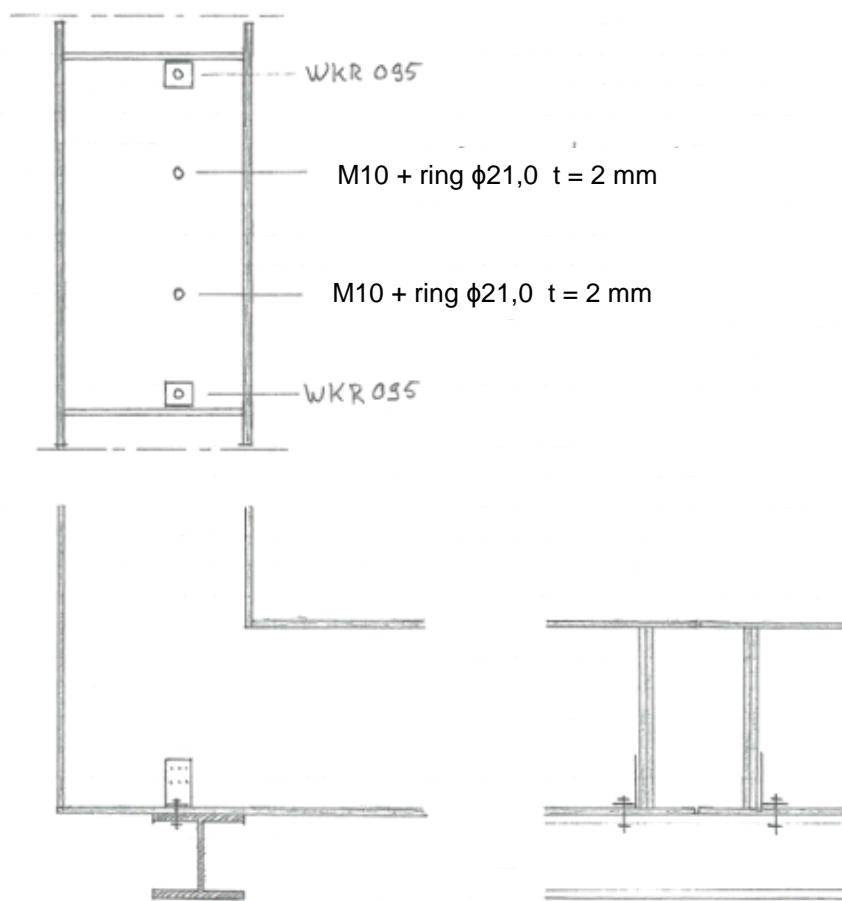


Figure 14 – Strengthening where the bottom corners can be found.

5.2 Description of the other structural parts

To prevent tilting as a result of the wind load, the webs are fixed on to the steel foundations in accordance with figure 15. See annex 6 for the documentation of the RotoBlaas WKR angle brackets.



each 1200 mm:

- 2 pieces WKR 095 + 5 nails $\phi 4,0 \times 60$,
Including 1 bolt M10 - 4.6 per anchor
- 2 bolts M10 - 4.6 + ring $\phi 21,0 \ t = 2 \text{ mm}$

Figure 15 – Fixing of the WikiHouse to the steel substructure.

To realise a span of 600 mm for the plywood panels on the floor, dividing walls will be installed. They will be fixed to the webs in accordance with figure 16.

Fixing the dividing walls of the floor construction

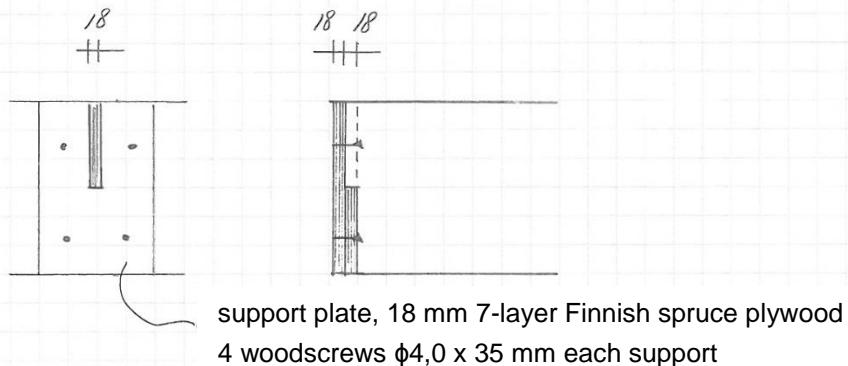


Figure 16 – Fixing of the dividing walls to the webs.

Installation of the cladding studs: 2 measuring 60 x 180 mm, strength class: C24; see figure 17.



Figure 17 – Installation of the cladding studs.

Other materials:

The flanges are screwed on to the webs using round 4.0 x 50 mm screws where every peg can be found. The contribution from a structural perspective is very small with regard to the interaction because of the much lower stiffness of the screw joints than the squash strength on the plywood panels. The screws, however, do ensure that the parts stay fixed to each other at all times. The risks of becoming loose, for example, the bottom panel from the floor structure, is, therefore, excluded. Although the required unloaded edge distances are not being met, the screws are more than capable of fulfilling the fixation function. In addition, screws are screwed into the partitions.

SHR report 16.0462-1 discusses the 'Fire spreading and fire-safe main load-bearing structure' subject further. SHR report 16.0462-2 discusses the 'Foundation structure calculation' subject further.

6 Conclusion

The WikiHouse pioneering home is a self-build concept where a house is produced from parts milled from 18 mm Finnish spruce plywood.

The underlying laboratory tests, calculations and drawings elaborated in this SHR report show that the structure of the WikiHouse pioneering home can offer sufficient resistance to the loads that are exercised in accordance with the Dutch Buildings Decree. This fits in with Section 2.1, 'General strength of the building structure', of the Dutch Buildings Decree.

Literature

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SHR report 16.0462-2 'Pionierswoning WikihouseNL te Almere: constructieberekening fundering' (Pioneering home WikihouseNL in Almere: foundation structure calculation) of 20 March 2017.

NEN-EN 338:2016 Structural timber - Strength classes.

NEN-EN 408:2010+A1:2012 Timber structures - Structural timber and glued laminated timber - Determination of some physical and mechanical properties.

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NEN-EN 636:2012+A1:2015 Plywood - Specifications.

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NEN-EN 1991-1-1:2002+C1:2011 Eurocode 1: Actions on structures - Part 1-1: General actions – Densities, self-weight, imposed loads for buildings (including C1:2009).

NEN-EN 1991-1-1:2002+C1:2011/NB: 2011 National Annex to Eurocode 1: Actions on structures - Part 1-1: General actions – Densities, self-weight, imposed loads for buildings (including C1:2009).

NEN-EN 1991-1-2:2002+C1:2011/NB: 2011 National Annex to NEN-EN 1991-1-2:2002 Eurocode 1: Actions on structures - Part 1-1: General actions – Actions on structures exposed to fire (including C1:2009).

NEN-EN 1991-1-3:2003+C1:2011/NB: 2011 National Annex to NEN-EN 1991-1-3:2003 Eurocode 1: Actions on structures - Part 1-3: General actions – Snow loads (including C1:2009).

NEN-EN 1991-1-4:2005+A1+C2:2011 Eurocode 1: Actions on structures – Part 1-4: General Actions – Wind load (including A1:2010 and C2:2010).

NEN-EN 1991-1-4:2005+A1+C2:2011/NB: 2011 National Annex to Eurocode 1: Actions on structures – Part 1-4: General Actions – Wind load (including A1:2010 and C2:2010).

NEN-EN 1995-1-1:2005+C1+A2:2014 Eurocode 5: Design of timber structures – Part 1-1: General - Common rules and rules for buildings (including C1:2006 and A1:2008 and A2:2014).

NEN-EN 1995-1-1:2005+C1+A1/NB: 2013 National Annex to Eurocode 5: Design of timber structures – Part 1-1: General - Common rules and rules for buildings (includes C1:2006 and A1:2008).

Annex 1: Technical Drawings construction request



AANVRAAG OMGEVINGSVERGUNNING

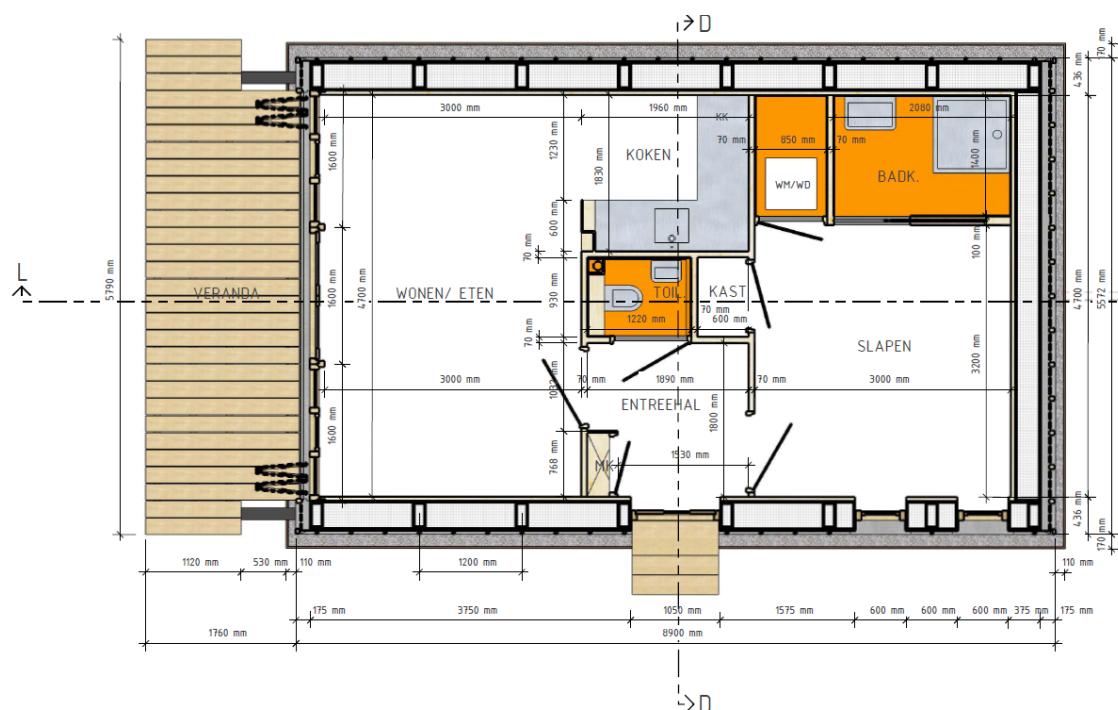
WikiHouse Almere, Pionierswoning, 01-03-2017

Opdrachtgever & financierder: Woningbouw atelier & GoedeStede

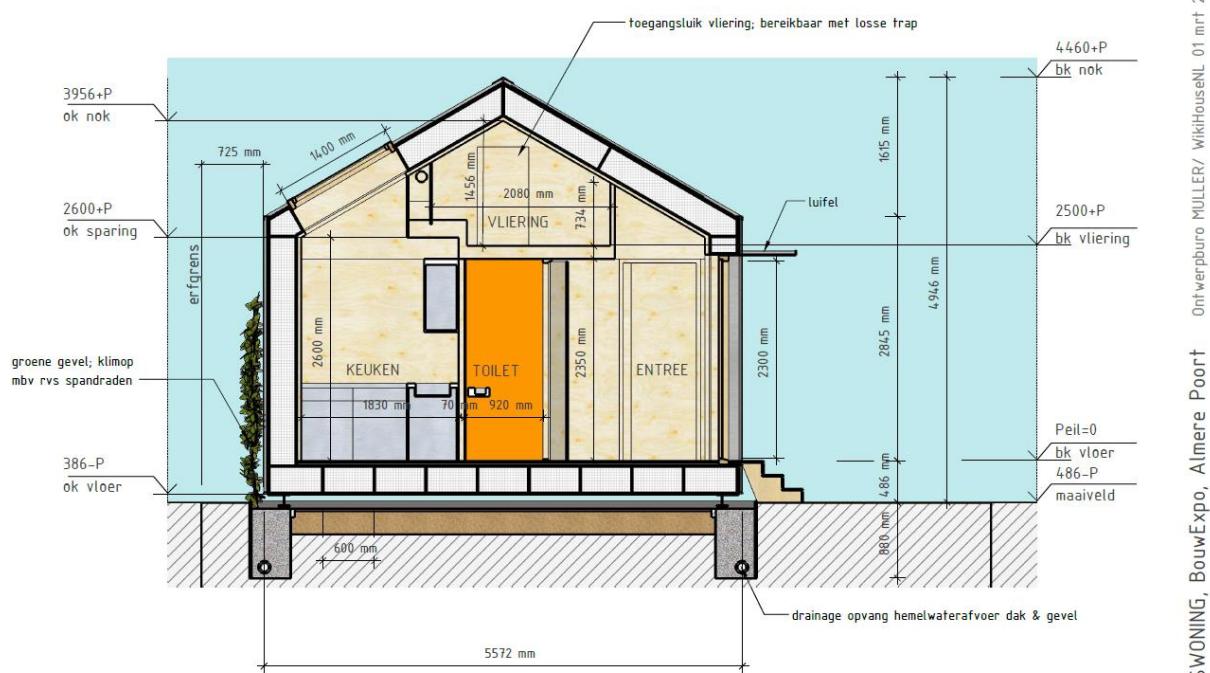
Ontwerp- & bouwteam: WikiHouseNL / Ontwerpstudio MULLER / SHR / Invent / BOUWscoop



Bouwbesluit artikels: 2.2.1. Veiligheid d. & h./ 2.2.3. Bruikbaarheid a.-e./ 2.3. Plano & Sted voorschriften a, c.-e./ 2.5. Welstand a.-d.

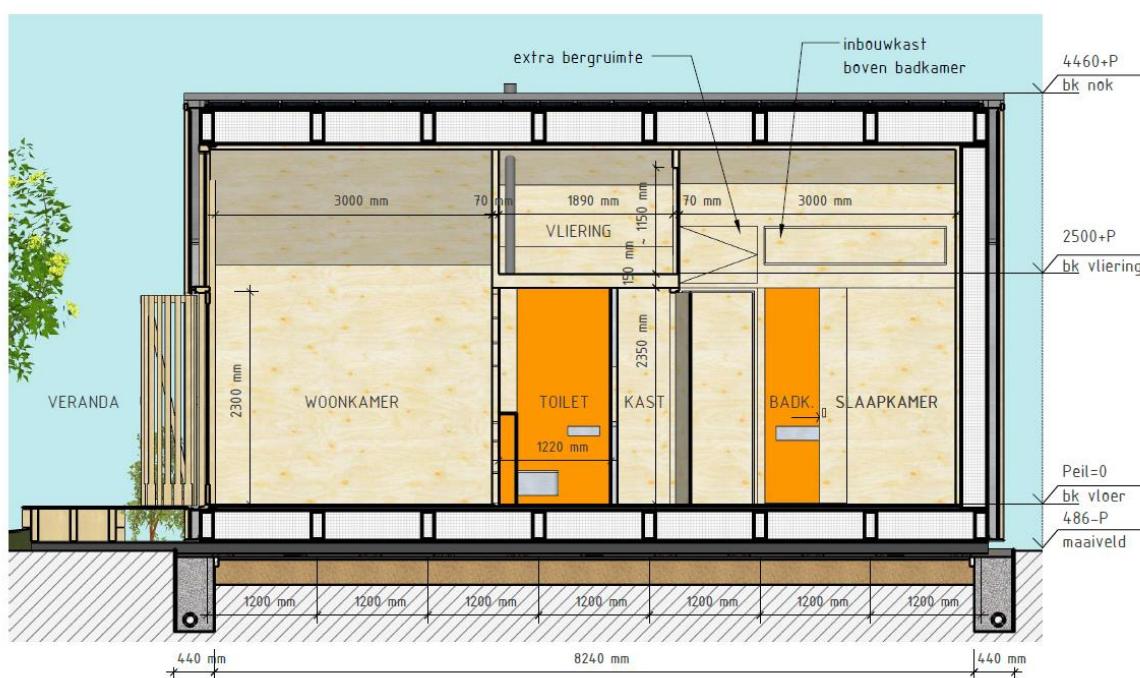


VONING, BouwExpo, Almere Poort
Ontwerpstudio MULLER / WikiHouseNL 01 mrt 2017

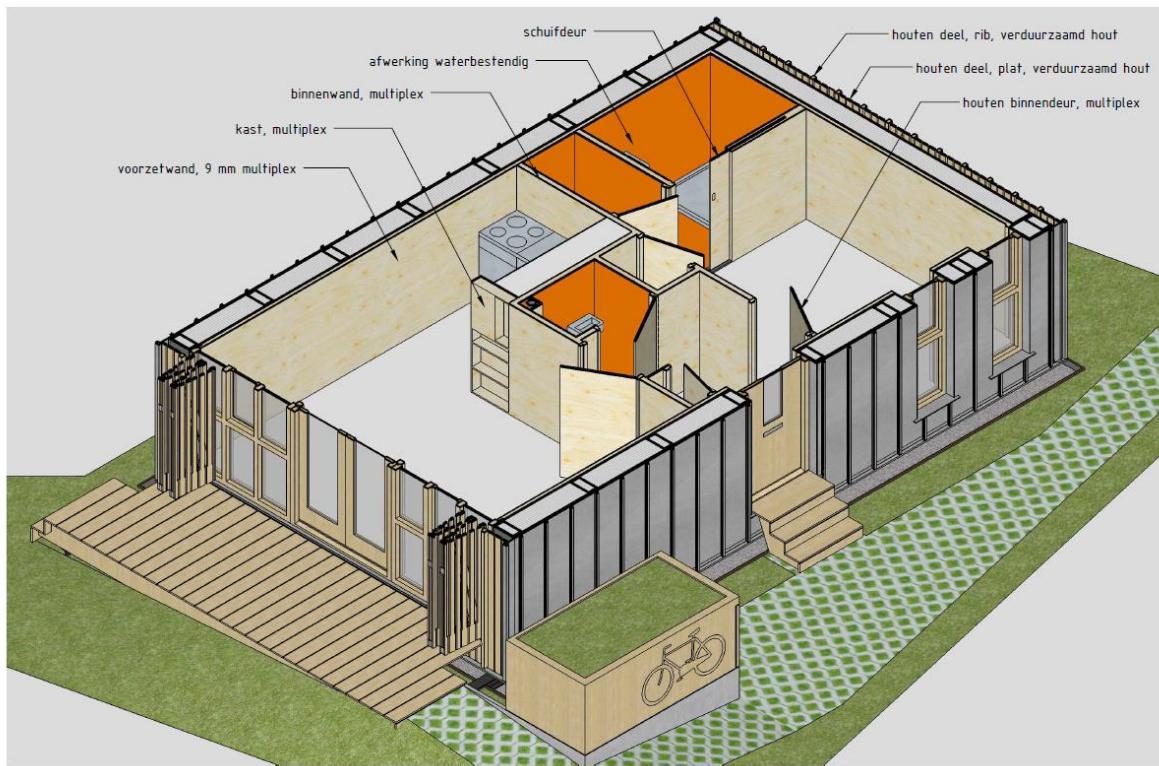


DWARSDOORSNEDE DD: schaal 1:50

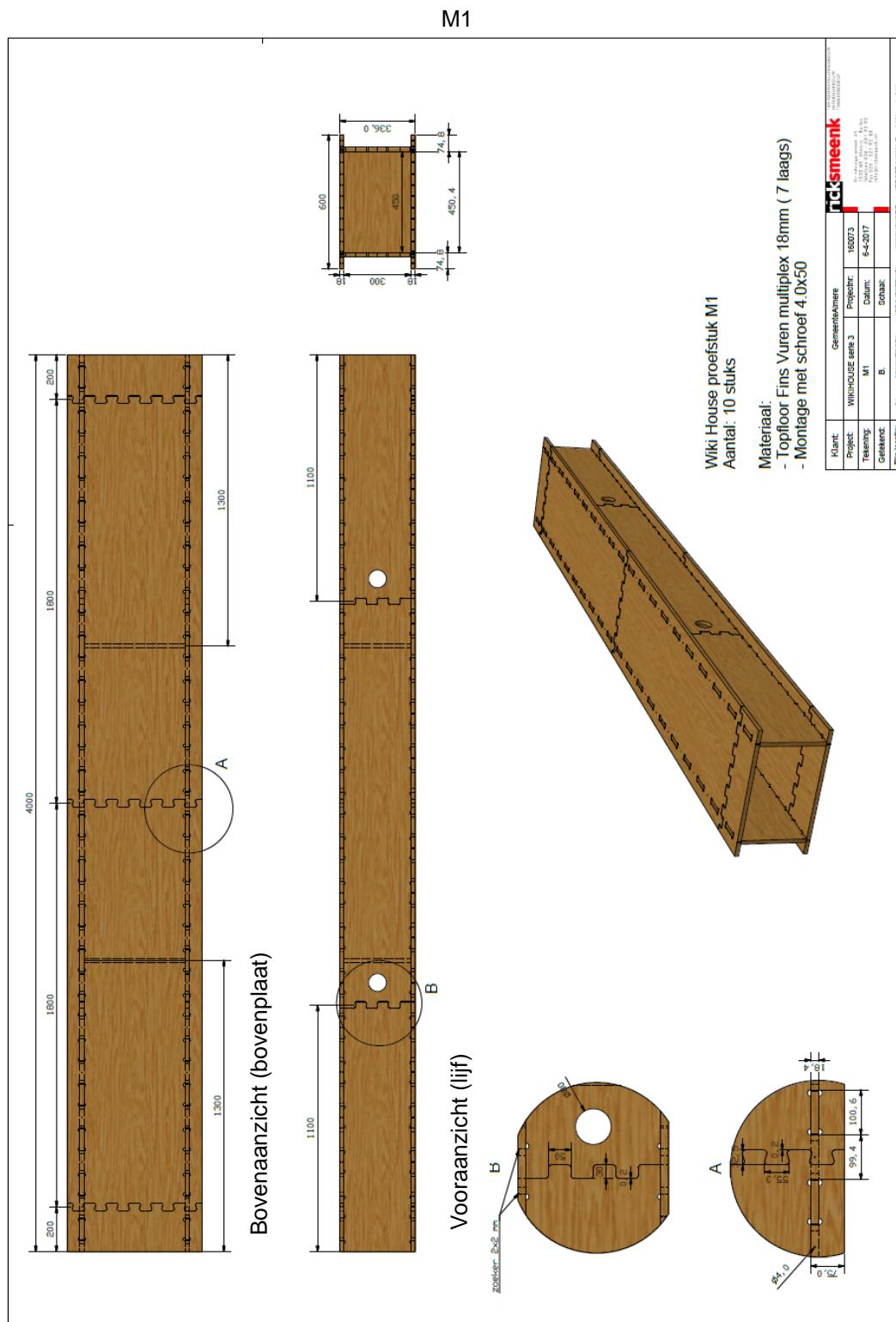
ONTWERPBUREAU MULLER / WikiHouseNL 01 mrt 2017



