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Horizontal Research Activities Involving SMEs

Collective Research

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**D 3.2. Analysis of Apartment House (AH)  
– Input for WP 4 to 6**

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## Deliverables D3.2: Analysis of Apartment House (AH) – Input for WP 4 to 6

**Project:**                   Enhanced Safety and Efficient Construction of Masonry  
Structures in Europe

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# 1. Introduction

In the first step, a review of mostly common types of apartment-houses will be carried out. Generally the investigations will focus on 4-storey buildings. Also the criterion of dominating long shear walls and the number of shear walls will be taken in consideration.

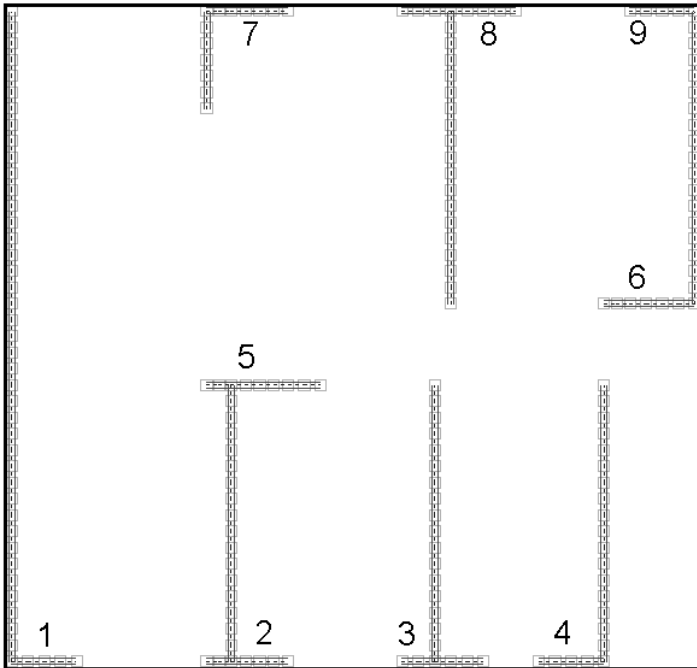
Due to the numerical effort, the investigations were carried out using a smeared modelling of masonry. Thereby local effects, like the influence of the unit size / the format or the perforation pattern couldn't be determined (s. work-package 4). For the calculations, a non-linear behaviour of the masonry will be taken in account.

## 1.1. Plans

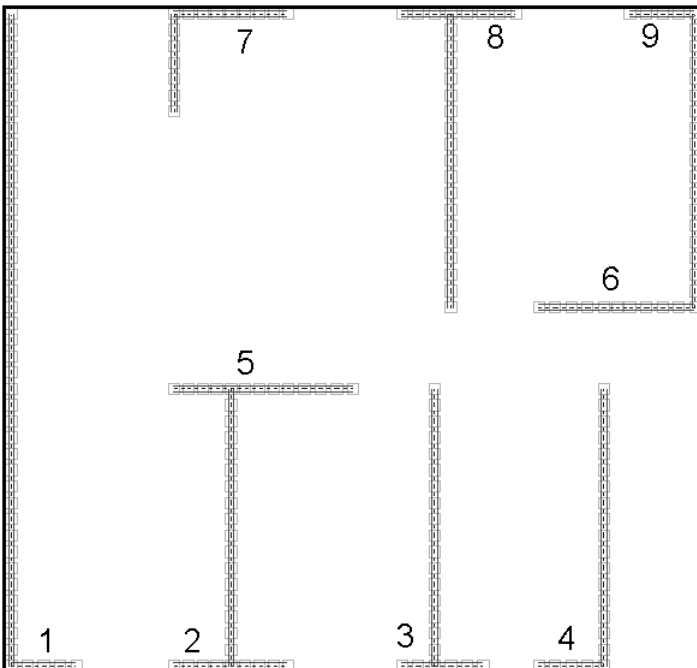
From a number of examined systems two representative plans have been chosen. They are termed basic-plans *Apartment-house-1 (AH1)* and *Apartment-house-2 (AH2)*. In a further step they were modified to type *AH1\** and type *AH2\**, where the number and length of the shear walls were modified.

For the numerical investigations, the system was reduced due to symmetric effects to the half structure (AH1 shown in Figure 1). The staircase is located in the plan down right. For the spacial model the stair-plate has been placed horizontal extending the regular slab.

The structure was investigated under horizontal forces acting in the "weak" direction, i.e. in the given plans from right to left end vice versa. Investigations with impact in the strong direction were left out, as not being relevant.

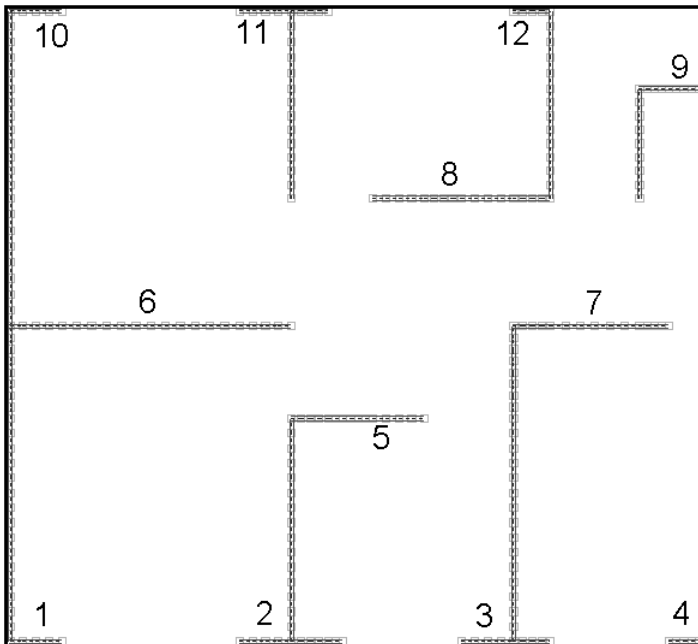


**Figure 1:** Plan of the Apartment-House 1 (AH1) with the numeration of the shear-walls

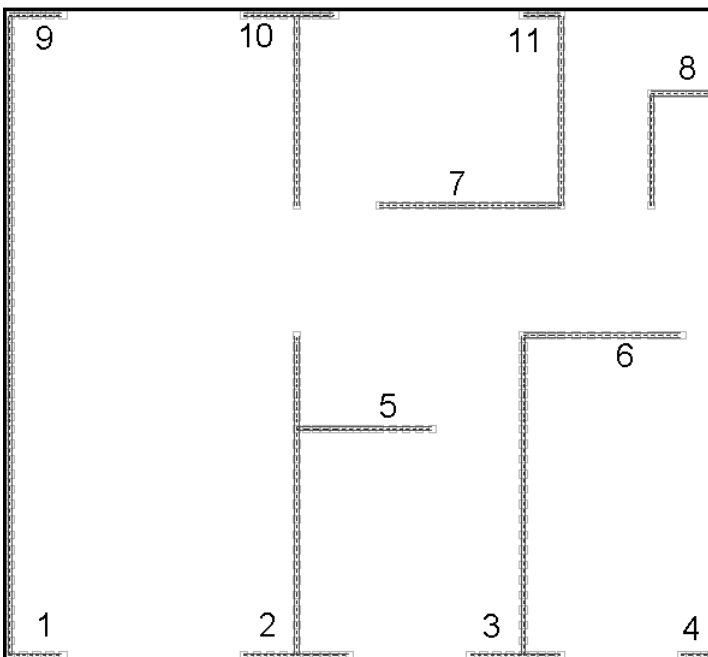


**Figure 2:** Plan of the modified Apartment-House 1 (AH1\*) with the numeration of the shear-walls

Apartment-House 2 has a slightly different plan with the staircase top right.



**Figure 3:** Plan of the Apartment-House 2 (AH2) with the numeration of the shear-walls



**Figure 4:** Plan of the modified Apartment-House 2 (AH2\*) with the numeration of the shear-walls

It was simplifying assumed that the opening for the doors and windows take the full storey height, i. e. no load bearing parapet or lintel exist. This simplification was necessary to reduce the effort of the numerical spacial investigations using the finite-element-method.

As the relevant region under seismic loadings is generally the first storey, all investigations focus on sections in the lower storey. Therefore three sections at the cap of the

wall (about 0,2m under the upper slab), in the middle of the wall and at the base of the wall (about 0,2cm above the fixings) have been chosen.

### 1.2. Geometric parameters

The thickness of the walls was taken to 17<sup>5</sup>, 24 resp. 30 cm. The storey height was taken constantly to 2.75 m with a thickness of the concrete slabs of 20cm.

The length of the walls is given in the following tables:

**Table 1:** Geometric parameters of Apartment House 1 (AH1)

Wall No.:	1	2	3	4	5	6	7	8	9
Length l [m]	1	1,25	1,25	1	1,75	1,4	1,25	1,75	1
thickness d [cm]	24	24	24	24	17.5	24	24	24	24

**Table 2:** Geometric parameters of the modified Apartment House 1 (AH1\*)

Wall No.:	1	2	3	4	5	6	7	8	9
Length l [m]	1	1,75	1,25	1	2.75	2.4	1.75	1.75	1
thickness d [cm]	24	24	24	24	17.5	24	24	24	24

**Table 3:** Geometric parameters of Apartment House 2 (AH2)

Wall No.:	1	2	3	4	5	6	7	8	9	10	11	12
Length l [m]	0.875	1.75	1.5	0.5	2.25	4.75	2.625	3	1	0.875	1.5	0.625
thickness d [cm]	30	30	30	30	24	30	30	30	24	30	30	30

**Table 4:** Geometric parameters of the modified Apartment House 2 (AH2\*)

Wall No.:	1	2	3	4	5	6	7	8	9	10	11
Length l [m]	0.875	1.75	1.5	0.5	2.25	2.625	3	1	0.875	1.5	0.625
thickness d [cm]	30	30	30	30	24	30	30	30	30	30	24

The roof of the apartment house was assumed to be a flat roof without a timber truss structure above. Also no balcony structures were taken into consideration. These simplifications helps the results become more comparable.

The number of storeys was taken to 3 and 4 to cover the mostly found types of apartment-house structures.

### 1.3. System

The numerical investigations have been carried out on a special finite-element system. The RC-slabs were considered remaining uncracked and the vertical shear walls were described by a nonlinear material law.

The interface between horizontal RC-slabs and the vertical masonry walls was assumed to be fix as tension failure perpendicular to the bed joints is included in the material model of the masonry walls.

The basement was assumed to be very stiff and therefore not deciding for the dynamic behaviour of the structure and for the failure modes. Therefore the basement was neglected. The fixing of the structure was assumed to be stiff without any flexibility.

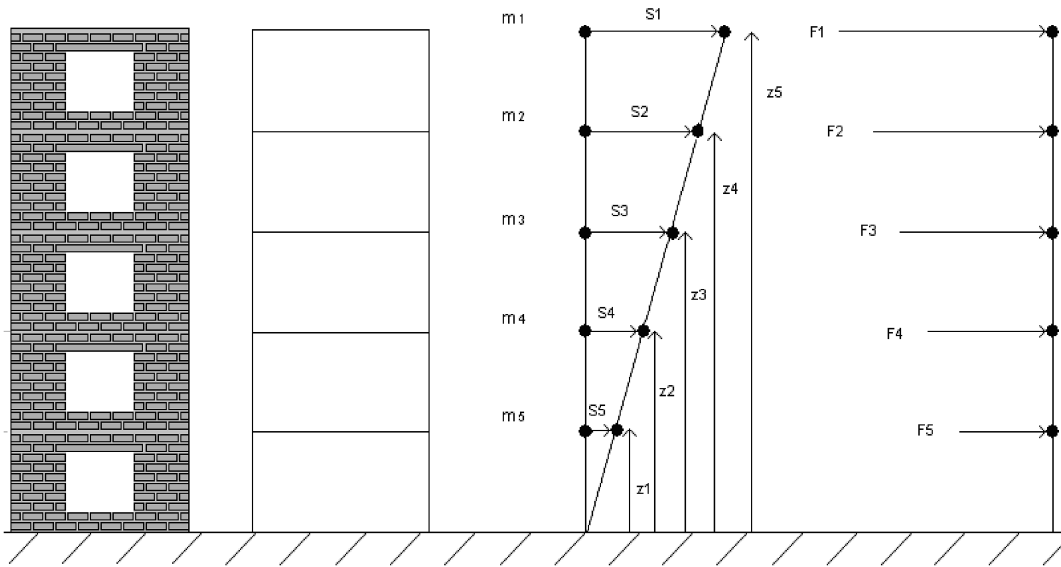
The chosen finite-element-approximation enables to cover shell deformations and also plate deformations. The latter is realized by a splitting of the plate-bending in 2 parallel shell components. Therefore a differentiation in a lower and an upper component resp. side is made.

### 1.4. Loadings

For the calculations vertical and also horizontal loads were considered. The vertical loads were taken to the dead load of the structure and the quasi-permanent value of the live load according Eurocode 8. The vertical loads were simplified applied using a constant plane load in the concrete slabs including also the dead loads of the walls.

The horizontal load was applied by point loads in the slabs in each storey. The position in the horizontal direction was determined in the centre, as no torsional effects were intended. The distribution over the height of the structure was taken to a linear approximation of the first eigenform.





**Figure 5:** Estimated 1<sup>st</sup> eigenform of the structure and corresponding distribution of the horizontal forces  
The direction of the horizontal load was set in the weak direction – in the given plans orientated from right to left and vice versa.

## 2. Material law

### 2.1. Concrete

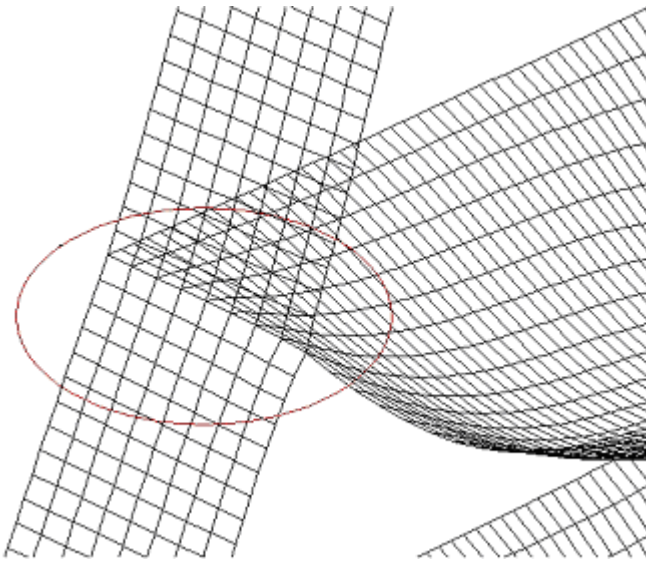
As explained above the concrete slabs were assumed to remain uncracked and behave linear-elastic. The Young-modulus was taken to  $30.000 \text{ N/mm}^2$ . The mass of the concrete was modified to cover the total dead load (concrete slabs and also masonry walls / as the mass of the masonry was neglected to simplify the characteristics of the normal force in the walls in dependence of the height) and the permanently present live load in the load-case earthquake.

### 2.2. Masonry

For the vertical masonry walls under combined vertical and horizontal, i.e. combined normal-, bending- and shear-stress simple non-linearities had to be considered in its material law.

In the preliminary stage several in literature given material and failure models were reviewed and tried to integrate in existing FE-programmes. As a result it was found, that due to the numerical effort (spacial investigations of whole apartment house structures) and suitability of the FE-programmes the only possible failure criterion covered in a smeared material law was a tension failure. As the principal (tension) strain and stress under combined stress divergate from the orientation of the joints in the masonry, the assumption of a general tension failure contains in this regard a specific error. Nevertheless the description of the tension failure perpendicular to the bed joint using an isotropic failure criterion was assumed to be sufficient, proven by calculations on a cantilever wall. Even assuming an evanescently tension strength perpendicular to the bed joint in the calculations, a strength greater than zero has to be supplied for numerical reasons. Also in the regions of singularities (e.g. corners), of load application and of the coupling of horizontal and vertical shell-elements (Figure 6) singular tensions peaks appear due to numerical reasons. Applying the finite-element approximation, with these effects without any tension strength a brittle failure will be indicated. Therefore a small isotropic tension strength of  $0.18$  resp.  $0.3 \text{ MN/m}^2$  was chosen.

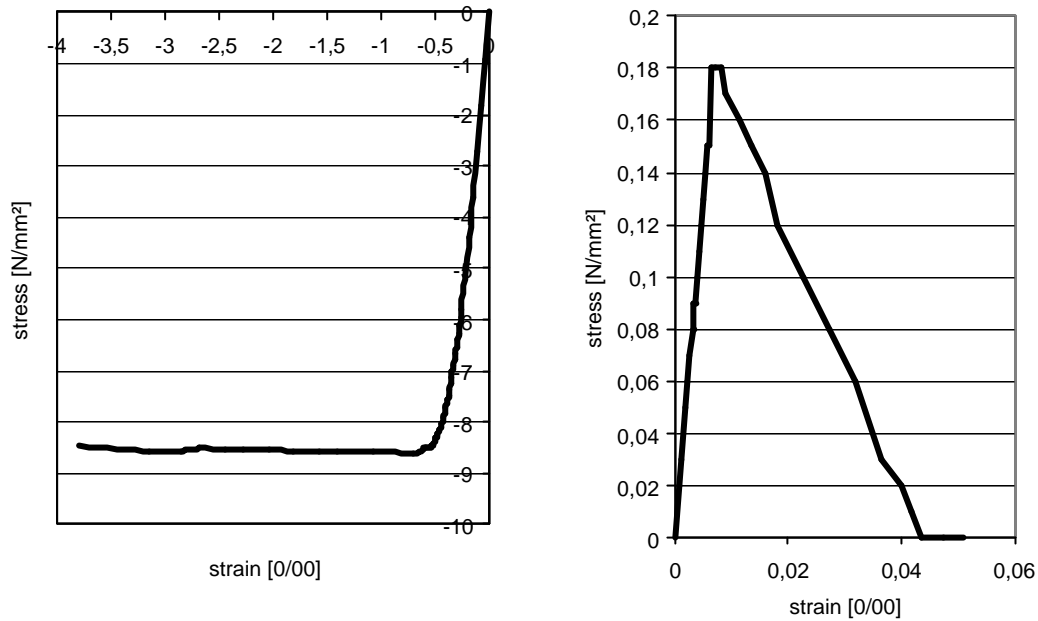
Generally a higher tension strength also can cover possible vertical reinforcement, like found in confined masonry. Therefore a calculation with a tension strength was carried out in addition.



**Figure 6:** Coupling of slabs and walls (deformed shape)

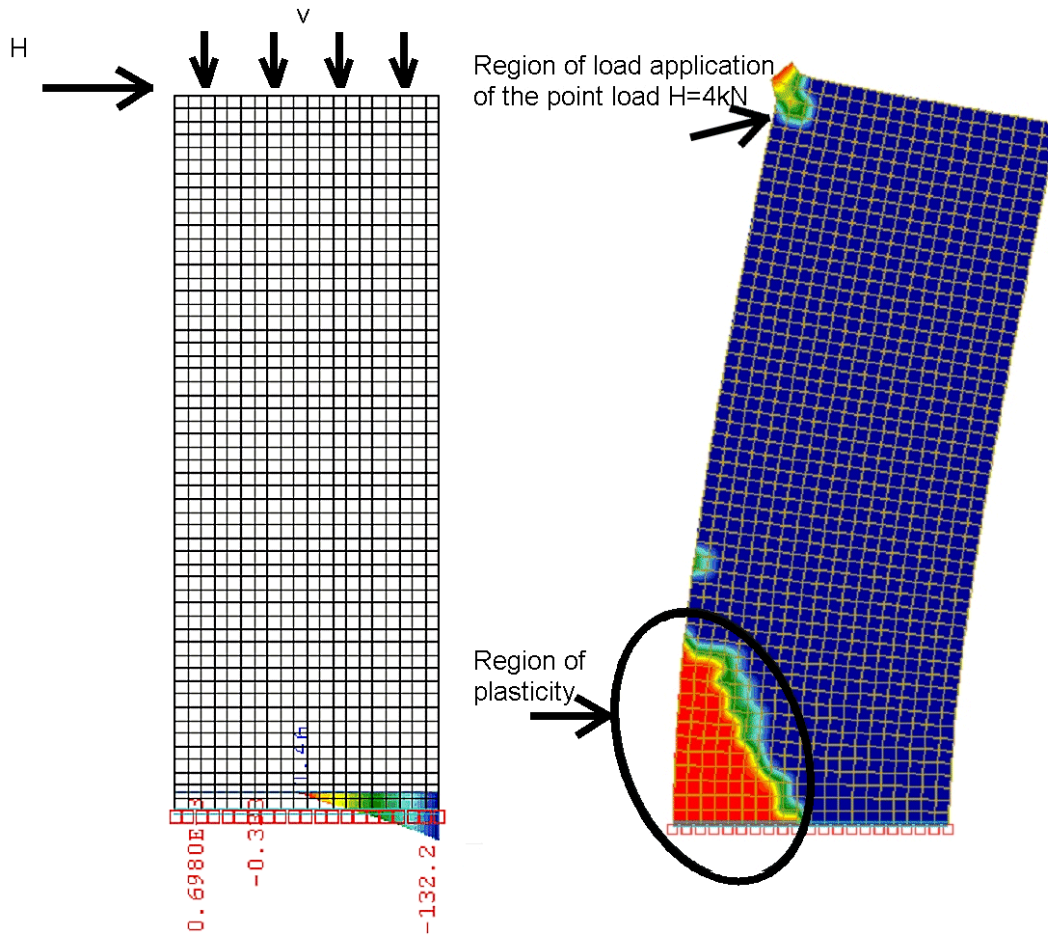
Under compression these kinds of singularity effects also appear, but no brittle failure occurs, as stress rearrangement is possible. On the other hand, under high compression stresses a plasticity of masonry is observed in experimental tests. Thus, for masonry under compression an ideal plastic behaviour was chosen when reaching the compression strength. This effect could be described as ductile.

In the following figures the strain-stress-relationship under compression (compression strength  $8.5 \text{ N/mm}^2$ ) and under tension (tension strength  $0.18 \text{ N/mm}^2$ ) is shown. The behaviour under tension also includes the fracture energy and the used element approximation.