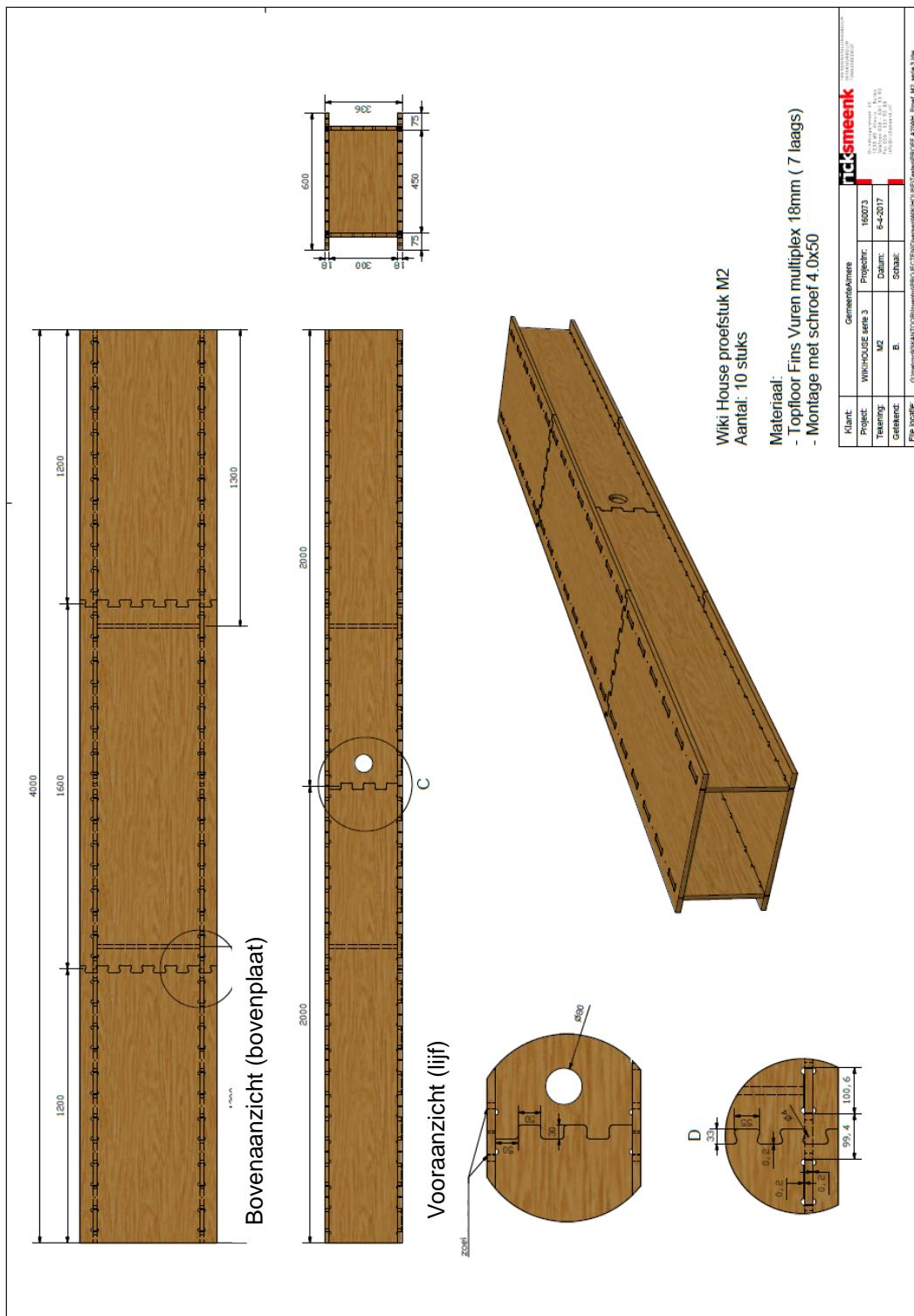
LANGSDOORSNEDE LL: schaal 1:50



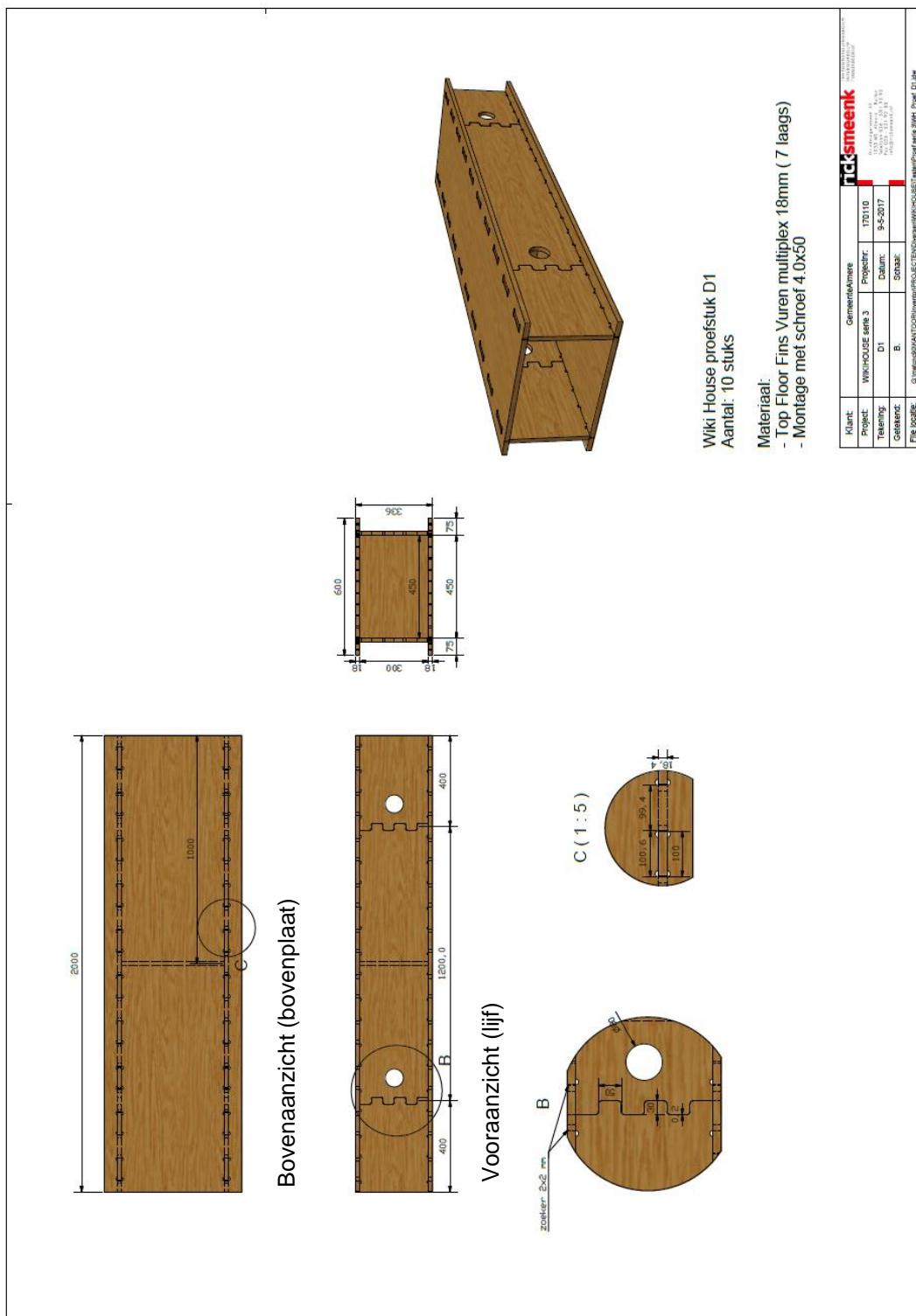
Annex 2: Samples, technical drawings



M2

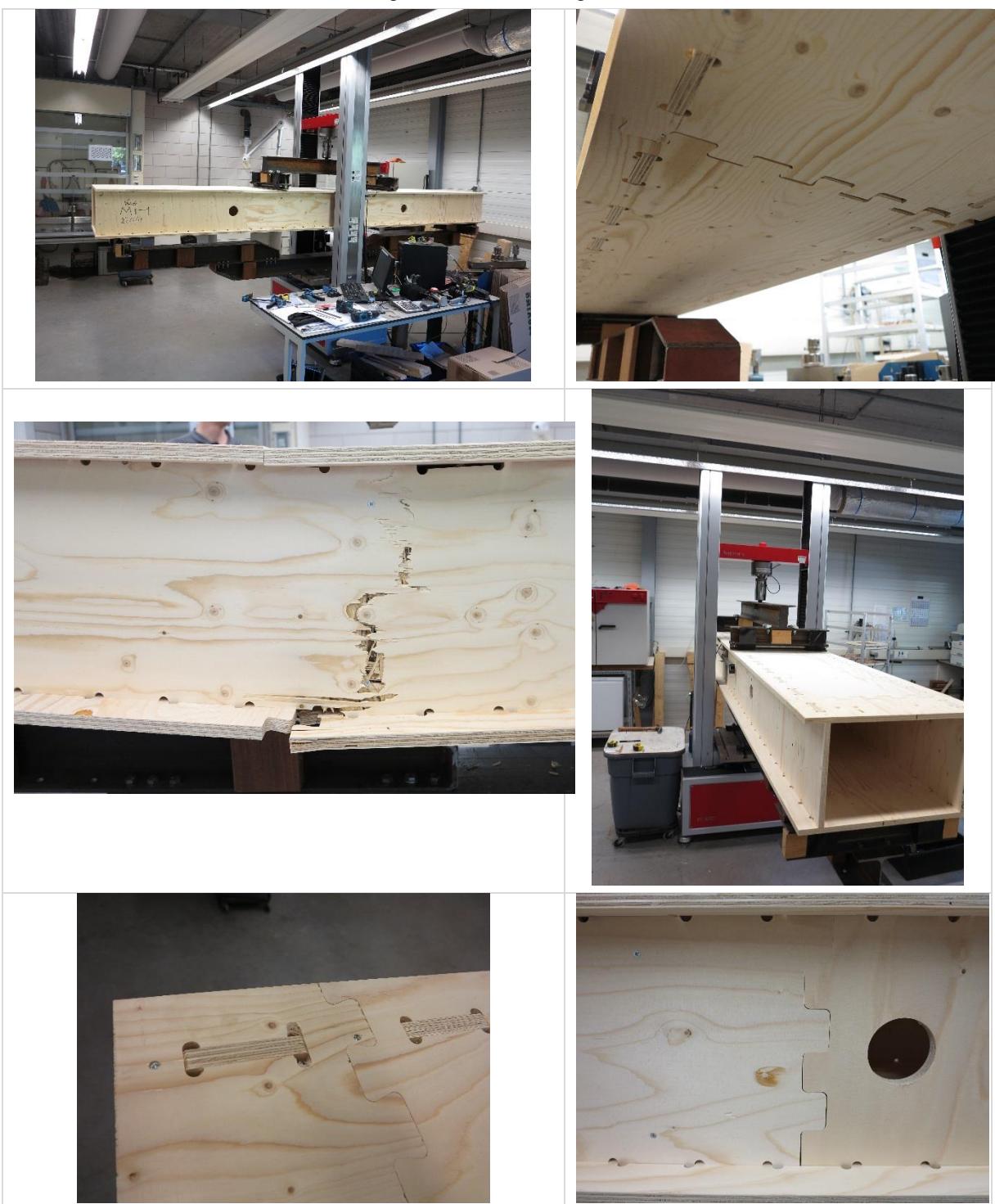


D1



Annex 3: Execution tests + analysis test results

Bending moment + bending stiffness



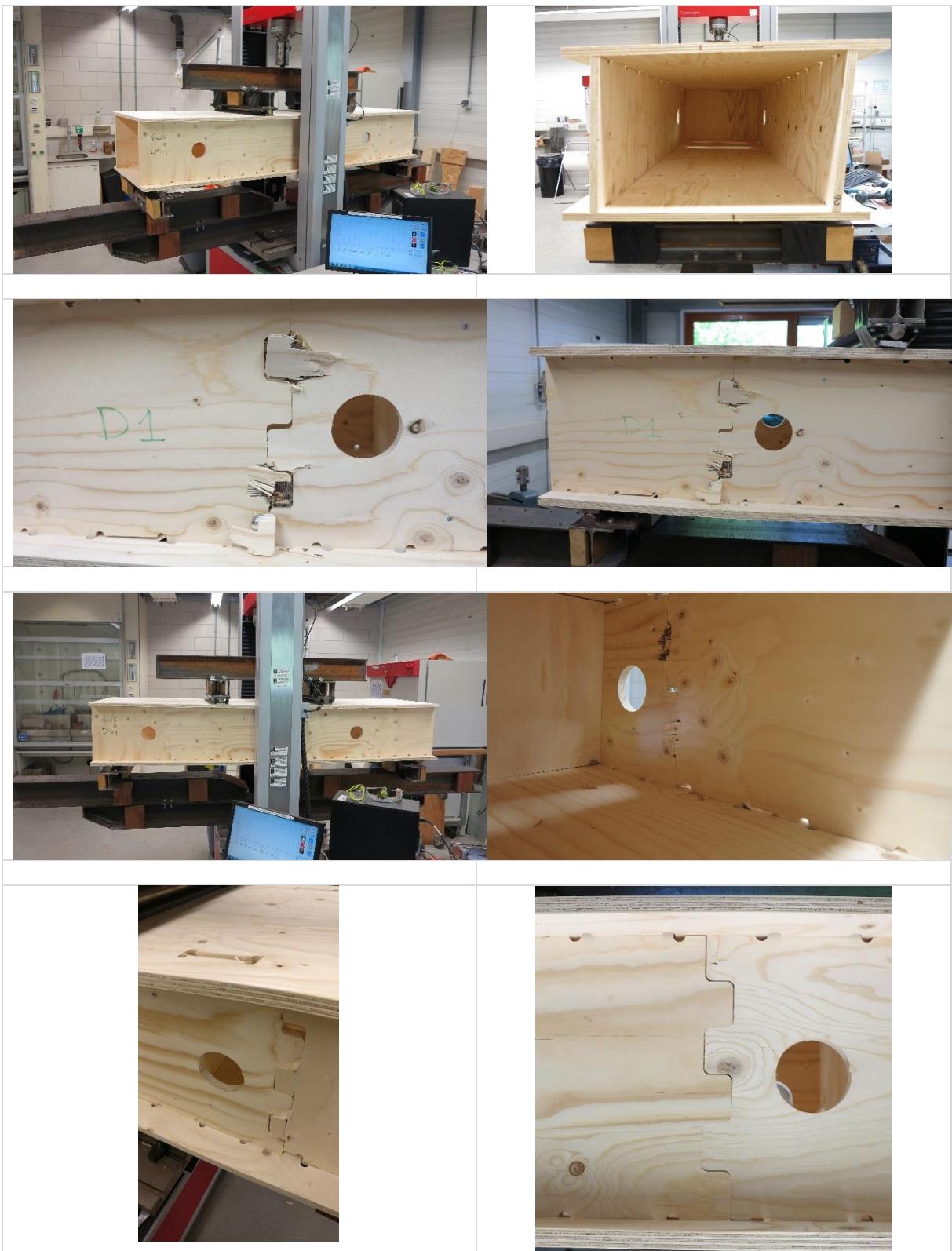
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Moment	meetbrug	L_1 [mm] :	1000
160462	oplegging-F	L_2 [mm] :	1225
	F-F	L_3 [mm] :	1200
	overspanning	L [mm] :	3650
Serie M1+M2	Code	F_{max} [kN]	EI [N/mm ² ·mm ⁴]
M1-1*	33,0	-	20,2
M1-2	31,0	1,261150E+12	19,0
M1-3	36,4	1,279075E+12	22,3
M1-4	35,9	1,181690E+12	22,0
M1-5	37,2	1,706795E+12	22,8
M1-6	38,8	1,228885E+12	23,8
M1-7	34,9	1,384559E+12	21,3
M1-8	47,1	1,382520E+12	28,9
M1-9	38,7	1,134724E+12	23,7
M1-10	40,8	1,261485E+12	25,0
M1-11	39,0	1,152237E+12	23,9
M2-1	44,5	1,155749E+12	27,3
M2-2	37,2	1,141169E+12	22,8
M2-3	40,0	1,036637E+12	24,5
M2-4	47,2	1,232105E+12	28,9
M2-5	42,9	1,043313E+12	26,3
M2-6	39,9	1,064843E+12	24,4
M2-7	36,8	1,058667E+12	22,6
M2-8	40,8	1,170970E+12	25,0
M2-9	42,7	1,131598E+12	26,1
M2-10	41,3	1,324437E+12	25,3
M2-11	33,2	1,076635E+12	20,3
Mean	1,209964E+12	23,9	
St.Dev	1,542355E+11	2,63	
VC (%)	13%	11%	
Karakteristische waarden volgens NEN-EN 1990 bijlage D			
EI_{mean}	[N/mm ² ·mm ⁴]	1,209964E+12	
n		20	
k _n		1,76	
M_k	[kNm]	19,3	
k _{mod}	klimaatklasse 2, belastingduur: middellang	0,80	
k _{mod}	klimaatklasse 2, belastingduur: kort	0,90	
γ _m		1,2	
M_{d, middellang}	[kNm]	12,9	
M_{d, kort}	[kNm]	14,5	