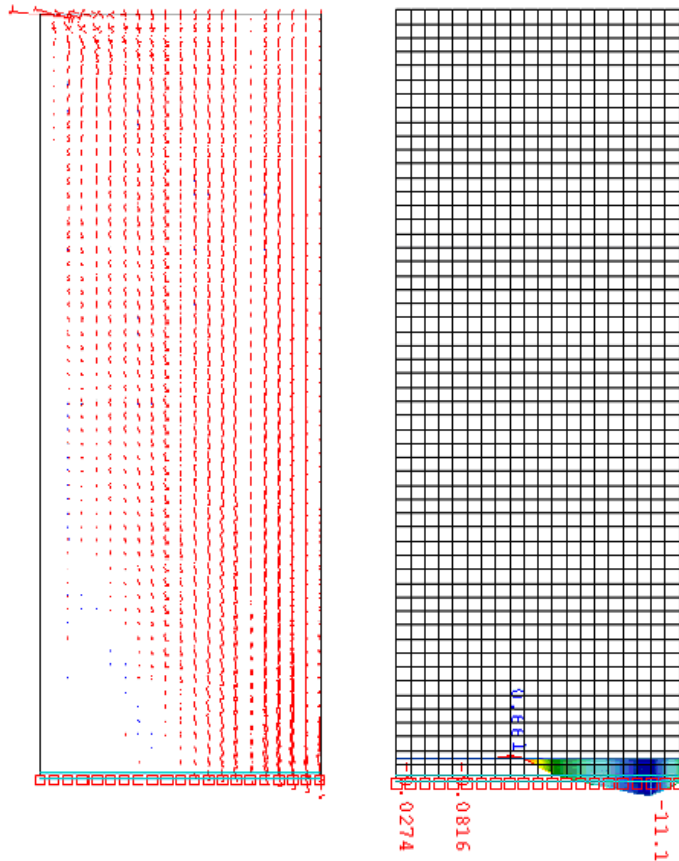


**Figure 7:** Strain-stress-relationship under compression (compression strength 8,5 N/mm<sup>2</sup>) and under tension (tension strength 0,18 N/mm<sup>2</sup>) of a element

The investigations of a cantilever wall ( $l=1\text{m}$ ,  $d=0,24\text{m}$ ,  $h=2,75\text{m}$ ) under normal (at the cap of the wall:  $v=33\text{kN/m}$ ) and horizontal forces ( $H=4\text{kN}$  at the cap of the wall) lead to combined stress and the following figures:



**Figure 8:** Normal stress [kN/m] next to the foundation and regions of plasticity at a cantilever wall under the above given combined action (tension strength taken to  $0.02 \text{ N/mm}^2$ )



**Figure 9:** Principal stresses and distribution of the shear stress [kN/m] next to the foundation under the above given combined action

The determination of regions of plasticising covers tension- and also compression-plasticising.

### 2.3. Numerical effort

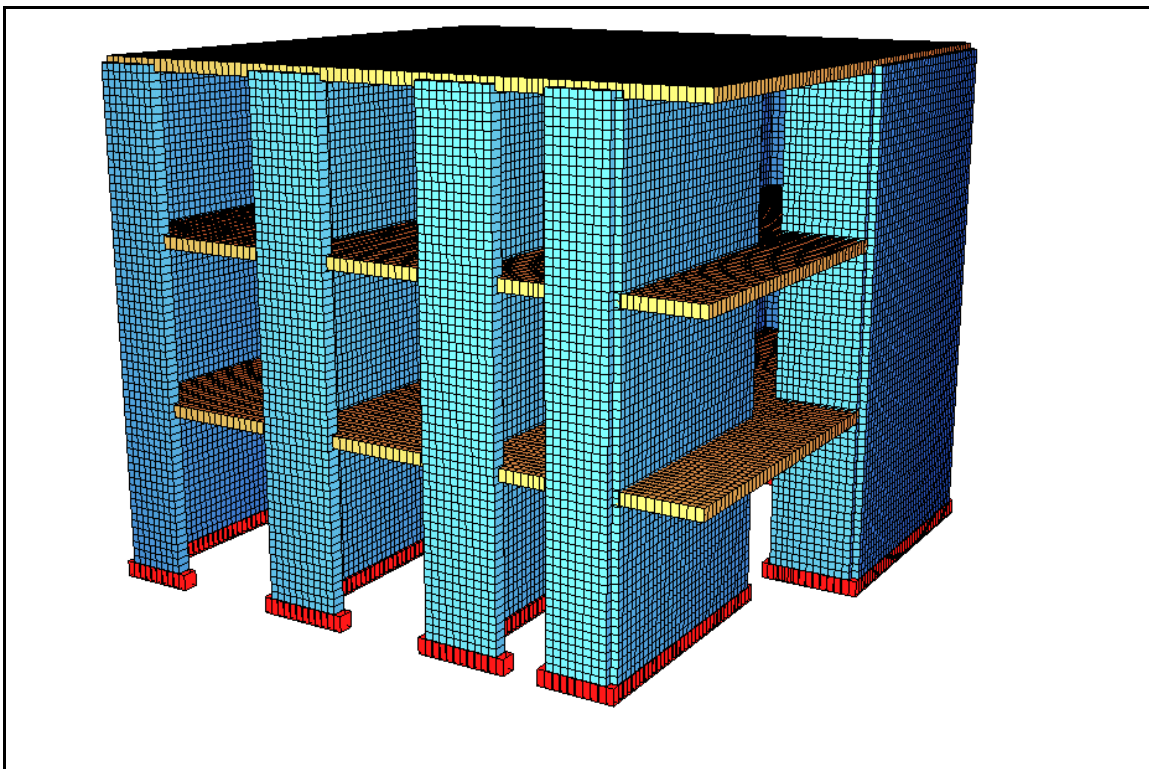
As in the following the whole structure was investigated, the numerical effort was generally very high. In addition, the finite-element-mesh was constricted to investigate the influence of the element-dimensions up to 10cm. Therefore the duration of calculation was about 6 h, without pre- and post-processing.

### 3. Initial, detailed Investigations on Apartment-House 1

At the beginning the first investigations have been carried out on the structure *Apartment-House 1*. Here the result will be given for example very detailed, as the following parametric studies (s. following chapters) will be presented due to volume reasons just with the condensed results in tables and diagrams.

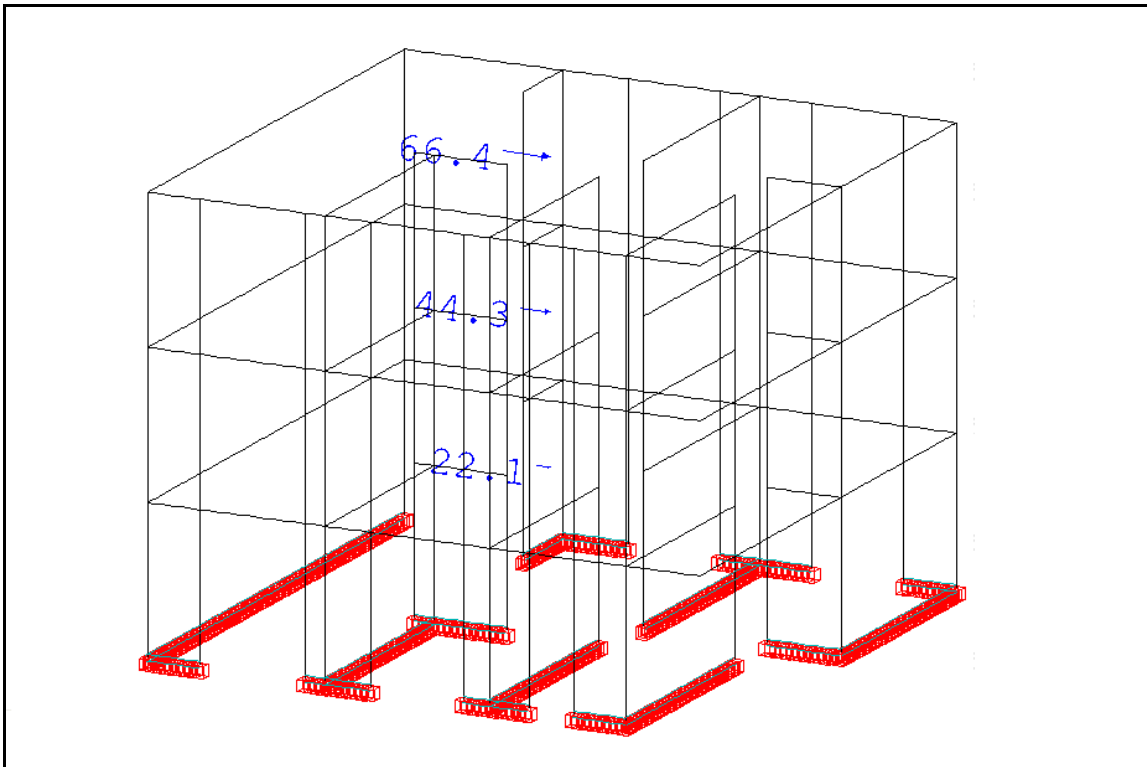
#### 3.1. Structure

The structure was calculated with a tension strength of  $0.18 \text{ N/mm}^2$  and a compression strength of  $8.5 \text{ N/mm}^2$ . The vertical load was  $3 \times 1206 = 3618 \text{ kN}$ . The isometric view of the structure is given below.



**Figure 10:** Apartment-House 1 with 3 storeys – isometric view

The horizontal force was taken to  $133 \text{ kN}$  and distributed to the 3 slabs (according Figure 5) given in detail in Figure 11.

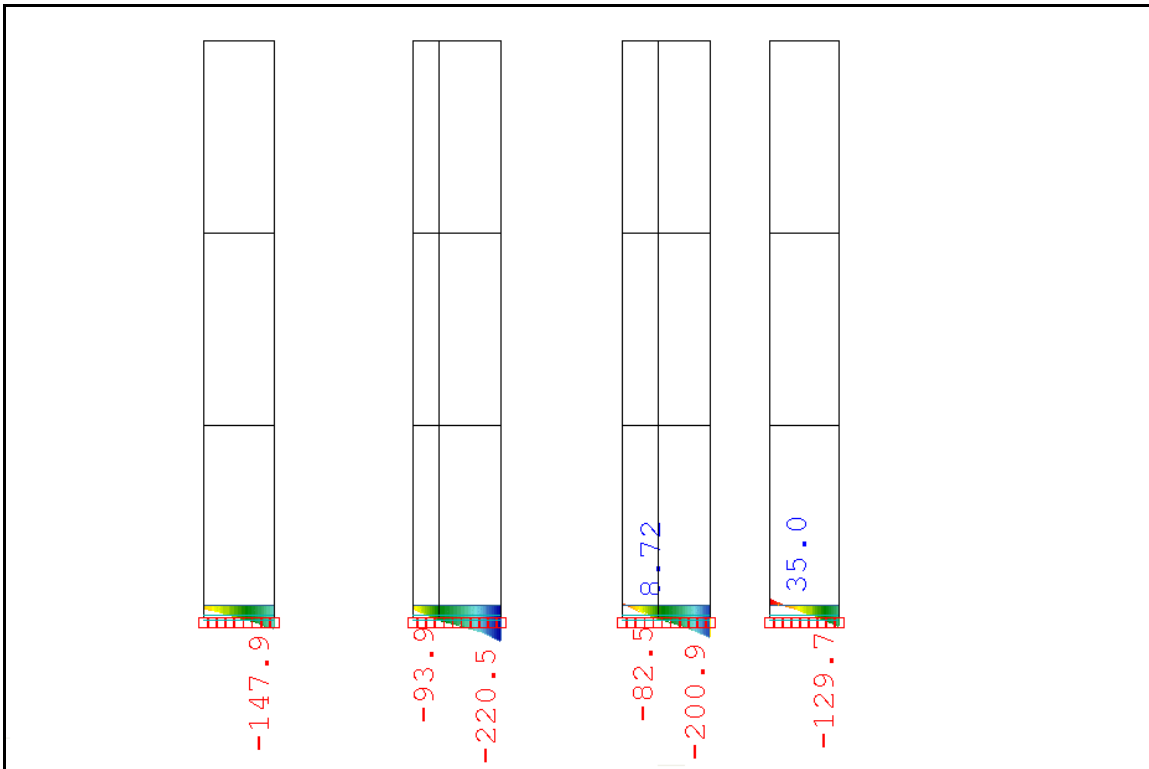


**Figure 11:** Distribution of the horizontal loads

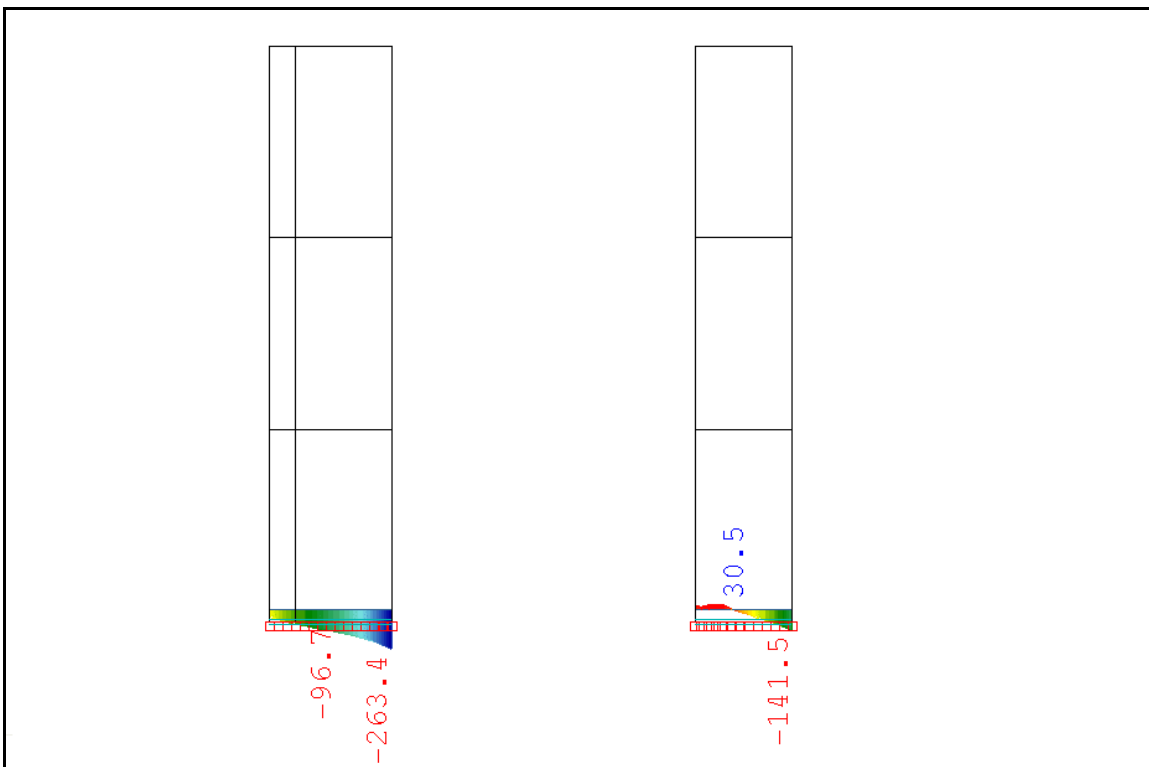
### 3.2. Membrane forces

The results of the calculations were evaluated to the shear forces in the walls of the lowest storey in a section 20cm above the fixed nodes. The distribution of the membrane forces and shear flow in the section in the relevant walls 1 to 9 is shown below.

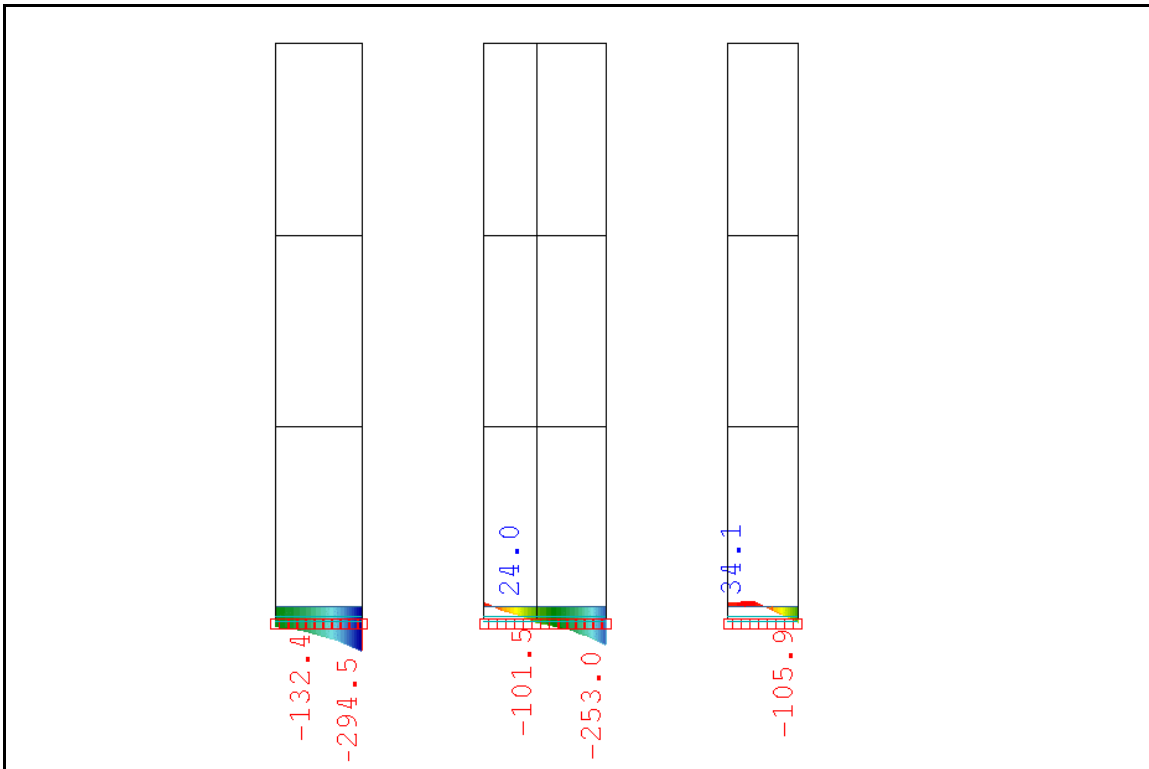




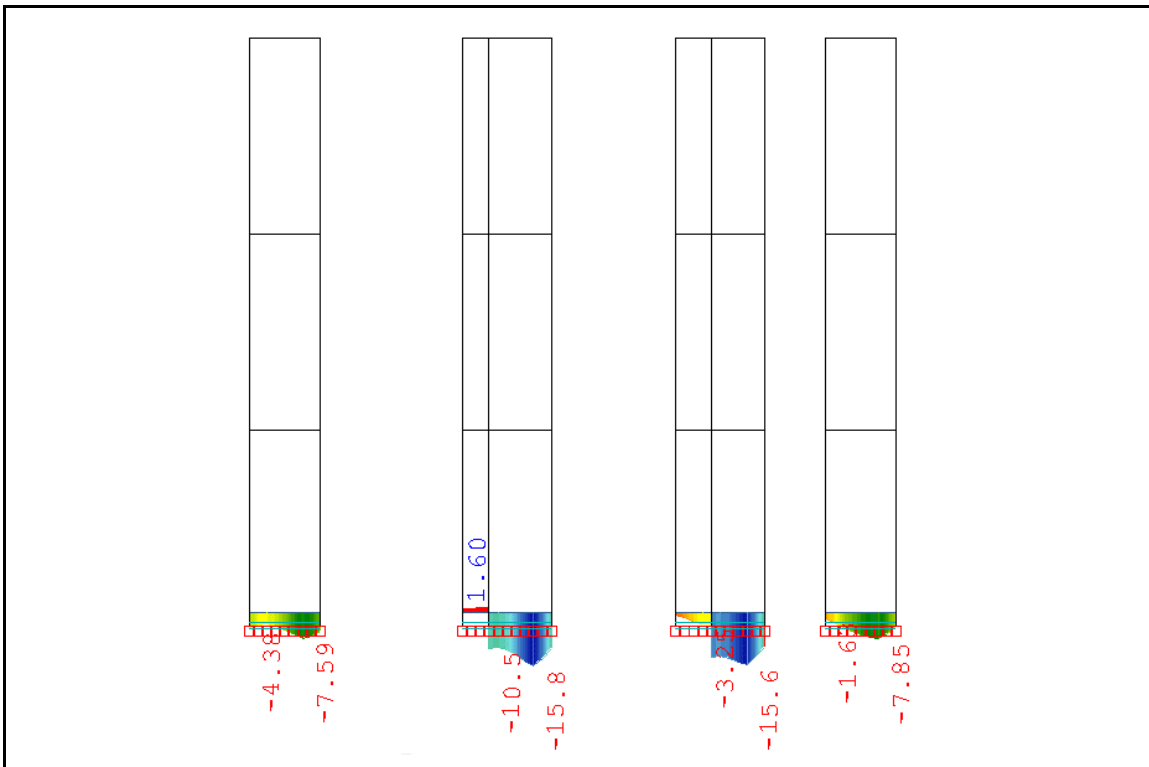
**Figure 12:** Apartment-House 1: Membrane forces [kN/m] perpendicular to the section – walls 1 to 4



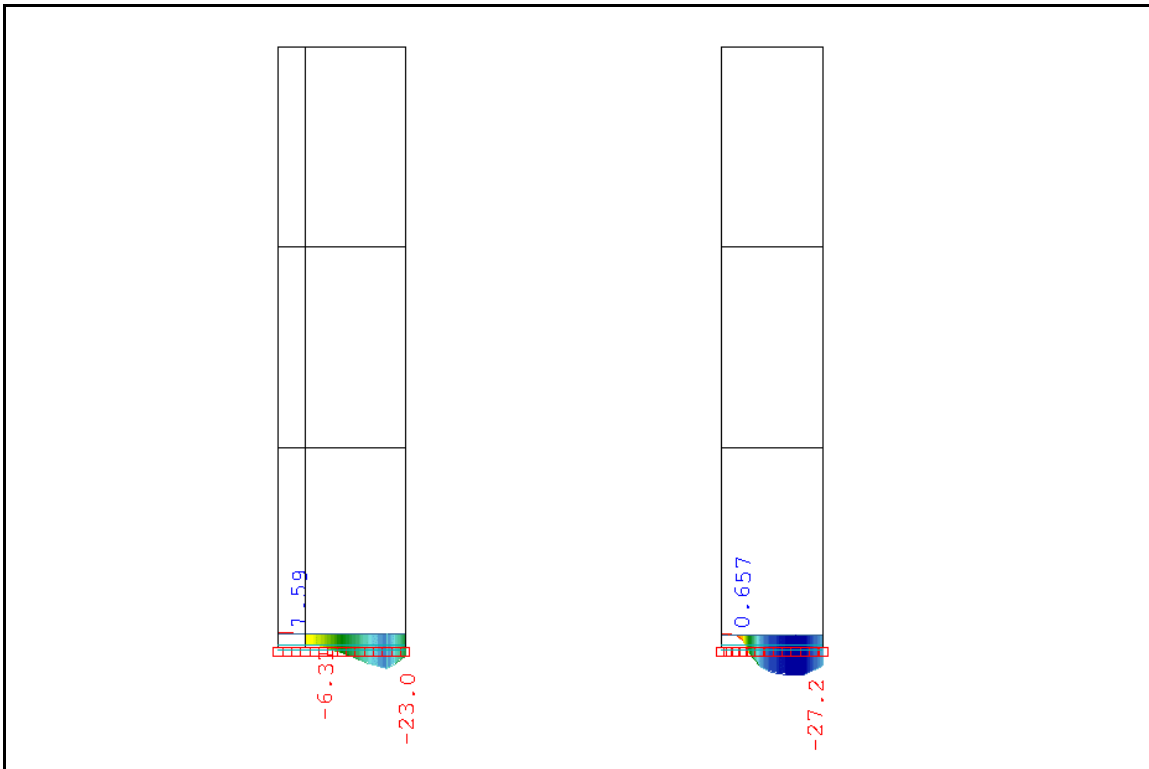
**Figure 13:** Apartment-House 1: Membrane forces [kN/m] perpendicular to the section – walls 5 to 6



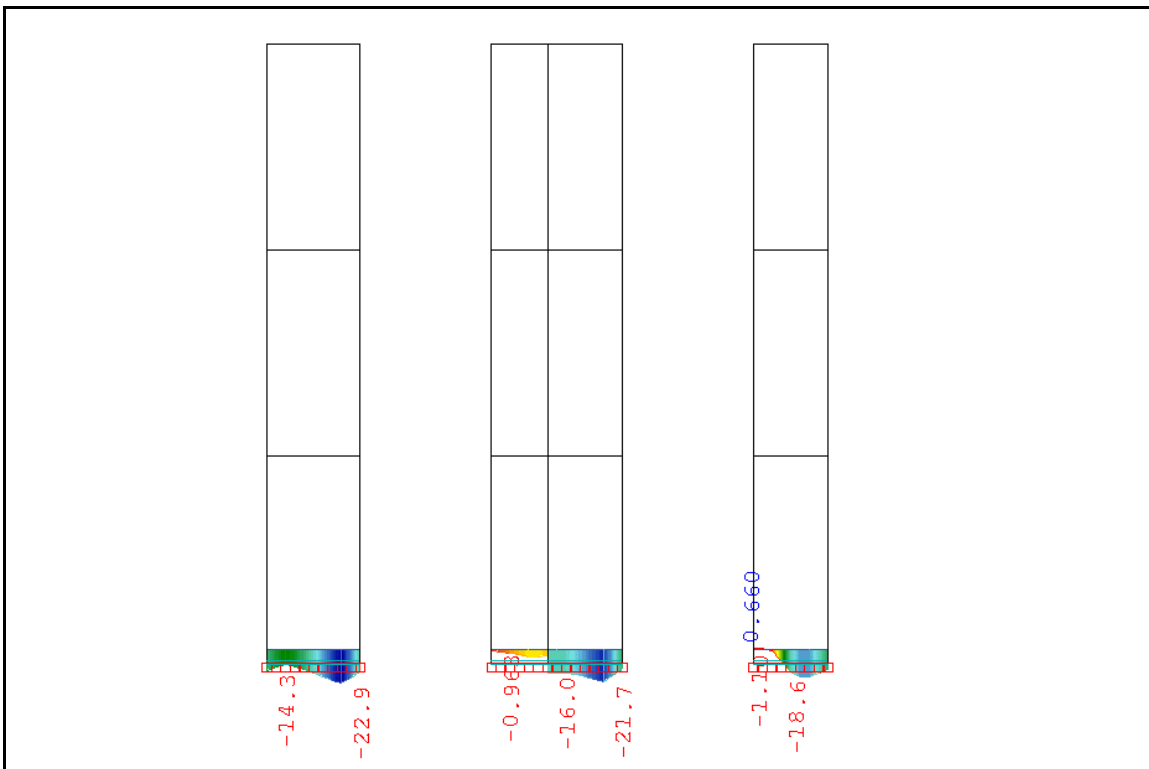
**Figure 14:** Apartment-House 1: Membrane forces [kN/m] perpendicular to the section – walls 7 to 9



**Figure 15:** Apartment-House 1: Membrane shear flow [KN/m] – walls 1 to 4



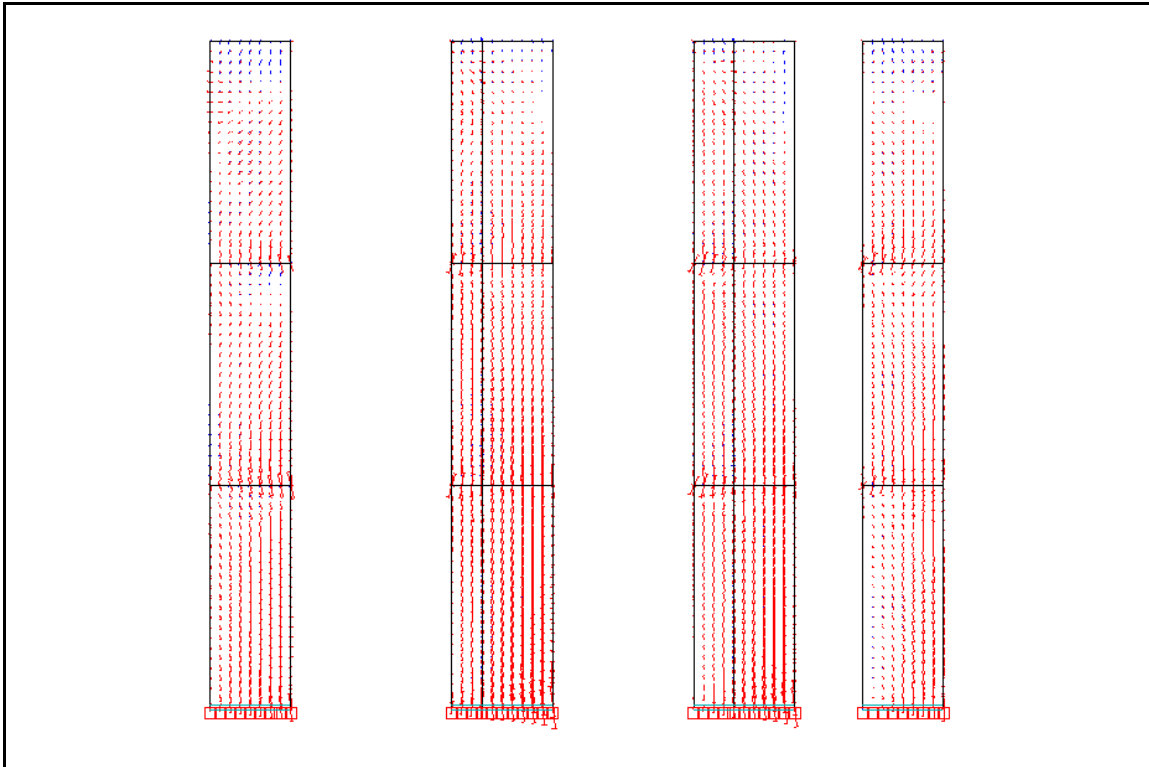
**Figure 16:** Apartment-House 1: Membrane shear flow [KN/m] – walls 5 to 6



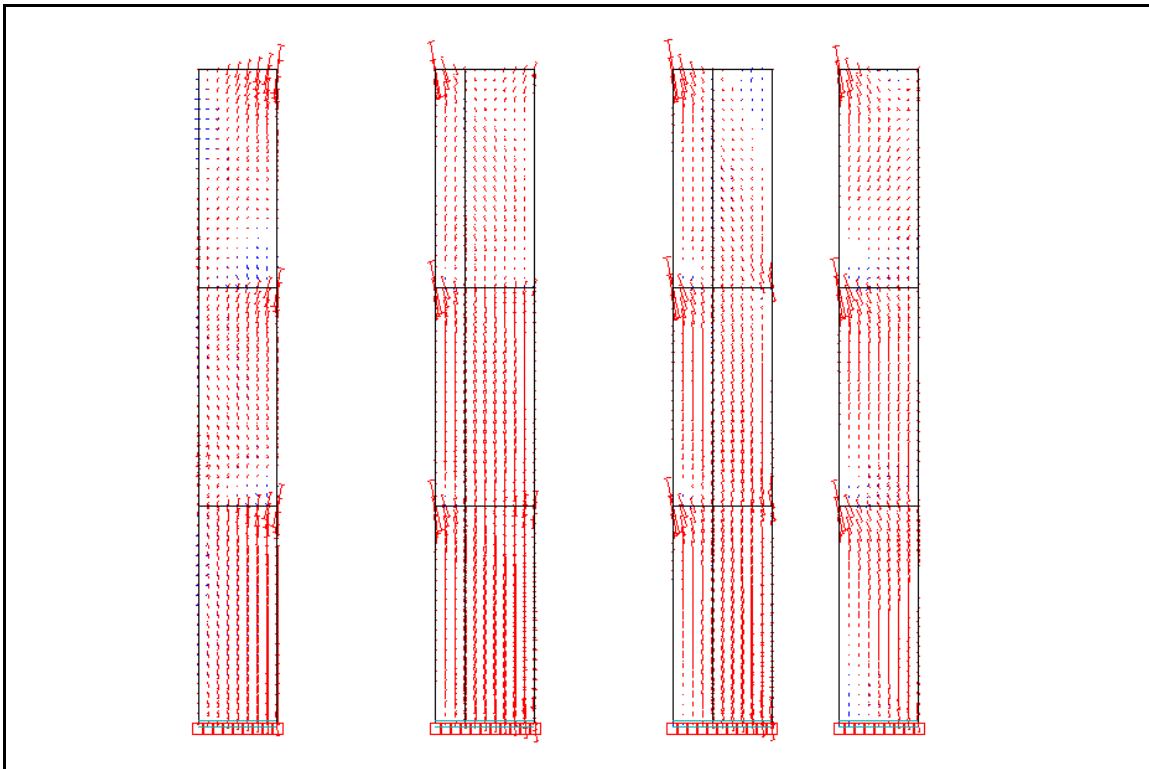
**Figure 17:** Apartment-House 1: Membrane shear flow [KN/m] – walls 7 to 9

### 3.3. Principal stresses

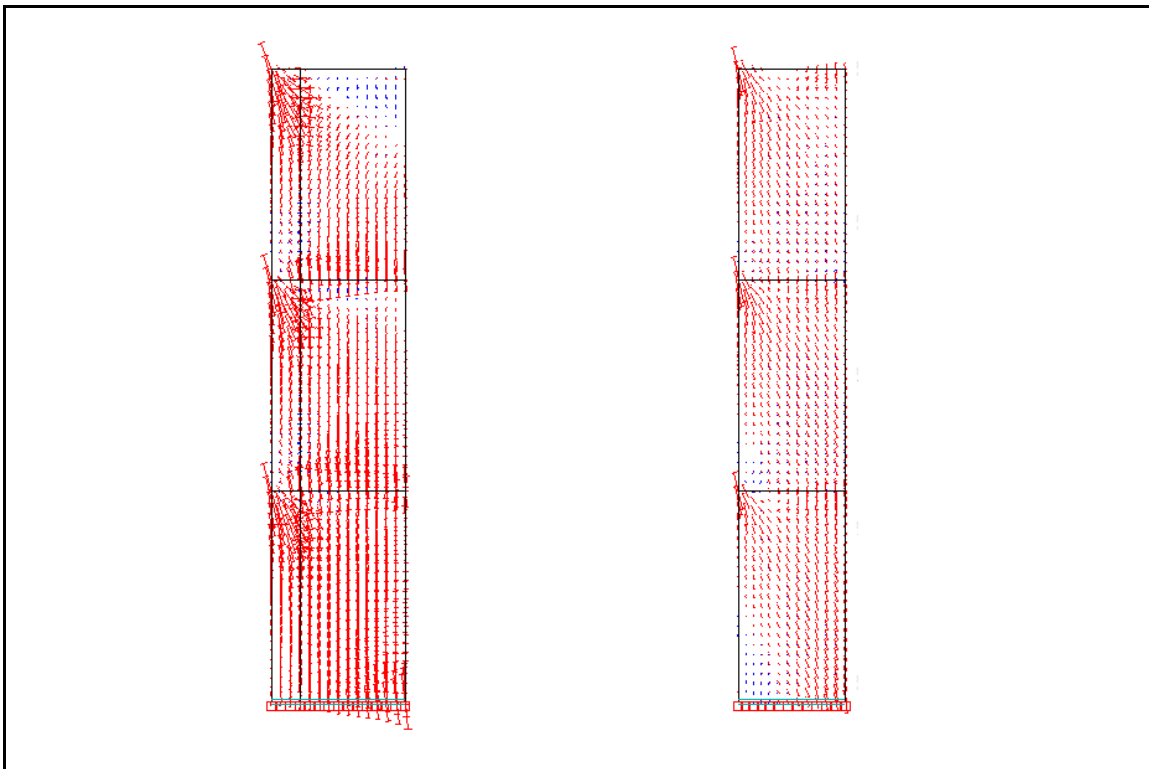
The differentiation of upper and lower side (s. chapter 1.3) regarding the principal stresses is shown below.



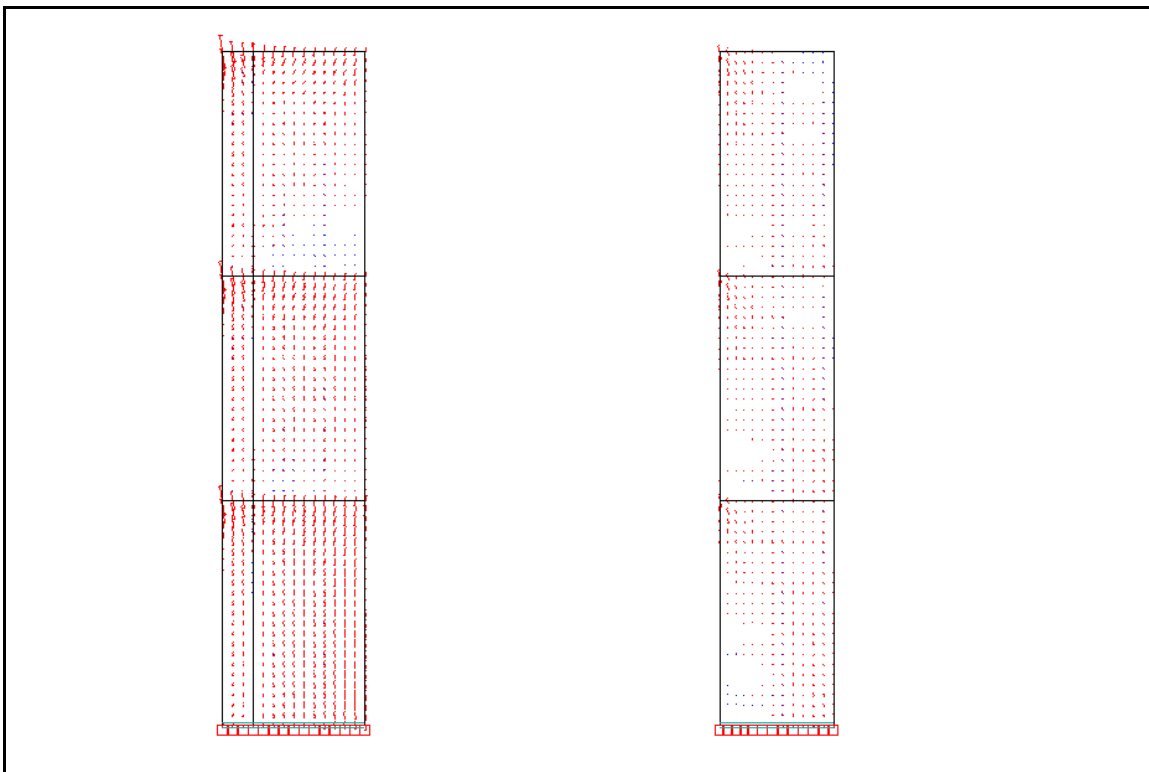
**Figure 18:** Apartment-House 1: Trajectories (principal-stresses) on the upper side – walls 1 to 4



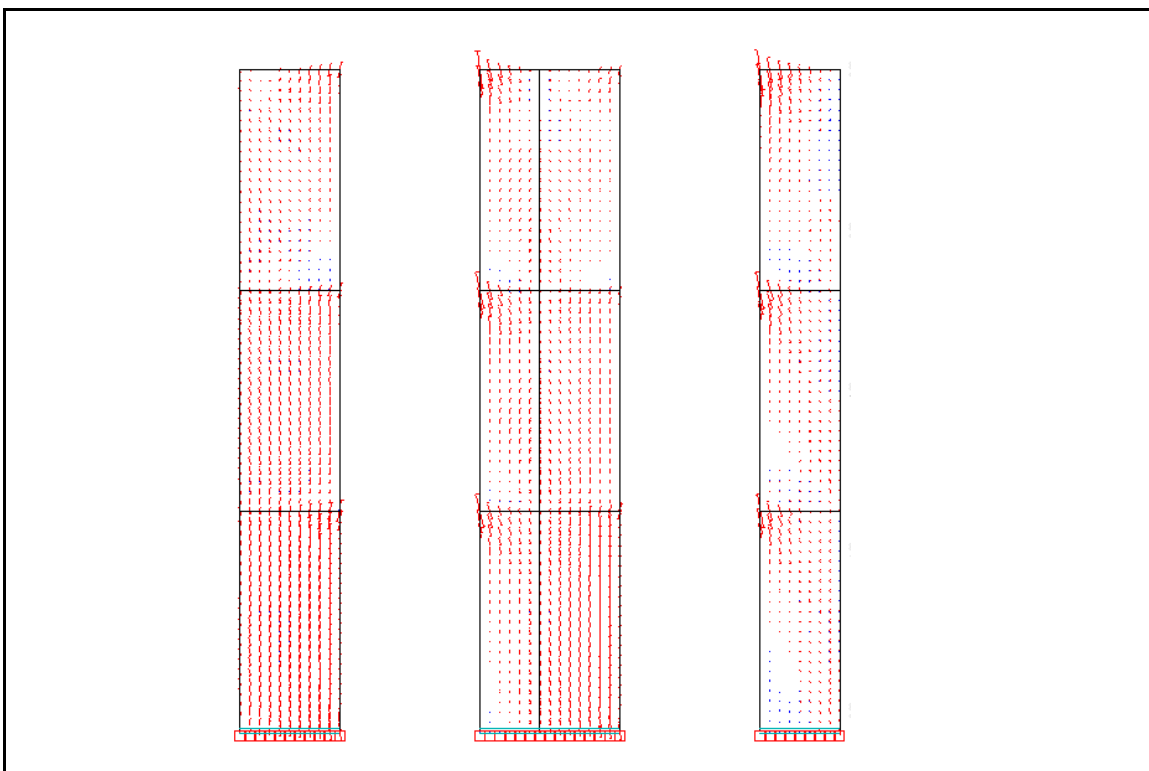
**Figure 19:** Apartment-House 1: Trajectories (principal-stresses) on the lower side – walls 1 to 4



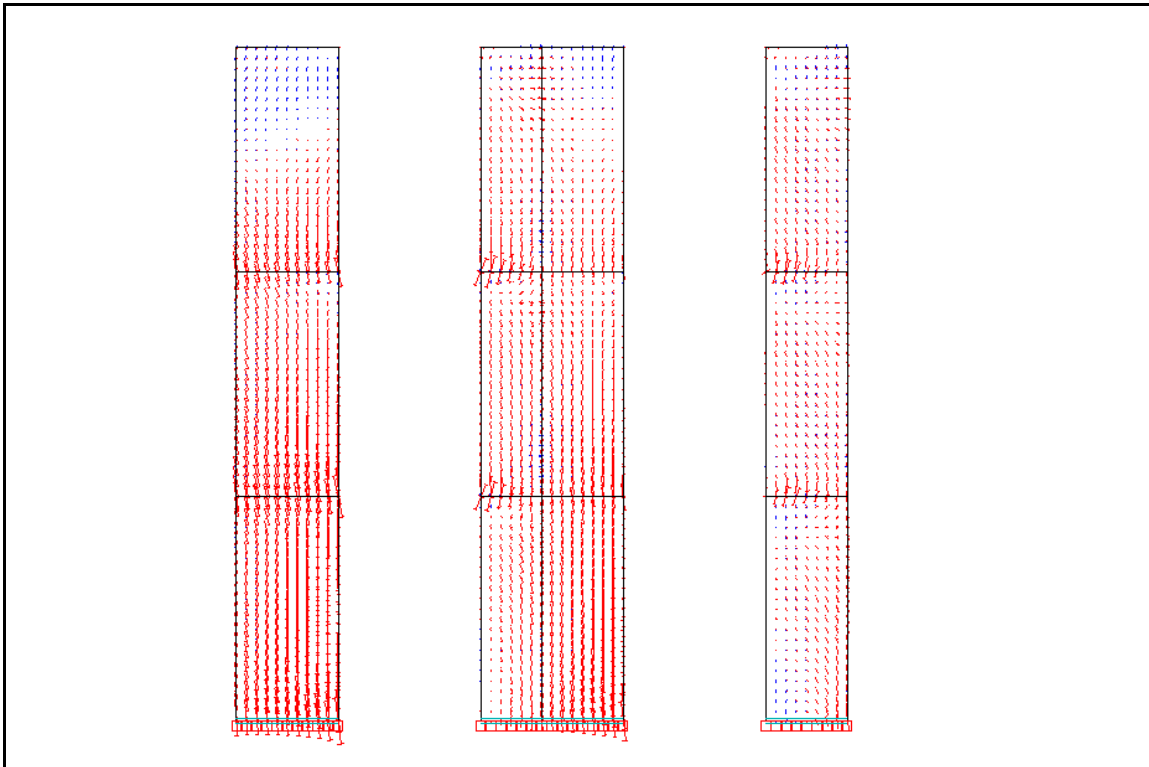
**Figure 20:** Apartment-House 1: Trajectories (principal-stresses) on the upper side – walls 5 to 6



**Figure 21:** Apartment-House 1: Trajectories (principal-stresses) on the lower side – walls 5 to 6



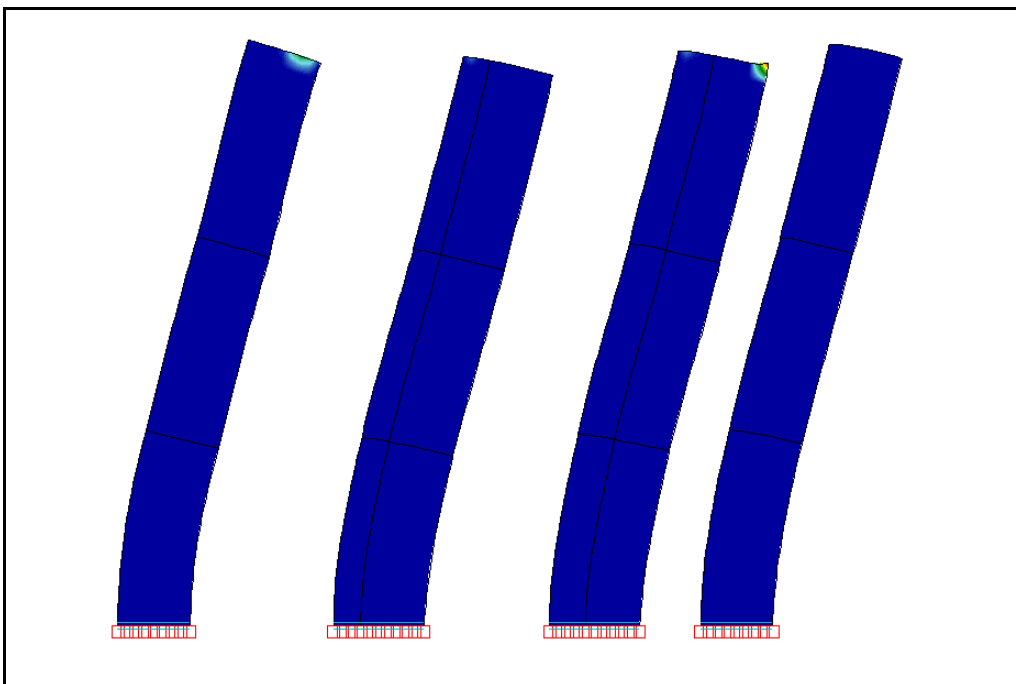
**Figure 22:** Apartment-House 1: Trajectories (principal-stresses) on the upper side – walls 7 to 9