Shear force



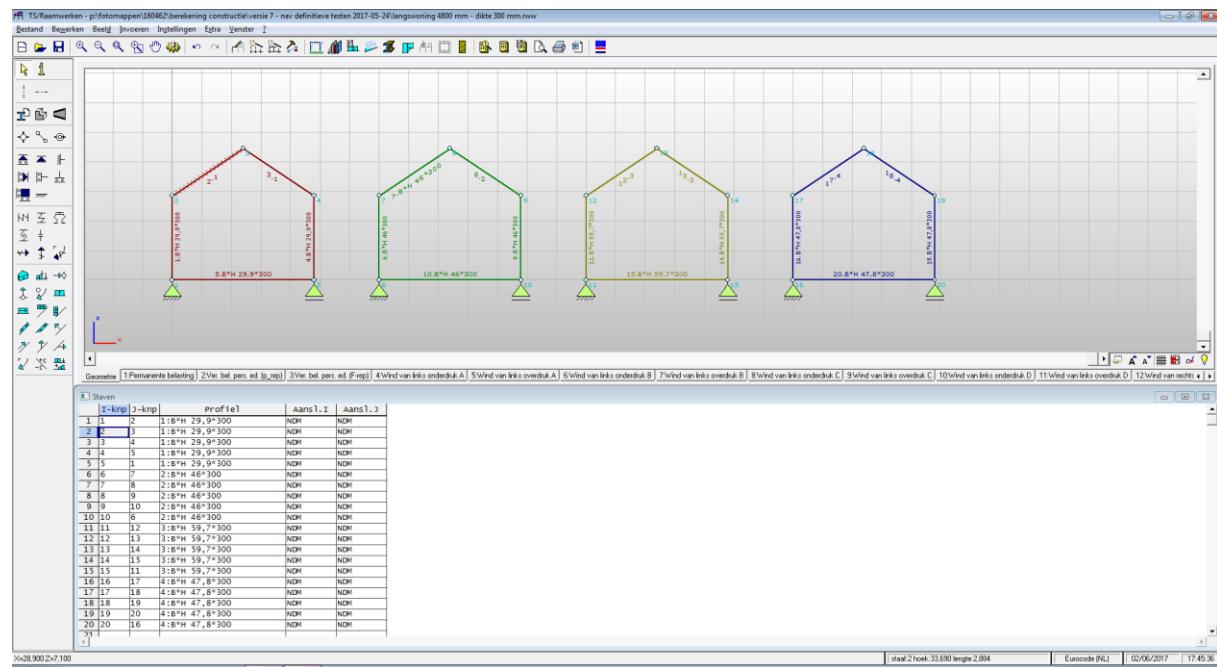
Report code: 16.0462-3

Date: 24 July 2017

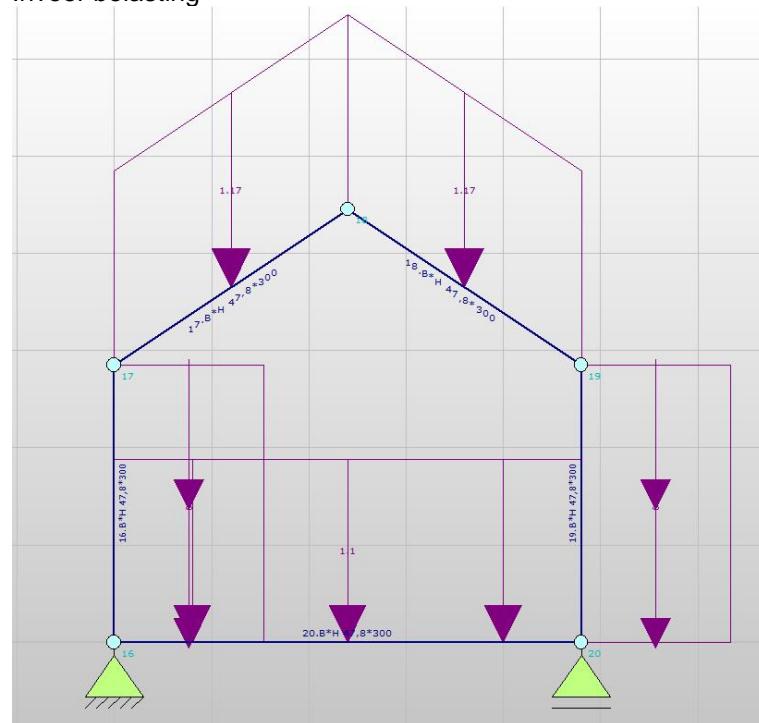
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Dwarskracht	F-F	L_1 [mm] :	600	
160462	overspanning	L [mm] :	1800	
Serie D1	Code	F_{max} [N]	F_{max} [kN]	V_{max} [kN]
D1-1		51.890	51,9	25,9
D1-2		50.620	50,6	25,3
D1-3		50.710	50,7	25,4
D1-4		50.940	50,9	25,5
D1-5		56.780	56,8	28,4
D1-6		55.100	55,1	27,5
D1-7		58.540	58,5	29,3
D1-8		56.390	56,4	28,2
D1-9		50.880	50,9	25,4
D1-10		54.660	54,7	27,3
Mean		26,8		
<u>St.Dev</u>		1,49		
VC (%)		6%		
Karakteristieke waarden volgens NEN-EN 1990 bijlage D				
n		10		
K_n		1,92		
V_k		24,0		
K_{mod}	klimaatklasse 2, belastingduur: middellang	0,80		
K_{mod}	klimaatklasse 2, belastingduur: kort	0,90		
γ_m		1,2		
$V_{d, middellang}$		[kN] 16,0		
$V_{d, kort}$		[kN] 18,0		

Annex 4: Calculation main load-bearing structure



Invoer belasting

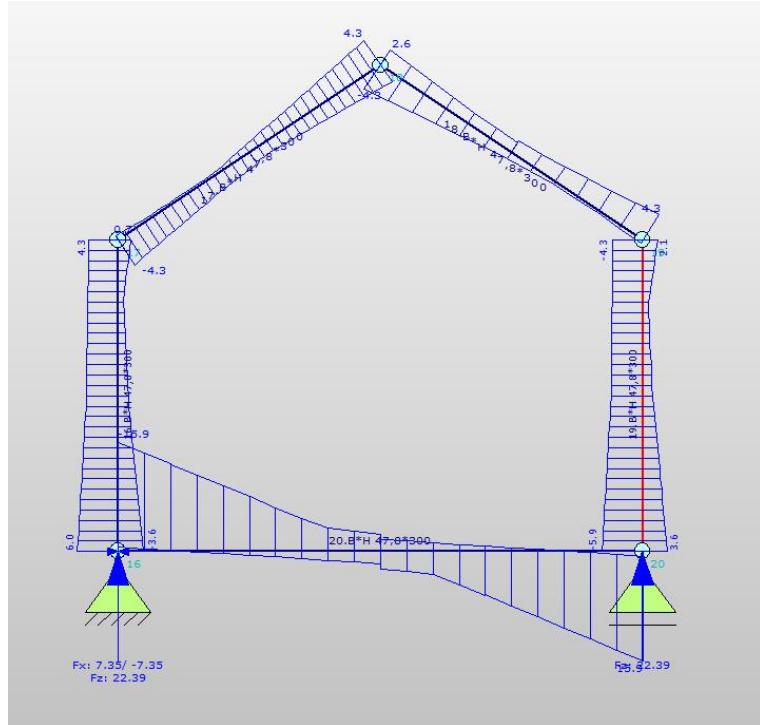


Report code: 16.0462-3

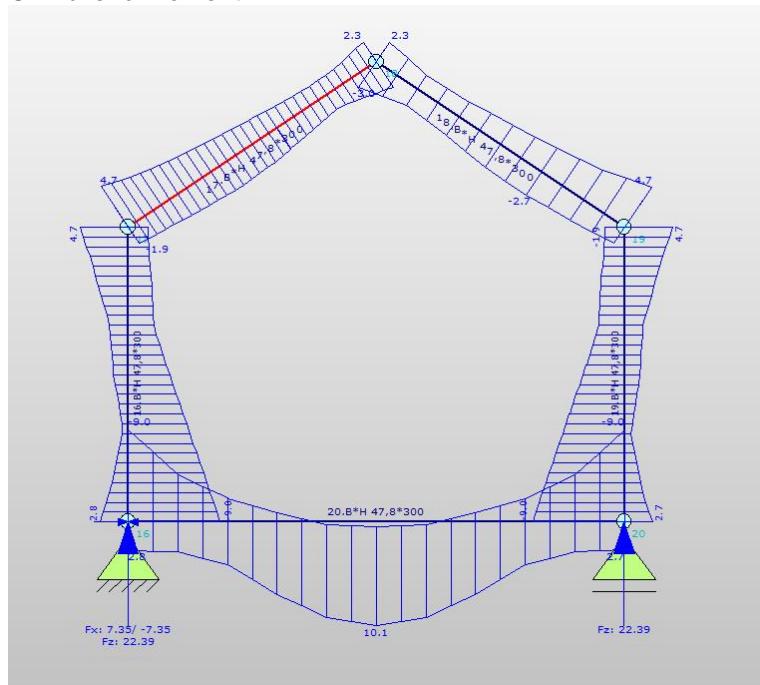
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Omhullend dwarskracht



Omhullend moment



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TS/Raamwerken
Rel: 6.06b 6 jun 2017

Project..: WikihouseNL
Onderdeel: langswoning
Dimensies: kN;mm;rad (tenzij anders aangegeven)
Datum....: 09/11/2016
Bestand..: P:\Fotomappen\160462\berekening constructie\versie 7 - nav
definitieve testen 2017-05-24\langswoning 4800 mm - dikte 300
mm.rww

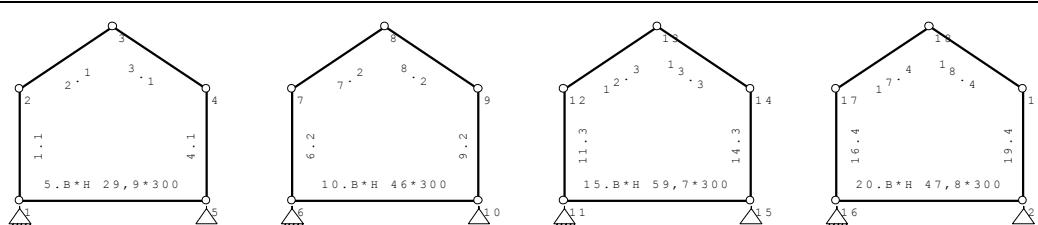
Belastingbreedte.: 1.800
Rekenmodel.....: 2e-orde-elastisch.
Theorieën voor de bepaling van de krachtsverdeling:
1) Uiterste grenstoestand:
Geometrisch niet lineair alle staven.
Fysisch lineair alle staven.
2) Gebruiksgrenstoestand:
Lineaire-elasticitietstheorie

Maximum aantal iteraties.....: 50
Max.deellengte kolommen/wanden: 0.500 Max.deellengte balken/vloeren: 0.500
Max. X-verplaatsing in UGT....: 0.500 Max. Z-verplaatsing in UGT...: 0.250

Gunstige werking van de permanente belasting wordt automatisch verwerkt.

Toegepaste normen volgens Eurocode met Nederlandse NB

Belastingen	NEN-EN 1990:2002	C2:2010	NB:2011(nl)
	NEN-EN 1991-1-1:2002	C1:2009	NB:2011(nl)
	NEN-EN 1991-1-3:2003	C1:2009	NB:2011(nl)
	NEN-EN 1991-1-4:2005	C2:2011	NB:2011(nl)
Hout	NEN-EN 1995-1-1:2005	A1:2011,C1:2006	NB:2011(nl)

GEOMETRIE

MATERIALEN

Mt Omschrijving	E-modulus[N/mm ²]	S.M.	S.M.verhoogd	Pois.	Uitz. coëff
1 C18	9000	3.2	3.8	0.00	5.0000e-006

Bij de bepaling v.h. e.g. van houten staven is de S.M.verhoogd toegepast.

PROFIELEN [mm]

Prof. Omschrijving	Materiaal	Oppervlak	Traagheid	Vormf.
1 B*H 29,9*300	1:C18	8.9700e+003	6.7275e+007	0.00
2 B*H 46*300	1:C18	1.3800e+004	1.0350e+008	0.00
3 B*H 59,7*300	1:C18	1.7910e+004	1.3432e+008	0.00
4 B*H 47,8*300	1:C18	1.4340e+004	1.0755e+008	0.00
5 B*H 27,6*300	1:C18	8.2800e+003	6.2100e+007	0.00
6 B*H 42,5*300	1:C18	1.2750e+004	9.5625e+007	0.00
7 B*H 55,2*300	1:C18	1.6560e+004	1.2420e+008	0.00
8 B*H 44,2*300	1:C18	1.3260e+004	9.9450e+007	0.00

PROFIELEN vervolg [mm]

Prof.	Staaftype	Breedte	Hoogte	e	Type	b1	h1	b2	h2
1	0:Normaal	30	300	150.0	0:RH				
2	0:Normaal	46	300	150.0	0:RH				
3	0:Normaal	60	300	150.0	0:RH				
4	0:Normaal	48	300	150.0	0:RH				
5	0:Normaal	28	300	150.0	0:RH				
6	0:Normaal	43	300	150.0	0:RH				
7	0:Normaal	55	300	150.0	0:RH				
8	0:Normaal	44	300	150.0	0:RH				

KNOOPEN

Knoop	X	Z	Knoop	X	Z
1	0.000	0.000	6	7.000	0.000
2	0.000	2.850	7	7.000	2.850
3	2.400	4.450	8	9.400	4.450
4	4.800	2.850	9	11.800	2.850
5	4.800	0.000	10	11.800	0.000
11	14.000	0.000	16	21.000	0.000
12	14.000	2.850	17	21.000	2.850

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Project...: WikihouseNL
 Onderdeel: langswoning

KNOOPEN

Knoop	X	Z	Knoop	X	Z
13	16.400	4.450	18	23.400	4.450
14	18.800	2.850	19	25.800	2.850
15	18.800	0.000	20	25.800	0.000

STAVEN

St.	ki	kj	Profiel	Aansl.i	Aansl.j	Lengte	Opm.
1	1	2	1:B*H 29,9*300	NDM	NDM	2.850	
2	2	3	1:B*H 29,9*300	NDM	NDM	2.884	
3	3	4	1:B*H 29,9*300	NDM	NDM	2.884	
4	4	5	1:B*H 29,9*300	NDM	NDM	2.850	
5	5	1	1:B*H 29,9*300	NDM	NDM	4.800	
6	6	7	2:B*H 46*300	NDM	NDM	2.850	
7	7	8	2:B*H 46*300	NDM	NDM	2.884	
8	8	9	2:B*H 46*300	NDM	NDM	2.884	
9	9	10	2:B*H 46*300	NDM	NDM	2.850	
10	10	6	2:B*H 46*300	NDM	NDM	4.800	
11	11	12	3:B*H 59,7*300	NDM	NDM	2.850	
12	12	13	3:B*H 59,7*300	NDM	NDM	2.884	
13	13	14	3:B*H 59,7*300	NDM	NDM	2.884	
14	14	15	3:B*H 59,7*300	NDM	NDM	2.850	
15	15	11	3:B*H 59,7*300	NDM	NDM	4.800	
16	16	17	4:B*H 47,8*300	NDM	NDM	2.850	
17	17	18	4:B*H 47,8*300	NDM	NDM	2.884	
18	18	19	4:B*H 47,8*300	NDM	NDM	2.884	
19	19	20	4:B*H 47,8*300	NDM	NDM	2.850	
20	20	16	4:B*H 47,8*300	NDM	NDM	4.800	

VASTE STEUNPUNTEN

Nr.	knoop	Kode	XZR	1=vast 0=vrij	Hoek
1	1	110			0.00
2	5	010			0.00
3	6	110			0.00
4	10	010			0.00
5	11	110			0.00
6	15	010			0.00
7	16	110			0.00
8	20	010			0.00

BELASTINGGENERATIE ALGEMEEN.

Betrouwbaarheidsklasse.....: 1 Referentieperiode.....: 50
 Gebouwdiepte.....: 10.00 Gebouwhoogte.....: 5.00
 Niveau aansl.terrein.....: 0.00 E.g. scheid.w. [kN/m²]: 0.50

WIND

Terrein categorie ...[4.3.2]....: Onbebauwd
 Windgebied: 2 Vb,0 ..[4.2].....: 27.000
 Positie spant in het gebouw....: 1.200 Kr ...[4.3.2].....: 0.209
 z0[4.3.2]....: 0.200 Zmin ...[4.3.2].....: 4.000
 Co wind van links ...[4.3.3]....: 1.000 Co wind van rechts....: 1.000
 Co wind loodrecht ...[4.3.3]....: 1.000
 Cpi wind van links ...[7.2.9]....: 0.200 -0.300
 Cpi windloodrecht ...[7.2.9]....: 0.200 -0.300
 Cpi wind van rechts ...[7.2.9]....: 0.200 -0.300
 Cfr windwrijving[7.5].....: 0.040

SNEEUW

Sneeuwbelasting (sk) 50 jaar : 0.70
 Sneeuwbelasting (sn) n jaar : 0.70

STAFAFTYPEN

Type	staven
1:Vloer.	: 10,20
5:Linker gevel.	: 11,16
6:Rechter gevel.	: 14,19
7:Dak.	: 12,13,17,18
9:Open.	: 1-9,15

Report code: 16.0462-3

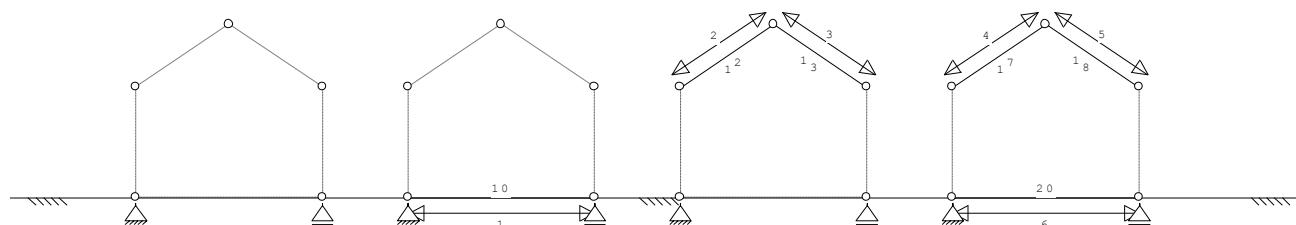
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Project...: WikihouseNL
 Onderdeel: langswoning

LASTVELDEN

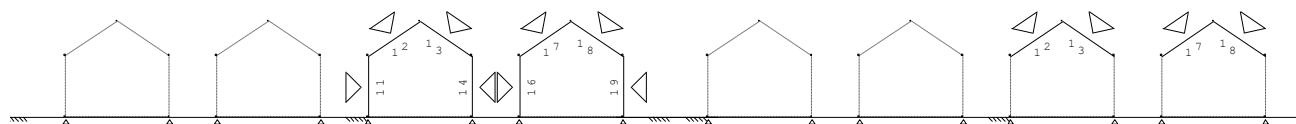
Veranderlijke belastingen door personen

**LASTVELDEN**

Nr.	Balk	Veld	Gebruiksfunctie	Psi-t
1	10-10	10-10	Vloer woning, verblijf... Tabel 6.2	1.00
2	12-12	12-12	Dak niet toegankelijk voor dagelijks gebruik. Tabel 6.9	1.00
3	13-13	13-13	Dak niet toegankelijk voor dagelijks gebruik. Tabel 6.9	1.00
4	17-17	17-17	Dak niet toegankelijk voor dagelijks gebruik. Tabel 6.9	1.00
5	18-18	18-18	Dak niet toegankelijk voor dagelijks gebruik. Tabel 6.9	1.00
6	20-20	20-20	Vloer woning, verblijf... Tabel 6.2	1.00

LASTVELDEN

Wind staven Sneeuw staven

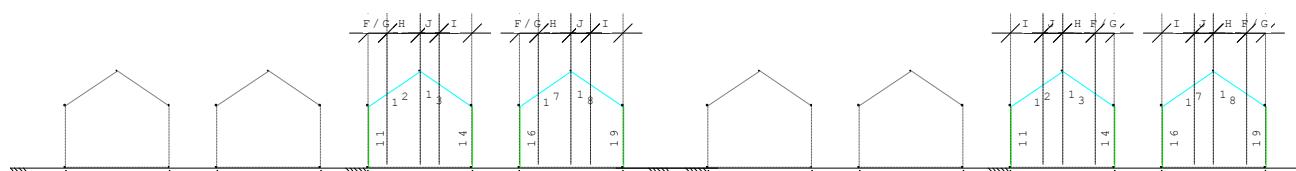
**WIND DAKTYPES**

Nr.	Staaf Type	reductie bij wind van links		reductie bij wind van Rechts		Cpe volgens art:
		wind van links	wind van Rechts	wind van links	wind van Rechts	
1	11 Gevel	0.850	0.850	7.2.2		
2	12 Zadeldak	1.000	1.000	7.2.5		
3	13 Zadeldak	1.000	1.000	7.2.5		
4	14 Gevel	0.850	0.850	7.2.2		
5	16 Gevel	0.850	0.850	7.2.2		
6	17 Zadeldak	1.000	1.000	7.2.5		
7	18 Zadeldak	1.000	1.000	7.2.5		
8	19 Gevel	0.850	0.850	7.2.2		

Het gebrek aan correlatie tussen de winddrukken op de gevels aan de loef- en lijzijde is in rekening gebracht volgens EN1991-1-4 art.7.2.2.
Let op: het in rekening brengen van het gebrek aan correlatie is bedoeld voor stabiliteitsberekeningen en niet voor de toetsing van individuele constructieonderdelen. Het gebrek aan correlatie wordt nu ten onrechte toegepast in een sterkeberekening.