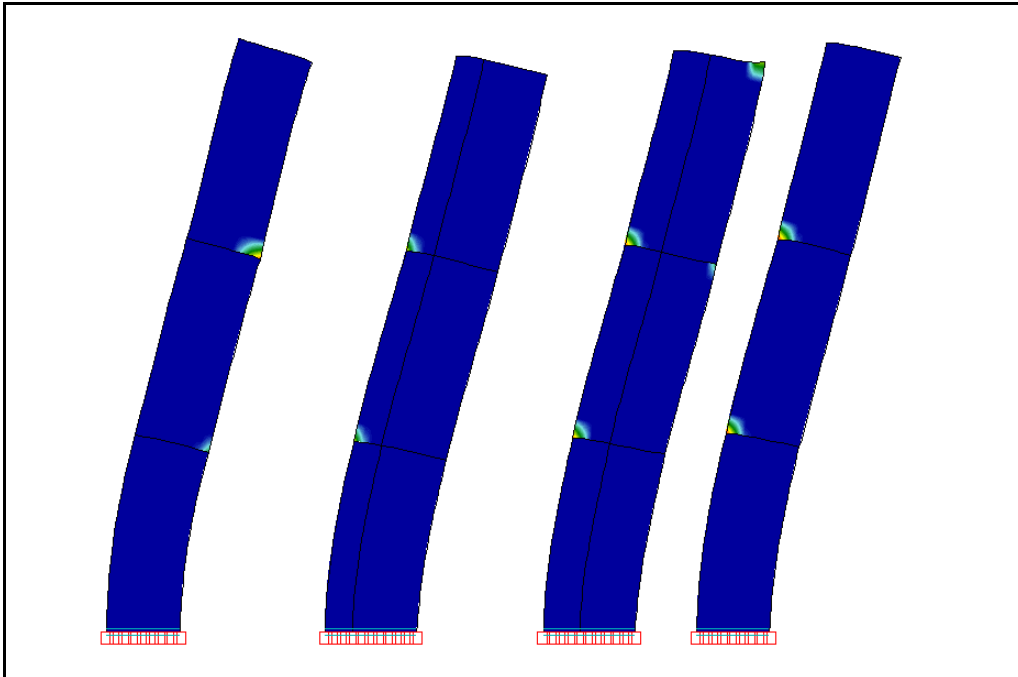
**Figure 23:** Apartment-House 1: Trajectories (principal-stresses) on the lower side – walls 7 to 9

### 3.4. Plasticising

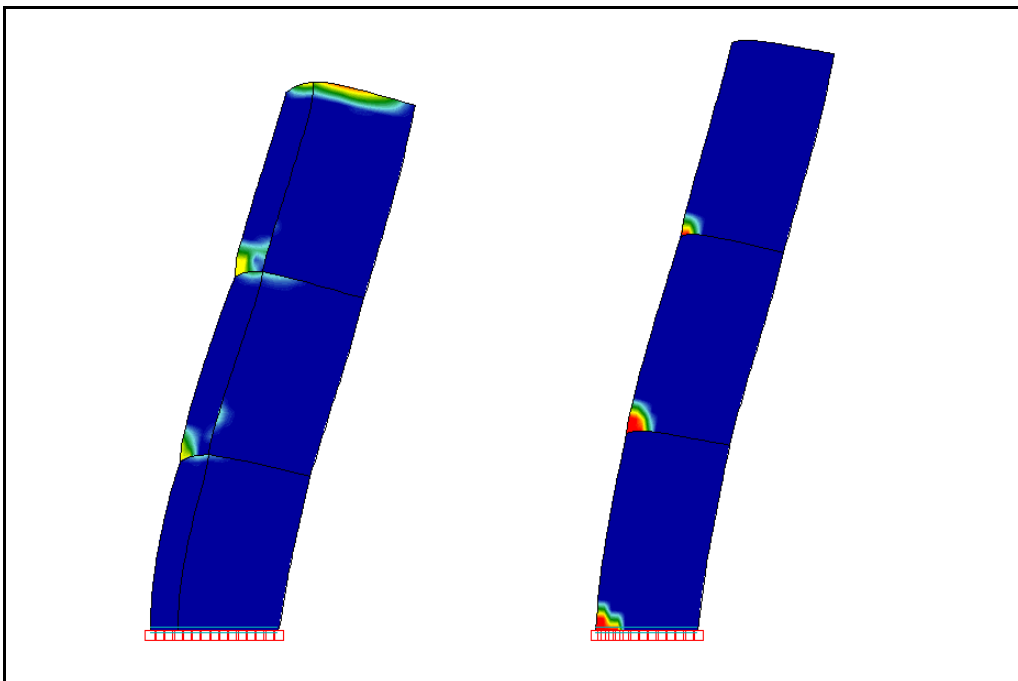
The regions with plasticising are shown below.



**Figure 24:** Apartment-House 1: Plasticising on the upper side – walls 1 to 4

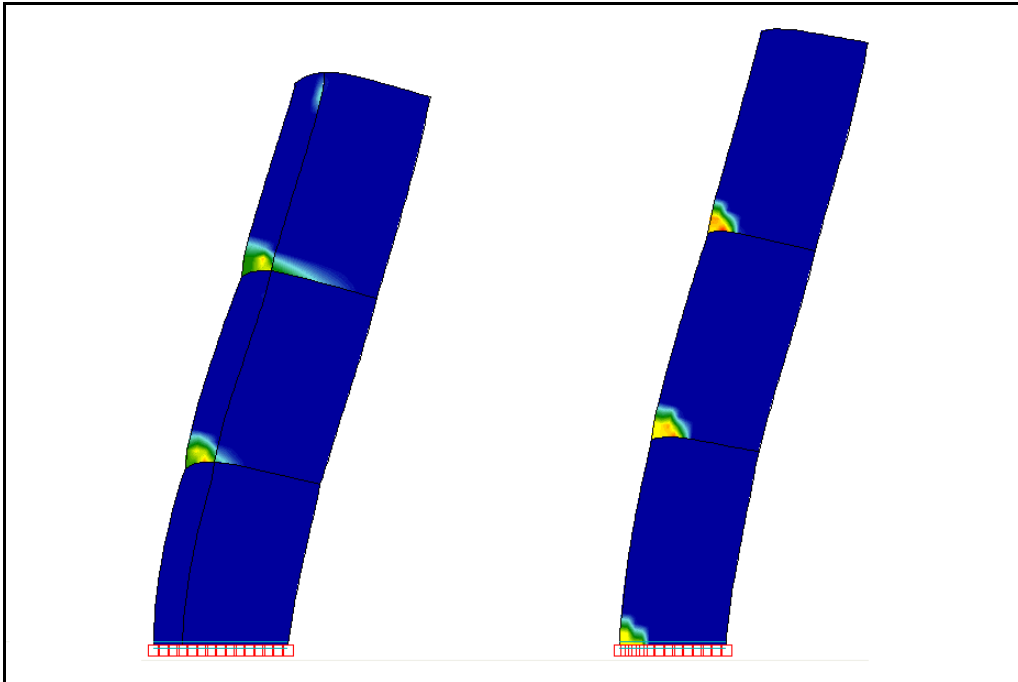


**Figure 25:** Apartment-House 1: Plasticising on the lower side – walls 1 to 4

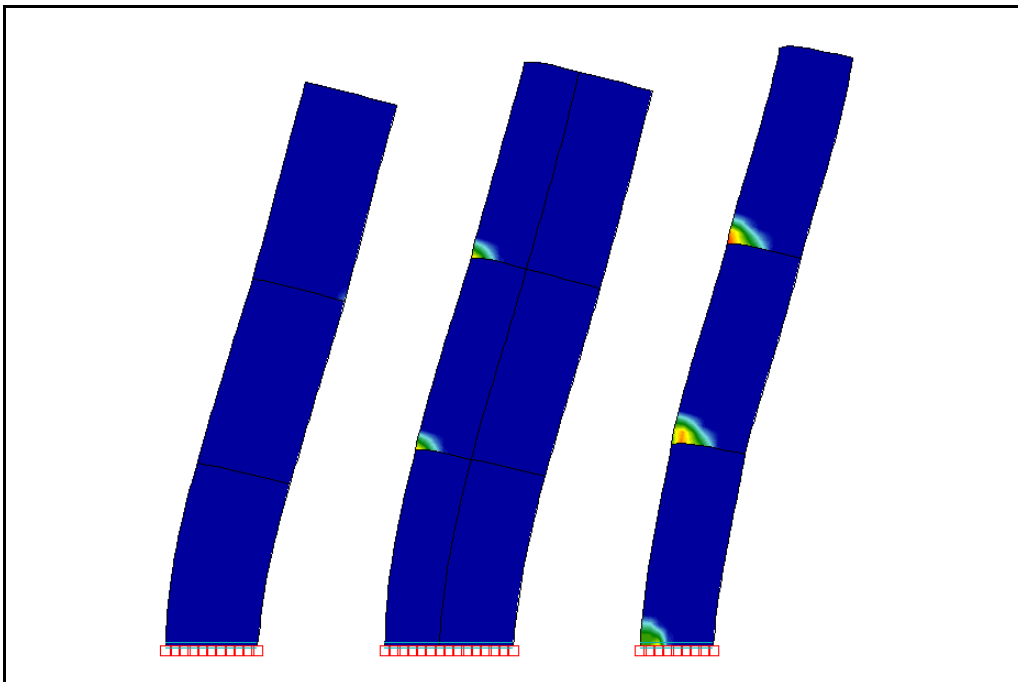


**Figure 26:** Apartment-House 1: Plasticising on the upper side – walls 5 to 6

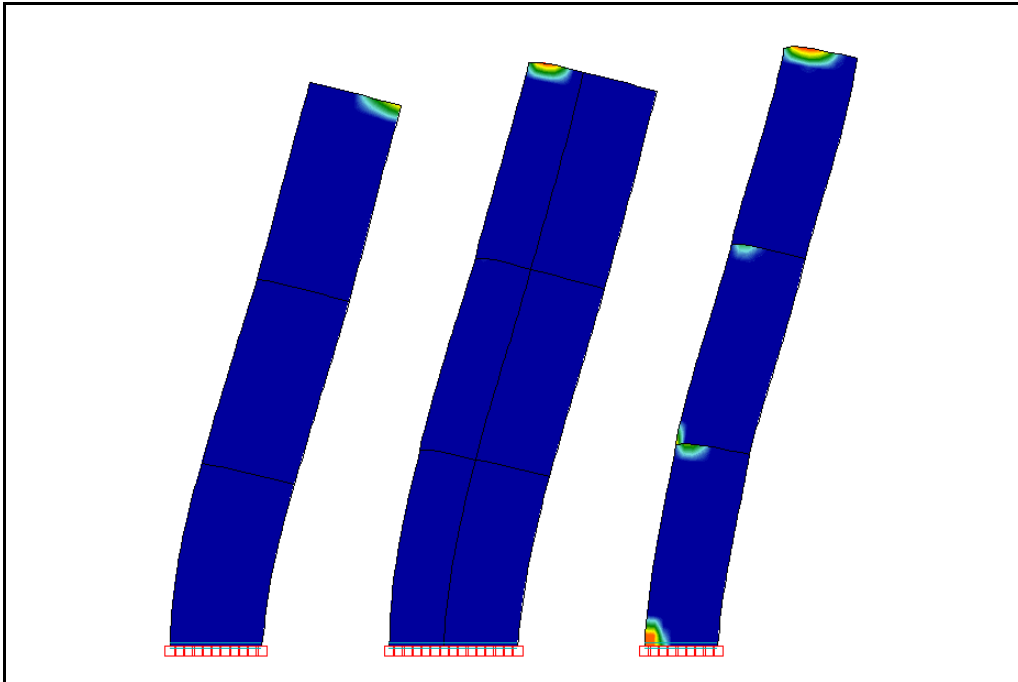




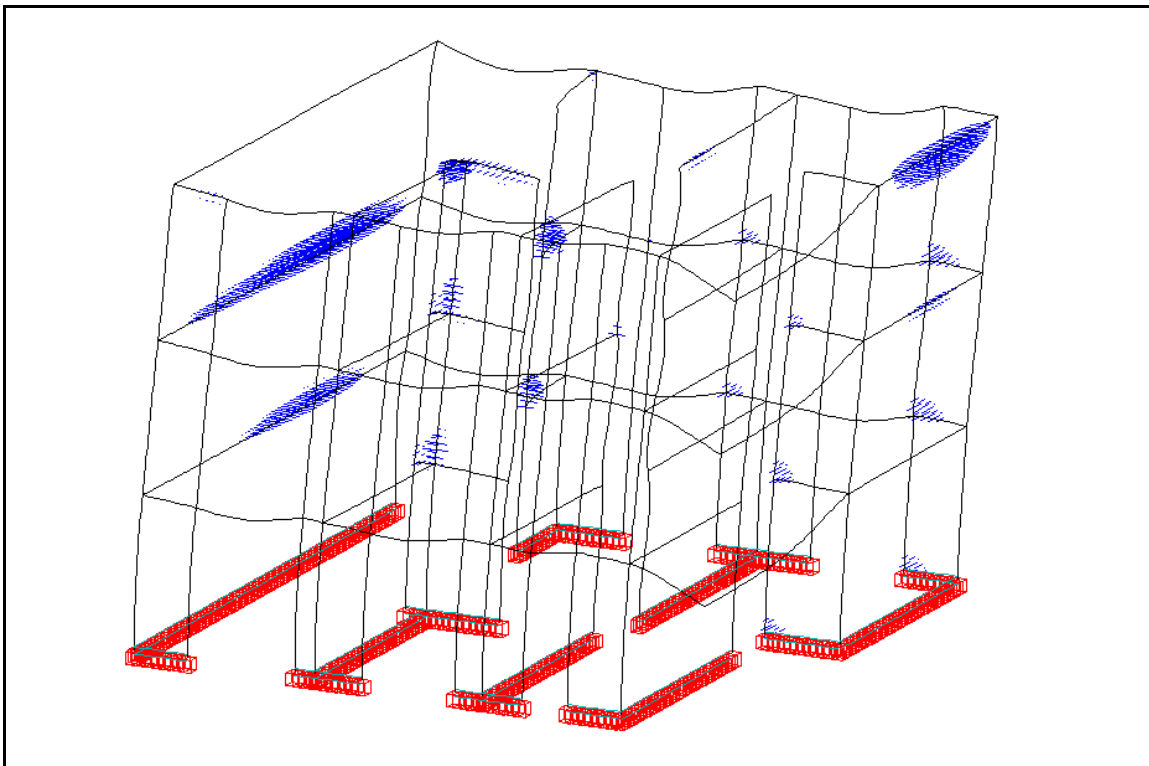
**Figure 27:** Apartment-House 1: Plasticising on the lower side – walls 5 to 6



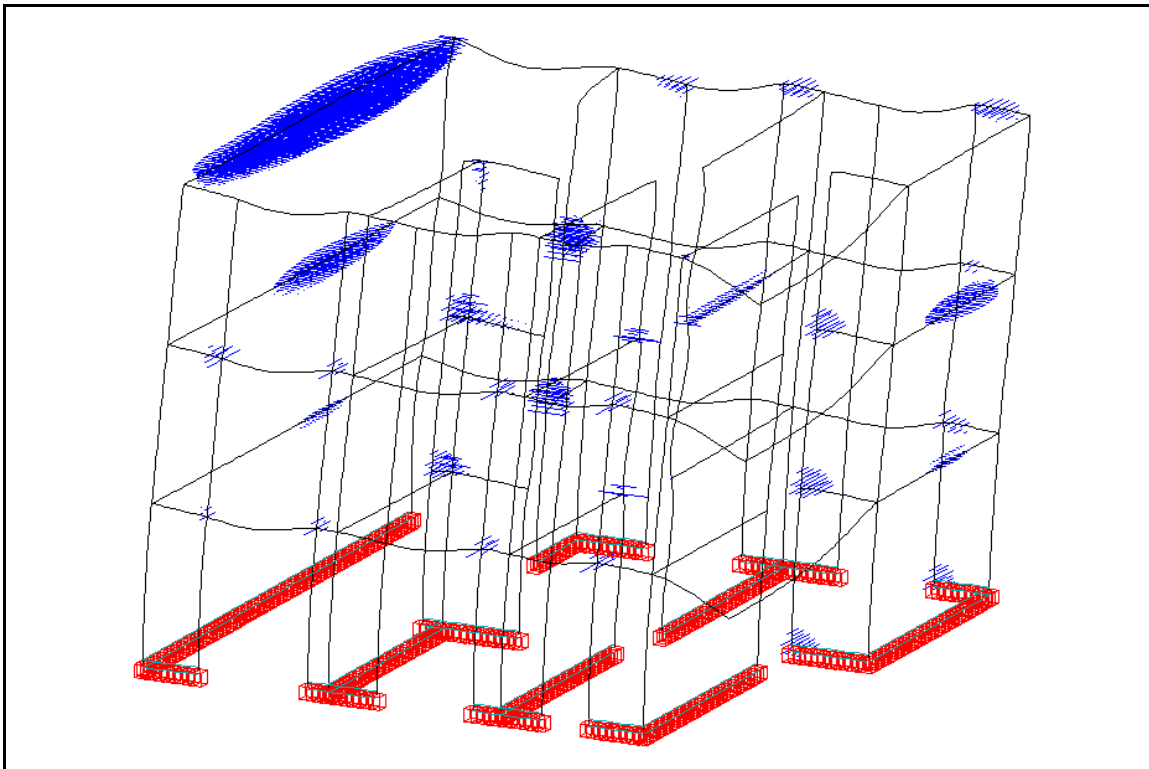
**Figure 28:** Apartment-House 1: Plasticising on the upper side – walls 7 to 9



**Figure 29:** Apartment-House 1: Plasticising on the lower side – walls 7 to 9

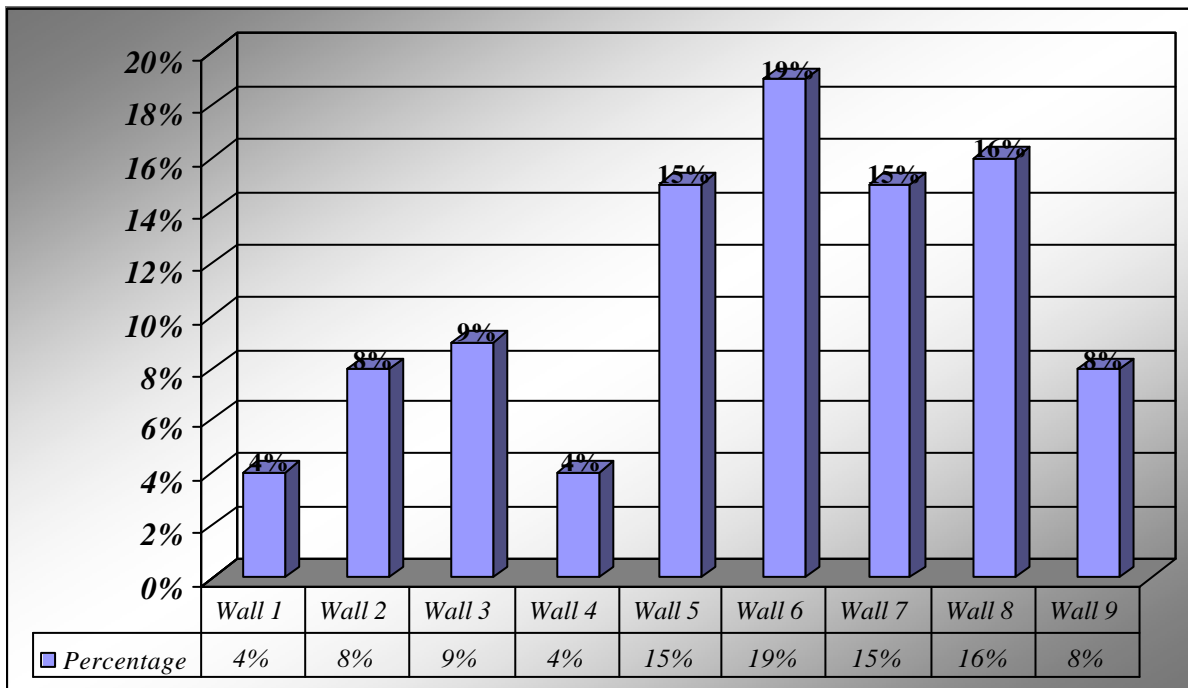


**Figure 30:** Apartment-House 1: Plasticising on the lower side – whole structure



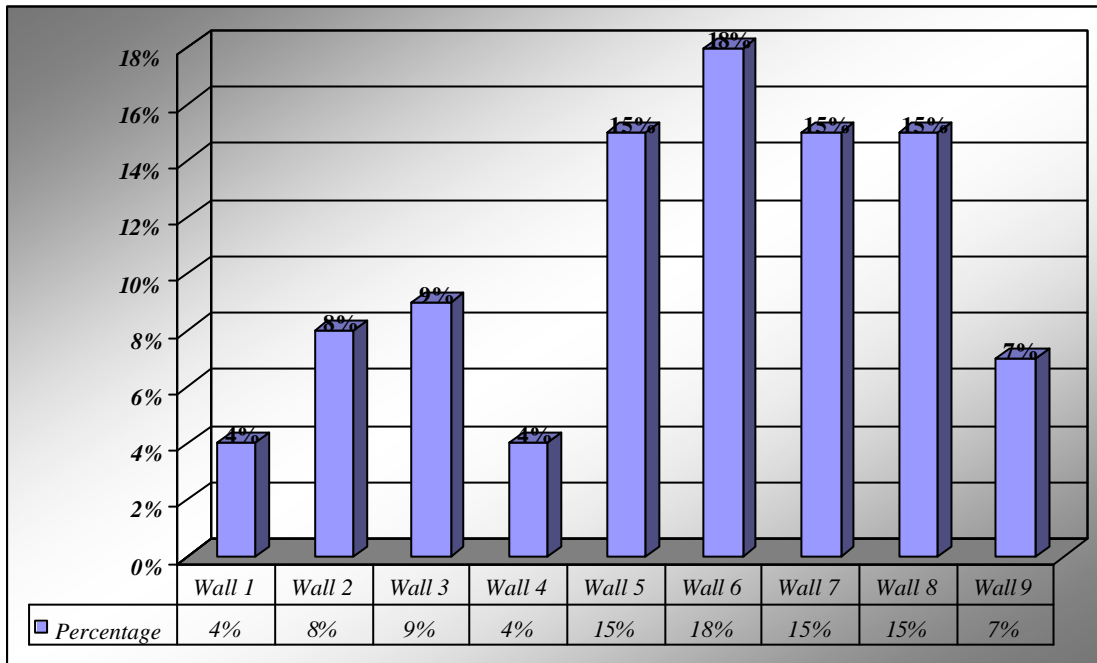
**Figure 31:** Apartment-House 1: Plasticising on the upper side – whole structure

### 3.5. Distribution of the horizontal force



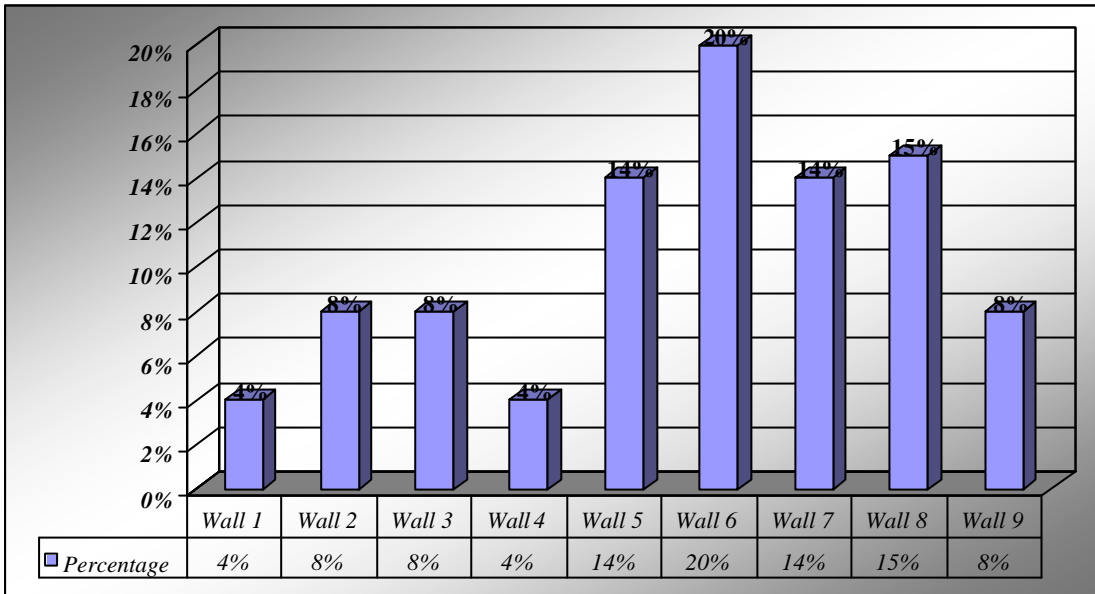
**Figure 32:** Distribution of the total shear-force in the structure to the walls 1 to 9 (3-storey-structure, tension strength 0.18N/mm<sup>2</sup>)

In addition a calculation on a 4-storey structure was carried out (tension strength of 0.18 N/mm<sup>2</sup>; compression strength of 8.5 N/mm<sup>2</sup>, vertical load 4824 kN; horizontal load 147kN). The distribution to the walls 1 to 9 is shown below.



**Figure 33:** Distribution of the total shear-force in the structure to the walls 1 to 9 (4-storey-structure, tension strength 0.18N/mm<sup>2</sup>)

Further the tension strength was enhanced to 0.4 N/mm<sup>2</sup> to investigate the effect. The distribution to the walls 1 to 9 is shown below.



**Figure 34:** Distribution of the total shear-force in the structure to the walls 1 to 9 (4-storey-structure, tension strength 0.4N/mm<sup>2</sup>)

Due to the enhancement of the tension strength a slightly different distribution was found.

## 4. Apartment-House 1

The following presented calculations on the apartment house 1 have been carried out with a tension strength of  $0.3 \text{ N/mm}^2$  and a compression strength of  $8.5 \text{ MN/m}^2$ . The number of storeys remained constantly to 4. The horizontal force  $H$  was enhanced in several load steps from  $100 \text{ kN}$  to  $800 \text{ kN}$ . In addition also calculations with horizontal forces in the opposite direction were carried out – marked with affix *H-negative*. Generally the last load-levels indicate a “numerically” collapse of the structure as the residual forces enhanced significantly (about  $600 \text{ kN}$  resp.  $-500 \text{ kN}$ ). This effect is indicated by the discrepancy of the external vertical load (applied dead load of the structure) and the resulting internal force in the mentioned section (s. appendix). Nevertheless the calculations have been carried out for all load-levels.

The results of the calculations were evaluated to determine the distribution of the total horizontal force  $H$  to each wall-sections (here mentioned the walls orientated in the direction of the horizontal force  $H$ ) and in the next step to determine the position of the resulting normal force  $N$  in each wall-section – latter was described by the excentricity  $e$ .

### 4.1. Distribution of the shear force

The distribution to the single walls in the three sections – i.e. at the cap of the wall, in the middle of the wall and at the base of the wall – is shown in the following diagram. Additionally the results with negative horizontal forces are given.

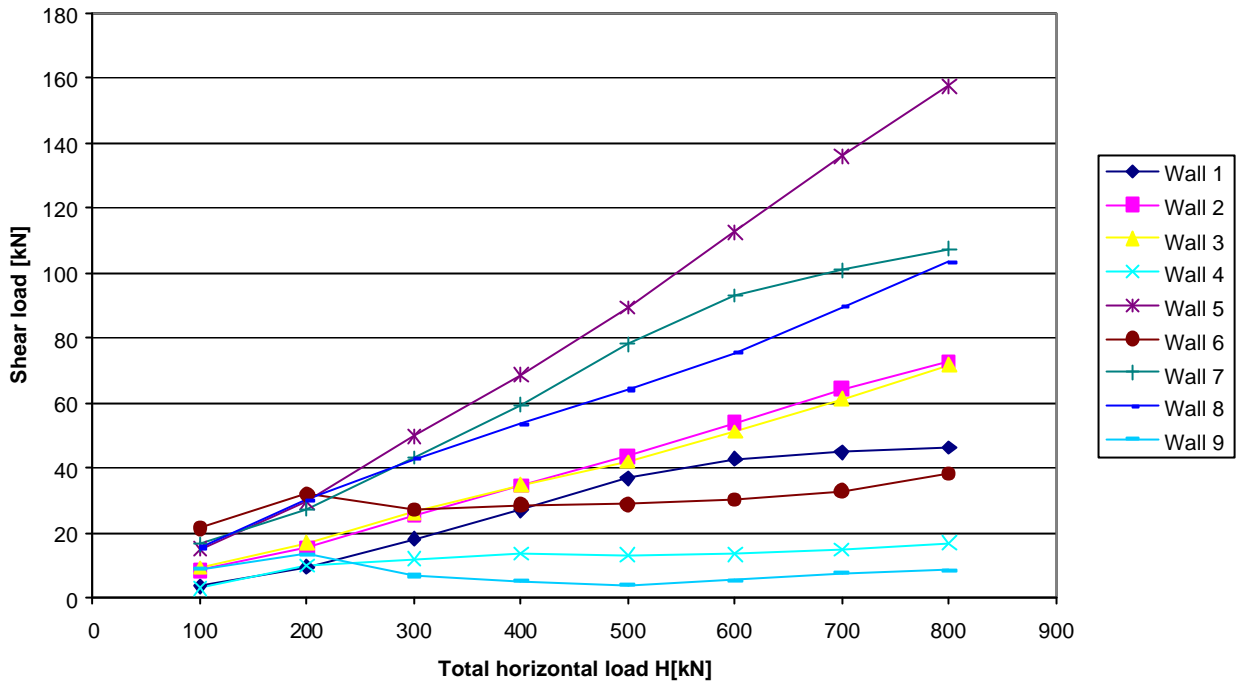


Figure 35: Apartment-House 1– shear force in the base of the walls – positive H

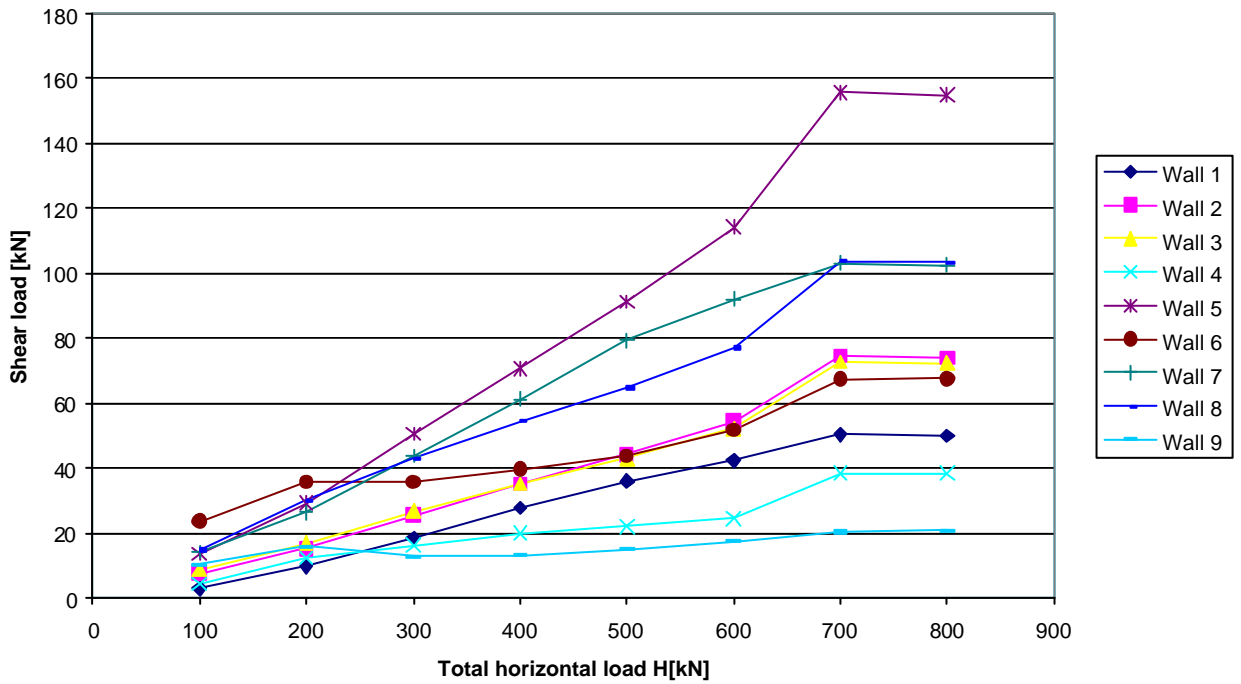


Figure 36: Apartment-House 1–shear force in the middle of the walls – positive H

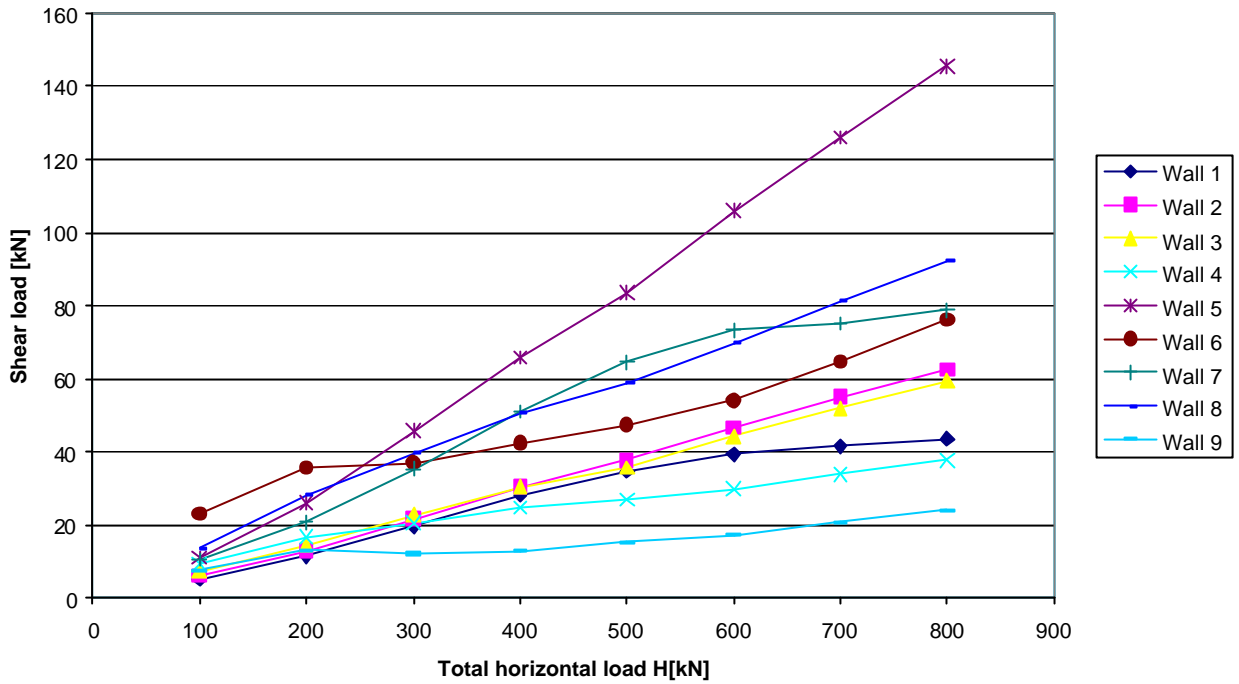


Figure 37: Apartment-House 1– shear force at the cap of the walls – positive H

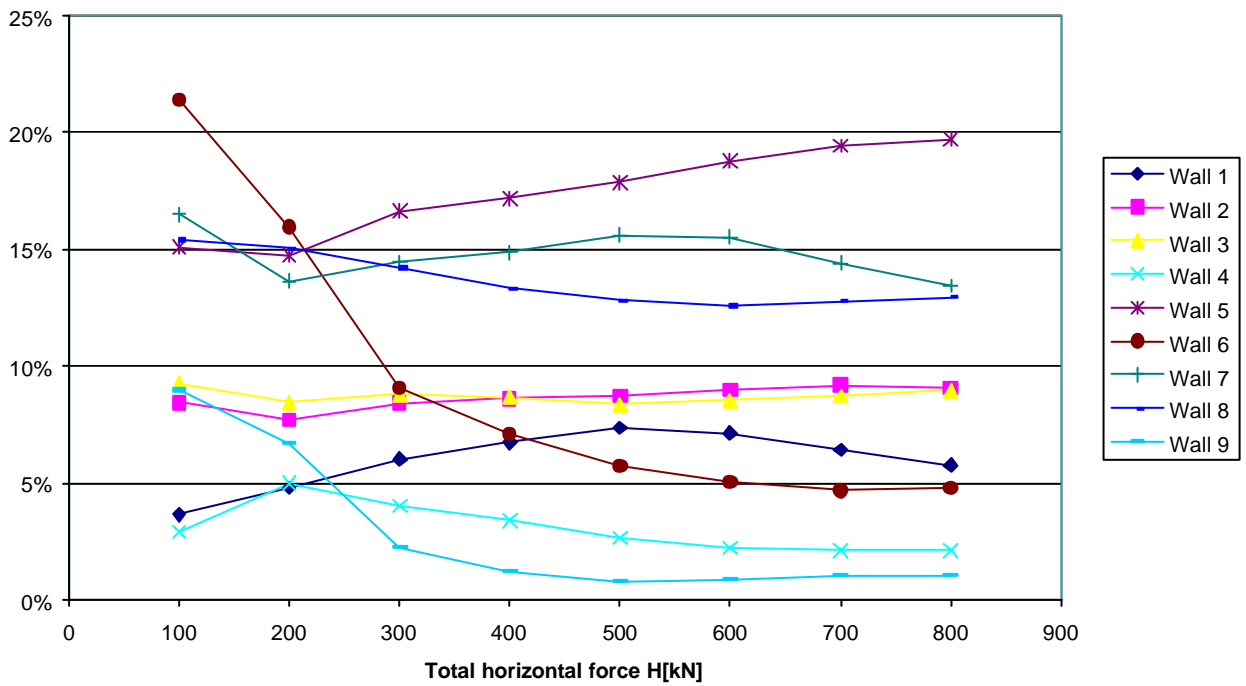
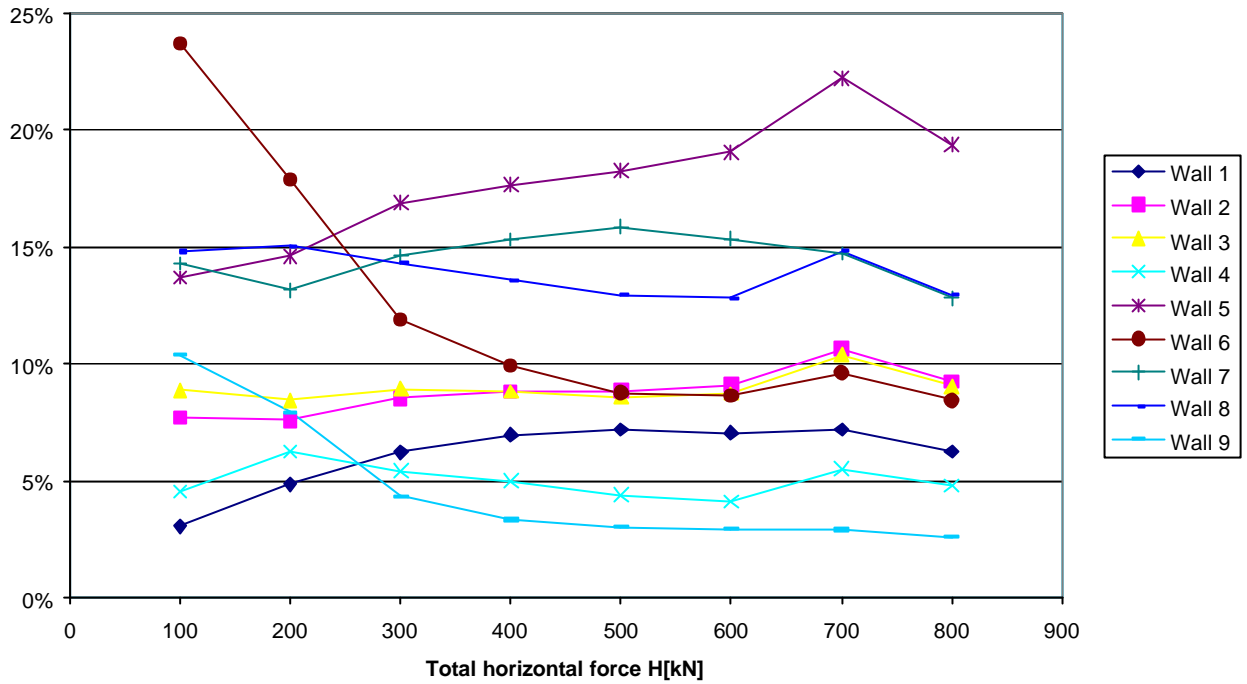
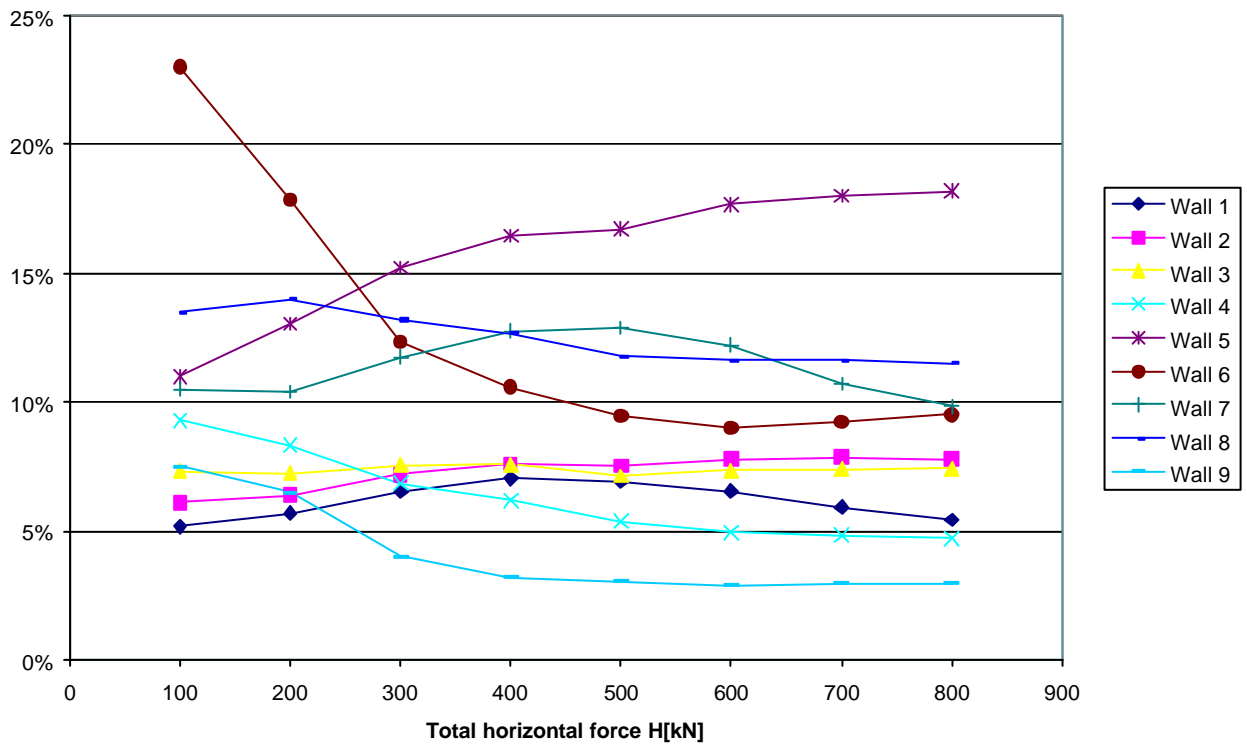


Figure 38: Apartment-House 1– distribution of the shear force in the base of the walls – positive H