WIND ZONES

Wind van links Wind van rechts

**WIND VAN LINKS ZONES**

Nr.	Staaf	Positie	Lengte	Zone
1	11	0.000	2.850	D
2	12	0.000	0.890	F/G
3	12	0.890	1.510	H
4	13	0.000	0.890	J
5	13	0.890	1.510	I
6	14	0.000	2.850	E
7	16	0.000	2.850	D
8	17	0.000	0.890	F/G
9	17	0.890	1.510	H
10	18	0.000	0.890	J

WIND VAN RECHTS ZONES

Nr.	Staaf	Positie	Lengte	Zone
1	19	0.000	2.850	D
2	18	0.000	0.890	F/G
3	18	0.890	1.510	H
4	17	0.000	0.890	J
5	17	0.890	1.510	I
6	16	0.000	2.850	E
7	14	0.000	2.850	D
8	13	0.000	0.890	F/G
9	13	0.890	1.510	H
10	12	0.000	0.890	J

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 Project..: WikihouseNL
 Onderdeel: langswoning

WIND VAN LINKS ZONES				WIND VAN RECHTS ZONES			
Nr.	Staaf	Positie	Lengte Zone	Nr.	Staaf	Positie	Lengte Zone
11	18	0.890	1.510 I	11	12	0.890	1.510 I
12	19	0.000	2.850 E	12	11	0.000	2.850 E

Wind indexen

Index	CsCd	Cpe/Cpi	qp	breedte	reductie	Qw	Zone	Hoek(en)
Qw1		0.300	0.655	1.800		-0.354		
Qw2	1.00	0.800	0.655	1.800	0.85	-0.801 D		
Qw3	1.00	0.700	0.655	1.800		-0.825 F	33.7	
Qw4	1.00	0.449	0.655	1.800		-0.529 H	33.7	
Qw5	1.00	-0.451	0.655	1.800		0.531 J	33.7	
Qw6	1.00	-0.351	0.655	1.800		0.413 I	33.7	
Qw7	1.00	-0.500	0.655	1.800	0.85	0.501 E		
Qw8		-0.200	0.655	1.800		0.236		
Qw9	1.00	-0.377	0.655	1.800		0.444 F	33.7	
Qw10	1.00	-0.151	0.655	1.800		0.178 H	33.7	
Qw11	1.00	-1.200	0.655	1.700		1.335		
Qw12	1.00	-0.800	0.655	0.100		0.052		
Qw13	1.00	-1.100	0.655	0.700		0.504	33.7	
Qw14	1.00	-0.825	0.655	1.100		0.594	33.7	
Qw15	1.00	-1.400	0.655	0.700		0.642	33.7	
Qw16	1.00	-0.800	0.655	1.800		0.943		
Qw17	1.00	-0.500	0.655	1.800		0.589	33.7	

SNEEUW DAKTYPEN

Staaf	artikel
12-12	5.3.3 Zadeldak
13-13	5.3.3 Zadeldak
17-17	5.3.3 Zadeldak
18-18	5.3.3 Zadeldak

Sneeuw indexen

Index	art	μ	s _x	red.	posfac	breedte	Q _s	hoek
Qs1	5.3.3	0.702	0.70	1.00		1.800	0.884	33.7
Qs2	5.3.3	0.351	0.70	1.00		1.800	0.442	33.7

BELASTINGGEVALLEN

B.G.	Omschrijving	Type
1	Permanente belasting	EGZ=0.00
g	2 Ver. bel. pers. ed. (p_rep)	1
g	3 Ver. bel. pers. ed. (Frep)	2
g	4 Wind van links onderdruk A	3
g	5 Wind van links overdruk A	7
g	6 Wind van links onderdruk B	8
g	7 Wind van links overdruk B	9
g	8 Wind van links onderdruk C	10
g	9 Wind van links overdruk C	37
g	10 Wind van links onderdruk D	38
g	11 Wind van links overdruk D	39
g	12 Wind van rechts onderdruk A	40
g	13 Wind van rechts overdruk A	11
g	14 Wind van rechts onderdruk B	12
g	15 Wind van rechts overdruk B	13
g	16 Wind van rechts onderdruk C	14
g	17 Wind van rechts overdruk C	41
g	18 Wind van rechts onderdruk D	42
g	19 Wind van rechts overdruk D	43
g	20 Wind loodrecht onderdruk A	44
g	21 Wind loodrecht overdruk A	15
g	22 Wind loodrecht onderdruk B	45
g	23 Wind loodrecht overdruk B	46
g	24 Sneeuw A	22
g	25 Sneeuw B	23
g	26 Sneeuw C	33

g = gegenereerd belastinggeval

Report code: 16.0462-3

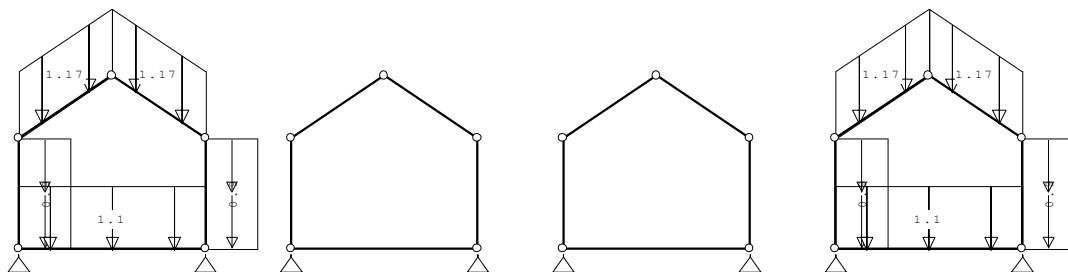
Date: 24 July 2017

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Project...: WikiHouseNL
Onderdeel: langswoning

BELASTINGEN

B.G:1 Permanente belasting

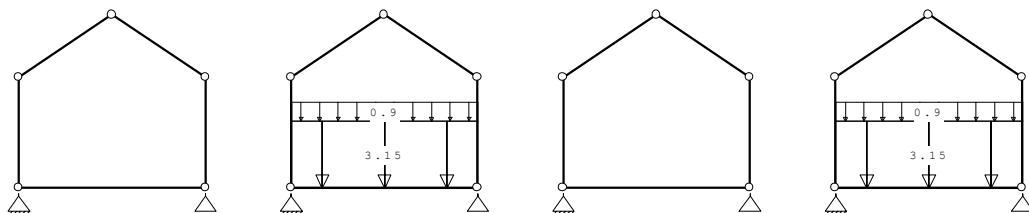

STAAFBELASTINGEN

B.G:1 Permanente belasting

Staaf	Type	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2
5	1:QZLokaal	1.10	1.10	0.000	0.000			
1	2:QXLokaal	-0.90	-0.90	0.000	0.000			
4	2:QXLokaal	0.90	0.90	0.000	0.000			
2	5:QZGlobaal	-1.17	-1.17	0.000	0.000			
3	5:QZGlobaal	-1.17	-1.17	0.000	0.000			
20	1:QZLokaal	1.10	1.10	0.000	0.000			
17	5:QZGlobaal	-1.17	-1.17	0.000	0.000			
18	5:QZGlobaal	-1.17	-1.17	0.000	0.000			
16	2:QXLokaal	-0.90	-0.90	0.000	0.000			
19	2:QXLokaal	0.90	0.90	0.000	0.000			

BELASTINGEN

B.G:2 Ver. bel. pers. ed. (p_rep)

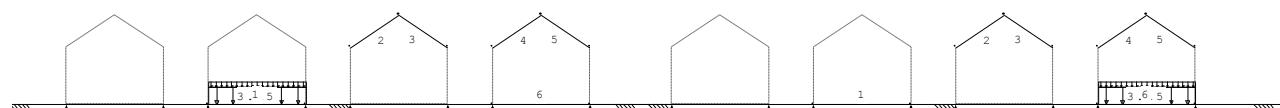

STAAFBELASTINGEN

B.G:2 Ver. bel. pers. ed. (p_rep)

Staaf	Type	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2
10	3:QZgeProj.	-3.15	-3.15	0.000	0.000	0.4	0.5	0.3
10	3:QZgeProj.	-0.90	-0.90	0.000	0.000	0.4	0.5	0.3
20	3:QZgeProj.	-3.15	-3.15	0.000	0.000	0.4	0.5	0.3
20	3:QZgeProj.	-0.90	-0.90	0.000	0.000	0.4	0.5	0.3

VERANDERLIJKE BELASTING SITUATIES

B.G:2 Ver. bel. pers. ed. (p_rep)


VERANDERLIJKE BELASTING SITUATIES

Lastvelden momentaan

Nr Lastvelden extreem

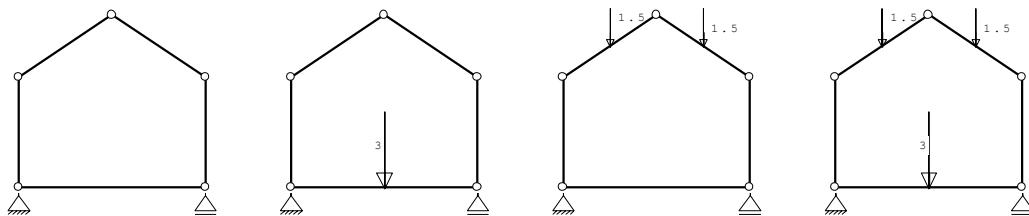
1 1

2 6

Project...: WikihouseNL
 Onderdeel: langswoning

BELASTINGEN

B.G:3 Ver. bel. pers. ed. (F-rep)

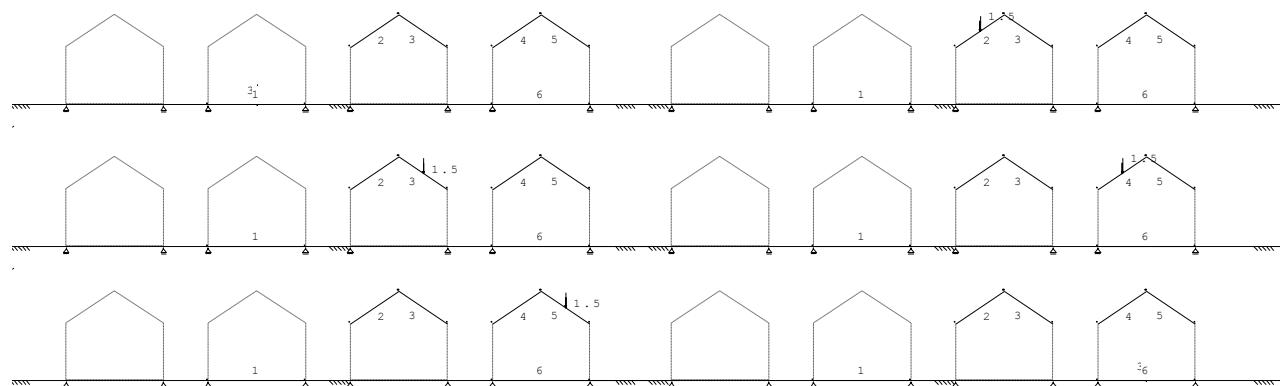
**STAAFBELASTINGEN**

B.G:3 Ver. bel. pers. ed. (F-rep)

Staaf Type	$q_1/p/m$	q_2	A	B	ψ_0	ψ_1	ψ_2
10 10:PZGeproj.	-3.00	2.400			0.4	0.5	0.3
12 10:PZGeproj.	-1.50	1.442			0.0	0.0	0.0
13 10:PZGeproj.	-1.50	1.442			0.0	0.0	0.0
17 10:PZGeproj.	-1.50	1.442			0.0	0.0	0.0
18 10:PZGeproj.	-1.50	1.442			0.0	0.0	0.0
20 10:PZGeproj.	-3.00	2.400			0.4	0.5	0.3

VERANDERLIJKE BELASTING SITUATIES

B.G:3 Ver. bel. pers. ed. (F-rep)

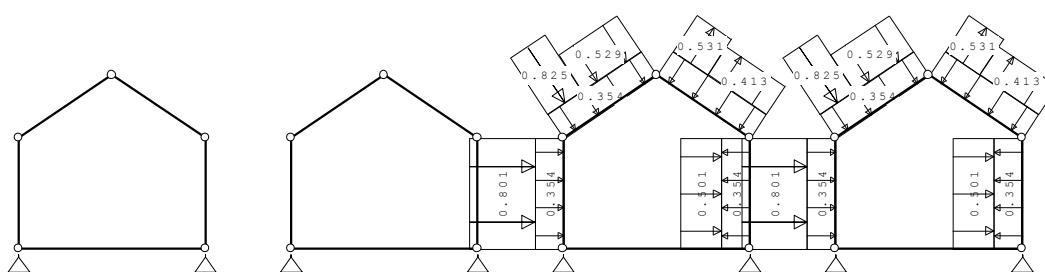
**VERANDERLIJKE BELASTING SITUATIES**

Nr Lastvelden extreem Lastvelden momentaan

- 1 1
- 2 2
- 3 3
- 4 4
- 5 5
- 6 6

BELASTINGEN

B.G:4 Wind van links onderdruk A



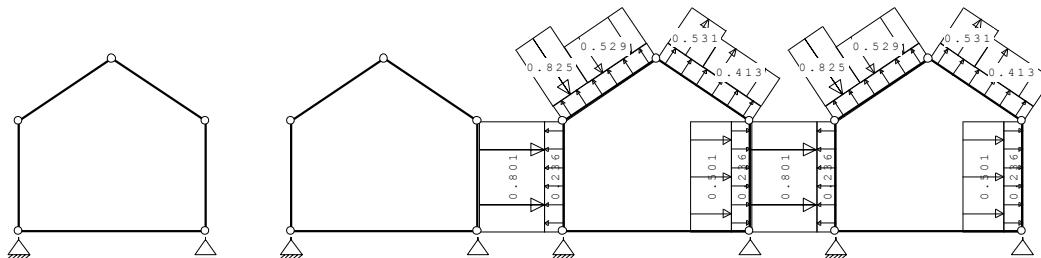
Project..: WikihouseNL
Onderdeel: langswoning

STAAFBELASTINGEN

Staat	Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2
11	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
11	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw3	-0.82	-0.82	0.000	1.815	0.0	0.2	0.0
12	1:QZLokaal	Qw4	-0.53	-0.53	1.070	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw5	0.53	0.53	0.000	1.815	0.0	0.2	0.0
13	1:QZLokaal	Qw6	0.41	0.41	1.070	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw3	-0.82	-0.82	0.000	1.815	0.0	0.2	0.0
17	1:QZLokaal	Qw4	-0.53	-0.53	1.070	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw5	0.53	0.53	0.000	1.815	0.0	0.2	0.0
18	1:QZLokaal	Qw6	0.41	0.41	1.070	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

B.G:4 Wind van links onderdruk A

BELASTINGEN



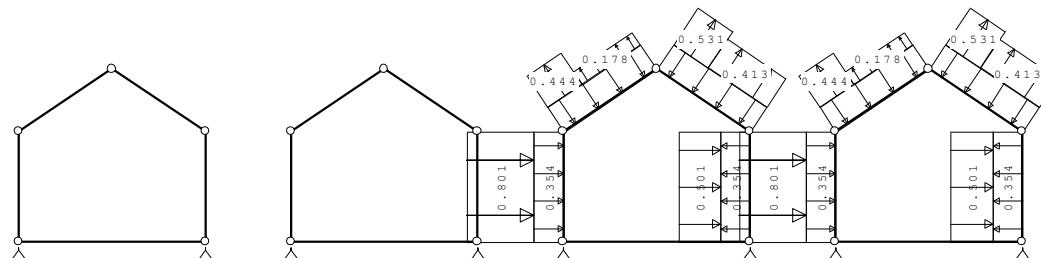
B.G:5 Wind van links overdruk A

STAALBELASTINGEN

STAFAKSTINGER		B.G.S. WIND VAN LINKS OVERDIJK H.							
Staaf	Type	Index	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2
11	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
11	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw3	-0.82	-0.82	0.000	1.815	0.0	0.2	0.0
12	1:QZLokaal	Qw4	-0.53	-0.53	1.070	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw5	0.53	0.53	0.000	1.815	0.0	0.2	0.0
13	1:QZLokaal	Qw6	0.41	0.41	1.070	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw3	-0.82	-0.82	0.000	1.815	0.0	0.2	0.0
17	1:QZLokaal	Qw4	-0.53	-0.53	1.070	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw5	0.53	0.53	0.000	1.815	0.0	0.2	0.0
18	1:QZLokaal	Qw6	0.41	0.41	1.070	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

B.G.:5 Wind van links overdruk A

BELASTINGEN



B-G:6 Wind van links onderdruk B

Report code: 16.0462-3

Date: 24 July 2017

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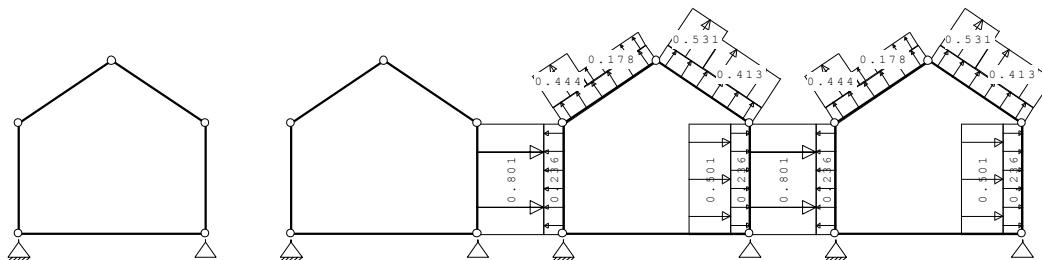
Project..: WikihouseNL
Onderdeel: langswoning

STAAFBELASTINGEN

Staaf Type	Index	$q_1/p/m$	q_2	A	B	Ψ_0	Ψ_1	Ψ_2	B.G:6 Wind van links onderdruk B	
11 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
12 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
13 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
16 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
18 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
11 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
12 1:QZLokaal	Qw9	0.44	0.44	0.000	1.815	0.0	0.2	0.0		
12 1:QZLokaal	Qw10	0.18	0.18	1.070	0.000	0.0	0.2	0.0		
13 1:QZLokaal	Qw5	0.53	0.53	0.000	1.815	0.0	0.2	0.0		
13 1:QZLokaal	Qw6	0.41	0.41	1.070	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		
16 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw9	0.44	0.44	0.000	1.815	0.0	0.2	0.0		
17 1:QZLokaal	Qw10	0.18	0.18	1.070	0.000	0.0	0.2	0.0		
18 1:QZLokaal	Qw5	0.53	0.53	0.000	1.815	0.0	0.2	0.0		
18 1:QZLokaal	Qw6	0.41	0.41	1.070	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		

BELASTINGEN

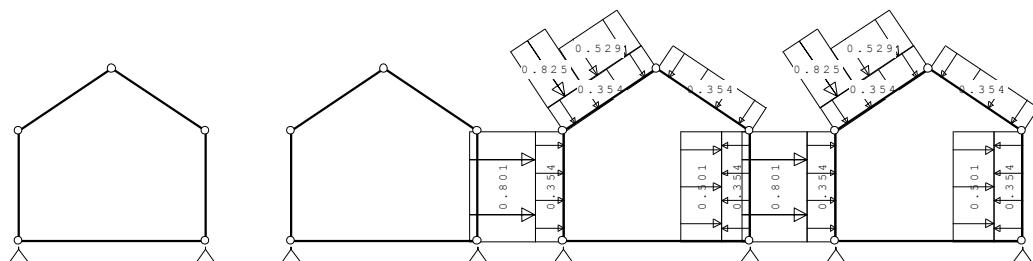
B.G:7 Wind van links overdruk B


STAAFBELASTINGEN

Staaf Type	Index	$q_1/p/m$	q_2	A	B	Ψ_0	Ψ_1	Ψ_2	B.G:7 Wind van links overdruk B	
11 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
12 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
13 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
16 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
18 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
11 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
12 1:QZLokaal	Qw9	0.44	0.44	0.000	1.815	0.0	0.2	0.0		
12 1:QZLokaal	Qw10	0.18	0.18	1.070	0.000	0.0	0.2	0.0		
13 1:QZLokaal	Qw5	0.53	0.53	0.000	1.815	0.0	0.2	0.0		
13 1:QZLokaal	Qw6	0.41	0.41	1.070	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		
16 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw9	0.44	0.44	0.000	1.815	0.0	0.2	0.0		
17 1:QZLokaal	Qw10	0.18	0.18	1.070	0.000	0.0	0.2	0.0		
18 1:QZLokaal	Qw5	0.53	0.53	0.000	1.815	0.0	0.2	0.0		
18 1:QZLokaal	Qw6	0.41	0.41	1.070	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		

BELASTINGEN

B.G:8 Wind van links onderdruk C



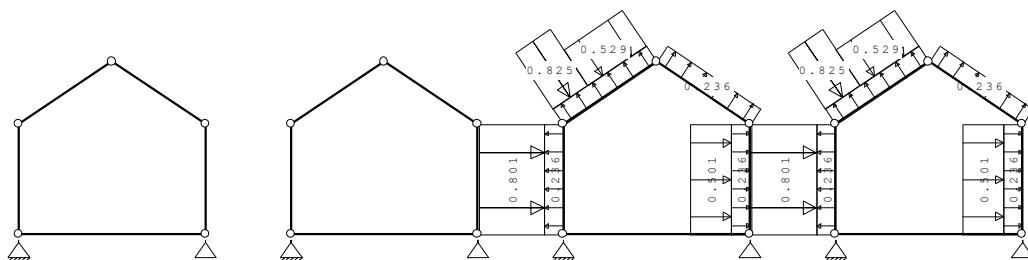
Project..: WikihouseNL
 Onderdeel: langswoning

STAAFBELASTINGEN

Staaf	Type	Index	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2	B.G:8 Wind van links onderdruk C	
11	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
12	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
13	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
14	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
16	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
17	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
18	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
19	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
11	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
12	1:QZLokaal	Qw3	-0.82	-0.82	0.000	1.815	0.0	0.2	0.0		
12	1:QZLokaal	Qw4	-0.53	-0.53	1.070	0.000	0.0	0.2	0.0		
14	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		
16	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
17	1:QZLokaal	Qw3	-0.82	-0.82	0.000	1.815	0.0	0.2	0.0		
17	1:QZLokaal	Qw4	-0.53	-0.53	1.070	0.000	0.0	0.2	0.0		
19	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		

BELASTINGEN

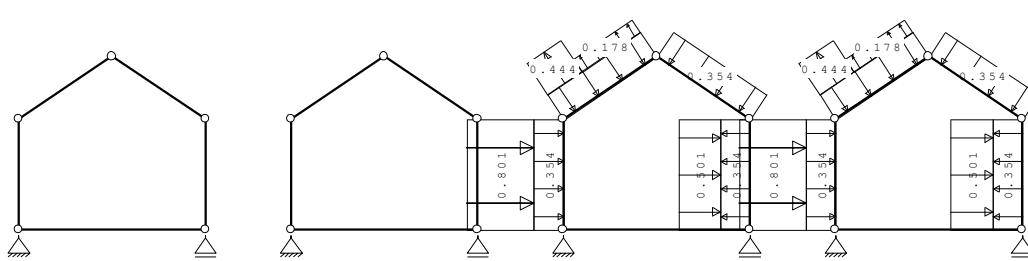
B.G:9 Wind van links overdruk C

**STAAFBELASTINGEN**

Staaf	Type	Index	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2	B.G:9 Wind van links overdruk C	
11	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
12	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
13	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
14	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
16	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
17	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
18	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
19	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
11	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
12	1:QZLokaal	Qw3	-0.82	-0.82	0.000	1.815	0.0	0.2	0.0		
12	1:QZLokaal	Qw4	-0.53	-0.53	1.070	0.000	0.0	0.2	0.0		
14	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		
16	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
17	1:QZLokaal	Qw3	-0.82	-0.82	0.000	1.815	0.0	0.2	0.0		
17	1:QZLokaal	Qw4	-0.53	-0.53	1.070	0.000	0.0	0.2	0.0		
19	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		

BELASTINGEN

B.G:10 Wind van links onderdruk D

**STAAFBELASTINGEN**

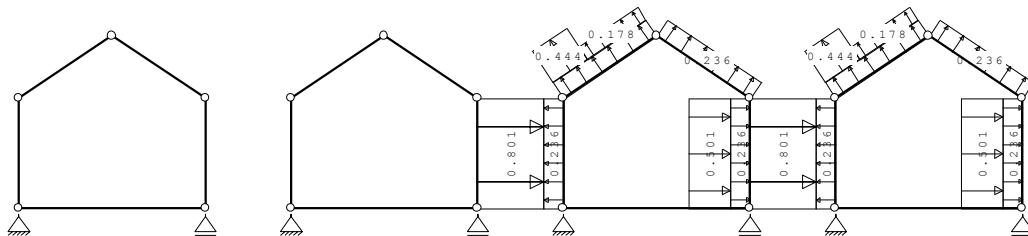
Staaf	Type	Index	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2	B.G:10 Wind van links onderdruk D	
11	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
12	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
13	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
14	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
16	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
17	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
18	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
19	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
11	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		

Project..: WikihouseNL
Onderdeel: langswoning

STAAFBELASTINGEN

Staaf Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2	B.G:10 Wind van links onderdruk D	
12 1:QZLokaal	Qw9	0.44	0.44	0.000	1.815	0.0	0.2	0.0		
12 1:QZLokaal	Qw10	0.18	0.18	1.070	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		
16 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw9	0.44	0.44	0.000	1.815	0.0	0.2	0.0		
17 1:QZLokaal	Qw10	0.18	0.18	1.070	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		

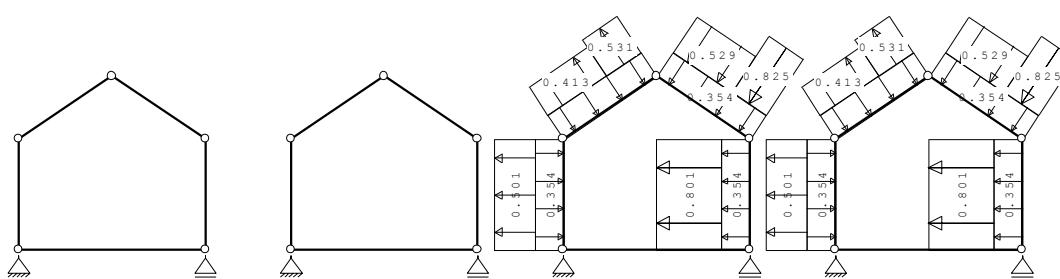
BELASTINGEN



STAAFBELASTINGEN

Staaf Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2	B.G:11 Wind van links overdruk D	
11 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
12 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
13 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
16 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
18 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0		
11 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
12 1:QZLokaal	Qw9	0.44	0.44	0.000	1.815	0.0	0.2	0.0		
12 1:QZLokaal	Qw10	0.18	0.18	1.070	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		
16 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw9	0.44	0.44	0.000	1.815	0.0	0.2	0.0		
17 1:QZLokaal	Qw10	0.18	0.18	1.070	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		

BELASTINGEN



STAAFBELASTINGEN

Staaf Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2	B.G:12 Wind van rechts onderdruk A	
11 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
12 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
13 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
16 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
18 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0		
19 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
18 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0		
18 1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0		
17 1:QZLokaal	Qw5	0.53	0.53	1.815	0.000	0.0	0.2	0.0		
17 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0		
16 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0		
14 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0		
13 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0		
13 1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0		
12 1:QZLokaal	Qw5	0.53	0.53	1.815	0.000	0.0	0.2	0.0		

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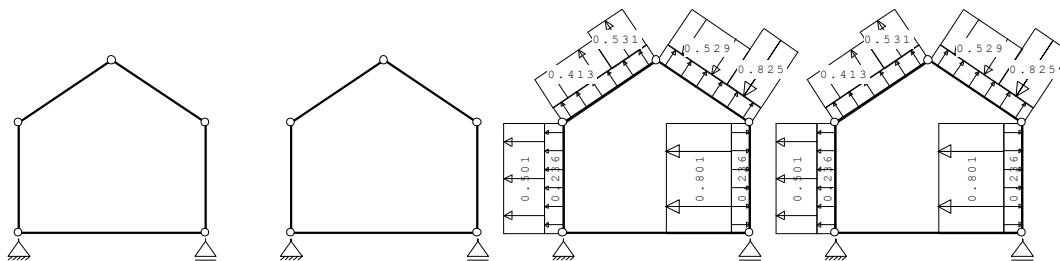
Project..: WikihouseNL
 Onderdeel: langswoning

STAAFBELASTINGEN

Staaf Type	Index	$q_1/p/m$	q_2	A	B	ψ_0	ψ_1	ψ_2
12 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0
11 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

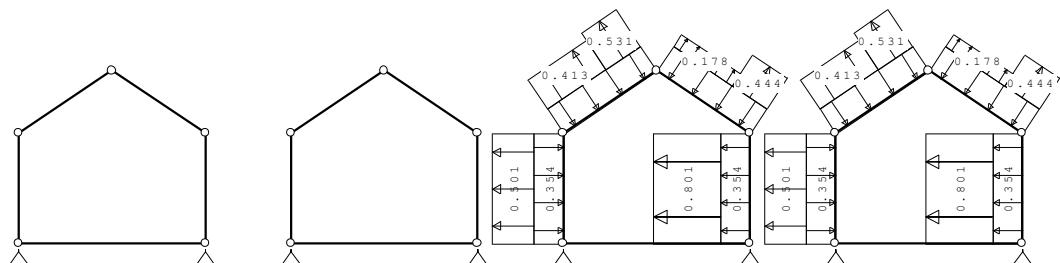
B.G:12 Wind van rechts onderdruk A

**STAAFBELASTINGEN**

Staaf Type	Index	$q_1/p/m$	q_2	A	B	ψ_0	ψ_1	ψ_2
11 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0
17 1:QZLokaal	Qw5	0.53	0.53	1.815	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0
16 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0
12 1:QZLokaal	Qw5	0.53	0.53	1.815	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0
11 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

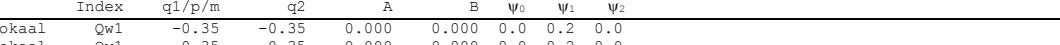
B.G:13 Wind van rechts overdruk A

**STAAFBELASTINGEN**

Staaf Type	Index	$q_1/p/m$	q_2	A	B	ψ_0	ψ_1	ψ_2
11 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0
17 1:QZLokaal	Qw5	0.53	0.53	1.815	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0
16 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0
12 1:QZLokaal	Qw5	0.53	0.53	1.815	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0
11 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:14 Wind van rechts onderdruk B

**STAAFBELASTINGEN**

Staaf Type	Index	$q_1/p/m$	q_2	A	B	ψ_0	ψ_1	ψ_2
11 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw4	0.44	0.44	1.815	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw5	0.18	0.18	0.000	1.070	0.0	0.2	0.0
17 1:QZLokaal	Qw6	0.53	0.53	1.815	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw7	0.41	0.41	0.000	1.070	0.0	0.2	0.0
16 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw4	0.44	0.44	1.815	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw5	0.18	0.18	0.000	1.070	0.0	0.2	0.0
12 1:QZLokaal	Qw6	0.53	0.53	1.815	0.000	0.0	0.2	0.0

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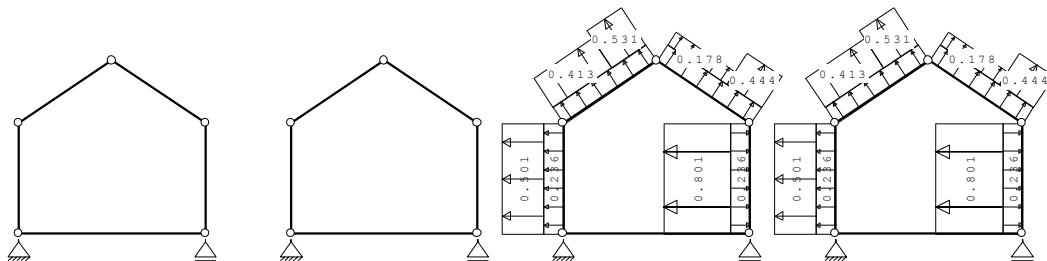
Project..: WikihouseNL
Onderdeel: langswoning

STAAFBELASTINGEN

Staaf Type	Index	$q_1/p/m$	q_2	A	B	ψ_0	ψ_1	ψ_2
12 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0
11 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

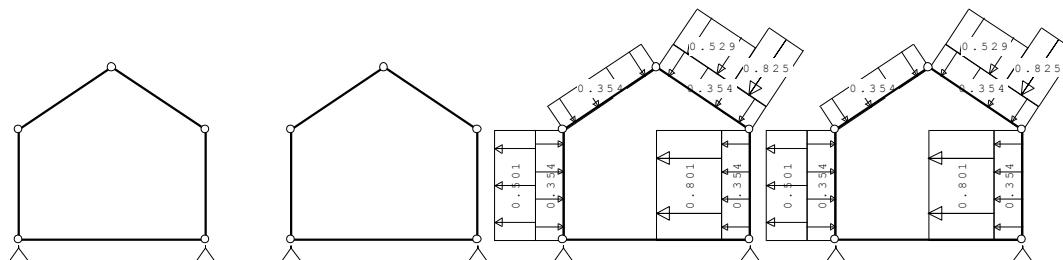
B.G:14 Wind van rechts onderdruk B


STAAFBELASTINGEN

Staaf Type	Index	$q_1/p/m$	q_2	A	B	ψ_0	ψ_1	ψ_2
11 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw9	0.44	0.44	1.815	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw10	0.18	0.18	0.000	1.070	0.0	0.2	0.0
17 1:QZLokaal	Qw5	0.53	0.53	1.815	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0
16 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw9	0.44	0.44	1.815	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw10	0.18	0.18	0.000	1.070	0.0	0.2	0.0
12 1:QZLokaal	Qw5	0.53	0.53	1.815	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw6	0.41	0.41	0.000	1.070	0.0	0.2	0.0
11 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

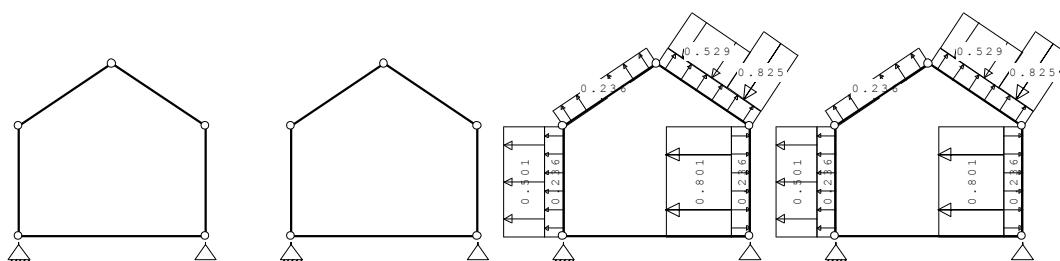
B.G:15 Wind van rechts overdruk B


STAAFBELASTINGEN

Staaf Type	Index	$q_1/p/m$	q_2	A	B	ψ_0	ψ_1	ψ_2
11 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0
16 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0
11 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:17 Wind van rechts overdruk C



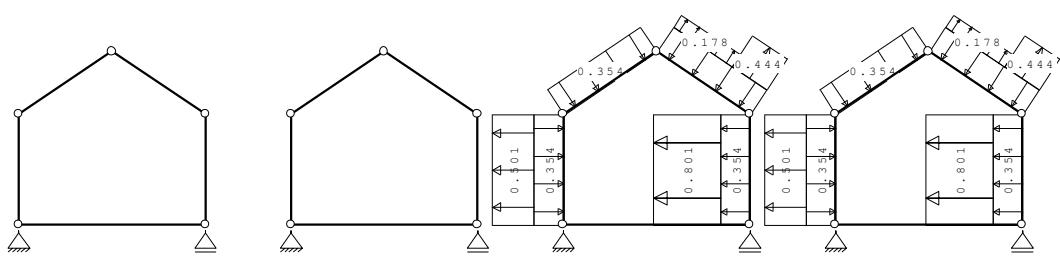
STAAFBELASTINGEN

B.G:17 Wind van rechts overdruk C

Staaf	Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2
11	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0
16	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw3	-0.82	-0.82	1.815	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw4	-0.53	-0.53	0.000	1.070	0.0	0.2	0.0
11	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:18 Wind van rechts onderdruk D



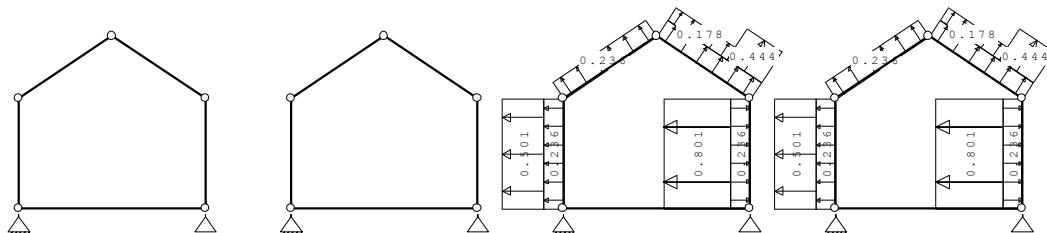
STAAFBELASTINGEN

B.G:18 Wind van rechts onderdruk D

Staaf	Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2
11	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw9	0.44	0.44	1.815	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw10	0.18	0.18	0.000	1.070	0.0	0.2	0.0
16	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw9	0.44	0.44	1.815	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw10	0.18	0.18	0.000	1.070	0.0	0.2	0.0
11	1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:19 Wind van rechts overdruk D



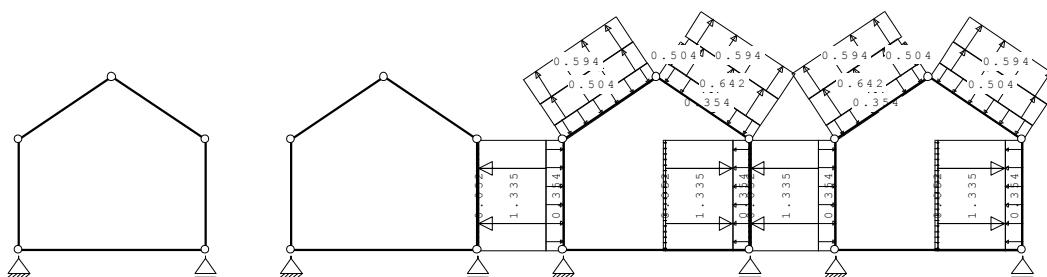
STAAFBELASTINGEN

B.G:19 Wind van rechts overdruk D

Staaf Type	Index	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2
11 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw9	0.44	0.44	1.815	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw10	0.18	0.18	0.000	1.070	0.0	0.2	0.0
16 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw2	-0.80	-0.80	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw9	0.44	0.44	1.815	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw10	0.18	0.18	0.000	1.070	0.0	0.2	0.0
11 1:QZLokaal	Qw7	0.50	0.50	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:20 Wind loodrecht onderdruk A



STAAFBELASTINGEN

B.G:20 Wind loodrecht onderdruk A

Staaf Type	Index	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2
11 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
11 1:QZLokaal	Qw11	1.34	1.34	0.000	0.000	0.0	0.2	0.0
11 1:QZLokaal	Qw12	0.05	0.05	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw11	1.34	1.34	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw12	0.05	0.05	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw11	1.34	1.34	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw12	0.05	0.05	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw11	1.34	1.34	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw12	0.05	0.05	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw13	0.50	0.50	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw14	0.59	0.59	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw15	0.64	0.64	0.120	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw13	0.50	0.50	0.000	2.764	0.0	0.2	0.0
13 1:QZLokaal	Qw14	0.59	0.59	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw13	0.50	0.50	2.764	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw15	0.64	0.64	0.000	0.120	0.0	0.2	0.0
17 1:QZLokaal	Qw14	0.59	0.59	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw13	0.50	0.50	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw14	0.59	0.59	0.000	0.000	0.0	0.2	0.0