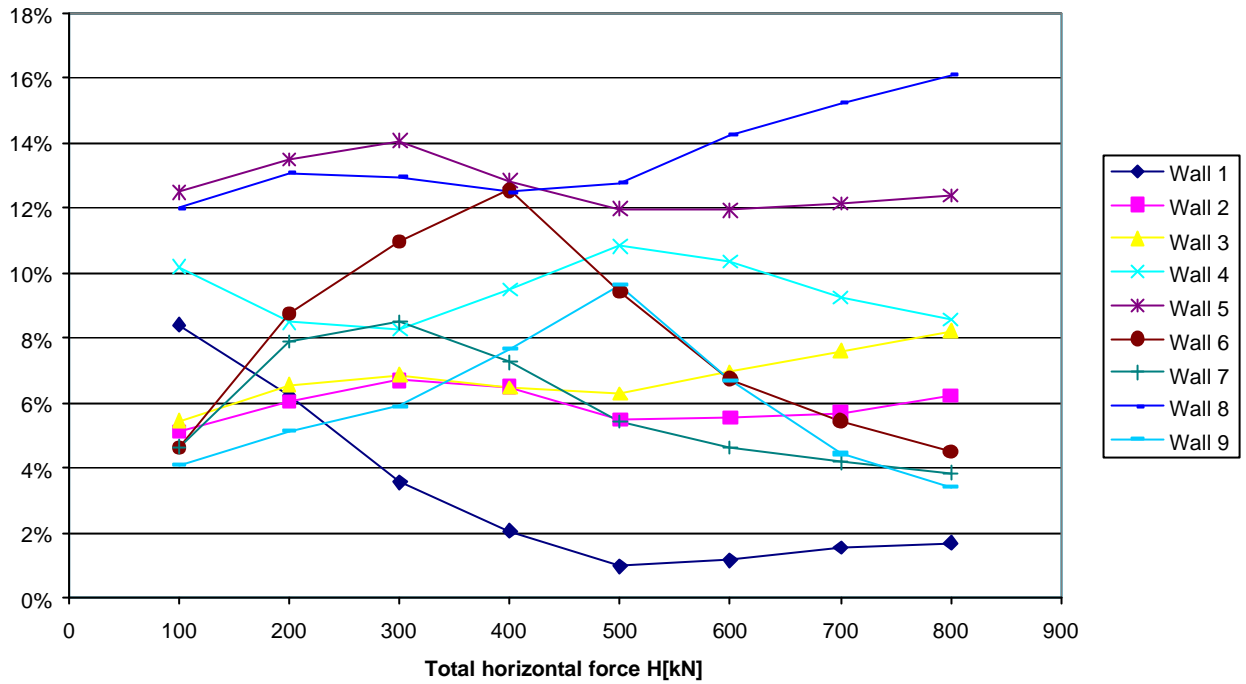




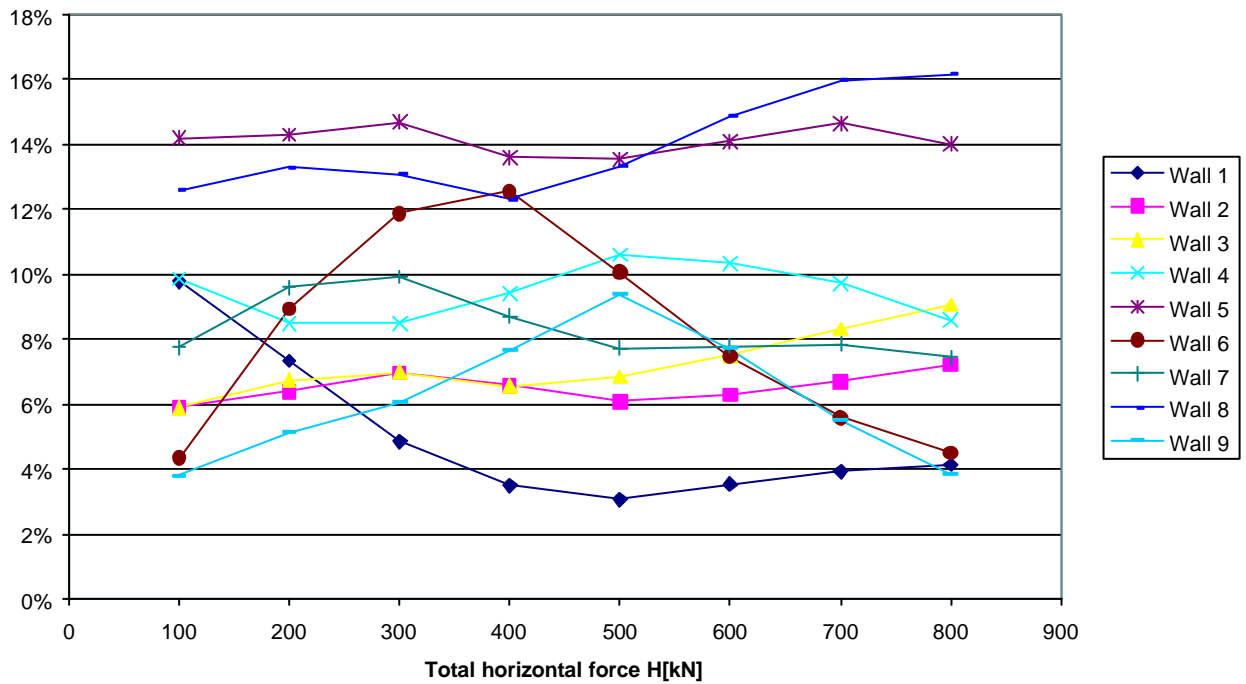
**Figure 39:** Apartment-House 1– distribution of the shear force in the middle of the walls – positive H



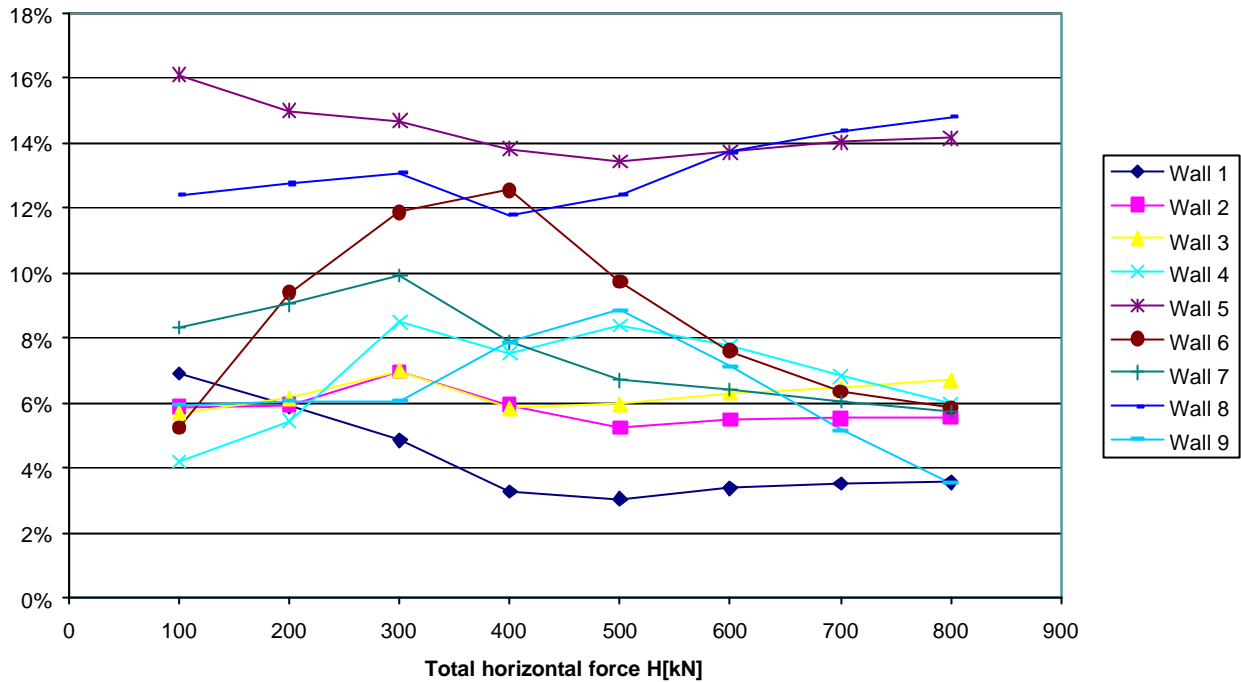
**Figure 40:** Apartment-House 1– distribution of the shear force at the cap of the walls – positive H



**Figure 41:** Apartment-House 1– distribution of the shear force in the base of the walls – negative H



**Figure 42:** Apartment-House 1– distribution of the shear force in the middle of the walls – negative H



**Figure 43:** Apartment-House 1– distribution of the shear force at the cap of the walls – negative H

Comparing the distribution of the horizontal forces at the cap of the wall with different orientation of the external horizontal force H a divergency appears. Especially the horizontal forces obtained by the walls 6, 8, and 5 / 7 differ. This effect could be explained with the configuration of the transverse walls in function of a flange and the orientation referring to orientation of the external horizontal force.

During the calculations it was found, that due to plate deformations of the transverse walls in the mentioned section secondary horizontal shear stresses resp. corresponding forces appeared. For the equilibrium of state in the mentioned walls orientated in longitudinal direction counteracting forces resulted. With arising external horizontal force H this effect was reduced. Further due to plate shear loadings approximate 10% of the total horizontal force was carried by the transverse walls. This has to be regarded when comparing the impact load H and the sum of the shear forces in the mentioned walls (important at higher load levels).

#### 4.2. Normal force

The determination of the position of the resulting normal force N in each wall-section – latter was described by the excentricity e – is given in the tables in the annex. Regard-

ing the normal stresses a significant difference between the investigated sections, i.e. cap, middle and base of the wall, was recognized.

This effect enhanced with rising load levels, as the non-linear-effects, especially opening cross-sections due to exceeding tension strength, dominate.

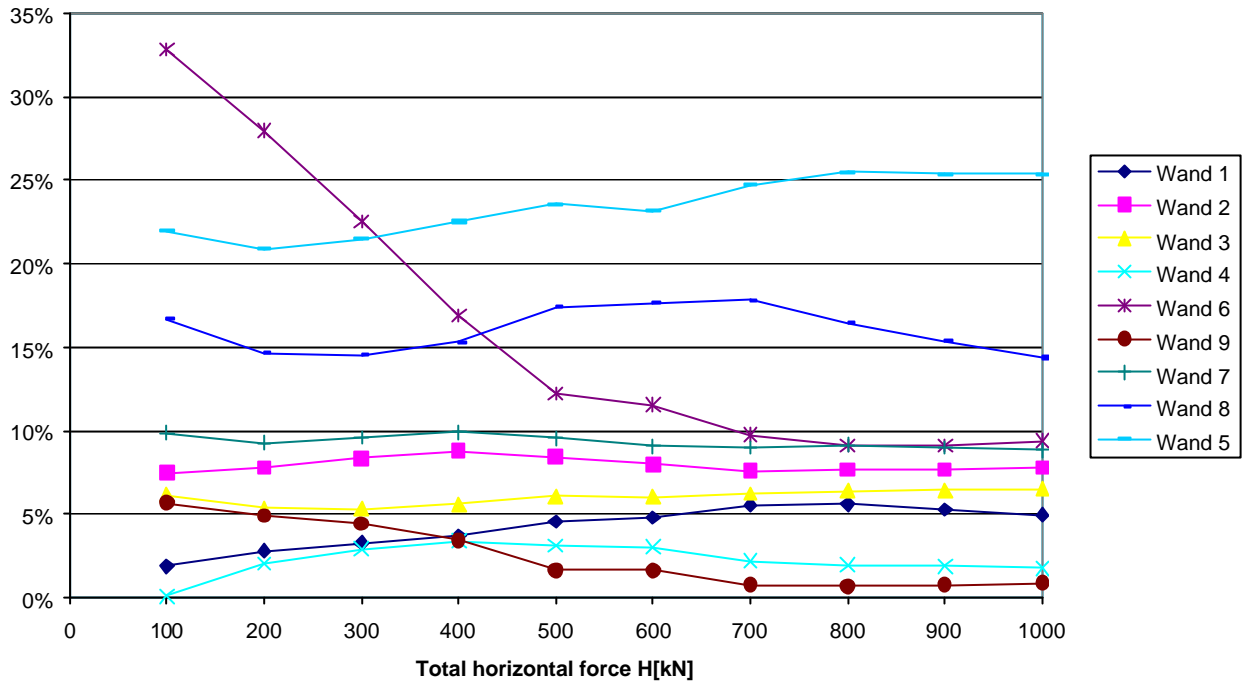
## 5. Apartment-House 1-modified

The following presented calculations on the modified apartment house 1 have been carried out with a tension strength of  $0.3 \text{ N/mm}^2$  and a compression strength of  $8.5 \text{ MN/m}^2$ . The number of storeys remained constantly to 4. The horizontal force  $H$  was enhanced in several load steps from  $100 \text{ kN}$  to  $1000 \text{ kN}$ . In addition also calculations with horizontal forces in the opposite direction were carried out – marked with affix *H-negative*. Generally the last load-levels indicate a “numerically” collapse of the structure as the residual forces enhanced significantly ( $400\text{kN}$  resp.  $-700\text{kN}$ ). This effect is indicated by the discrepancy of the external vertical load (applied dead load of the structure) and the resulting internal force in the mentioned section (s. appendix). Nevertheless the calculations have been carried out for all load-levels.

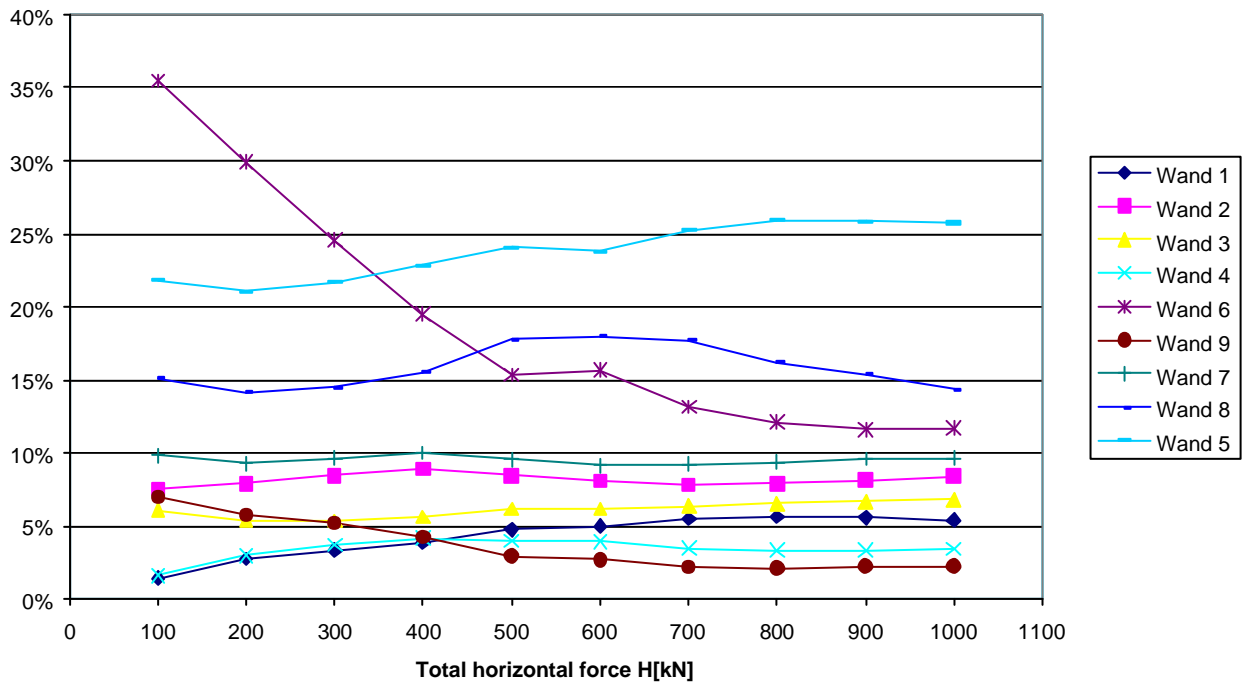
The results of the calculations were evaluated to determine the distribution of the total horizontal force  $H$  to each wall-sections (here mentioned the walls orientated in the direction of the horizontal force  $H$ ) and in the next step to determine the position of the resulting normal force  $N$  in each wall-section – latter was described by the excentricity  $e$ .

### 5.1. Distribution of the shear force

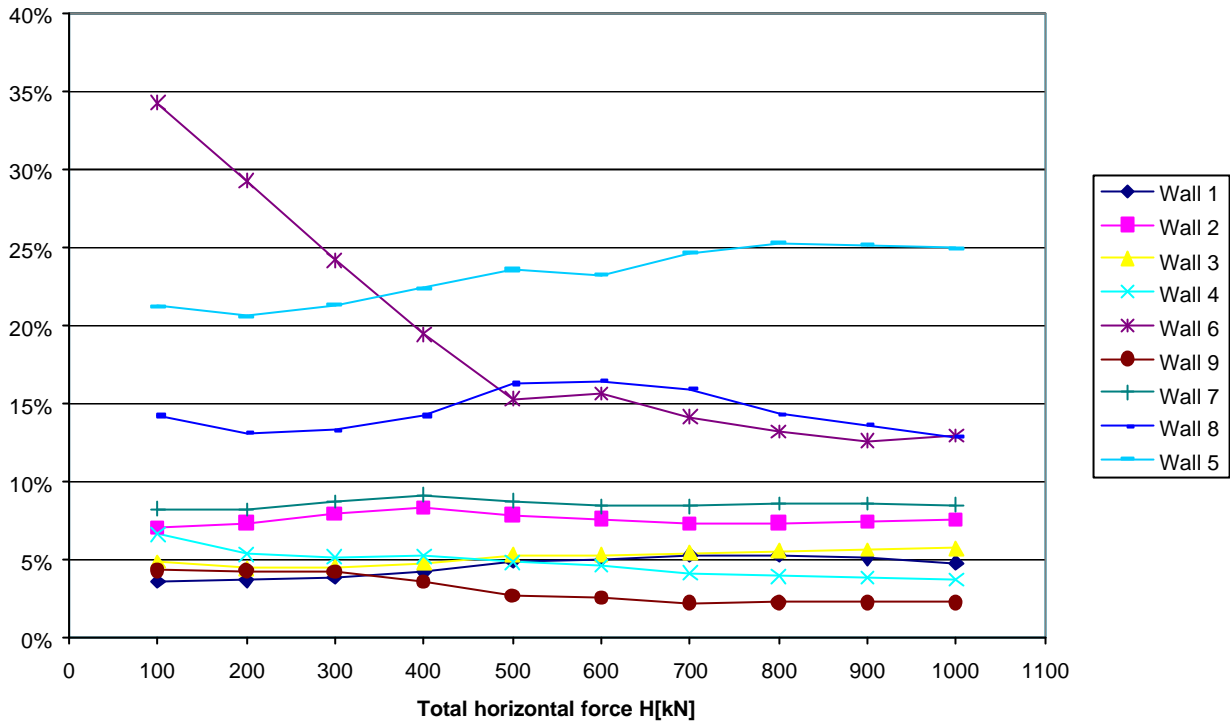
The distribution to the single walls in the three sections – i.e. at the cap of the wall, in the middle of the wall and at the base of the wall – is shown in the following diagram. Additionally the results with negative horizontal forces are given.



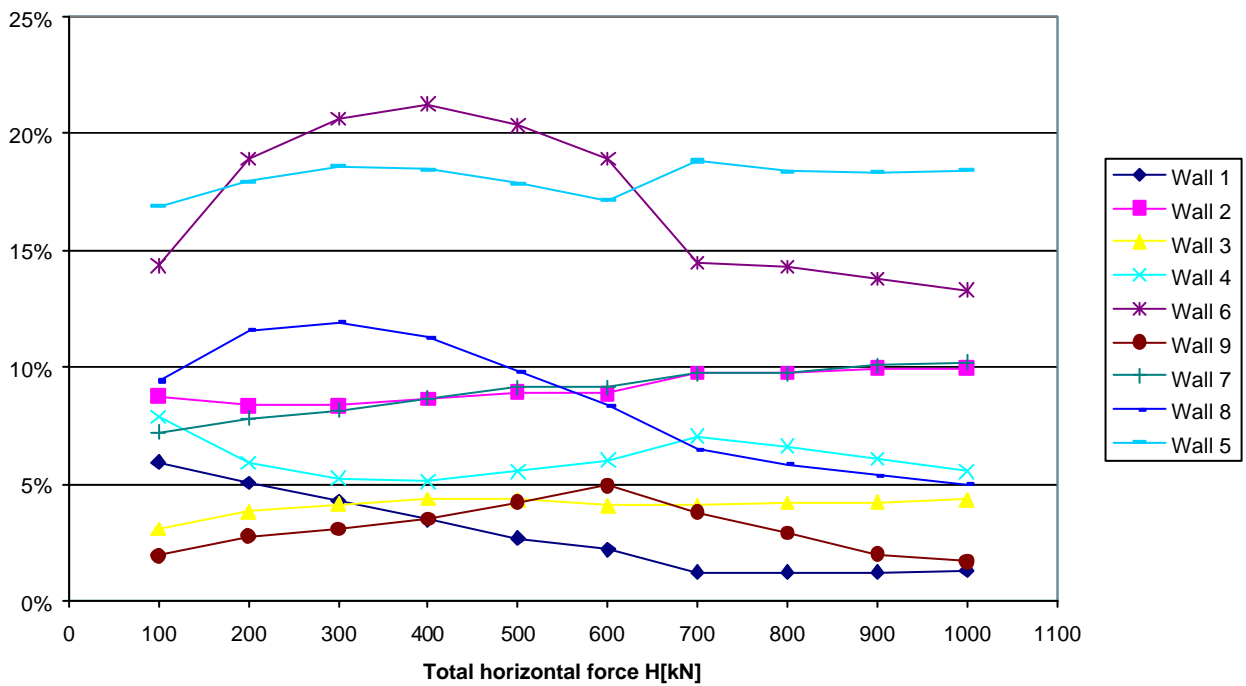
**Figure 44:** Apartment-House 1-modified – distribution of the shear force in the base of the walls – positive H



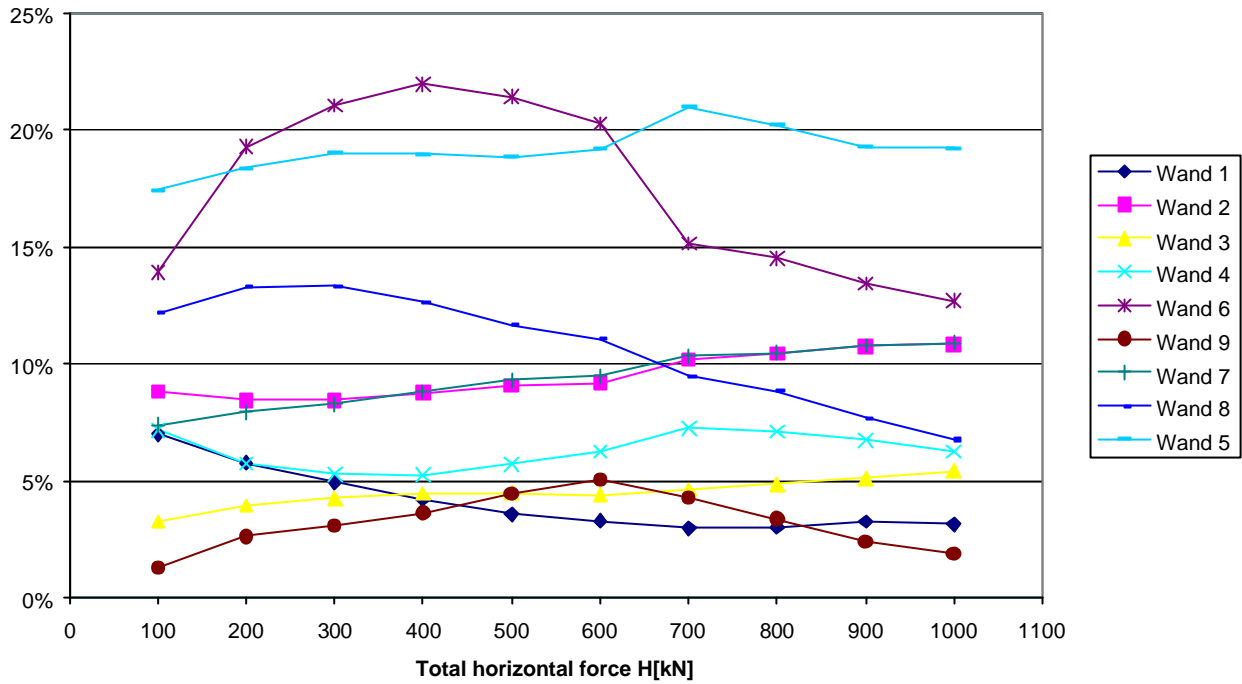
**Figure 45:** Apartment-House 1-modified – distribution of the shear force in the middle of the walls – positive H