Onderdeel: langswoning

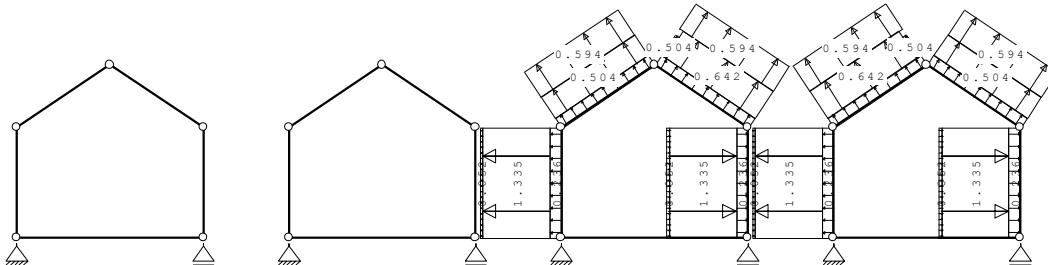
Report code: 16.0462-3

Date: 24 July 2017

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BELASTINGEN

B.G:21 Wind loodrecht overdruk A



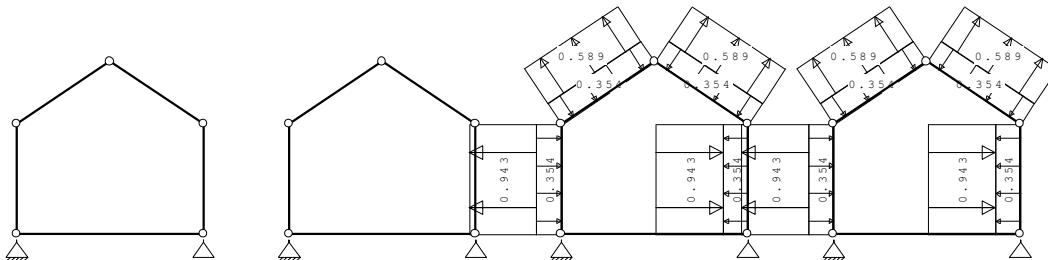
STAAFBELASTINGEN

B.G:21 Wind loodrecht overdruk A

Staaf	Type	Index	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2
11	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
11	1:QZLokaal	Qw11	1.34	1.34	0.000	0.000	0.0	0.2	0.0
11	1:QZLokaal	Qw12	0.05	0.05	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw11	1.34	1.34	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw12	0.05	0.05	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw11	1.34	1.34	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw12	0.05	0.05	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw11	1.34	1.34	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw12	0.05	0.05	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw13	0.50	0.50	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw14	0.59	0.59	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw15	0.64	0.64	0.120	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw13	0.50	0.50	0.000	2.764	0.0	0.2	0.0
13	1:QZLokaal	Qw14	0.59	0.59	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw13	0.50	0.50	2.764	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw15	0.64	0.64	0.000	0.120	0.0	0.2	0.0
17	1:QZLokaal	Qw14	0.59	0.59	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw13	0.50	0.50	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw14	0.59	0.59	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:22 Wind loodrecht onderdruk B



STAAFBELASTINGEN

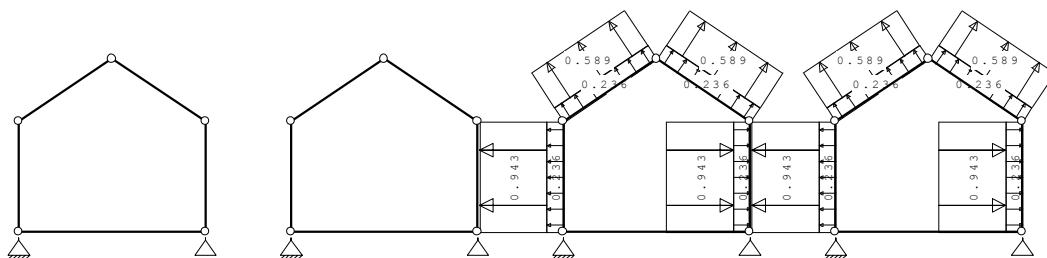
B.G:22 Wind loodrecht onderdruk B

Staaf	Type	Index	q1/p/m	q2	A	B	ψ_0	ψ_1	ψ_2
11	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw1	-0.35	-0.35	0.000	0.000	0.0	0.2	0.0
11	1:QZLokaal	Qw16	0.94	0.94	0.000	0.000	0.0	0.2	0.0
14	1:QZLokaal	Qw16	0.94	0.94	0.000	0.000	0.0	0.2	0.0
16	1:QZLokaal	Qw16	0.94	0.94	0.000	0.000	0.0	0.2	0.0
19	1:QZLokaal	Qw16	0.94	0.94	0.000	0.000	0.0	0.2	0.0
12	1:QZLokaal	Qw17	0.59	0.59	0.000	0.000	0.0	0.2	0.0
13	1:QZLokaal	Qw17	0.59	0.59	0.000	0.000	0.0	0.2	0.0
17	1:QZLokaal	Qw17	0.59	0.59	0.000	0.000	0.0	0.2	0.0
18	1:QZLokaal	Qw17	0.59	0.59	0.000	0.000	0.0	0.2	0.0

Project...: WikihouseNL
Onderdeel: langswoning

BELASTINGEN

B.G:23 Wind loodrecht overdruk B



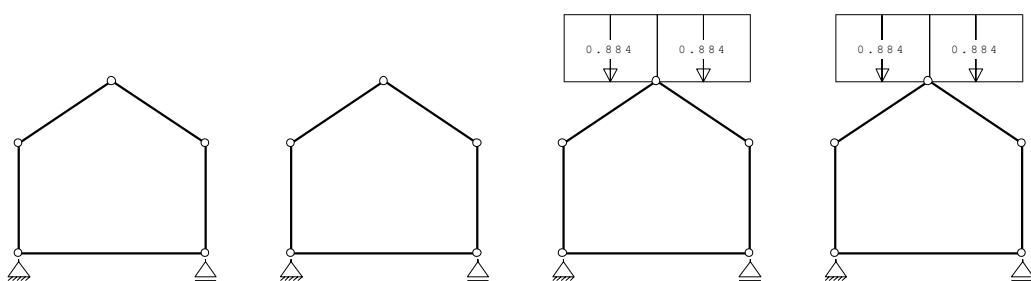
STAAFBELASTINGEN

B.G:23 Wind loodrecht overdruk B

Staaf Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2
11 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw8	0.24	0.24	0.000	0.000	0.0	0.2	0.0
11 1:QZLokaal	Qw16	0.94	0.94	0.000	0.000	0.0	0.2	0.0
14 1:QZLokaal	Qw16	0.94	0.94	0.000	0.000	0.0	0.2	0.0
16 1:QZLokaal	Qw16	0.94	0.94	0.000	0.000	0.0	0.2	0.0
19 1:QZLokaal	Qw16	0.94	0.94	0.000	0.000	0.0	0.2	0.0
12 1:QZLokaal	Qw17	0.59	0.59	0.000	0.000	0.0	0.2	0.0
13 1:QZLokaal	Qw17	0.59	0.59	0.000	0.000	0.0	0.2	0.0
17 1:QZLokaal	Qw17	0.59	0.59	0.000	0.000	0.0	0.2	0.0
18 1:QZLokaal	Qw17	0.59	0.59	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:24 Sneeuw A



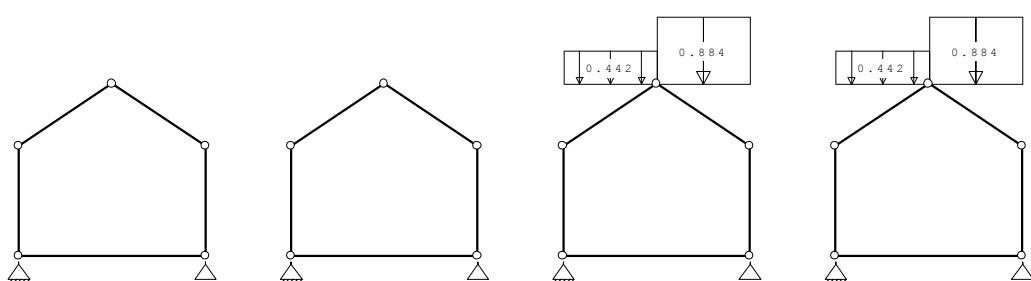
STAAFBELASTINGEN

B.G:24 Sneeuw A

Staaf Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2
12 3:QZgeProj.	Qs1	-0.88	-0.88	0.000	0.000	0.0	0.2	0.0
13 3:QZgeProj.	Qs1	-0.88	-0.88	0.000	0.000	0.0	0.2	0.0
17 3:QZgeProj.	Qs1	-0.88	-0.88	0.000	0.000	0.0	0.2	0.0
18 3:QZgeProj.	Qs1	-0.88	-0.88	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:25 Sneeuw B



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Date: 24 July 2017

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 Project...: WikihouseNL
 Onderdeel: langswoning

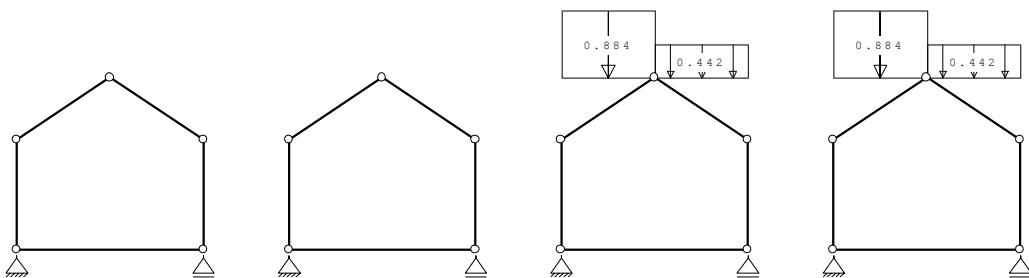
STAAFBELASTINGEN

B.G:25 Sneeuw B

Staaf Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2
12 3:QZgeProj.	Qs2	-0.44	-0.44	0.000	0.000	0.0	0.2	0.0
13 3:QZgeProj.	Qs1	-0.88	-0.88	0.000	0.000	0.0	0.2	0.0
17 3:QZgeProj.	Qs2	-0.44	-0.44	0.000	0.000	0.0	0.2	0.0
18 3:QZgeProj.	Qs1	-0.88	-0.88	0.000	0.000	0.0	0.2	0.0

BELASTINGEN

B.G:26 Sneeuw C


STAAFBELASTINGEN

B.G:26 Sneeuw C

Staaf Type	Index	q1/p/m	q2	A	B	Ψ_0	Ψ_1	Ψ_2
12 3:QZgeProj.	Qs1	-0.88	-0.88	0.000	0.000	0.0	0.2	0.0
13 3:QZgeProj.	Qs2	-0.44	-0.44	0.000	0.000	0.0	0.2	0.0
17 3:QZgeProj.	Qs1	-0.88	-0.88	0.000	0.000	0.0	0.2	0.0
18 3:QZgeProj.	Qs2	-0.44	-0.44	0.000	0.000	0.0	0.2	0.0

 Project...: WikihouseNL
 Onderdeel: langswoning

BEREKENINGSTATUS

B.C.	Iteratie	Status
214	1	Lineaire berekening
215	1	Lineaire berekening
216	1	Lineaire berekening
217	1	Lineaire berekening
218	1	Lineaire berekening
219	1	Lineaire berekening
220	1	Lineaire berekening
221	1	Lineaire berekening

BELASTINGCOMBINATIES

BC Type	BG Gen. Factor				
1 Fund.	1 Perm	1.22			
2 Fund.	1 Perm	1.08			
3 Fund.	1 Perm	0.90			
4 Fund.	1 Perm	1.22	2 psi0	1.35	
5 Fund.	1 Perm	1.22	3 psi0	1.35	
6 Fund.	1 Perm	1.08	2 Extr	1.35	
7 Fund.	1 Perm	1.08	3 Extr	1.35	
8 Fund.	1 Perm	1.08	4 Extr	1.35	
9 Fund.	1 Perm	1.08	5 Extr	1.35	
10 Fund.	1 Perm	1.08	6 Extr	1.35	
11 Fund.	1 Perm	1.08	7 Extr	1.35	
12 Fund.	1 Perm	1.08	8 Extr	1.35	
13 Fund.	1 Perm	1.08	9 Extr	1.35	
14 Fund.	1 Perm	1.08	10 Extr	1.35	
15 Fund.	1 Perm	1.08	11 Extr	1.35	
16 Fund.	1 Perm	1.08	12 Extr	1.35	
17 Fund.	1 Perm	1.08	13 Extr	1.35	
18 Fund.	1 Perm	1.08	14 Extr	1.35	
19 Fund.	1 Perm	1.08	15 Extr	1.35	
20 Fund.	1 Perm	1.08	16 Extr	1.35	
21 Fund.	1 Perm	1.08	17 Extr	1.35	
22 Fund.	1 Perm	1.08	18 Extr	1.35	
23 Fund.	1 Perm	1.08	19 Extr	1.35	
24 Fund.	1 Perm	1.08	20 Extr	1.35	
25 Fund.	1 Perm	1.08	21 Extr	1.35	
26 Fund.	1 Perm	1.08	22 Extr	1.35	
27 Fund.	1 Perm	1.08	23 Extr	1.35	
28 Fund.	1 Perm	1.08	24 Extr	1.35	
29 Fund.	1 Perm	1.08	25 Extr	1.35	
30 Fund.	1 Perm	1.08	26 Extr	1.35	
31 Fund.	1 Perm	0.90	2 Extr	1.35	
32 Fund.	1 Perm	0.90	2 psi0	1.35	
33 Fund.	1 Perm	0.90	3 Extr	1.35	
34 Fund.	1 Perm	0.90	3 psi0	1.35	
35 Fund.	1 Perm	0.90	4 Extr	1.35	
36 Fund.	1 Perm	0.90	5 Extr	1.35	
37 Fund.	1 Perm	0.90	6 Extr	1.35	
38 Fund.	1 Perm	0.90	7 Extr	1.35	
39 Fund.	1 Perm	0.90	8 Extr	1.35	
40 Fund.	1 Perm	0.90	9 Extr	1.35	
41 Fund.	1 Perm	0.90	10 Extr	1.35	
42 Fund.	1 Perm	0.90	11 Extr	1.35	
43 Fund.	1 Perm	0.90	12 Extr	1.35	
44 Fund.	1 Perm	0.90	13 Extr	1.35	

45 Fund.	1 Perm	0.90	14	Extr	1.35		
46 Fund.	1 Perm	0.90	15	Extr	1.35		
47 Fund.	1 Perm	0.90	16	Extr	1.35		
48 Fund.	1 Perm	0.90	17	Extr	1.35		
49 Fund.	1 Perm	0.90	18	Extr	1.35		
50 Fund.	1 Perm	0.90	19	Extr	1.35		
51 Fund.	1 Perm	0.90	20	Extr	1.35		
52 Fund.	1 Perm	0.90	21	Extr	1.35		
53 Fund.	1 Perm	0.90	22	Extr	1.35		
54 Fund.	1 Perm	0.90	23	Extr	1.35		
55 Fund.	1 Perm	0.90	24	Extr	1.35		
56 Fund.	1 Perm	0.90	25	Extr	1.35		
57 Fund.	1 Perm	0.90	26	Extr	1.35		
58 Fund.	1 Perm	1.08	4	Extr	1.35	2 psi0	1.35
59 Fund.	1 Perm	1.08	4	Extr	1.35	3 psi0	1.35
60 Fund.	1 Perm	1.08	5	Extr	1.35	2 psi0	1.35
61 Fund.	1 Perm	1.08	5	Extr	1.35	3 psi0	1.35
62 Fund.	1 Perm	1.08	6	Extr	1.35	2 psi0	1.35
63 Fund.	1 Perm	1.08	6	Extr	1.35	3 psi0	1.35
64 Fund.	1 Perm	1.08	7	Extr	1.35	2 psi0	1.35
65 Fund.	1 Perm	1.08	7	Extr	1.35	3 psi0	1.35
66 Fund.	1 Perm	1.08	8	Extr	1.35	2 psi0	1.35
67 Fund.	1 Perm	1.08	8	Extr	1.35	3 psi0	1.35
68 Fund.	1 Perm	1.08	9	Extr	1.35	2 psi0	1.35
69 Fund.	1 Perm	1.08	9	Extr	1.35	3 psi0	1.35
70 Fund.	1 Perm	1.08	10	Extr	1.35	2 psi0	1.35
71 Fund.	1 Perm	1.08	10	Extr	1.35	3 psi0	1.35
72 Fund.	1 Perm	1.08	11	Extr	1.35	2 psi0	1.35
73 Fund.	1 Perm	1.08	11	Extr	1.35	3 psi0	1.35
74 Fund.	1 Perm	1.08	12	Extr	1.35	2 psi0	1.35

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BELASTINGCOMBINATIES

BC Type	BG Gen. Factor				
75 Fund.	1 Perm	1.08	12 Extr	1.35	3 psio 1.35
76 Fund.	1 Perm	1.08	13 Extr	1.35	2 psio 1.35
77 Fund.	1 Perm	1.08	13 Extr	1.35	3 psio 1.35
78 Fund.	1 Perm	1.08	14 Extr	1.35	2 psio 1.35
79 Fund.	1 Perm	1.08	14 Extr	1.35	3 psio 1.35
80 Fund.	1 Perm	1.08	15 Extr	1.35	2 psio 1.35
81 Fund.	1 Perm	1.08	15 Extr	1.35	3 psio 1.35
82 Fund.	1 Perm	1.08	16 Extr	1.35	2 psio 1.35
83 Fund.	1 Perm	1.08	16 Extr	1.35	3 psio 1.35
84 Fund.	1 Perm	1.08	17 Extr	1.35	2 psio 1.35
85 Fund.	1 Perm	1.08	17 Extr	1.35	3 psio 1.35
86 Fund.	1 Perm	1.08	18 Extr	1.35	2 psio 1.35
87 Fund.	1 Perm	1.08	18 Extr	1.35	3 psio 1.35
88 Fund.	1 Perm	1.08	19 Extr	1.35	2 psio 1.35
89 Fund.	1 Perm	1.08	19 Extr	1.35	3 psio 1.35
90 Fund.	1 Perm	1.08	20 Extr	1.35	2 psio 1.35
91 Fund.	1 Perm	1.08	20 Extr	1.35	3 psio 1.35
92 Fund.	1 Perm	1.08	21 Extr	1.35	2 psio 1.35
93 Fund.	1 Perm	1.08	21 Extr	1.35	3 psio 1.35
94 Fund.	1 Perm	1.08	22 Extr	1.35	2 psio 1.35
95 Fund.	1 Perm	1.08	22 Extr	1.35	3 psio 1.35
96 Fund.	1 Perm	1.08	23 Extr	1.35	2 psio 1.35
97 Fund.	1 Perm	1.08	23 Extr	1.35	3 psio 1.35
98 Fund.	1 Perm	1.08	24 Extr	1.35	2 psio 1.35
99 Fund.	1 Perm	1.08	24 Extr	1.35	3 psio 1.35
100 Fund.	1 Perm	1.08	25 Extr	1.35	2 psio 1.35
101 Fund.	1 Perm	1.08	25 Extr	1.35	3 psio 1.35
102 Fund.	1 Perm	1.08	26 Extr	1.35	2 psio 1.35
103 Fund.	1 Perm	1.08	26 Extr	1.35	3 psio 1.35
104 Fund.	1 Perm	0.90	4 Extr	1.35	2 psio 1.35
105 Fund.	1 Perm	0.90	4 Extr	1.35	3 psio 1.35
106 Fund.	1 Perm	0.90	5 Extr	1.35	2 psio 1.35
107 Fund.	1 Perm	0.90	5 Extr	1.35	3 psio 1.35
108 Fund.	1 Perm	0.90	6 Extr	1.35	2 psio 1.35
109 Fund.	1 Perm	0.90	6 Extr	1.35	3 psio 1.35
110 Fund.	1 Perm	0.90	7 Extr	1.35	2 psio 1.35
111 Fund.	1 Perm	0.90	7 Extr	1.35	3 psio 1.35
112 Fund.	1 Perm	0.90	8 Extr	1.35	2 psio 1.35
113 Fund.	1 Perm	0.90	8 Extr	1.35	3 psio 1.35
114 Fund.	1 Perm	0.90	9 Extr	1.35	2 psio 1.35
115 Fund.	1 Perm	0.90	9 Extr	1.35	3 psio 1.35
116 Fund.	1 Perm	0.90	10 Extr	1.35	2 psio 1.35
117 Fund.	1 Perm	0.90	10 Extr	1.35	3 psio 1.35
118 Fund.	1 Perm	0.90	11 Extr	1.35	2 psio 1.35
119 Fund.	1 Perm	0.90	11 Extr	1.35	3 psio 1.35
120 Fund.	1 Perm	0.90	12 Extr	1.35	2 psio 1.35
121 Fund.	1 Perm	0.90	12 Extr	1.35	3 psio 1.35
122 Fund.	1 Perm	0.90	13 Extr	1.35	2 psio 1.35
123 Fund.	1 Perm	0.90	13 Extr	1.35	3 psio 1.35
124 Fund.	1 Perm	0.90	14 Extr	1.35	2 psio 1.35
125 Fund.	1 Perm	0.90	14 Extr	1.35	3 psio 1.35
126 Fund.	1 Perm	0.90	15 Extr	1.35	2 psio 1.35
127 Fund.	1 Perm	0.90	15 Extr	1.35	3 psio 1.35
128 Fund.	1 Perm	0.90	16 Extr	1.35	2 psio 1.35
129 Fund.	1 Perm	0.90	16 Extr	1.35	3 psio 1.35
130 Fund.	1 Perm	0.90	17 Extr	1.35	2 psio 1.35
131 Fund.	1 Perm	0.90	17 Extr	1.35	3 psio 1.35
132 Fund.	1 Perm	0.90	18 Extr	1.35	2 psio 1.35
133 Fund.	1 Perm	0.90	18 Extr	1.35	3 psio 1.35
134 Fund.	1 Perm	0.90	19 Extr	1.35	2 psio 1.35
135 Fund.	1 Perm	0.90	19 Extr	1.35	3 psio 1.35
136 Fund.	1 Perm	0.90	20 Extr	1.35	2 psio 1.35
137 Fund.	1 Perm	0.90	20 Extr	1.35	3 psio 1.35
138 Fund.	1 Perm	0.90	21 Extr	1.35	2 psio 1.35
139 Fund.	1 Perm	0.90	21 Extr	1.35	3 psio 1.35
140 Fund.	1 Perm	0.90	22 Extr	1.35	2 psio 1.35
141 Fund.	1 Perm	0.90	22 Extr	1.35	3 psio 1.35
142 Fund.	1 Perm	0.90	23 Extr	1.35	2 psio 1.35
143 Fund.	1 Perm	0.90	23 Extr	1.35	3 psio 1.35
144 Fund.	1 Perm	0.90	24 Extr	1.35	2 psio 1.35
145 Fund.	1 Perm	0.90	24 Extr	1.35	3 psio 1.35
146 Fund.	1 Perm	0.90	25 Extr	1.35	2 psio 1.35
147 Fund.	1 Perm	0.90	25 Extr	1.35	3 psio 1.35
148 Fund.	1 Perm	0.90	26 Extr	1.35	2 psio 1.35
149 Fund.	1 Perm	0.90	26 Extr	1.35	3 psio 1.35
150 Kar.	1 Perm	1.00	2 Extr	1.00	
151 Kar.	1 Perm	1.00	3 Extr	1.00	
152 Kar.	1 Perm	1.00	4 Extr	1.00	
153 Kar.	1 Perm	1.00	5 Extr	1.00	
154 Kar.	1 Perm	1.00	6 Extr	1.00	
155 Kar.	1 Perm	1.00	7 Extr	1.00	
156 Kar.	1 Perm	1.00	8 Extr	1.00	
157 Kar.	1 Perm	1.00	9 Extr	1.00	
158 Kar.	1 Perm	1.00	10 Extr	1.00	
159 Kar.	1 Perm	1.00	11 Extr	1.00	
160 Kar.	1 Perm	1.00	12 Extr	1.00	

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BELASTINGCOMBINATIES

BC Type	BG Gen. Factor				
161 Kar.	1 Perm	1.00	13 Extr	1.00	
162 Kar.	1 Perm	1.00	14 Extr	1.00	
163 Kar.	1 Perm	1.00	15 Extr	1.00	
164 Kar.	1 Perm	1.00	16 Extr	1.00	
165 Kar.	1 Perm	1.00	17 Extr	1.00	
166 Kar.	1 Perm	1.00	18 Extr	1.00	
167 Kar.	1 Perm	1.00	19 Extr	1.00	
168 Kar.	1 Perm	1.00	20 Extr	1.00	
169 Kar.	1 Perm	1.00	21 Extr	1.00	
170 Kar.	1 Perm	1.00	22 Extr	1.00	
171 Kar.	1 Perm	1.00	23 Extr	1.00	
172 Kar.	1 Perm	1.00	24 Extr	1.00	
173 Kar.	1 Perm	1.00	25 Extr	1.00	
174 Kar.	1 Perm	1.00	26 Extr	1.00	
175 Kar.	1 Perm	1.00	4 Extr	1.00	2 psio 1.00
176 Kar.	1 Perm	1.00	4 Extr	1.00	3 psio 1.00
177 Kar.	1 Perm	1.00	5 Extr	1.00	2 psio 1.00
178 Kar.	1 Perm	1.00	5 Extr	1.00	3 psio 1.00
179 Kar.	1 Perm	1.00	6 Extr	1.00	2 psio 1.00
180 Kar.	1 Perm	1.00	6 Extr	1.00	3 psio 1.00
181 Kar.	1 Perm	1.00	7 Extr	1.00	2 psio 1.00
182 Kar.	1 Perm	1.00	7 Extr	1.00	3 psio 1.00
183 Kar.	1 Perm	1.00	8 Extr	1.00	2 psio 1.00
184 Kar.	1 Perm	1.00	8 Extr	1.00	3 psio 1.00
185 Kar.	1 Perm	1.00	9 Extr	1.00	2 psio 1.00
186 Kar.	1 Perm	1.00	9 Extr	1.00	3 psio 1.00
187 Kar.	1 Perm	1.00	10 Extr	1.00	2 psio 1.00
188 Kar.	1 Perm	1.00	10 Extr	1.00	3 psio 1.00
189 Kar.	1 Perm	1.00	11 Extr	1.00	2 psio 1.00
190 Kar.	1 Perm	1.00	11 Extr	1.00	3 psio 1.00
191 Kar.	1 Perm	1.00	12 Extr	1.00	2 psio 1.00
192 Kar.	1 Perm	1.00	12 Extr	1.00	3 psio 1.00
193 Kar.	1 Perm	1.00	13 Extr	1.00	2 psio 1.00
194 Kar.	1 Perm	1.00	13 Extr	1.00	3 psio 1.00
195 Kar.	1 Perm	1.00	14 Extr	1.00	2 psio 1.00
196 Kar.	1 Perm	1.00	14 Extr	1.00	3 psio 1.00
197 Kar.	1 Perm	1.00	15 Extr	1.00	2 psio 1.00
198 Kar.	1 Perm	1.00	15 Extr	1.00	3 psio 1.00
199 Kar.	1 Perm	1.00	16 Extr	1.00	2 psio 1.00
200 Kar.	1 Perm	1.00	16 Extr	1.00	3 psio 1.00
201 Kar.	1 Perm	1.00	17 Extr	1.00	2 psio 1.00
202 Kar.	1 Perm	1.00	17 Extr	1.00	3 psio 1.00
203 Kar.	1 Perm	1.00	18 Extr	1.00	2 psio 1.00
204 Kar.	1 Perm	1.00	18 Extr	1.00	3 psio 1.00
205 Kar.	1 Perm	1.00	19 Extr	1.00	2 psio 1.00
206 Kar.	1 Perm	1.00	19 Extr	1.00	3 psio 1.00
207 Kar.	1 Perm	1.00	20 Extr	1.00	2 psio 1.00
208 Kar.	1 Perm	1.00	20 Extr	1.00	3 psio 1.00
209 Kar.	1 Perm	1.00	21 Extr	1.00	2 psio 1.00
210 Kar.	1 Perm	1.00	21 Extr	1.00	3 psio 1.00
211 Kar.	1 Perm	1.00	22 Extr	1.00	2 psio 1.00
212 Kar.	1 Perm	1.00	22 Extr	1.00	3 psio 1.00
213 Kar.	1 Perm	1.00	23 Extr	1.00	2 psio 1.00
214 Kar.	1 Perm	1.00	23 Extr	1.00	3 psio 1.00
215 Kar.	1 Perm	1.00	24 Extr	1.00	2 psio 1.00
216 Kar.	1 Perm	1.00	24 Extr	1.00	3 psio 1.00
217 Kar.	1 Perm	1.00	25 Extr	1.00	2 psio 1.00
218 Kar.	1 Perm	1.00	25 Extr	1.00	3 psio 1.00
219 Kar.	1 Perm	1.00	26 Extr	1.00	2 psio 1.00
220 Kar.	1 Perm	1.00	26 Extr	1.00	3 psio 1.00
221 Blij.	1 Perm	1.00			

GUNSTIGE WERKING PERMANENTE BELASTINGEN

BC Staven met gunstige werking

- 1 Geen
- 2 Geen
- 3 Alle staven de factor:0.90
- 4 Geen
- 5 Geen
- 6 Geen
- 7 Geen
- 8 Geen
- 9 Geen
- 10 Geen
- 11 Geen
- 12 Geen
- 13 Geen
- 14 Geen
- 15 Geen
- 16 Geen
- 17 Geen
- 18 Geen
- 19 Geen
- 20 Geen

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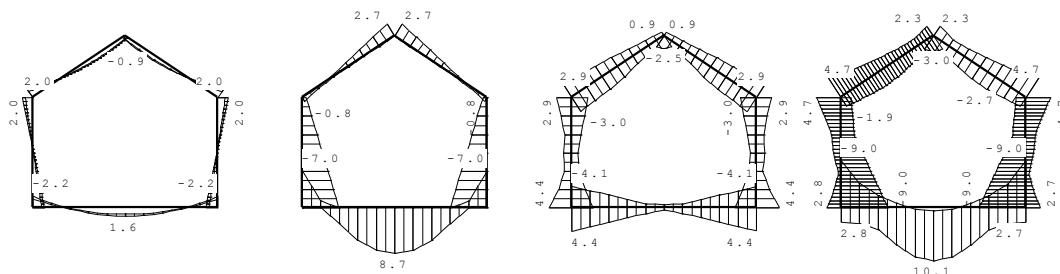
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OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES**MOMENTEN** 2e orde

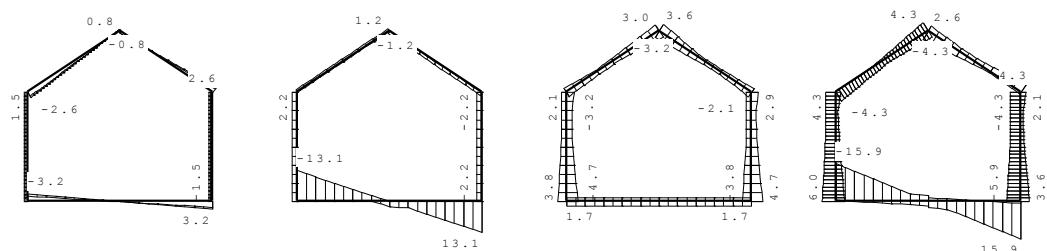
Fundamentele combinatie



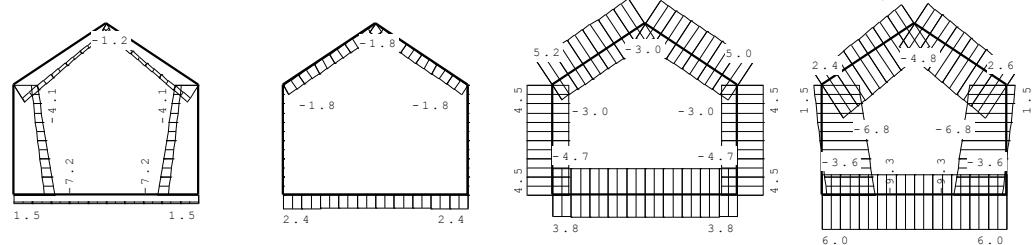
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DWARSKRACHTEN 2e orde

Fundamentele combinatie

**NORMAALKRACHTEN** 2e orde

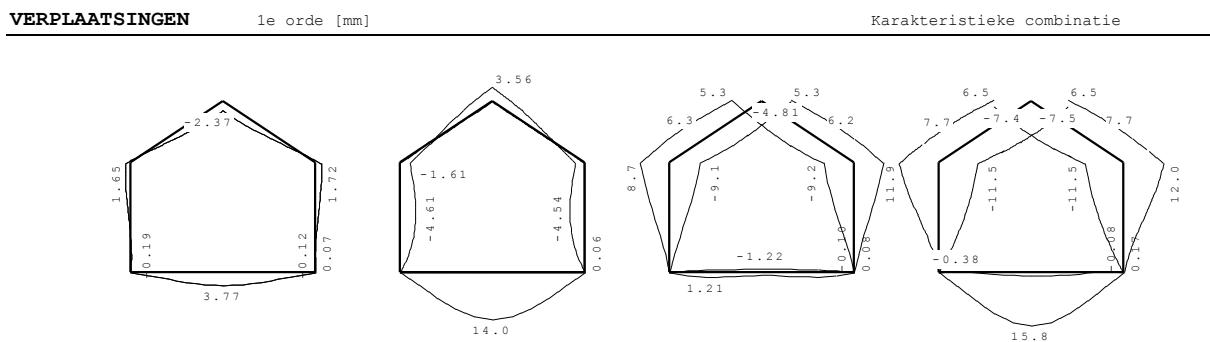
Fundamentele combinatie

**REACTIES** 2e orde

Fundamentele combinatie

Kn.	X-min	X-max	Z-min	Z-max	M-min	M-max
1	0.00	0.00	7.72	10.42		
5			7.72	10.42		
6	0.00	0.00	0.00	13.12		
10			0.00	13.12		
11	-7.38	7.38	-4.64	4.13		
15			-4.43	4.13		
16	-7.35	7.35	3.29	22.39		
20			3.08	22.39		

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OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES

MATERIAALGEGEVENS

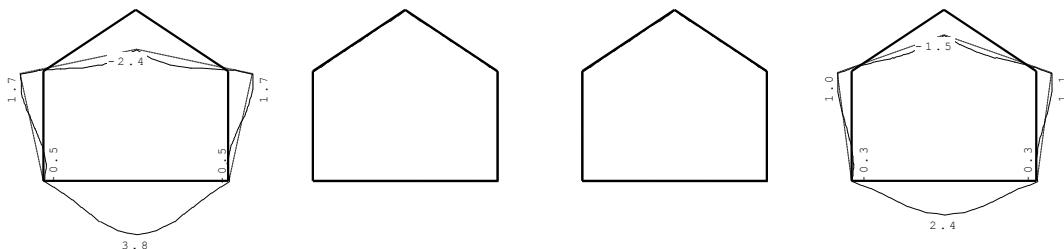
Materiaal	$f_{m, y, k}$ [N/mm ²]	ρ_k [kg/m ³]	ρ_{mean} [kg/m ³]	$f_{t, 0, k}$ [N/mm ²]	$f_{t, 90, k}$ [N/mm ²]	$f_{c, 0, k}$ [N/mm ²]	$f_{c, 90, k}$ [N/mm ²]	$f_{v, k}$ [N/mm ²]
C18	18	320	380	11	0.4	18	2.2	3.4

MATERIAALGEGEVENS (vervolg)

Materiaal	G_{mean} [N/mm ²]	$E_{0, 0, 5}$ [N/mm ²]	$E_{0, mean}$ [N/mm ²]	$E_{0, mean, t}$ [N/mm ²]	Klimaatklasse	k_{def}	$E_{mean, t, fin}$ [N/mm ²]
C18	560	6000	300	9000	I	0.60	5625

VERVORMINGEN w1

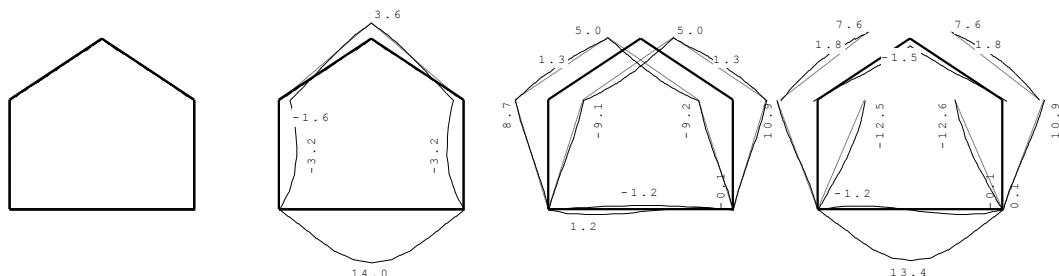
Blijvende combinatie



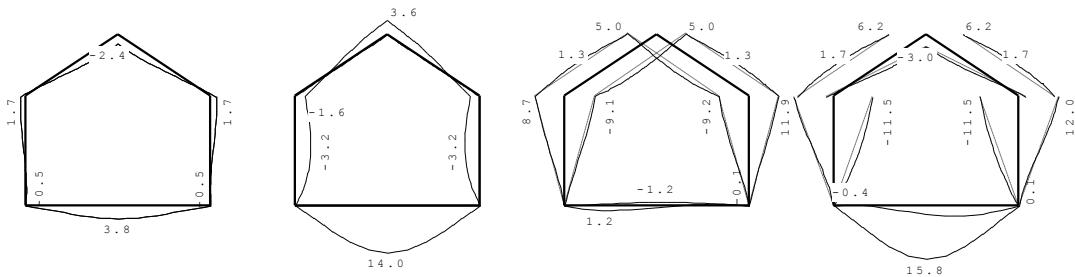
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VERVORMINGEN Wbij

Karakteristieke combinatie

**VERVORMINGEN Wmax**

Karakteristieke combinatie

**DOORBUIGINGEN**

Karakteristieke combinatie

Nr.	staven	Zijde	positie	l _{rep}	w ₁	w ₂	-- w _{bij} --	w _{tot}	w _c	-- w _{max} --	
				[m]	[mm]	[mm]	[mm] [l _{rep} /]	[mm]	[mm]	[mm] [l _{rep} /]	
2	2	Neg.	/	5769	-3.1			-3.1	-3.1	1833	
3	3	Neg.	1.442	2884	-0.5			-0.5	-0.5	6080	
3	3	Pos.	/	5769	3.1			3.1	3.1	1833	
5	5	Pos.	2.400	4800	3.8			3.8	3.8	1273	
7	7	Pos.	/	5769		5.1	1122	5.1	5.1	1122	
8	8	Neg.	/	5769		-5.1	1122	-5.1	-5.1	1122	
8	8	Pos.	1.442	2884		0.8	3596	0.8	0.8	3596	
10	10	Pos.	2.400	4800		14.0	344	14.0	14.0	344	
12	12	Neg.	1.070	2884		-1.3	2203	-1.3	-1.3	2203	
12	12	Pos.	1.361	2884		1.3	2145	1.3	1.3	2145	
13	13	Neg.	1.815	2884		-1.3	2214	-1.3	-1.3	2214	
13	13	Pos.	1.523	2884		1.3	2158	1.3	1.3	2158	
15	15	Neg.	2.400	4800		-1.2	3945	-1.2	-1.2	3945	
15	15	Pos.	3.840	4800		1.2	3982	1.2	1.2	3982	
17	17	Neg.	/	5769	-2.0	-2.1	2770	-4.1	-4.1	1424	
17	17	Pos.	1.442	2884	-0.3	2.0	1477	1.7	1.7	1742	
18	18	Neg.	/	5769	2.0	-2.2	2658	-0.2	-0.2	28523	
18	18	Pos.	1.442	2884	-0.3	1.9	1484	1.6	1.6	1752	
20	20	Neg.	3.840	4800	1.1	-1.2	4156	-0.0	-0.0	>99999	
20	20	Pos.	2.400	4800	2.4	13.4	357	15.8	15.8	304	

HORIZONTALE VERPLAATSSING

Karakteristieke combinatie

Nr.	staven	Zijde	h	w ₁	w ₂	w ₃	-- w _{tot} --	
			[mm]	[mm]	[mm]	[mm]	[mm] [h/]	
1	1	Pos.	2850	1.7			1.7	1726
4	4	Neg.	2850	-1.7			-1.7	1726
6	6	Neg.	2850		-2.9	-2.9	980	
9	9	Pos.	2850		2.9	2.9	980	
11	11	Neg.	2850		-9.1	-9.1	312	
11	11	Pos.	2850		8.7	8.7	327	
14	14	Neg.	2850		-8.7	-8.7	329	
14	14	Pos.	2850		9.1	9.1	314	
16	16	Neg.	2850	1.0	-12.5	-11.5	248	
16	16	Pos.	2850	1.0	10.9	11.9	239	

Report code: 16.0462-3

Date: 24 July 2017

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Project..: WikihouseNL
Onderdeel: langswoning

HORIZONTALE VERPLAATSING

Nr.	staven	Zijde	h [mm]	w ₁ [mm]	w ₂ [mm]	w ₃ [mm]	-- w _{t o t} -- [mm]	Karakteristieke combinatie [h/j]
19	19	Neg.	2850	-1.0		-10.8	-11.9	240
19	19	Pos.	2850	-1.0		12.5	11.4	250