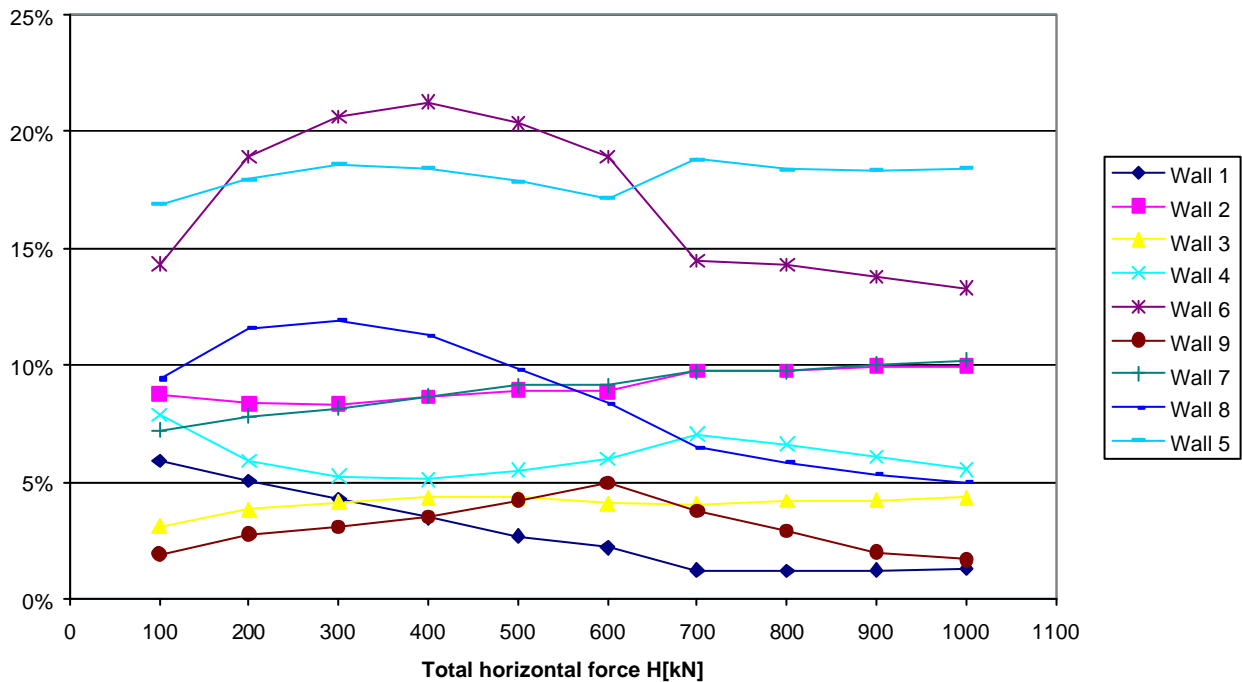
**Figure 46:** Apartment-House 1-modified – distribution of the shear force at the cap of the walls – positive H



**Figure 47:** Apartment-House 1-modified – distribution of the shear force in the base of the walls – negative H



**Figure 48:** Apartment-House 1-modified – distribution of the shear force in the middle of the walls – negative H



**Figure 49:** Apartment-House 1-modified – distribution of the shear force at the cap of the walls – negative H



Comparing the distribution of the horizontal forces at the cap of the wall with different orientation of the external horizontal force  $H$  a divergency appears. Especially the horizontal forces obtained by the walls 6, 8, and 5 / 7 differ. This effect could be explained with the configuration of the transverse walls in function of a flange and the orientation referring to orientation of the external horizontal force.

During the calculations it was found, that due to plate deformations of the transverse walls in the mentioned section secondary horizontal shear stresses resp. corresponding forces appeared. For the equilibrium of state in the mentioned walls orientated in longitudinal direction counteracting forces resulted. With arising external horizontal force  $H$  this effect was reduced. Further due to plate shear loadings approximate 10% of the total horizontal force was carried by the transverse walls. This has to be regarded when comparing the impact load  $H$  and the sum of the shear forces in the mentioned walls (important at higher load levels).

## 5.2. Normal force

The determination of the position of the resulting normal force  $N$  in each wall-section – latter was described by the excentricity  $e$  – is given in the tables in the annex. Regarding the normal stresses a significant difference between the investigated sections, i.e. cap, middle and base of the wall, was recognized.

This effect enhanced with rising load levels, as the non-linear-effects, especially opening cross-sections due to exceeding tension strength, dominate.

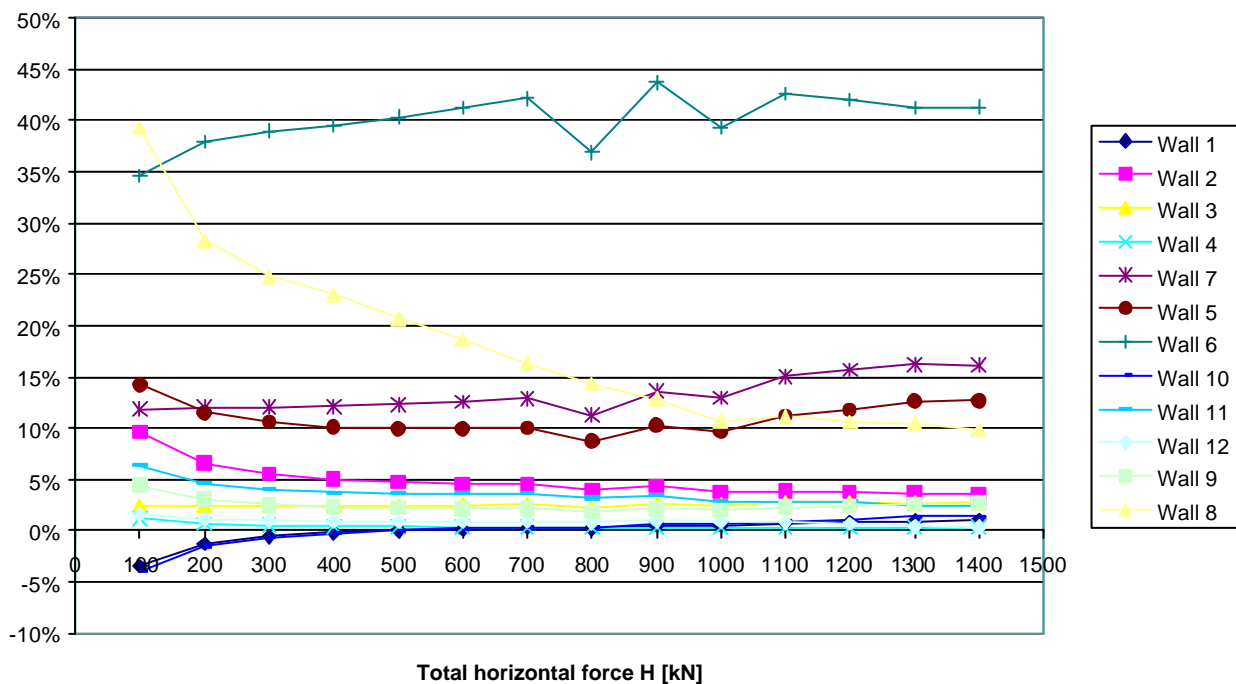
## 6. Apartment-House 2

The following presented calculations on the apartment house 2 have been carried out with a tension strength of 0.3 N/mm<sup>2</sup> and a compression strength of 8.5 MN/m<sup>2</sup>. The number of storeys remained constantly to 4. The horizontal force H was enhanced in several load steps from 100 kN up to 1100 resp. 1400 kN. In addition also calculations with horizontal forces in the opposite direction were carried out – marked with affix *H-negative*.

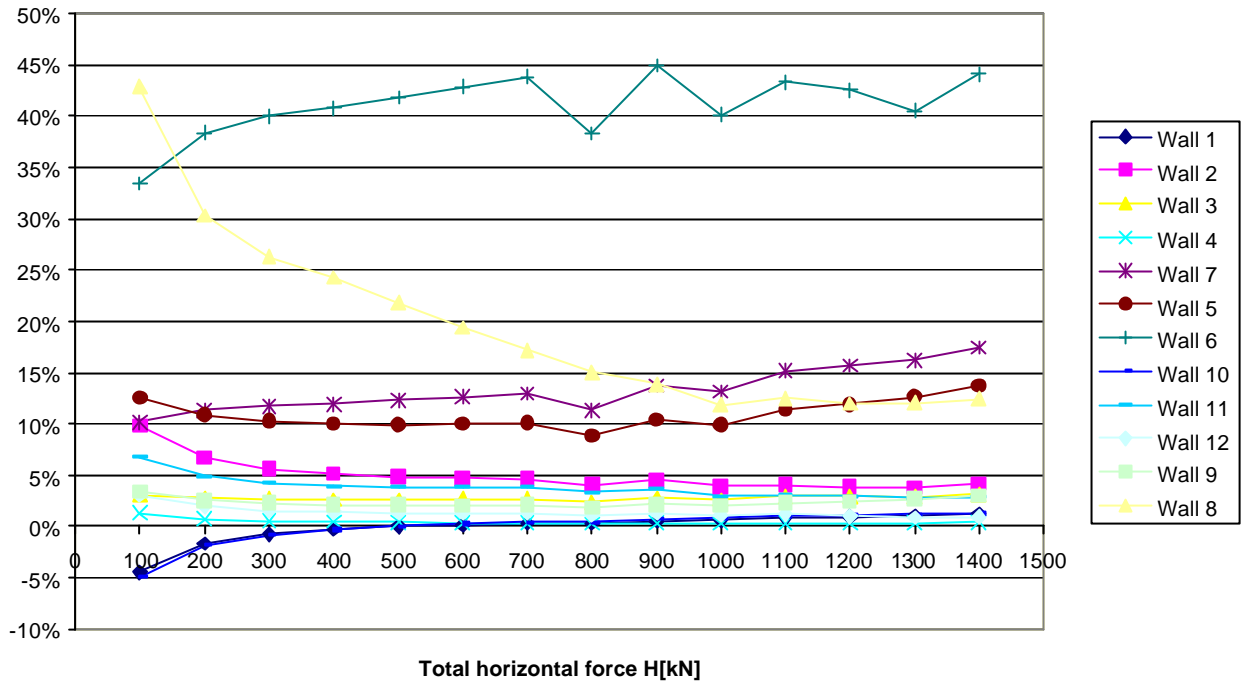
The results of the calculations were evaluated to determine the distribution of the total horizontal force H to each wall-sections (here mentioned the walls orientated in the direction of the horizontal force H) and in the next step to determine the position of the resulting normal force N in each wall-section – latter was described by the excentricity e.

### 6.1. Distribution of the shear force

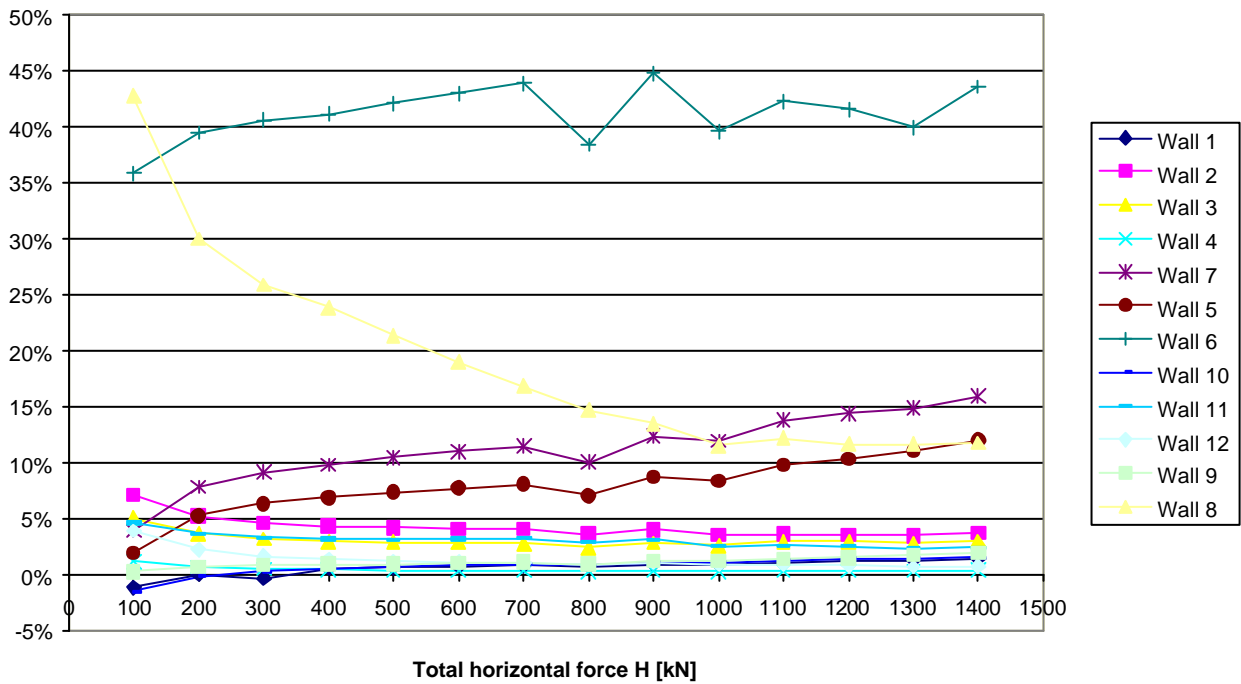
The distribution to the single walls in the three sections – i.e. at the cap of the wall, in the middle of the wall and at the base of the wall – is shown in the following diagram. Additionally the results with negative horizontal forces are given.



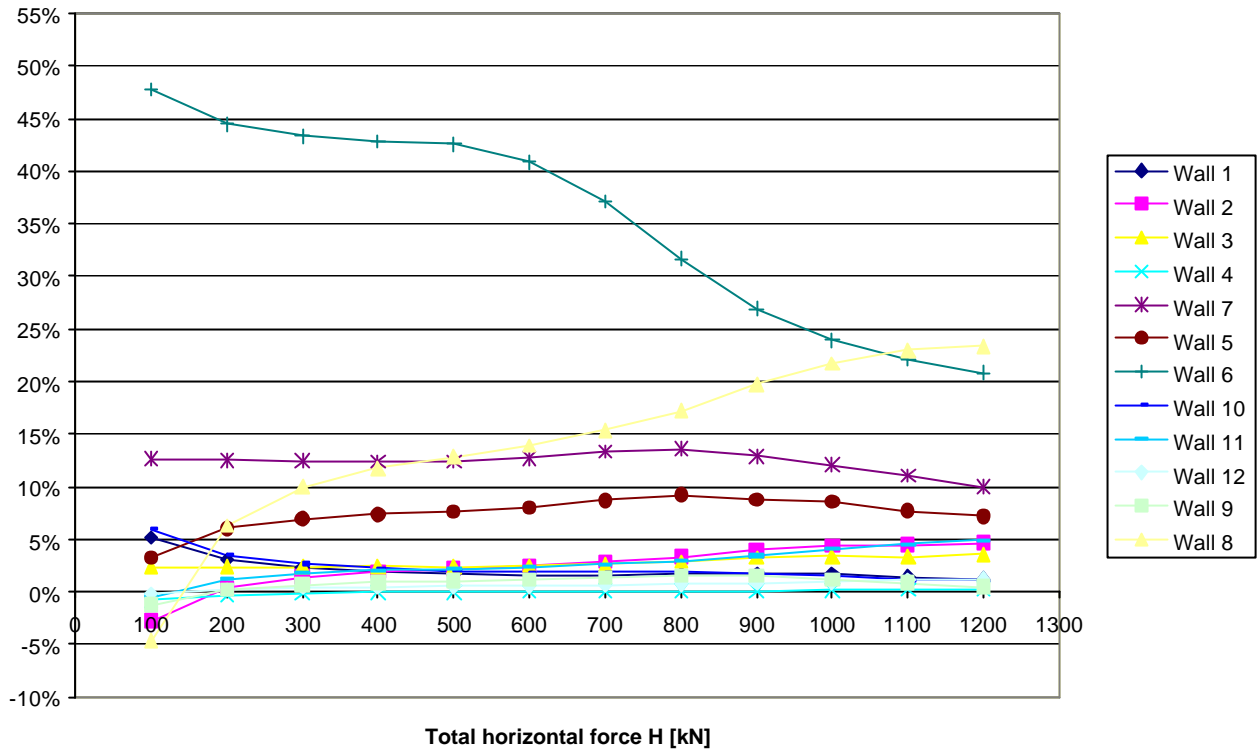
**Figure 50:** Apartment-House 2 – distribution of the shear force in the base of the walls – positive H



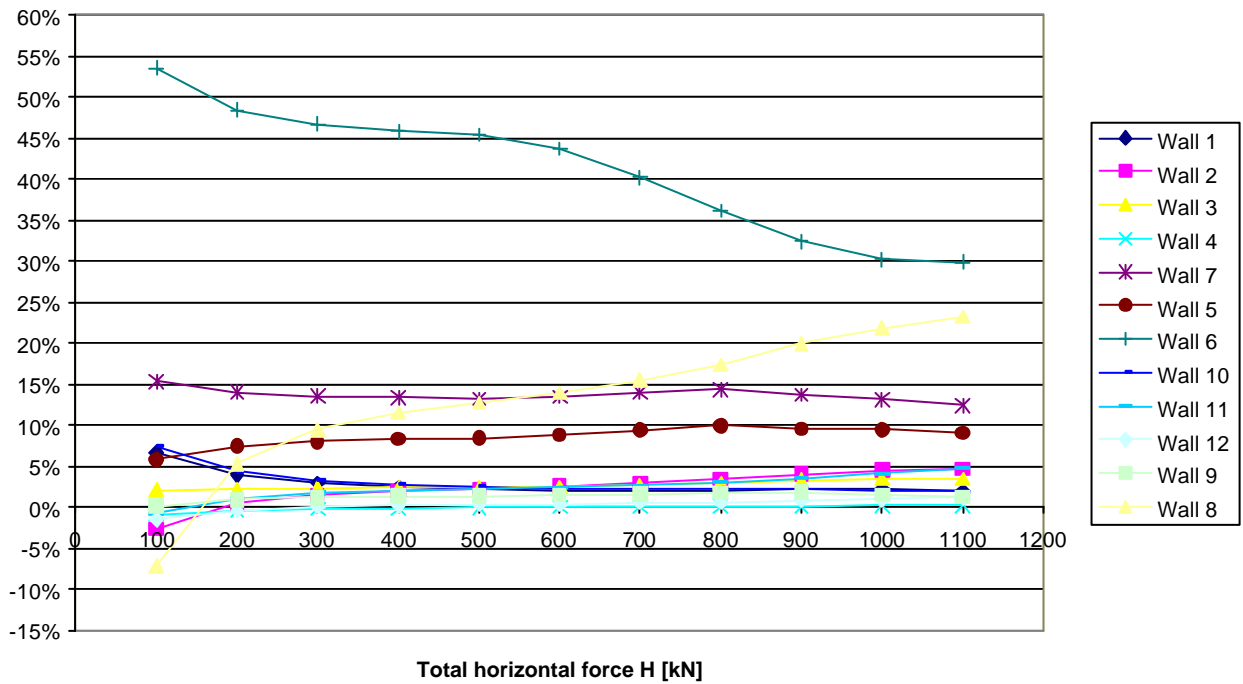
**Figure 51:** Apartment-House 2 – distribution of the shear force in the middle of the walls – positive H



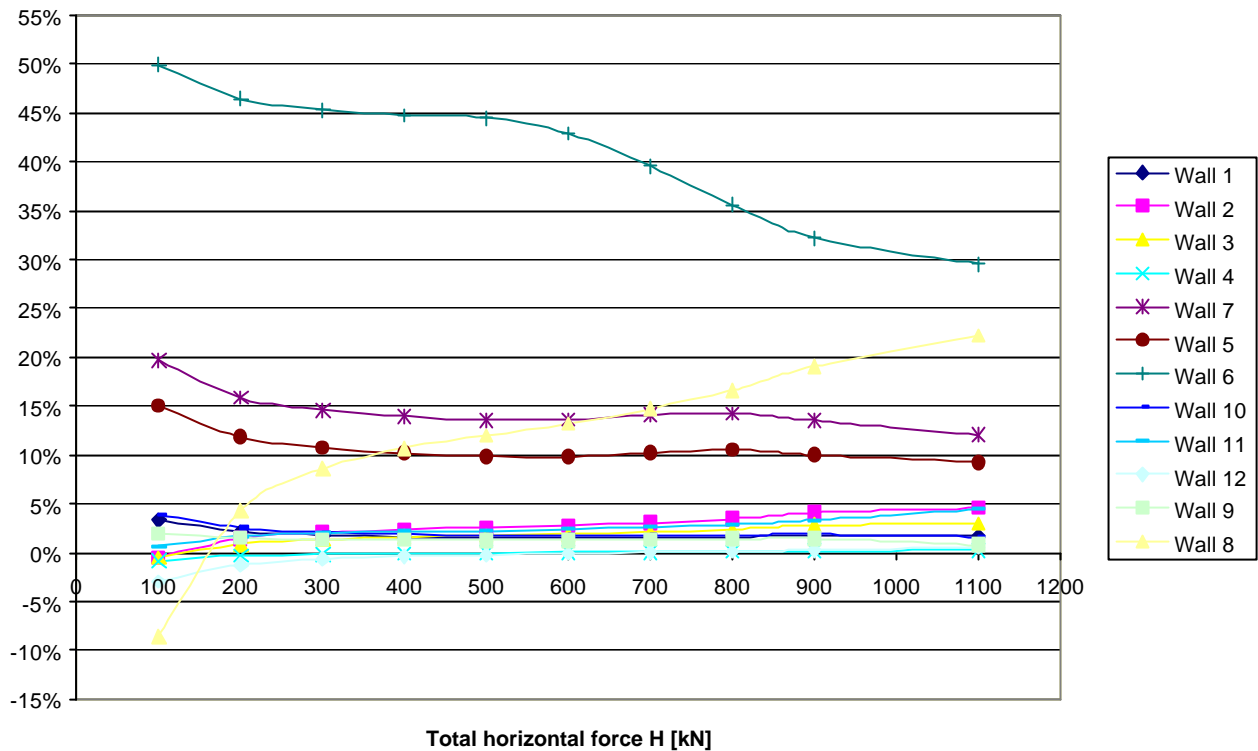
**Figure 52:** Apartment-House 2 – distribution of the shear force at the cap of the walls – positive H



**Figure 53:** Apartment-House 2 – distribution of the shear force in the base of the walls – nega-  
tive H



**Figure 54:** Apartment-House 2– distribution of the shear force in the middle of the walls – nega-  
tive H



**Figure 55:** Apartment-House 2 – distribution of the shear force at the cap of the walls – negative H

Comparing the distribution of the horizontal forces at the cap of the wall with different orientation of the external horizontal force H a divergency appears. Especially the horizontal forces obtained by the walls 6, 8, and 5 / 7 differ. This effect could be explained with the configuration of the transverse walls in function of a flange and the orientation referring to orientation of the external horizontal force.