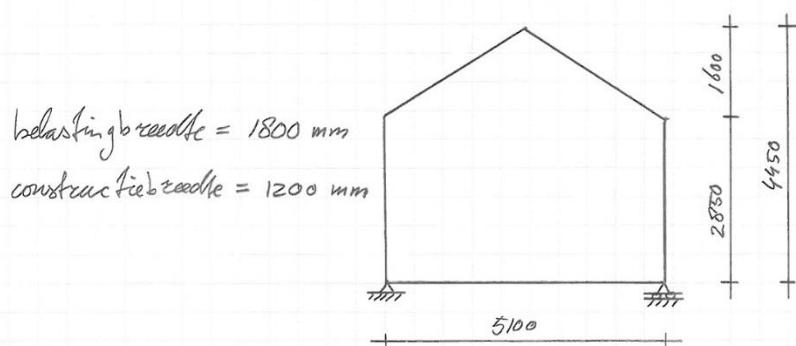
TOTALE HORIZONTALE VERPLAATSING

knoop	Zijde	h [mm]	w ₁ [mm]	w ₂ [mm]	w ₃ [mm]	-- w _{t o t} -- [mm]	Karakteristieke combinatie [h/j]
17	Neg.	2850	-1.7		-10.3	-11.9	239
19	Pos.	2850	1.7		10.3	12.0	237

Annex 5: Checks main slices + detail calculations

Controle berekening van de hoofddoorsnede

160462



van links naar rechts in Teknosoft.

blijvende belasting

middellange belasting

kortdurende belasting

UGT

controle verplaatsingen poortaal (horizontaal)

$$Weis = \frac{h}{300} = \frac{2850}{300} = 9,5 \text{ mm}$$

$$\text{optredend} = (1,7 + 9,2) \cdot \frac{1200}{1800} = 7,3 \text{ mm} \leq Weis = 9,5 \text{ mm}$$

reductie van de verplaatsingen
1800 mm belasting op 1200 mm constructie

? voldoet.

controle verplaatsingen vloer (verticale doorbuiging)

$$Weis = 0,004 \cdot l = 0,004 \cdot 5100 = 20,4 \text{ mm}$$

$$\text{optredend} = (3,8 + 14,0) \cdot \frac{1200}{1800} = 11,9 \text{ mm} \leq Weis = 20,4 \text{ mm}$$

controle moment in vloer

$$Md_{\text{op}} = 10,1 \text{ kNm}$$

$$\text{belastingbreedte} = 1800 \text{ mm}$$

$$Md_{\text{mid}} = 12,8 \text{ kNm}$$

$$\text{constructiebreedte} = 1200 \text{ mm}$$

zie uitvoer testresultaten

in voordeur

$$Md_{\text{optredend}} = 10,1 \text{ kNm}$$

$$\leq Md_{\text{mid}} = 12,8 \text{ kNm}$$

? voldoet.

controle moment in portaal fpu aandrukking vloer/wand 160462
 $M_d, \text{optredend} = 9,0 \text{ kNm}$ belasting breedte = 1800 mm
 $M_d, \text{kort} = 19,5 \text{ kNm}$ constructiebreedte = 1200 mm
 (zie uitvoer testresultaten) ivm voordeur

$$M_d, \text{optredend} = 9,0 \text{ kNm} \leq M_d, \text{kort} = 19,5 \text{ kNm}$$

is voldoet.

controle dwarskracht in vloer

$V_d, \text{optredend} = 15,9 \text{ kN}$	belasting breedte = 1800 mm
$V_d, \text{middellang} = 16,0 \text{ kN}$	constructiebreedte = 1200 mm
(zie uitvoer testresultaten)	ivm voordeur

$$V_d, \text{optredend} = 15,9 \text{ kN} \leq V_d, \text{middellang} = 16,0 \text{ kN}$$

is voldoet.

controle dwarskracht in portaal

$V_d, \text{optredend} = 6,0 \text{ kN}$	belasting breedte = 1800 mm
$V_d, \text{kort} = 18,0 \text{ kN}$	constructiebreedte = 1200 mm
	ivm voordeur

$$V_d, \text{optredend} = 6,0 \text{ kN} \leq V_d, \text{kort} = 18,0 \text{ kN}$$

is voldoet.

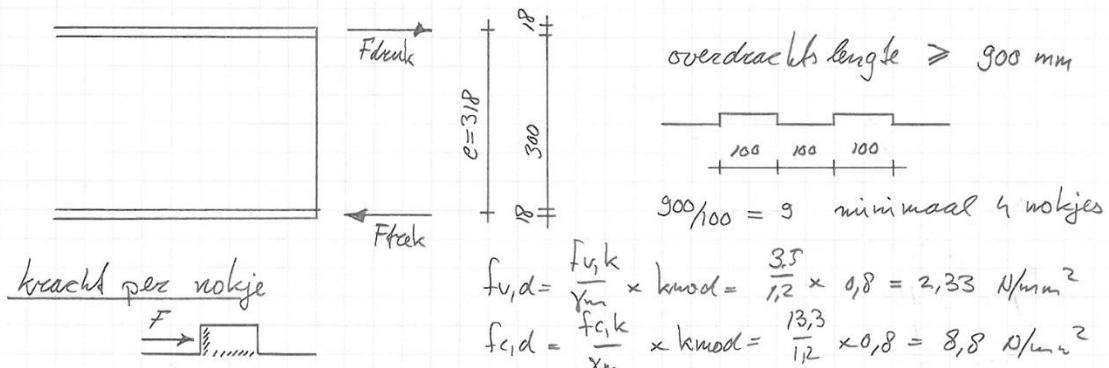
controle buigend moment op onderzoch 160462
 M_d , onderzoch = 9,0 kNm belas. lig breedte = 1800 mm
 met Ts rechter doorvoede

gekosten: $\frac{6 \times \text{lif} 18 \times 300 \text{ mm}}{(\text{standaard } 3 \text{ slaks + } 3 \times \text{extra uitvoeren per } 1800 \text{ mm})}$ Fins varen top laa
 7-laags $f_{t,l,k} = 8,0 \text{ N/mm}^2$

controle buigspanningen lif

 $W = \frac{1}{6} \cdot b \cdot h^2 = \frac{1}{6} \cdot (6 \cdot 18) \cdot 300^2 = 1620 \cdot 10^3 \text{ mm}^3$
 $f_{t,l,k} = 8,0 \text{ N/mm}^2$ zie handbook of Furnish plywood
 $f_{m,d} = \frac{f_{t,l,k}}{\gamma_m} \times \text{kmod} = \frac{8,0}{1,2} \times 0,9 = 6,0 \text{ N/mm}^2$
 $\sigma_{m,d} = \frac{M_d}{W} = \frac{9,0 \cdot 10^6}{1620 \cdot 10^3} = 5,6 \text{ N/mm}^2 \leq f_{m,d} = 6,0 \text{ N/mm}^2$
 § voldoel.

afsluiting breuk op de nokken



$F_d = 2d \cdot A = 2,33 \cdot 18 \cdot 100 \cdot 9 \cdot 10^{-3} = 16,78 \text{ kN per lif}$

$F_d = \bar{o}_{c,d} \cdot A = 8,8 \cdot 18 \cdot 18 \cdot 9 \cdot 10^{-3} = 11,90 \text{ kN per lif moedigend}$

$M_d, \text{opnembaar} = n \cdot F_d \cdot e = 5 \cdot 11,90 \cdot 0,318 = 18,1 \text{ kNm} \geq M_d = 9,0 \text{ kNm}$

§ voldoel

controle buigend moment fpu dakhooft + nok

$$M_d, f_{pu} \text{ dakhooft} = 4,7 \text{ kNm}$$

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gekoren: $3 \times \text{lif} 18 \times 300 \text{ mm}$

(standaard 3 stukken
per 1800 mm)

Fins varen triplex
7-laags

$$f_{t,1} = 8,0 \text{ N/mm}^2$$

controle buigspanningen in lif

$$W = \frac{1}{6} \cdot b \cdot h^2 = \frac{1}{6} \cdot (3 \cdot 18) \cdot 300^2 = 810 \cdot 10^3 \text{ mm}^3$$

$f_{t,1,k} = 8,0 \text{ N/mm}^2$ zie handbook of Finnish plywood; fig 11

$$f_{m,d} = \frac{f_{t,1,k}}{\gamma_m} \times k_{mod} = \frac{8,0}{1,2} \times 0,9 = 6,0 \text{ N/mm}^2$$

$$\sigma_{m,d} = \frac{M_d}{W} = \frac{4,7 \cdot 10^6}{810 \cdot 10^3} = 5,8 \text{ N/mm}^2 \leq f_{m,d} = 6,0 \text{ N/mm}^2$$

≤ voldoel

Berekening bevestiging wikihouse aan stalen fundering 160462
5

tegen opruilen $F_{vrd,Rd} = 9,64 \text{ kN}$ per 1800 mm

tegen afschuiven $F_{hor,Rd} = 7,38 \text{ kN}$ per 1800 mm

gekozen: 2 stakes WKR 035 + 5 stakes nagels $\phi 6,0 \times 60$ $R_{1,k} = 8,5 \text{ kN}$
inclusief
1x bout M10 - 4,6 per onder per 1200 mm
+ 2x bout M10 - 4,6 per 1200 mm

$$f_{v,Rk} = 0,9 \cdot f_{h,k} \cdot t \cdot d = 0,9 \cdot 29,0 \cdot 36 \cdot 4,0 = 1670 \text{ N}$$

$$f_{h,k} = 0,11 \cdot p_k \cdot d^{-0,3} = 0,11 \cdot 400 \cdot 4,0^{-0,3} = 29,0 \text{ N/mm}^2$$

bekeken als dunne staalplaat.

$$M_{y1,Rk} = 0,3 \cdot f_u \cdot d^{3,6} = 0,3 \cdot 600 \cdot 4,0^{2,6} = 6.616$$

$$F_{v,Rk} = 1,15 \cdot \sqrt{2 \cdot M_{y1,Rk} \cdot f_{h,k} \cdot d} = 1,15 \cdot \sqrt{2 \cdot 6.616 \cdot 29,0 \cdot 4,0} = 1.929 \text{ N}$$

$$F_{v,Rd} = \frac{F_{v,Rk}}{\gamma_m} \times k_{mod} = \frac{1929}{1,3} \times 0,8 = 986 \text{ N}$$

$$F_{v,d, \text{opneembare}} = 5 \times 986 \cdot 10^{-3} = 4,930 \text{ kN} \leq R_{1,k} = 8,5 \text{ kN}$$

$$F_{v,d, \text{opneembare}} = 4 \cdot 4,93 = 19,72 \text{ kN} \leq F_{v,Rd} = 9,64 \text{ kN} \text{ is voldoed.}$$

afschuiven kracht via ingeleid via onderplaat. via bouten naar stalen ligger
bouten M10 4 stakes per 1200 mm

$$F_{v,Rk} = 0,9 \cdot 29,0 \cdot 18,0 \cdot 10 = 2088 \text{ N}$$

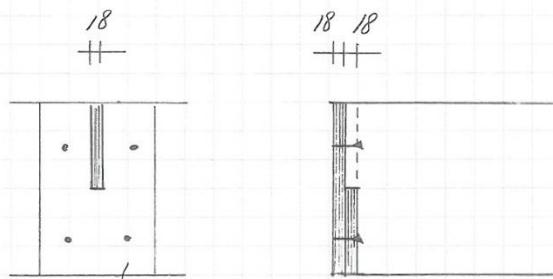
$$F_{v,Rd} = \frac{F_{v,Rk}}{\gamma_m} \times k_{mod} = \frac{2088}{1,3} \times 0,8 = 1.445 \text{ N}$$

$$F_{hor,Rd} = \frac{1200}{1800} \times 7,38 = 4,92 \text{ kN}$$

$$F_{v,d, \text{opneembare}} = 4 \times 1.445 \cdot 10^{-3} = 3,78 \text{ kN} \geq F_{hor,Rd} = 4,92 \text{ kN}$$

is voldoed.

Bewerking tussen schroffen vloer constructie



oplegplaats 18 mm 7-laags fins varenklaar
4x schroeven $\phi 4,0 \times 35$ per oplegplaats.

$$g_d = 1,08 \cdot 0,61 + 1,35 \cdot 2,25 = 3,70 \text{ kN/m}^2$$

$$F_{d, \text{reactie}} = 1/2 \times 0,6 \times 1,2 = 0,36 \text{ kN}$$

controle op leg druk

$$f_{c,+}, k = 13,3 \text{ N/mm}^2$$

$$f_{c,\perp, d} = \frac{13,3}{1,3} \times 0,8 = 8,2 \text{ N/mm}^2$$

$$F_{d, \text{oplegdruck}} = 18 \times 18 \times 8,2 \times 10^{-3} = 2,6 \text{ kN} \geq F_{d, \text{reactie}} = 0,36 \text{ kN}$$

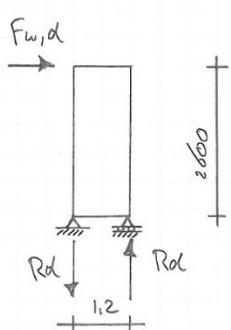
schroef $\phi 4,0 \times 35$ mm 4 stuks praktisch

I voldoet.

controle langs stabiliteit.

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kantelmoment verdeeld over 7 segmenten:



berekening is uitgevoerd zonder koppeling tussen de segmenten

$$g_P(2) = 0,75 \text{ kN/m}^2$$

$$\begin{array}{rcl} \text{oppervlak} & \frac{3,8}{2} \times 5,57 & = 7,80 \\ & 5,57 \times 1,62 \times 1/2 & = +4,51 \\ & & A = 12,31 \text{ m}^2 \quad \text{oppervlak kop gevel} \end{array}$$

$$\text{wrijving} \quad A = 8,8 \times 2 \times \sqrt{1,615^2 + 2,785^2} = 57,3 \text{ m}^2 \quad \text{oppervlak dak}$$

$$12,31 \times (0,8 + 0,7) \times 0,75 = 13,85$$

$$57,3 \times 0,04 \times 0,75 = +1,72$$

$$\begin{aligned} F_{w,k} &= 15,57 \text{ kN} \\ F_{w,d} &= \frac{F_{w,k} \times K_F \times \gamma_Q}{\text{7 segmenten}} \quad \text{correlatie factor volg. 7.2.2.(3)} \\ &= \frac{15,57 \times 0,5 \times 1,5}{7} \times 0,85 = 2,55 \text{ kN} \quad \text{NEN-EN 1991-1-4} \end{aligned}$$

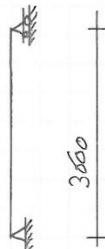
$$R_d = 2,55 \times \frac{2,6}{1,2} = 5,53 \text{ kN} \leq F_{u,d, \text{opneembaar}} = 5,78 \text{ kN}$$

{ } voltoed

zie berekening bewerking dwarsstabilititeit.

Berekening gevleugelen

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$$\text{belastingbreuk} = \frac{1600}{2} + \frac{1600}{2} = 1600 \text{ mm}$$

gekozen: 60 x 180 mm, sterkeklasse C24

$$Weis = \max \left\{ \frac{0,004 \cdot l}{18}, \frac{l}{LBZL 1001} \right\} = 0,004 \cdot 3600 = 14,4 \text{ mm}$$

$$g_{P(2)} = 0,75 \text{ kN/mm}^2 \quad g_k = 1,6 \times (1,4 + 0,2) \times 0,75 = 1,92 \text{ kN/mm}^2$$

$$g_d = g_k \times \gamma_a = 1,92 \times 1,35 = 2,59 \text{ kN/mm}^2$$

$$I = \frac{1}{12} \cdot b \cdot h^3 = \frac{1}{12} \cdot 60 \cdot 180^3 = 2916 \cdot 10^6 \text{ mm}^4$$

$$W_{optredend} = \frac{5}{384} \cdot \frac{1,92 \cdot 3600^4}{11000 \cdot 2916 \cdot 10^6} = 13,1 \text{ mm} \leq 14,4 \text{ mm} \quad \rightarrow \text{voldoed.}$$

$$M_d = \frac{1}{8} \cdot g_d \cdot l^2 = \frac{1}{8} \cdot 2,59 \cdot 3,6^2 = 4,2 \text{ kNm}$$

$$W = \frac{1}{6} \cdot b \cdot h^2 = \frac{1}{6} \cdot 60 \cdot 180^2 = 324 \cdot 10^3 \text{ mm}^3$$

$$\sigma_{m,d} = \frac{M_d}{W} = \frac{4,2 \cdot 10^6}{324 \cdot 10^3} = 13,0 \text{ N/mm}^2$$

$$f_{m,d} = \frac{f_{m,k}}{\gamma_m} \times k_{mod} = \frac{24,0}{1,3} \times 0,9 = 16,6 \text{ N/mm}^2$$

$$\sigma_{m,d} = 13,0 \text{ N/mm}^2 \leq f_{m,d} = 16,6 \text{ N/mm}^2 \rightarrow \text{voldoed.}$$

Annex 6: RothoBlaas corner anchor WKR095

BEAMS	WALLS	PERFORATED PLATES	OUTDOOR	ANCHORS																																																							
CODES AND DIMENSIONS																																																											
WKR 4 mm 4 mm thickness																																																											
①	②	③		CE <small>S235 GALV</small>																																																							
<table border="1"> <thead> <tr> <th>code</th><th>type</th><th>B [mm]</th><th>P [mm]</th><th>H [mm]</th><th>s [mm]</th><th>n Ø5 [pcs]</th><th>n Ø11 [pcs]</th><th>n Ø13,5 [pcs]</th><th>n Ø13,5 x 24,5 [pcs]</th><th></th><th></th><th>pcs/box</th></tr> </thead> <tbody> <tr> <td>①</td><td>PF101180</td><td>WKR095</td><td>65</td><td>88</td><td>95</td><td>4,0</td><td>11</td><td>1</td><td>-</td><td>1</td><td>•</td><td>•</td><td>25</td></tr> <tr> <td>②</td><td>PF101185</td><td>WKR135</td><td>65</td><td>88</td><td>135</td><td>4,0</td><td>16</td><td>1</td><td>1</td><td>1</td><td>•</td><td>•</td><td>25</td></tr> <tr> <td>③</td><td>PF101190</td><td>WKR285</td><td>65</td><td>88</td><td>285</td><td>4,0</td><td>30</td><td>1</td><td>3</td><td>1</td><td>•</td><td>•</td><td>25</td></tr> </tbody> </table>					code	type	B [mm]	P [mm]	H [mm]	s [mm]	n Ø5 [pcs]	n Ø11 [pcs]	n Ø13,5 [pcs]	n Ø13,5 x 24,5 [pcs]			pcs/box	①	PF101180	WKR095	65	88	95	4,0	11	1	-	1	•	•	25	②	PF101185	WKR135	65	88	135	4,0	16	1	1	1	•	•	25	③	PF101190	WKR285	65	88	285	4,0	30	1	3	1	•	•	25
code	type	B [mm]	P [mm]	H [mm]	s [mm]	n Ø5 [pcs]	n Ø11 [pcs]	n Ø13,5 [pcs]	n Ø13,5 x 24,5 [pcs]			pcs/box																																															
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code	type	B [mm]	P [mm]	H [mm]	s [mm]	n Ø5 [pcs]	n Ø11 [pcs]	n Ø13,5 [pcs]	n Ø13,5 x 24,5 [pcs]			pcs/box																																															
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ADDITIONAL PRODUCTS - FASTENERS																																																											
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PF101185 WKR135	nails LBA Ø4,0 x 60	14	20,6 1,00	7	16,9 1,00	710	430																																	
PF101190 WKR285	nails LBA Ø4,0 x 60	-	-	12	23,2 1,00	-	640																																	
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The case with load direction F _{4/5} can be treated as the combination of two different loading conditions as shown in the following sketch:																																								
The verification of the fixing to the concrete must be carried out separately and satisfy both the tensile and shear loading conditions.																																								
For notes and general principles please see p. 184.																																								
WKR				189																																				

Annex 7: Trima plywood: Topfloor Finnish spruce

24-4-2017

Trima plastmateriajien, De leverancier van houtachtig plastmateriaal.

[ProductenZoektool](#)

Topfloor Fins Vuren

Omschrijving

De bekende constructieplaat uit de Finse "Pellos" fabriek. Opgebouwd uit Vuren fineren afkomstig van de fijnspar uit Scandinavië / Finland. Het hout heeft een uniforme geelwitte kleur. De regelmatige groeikenmerken en gunstige gewicht en sterke eigenschappen van het vurenhout vormen de basis voor een sterke en stabiel eindproduct.

De kwaliteit II, betekent een gesloten en geschuurde zichtzijde.

De kwaliteit III, mag open gebreken bevatten.

**Kwaliteit:** II/III**Verlijming:** Exterieur**Productcertificaat:** CE 2+**Milieucertificaat:** PEFC**KOMO:** Ja**Gewicht:** ca. 520 kg/m³**Afmetingen en diktes**

Afmeting in mm:	Diktes in mm:	
2440x1220	18	7 ply

Toepassing

Vloeren, wanden, afscheidingen, verpakking.

Downloads[Handbook of Finnish plywood \(PDF\)](#)