During the calculations it was found, that due to plate deformations of the transverse walls in the mentioned section secondary horizontal shear stresses resp. corresponding forces appeared. For the equilibrium of state in the mentioned walls orientated in longitudinal direction counteracting forces resulted. With arising external horizontal force H this effect was reduced. Further due to plate shear loadings approximate 10% of the total horizontal force was carried by the transverse walls. This has to be regarded when comparing the impact load H and the sum of the shear forces in the mentioned walls (important at higher load levels).

## 6.2. Normal force

The determination of the position of the resulting normal force  $N$  in each wall-section – latter was described by the excentricity  $e$  – is given in the tables in the annex. Regarding the normal stresses a significant difference between the investigated sections, i.e. cap, middle and base of the wall, was recognized.

This effect enhanced with rising load levels, as the non-linear-effects, especially opening cross-sections due to exceeding tension strength, dominate.

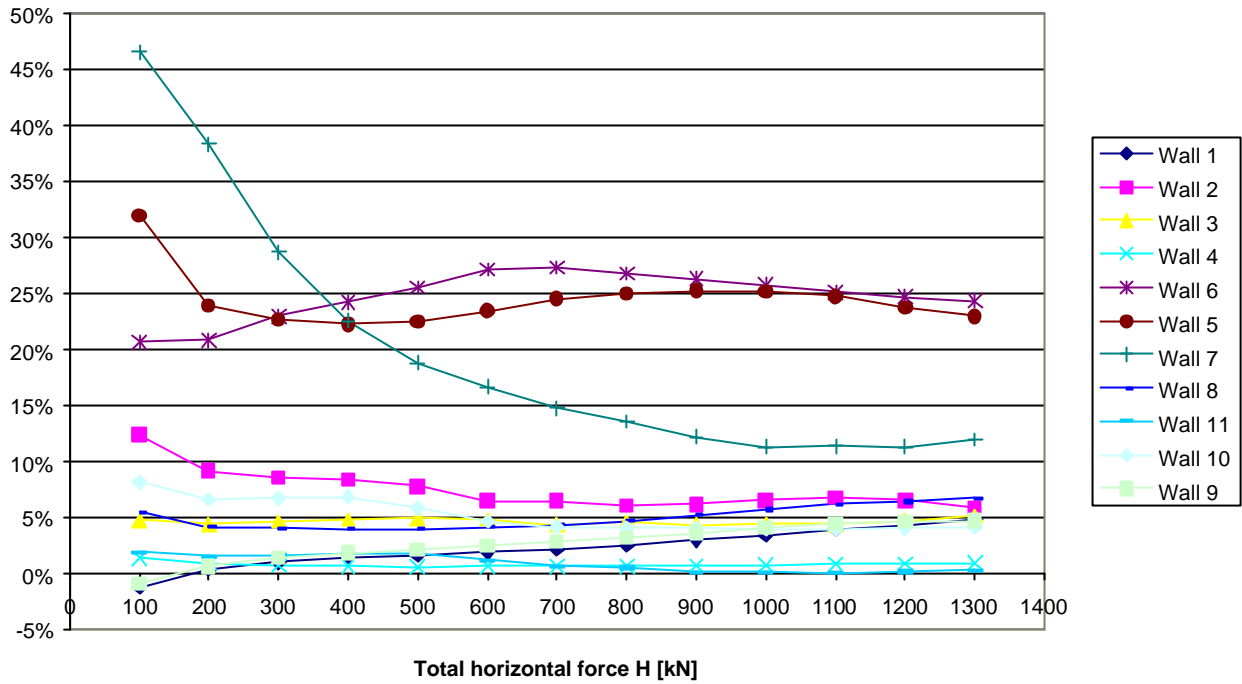
## 7. Apartment-House 2 - modified

The following presented calculations on the modified apartment house 2 have been carried out with a tension strength of  $0.3 \text{ N/mm}^2$  and a compression strength of  $8.5 \text{ MN/m}^2$ . The number of storeys remained constantly to 4. The horizontal force  $H$  was enhanced in several load steps from  $100 \text{ kN}$  to  $1300 \text{ kN}$ . In addition also calculations with horizontal forces in the opposite direction were carried out – marked with affix *H-negative*. Generally the last load-levels indicate a “numerically” collapse of the structure as the residual forces enhanced significantly ( $600$  resp.  $-600 \text{ kN}$ ). This effect is indicated by the discrepancy of the external vertical load (applied dead load of the structure) and the resulting internal force in the mentioned section (s. appendix). Nevertheless the calculations have been carried out for all load-levels.

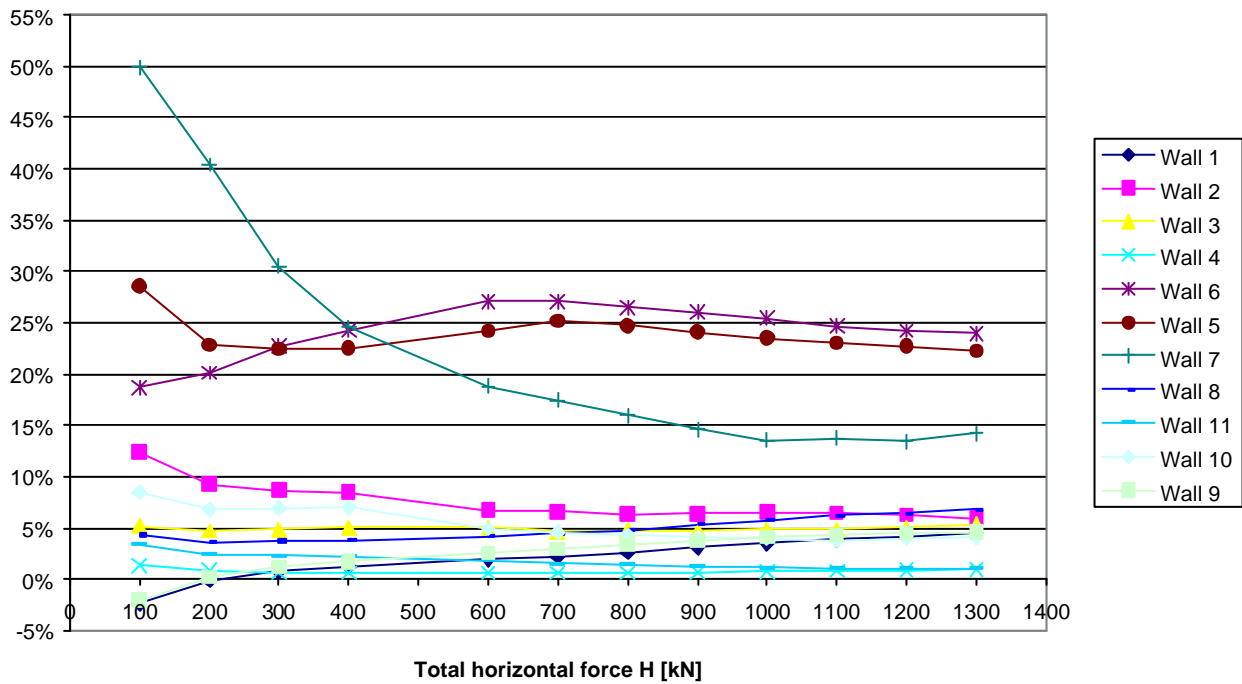
The results of the calculations were evaluated to determine the distribution of the total horizontal force  $H$  to each wall-sections (here mentioned the walls orientated in the direction of the horizontal force  $H$ ) and in the next step to determine the position of the resulting normal force  $N$  in each wall-section – latter was described by the excentricity  $e$ .

### 7.1. Distribution of the shear force

The distribution to the single walls in the section next to the foundation – i.e. the base of the wall - is described in the following diagram.

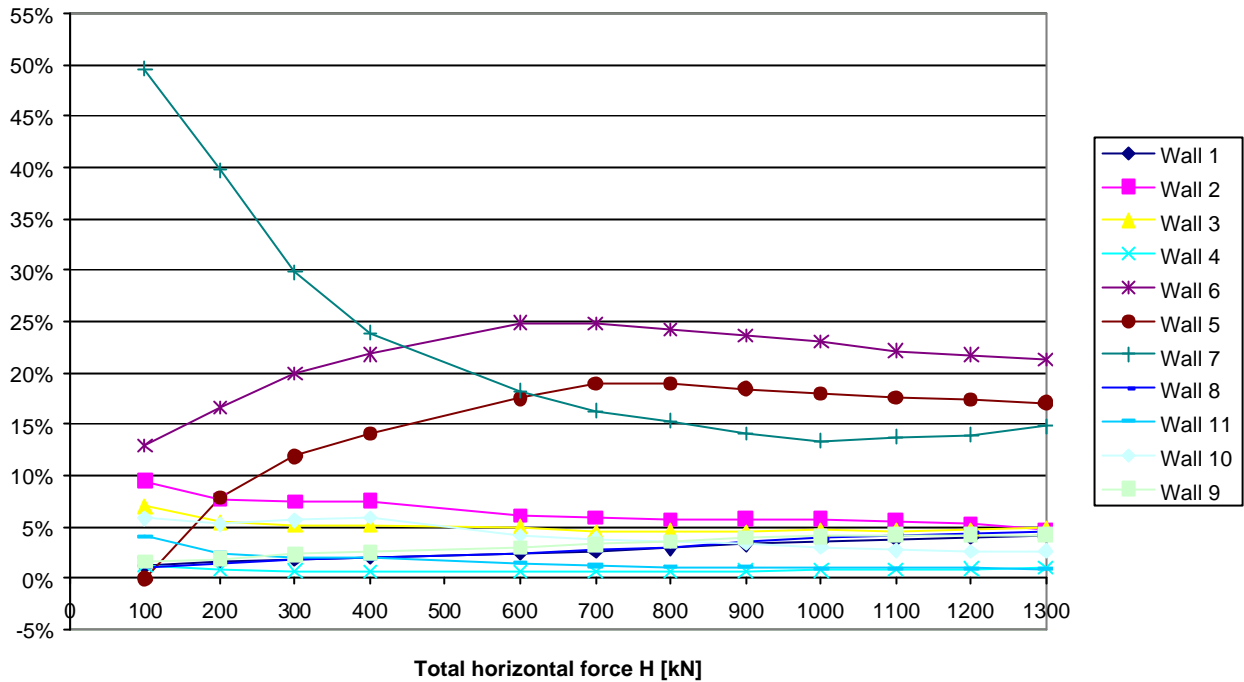


**Figure 56:** Apartment-House 2-modified – distribution of the shear force in the base of the walls – positive H

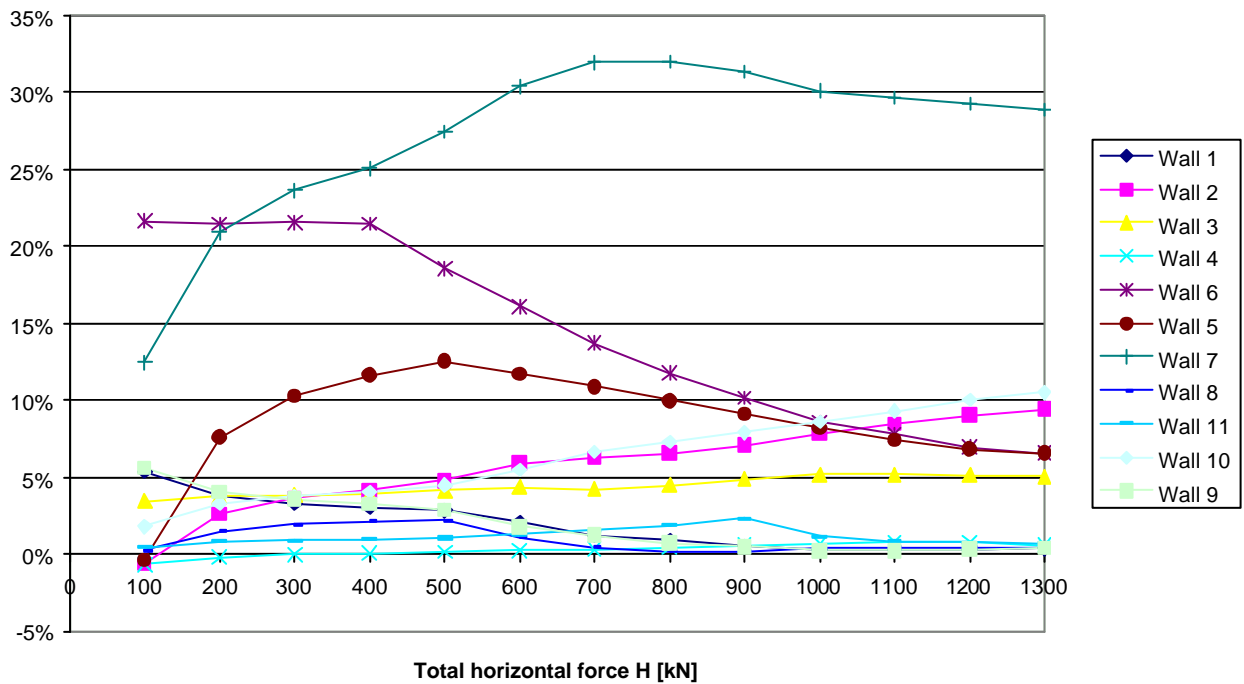


**Figure 57:** Apartment-House 2-modified – distribution of the shear force in the middle of the walls – positive H

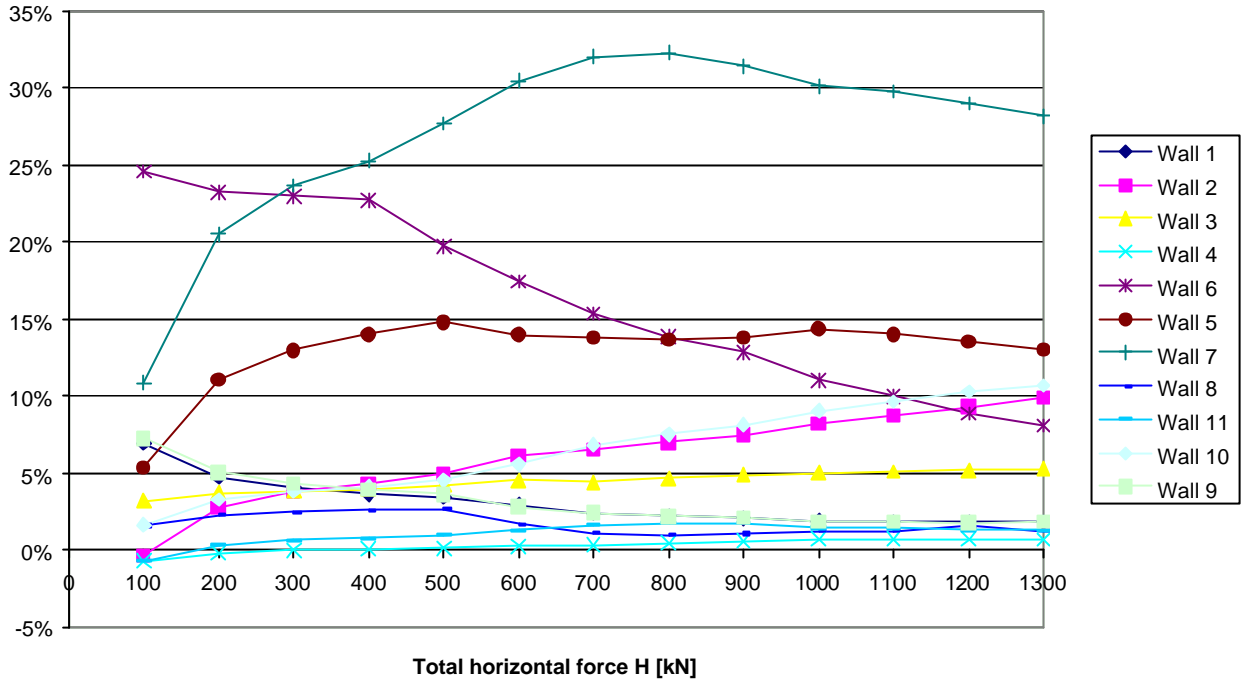




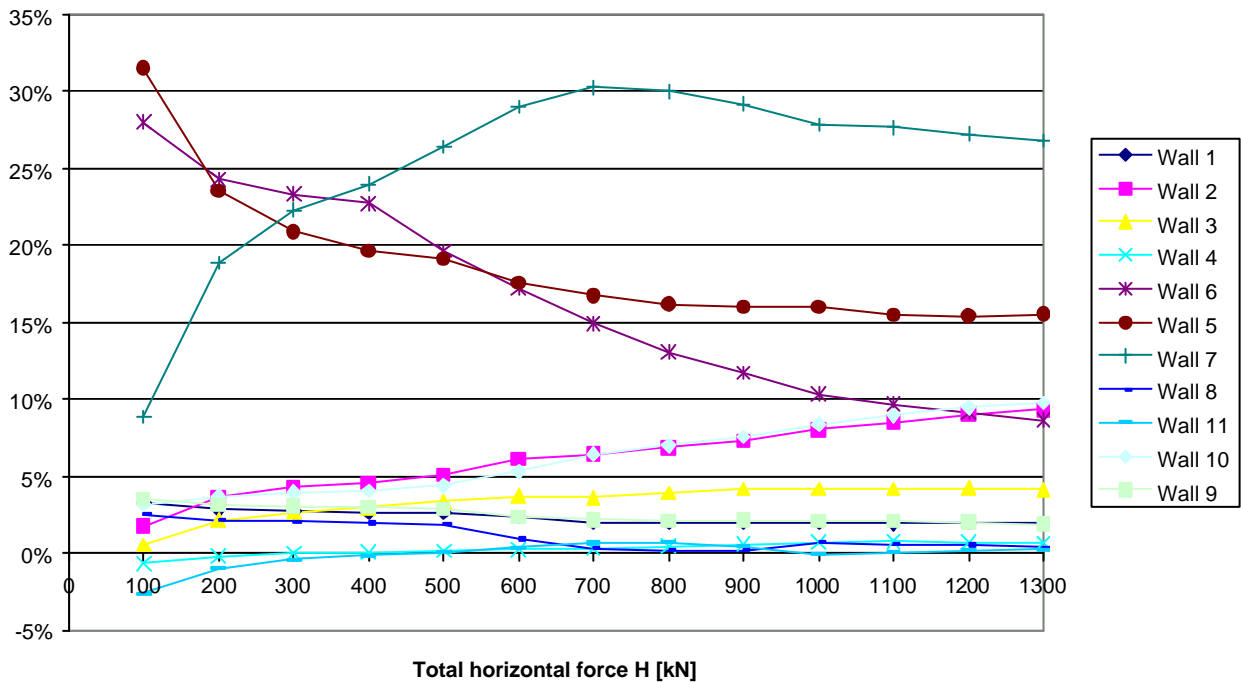
**Figure 58:** Apartment-House 2-modified – distribution of the shear force at the cap of the walls – positive H



**Figure 59:** Apartment-House 2-modified – distribution of the shear force at the base of the walls – negative H



**Figure 60:** Apartment-House 2-modified – distribution of the shear force in the middle of the walls – negative H



**Figure 61:** Apartment-House 2-modified – distribution of the shear force at the cap of the walls – negative H

Comparing the distribution of the horizontal forces at the cap of the wall with different orientation of the external horizontal force  $H$  a divergency appears. In Figure 58 wall 5 and 6 obtain – at higher load levels – more horizontal force than wall 7. In the opposite direction of  $H$  wall 7 obtains significantly more horizontal force than wall 5 or 6. This effect could be explained with the configuration of the transverse walls in function of a flange and the orientation referring to orientation of the external horizontal force.

During the calculations it was found, that due to plate deformations of the transverse walls in the mentioned section secondary horizontal shear stresses resp. corresponding forces appeared. For the equilibrium of state in the mentioned walls orientated in longitudinal direction counteracting forces resulted. With arising external horizontal force  $H$  this effect was reduced. Further due to plate shear loadings approximate 10% of the total horizontal force was carried by the transverse walls. This has to be regarded when comparing the impact load  $H$  and the sum of the shear forces in the mentioned walls (important at higher load levels).

## 7.2. Normal force

The determination of the position of the resulting normal force  $N$  in each wall-section – latter was described by the excentricity  $e$  – is given in the tables in the annex. Regarding the normal stresses a significant difference between the investigated sections, i.e. cap, middle and base of the wall, was recognized.

This effect enhanced with rising load levels, as the non-linear-effects, especially opening cross-sections due to exceeding tension strength, dominate.

## 8. Appendix

In the appendix the distribution of the normal forces including the position described by the excentricity  $e$  referred to the middle of the length of the wall is given. Also the sum of vertical forces in each section is found. By comparing the external vertical load with the sum in the section an indication about the stability of the system is possible.

**Table 5:** Compilation of the appendix

	Direction of H: positive			Direction of H: negative		
	Section at the base of the wall	Section in the middle of the wall	Section at the cap of the wall	Section at the base of the wall	Section in the middle of the wall	Section at the cap of the wall
Apartment House 1	Annex AH1 H-Pos H0 up to 900			Annex AH1 H-neg H -100 up to -900		
Apartment House 1 modified		Annex AH1-mod H-pos middle			Annex AH1-mod H-neg middle	
Apartment House 2		Annex AH2 H-pos middle			Annex AH2 H-neg middle	
Apartment House 2 modified	Annex AH2-mod H-pos base	Annex AH2-mod H-pos middle	Annex AH2-mod H-pos cap	Annex AH2-mod H-neg base		

Horizontal force H 0 KN

NON-LINEAR RESULTS

tension strength 0,3 Mpa

Section 1,375 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H #DIV/0!	Position of the resulting force N inside the cross section
1	1,00	0,240		60,30		0,00		inside the cross section
2	1,25	0,240		179,90		0,00		inside the cross section
3	1,25	0,240		139,10		0,00		inside the cross section
4	1,00	0,240		94,60		0,00		inside the cross section
5	1,75	0,175		280,60		0,00		inside the cross section
6	1,40	0,240		121,10		0,00		inside the cross section
7	1,25	0,240		220,40		0,00		inside the cross section
8	1,75	0,240		248,10		0,00		inside the cross section
9	1,00	0,240		73,70		0,00		inside the cross section
Sum				0	1417,8			

Sum wallmiddle list 1417,8  
Sum wallmiddle soil 4825,80

Section 0,125 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H #DIV/0!	Position of the resulting force N inside the cross section
1	1,00	0,240		60,90		0,00		inside the cross section
2	1,25	0,240		194,50		0,00		inside the cross section
3	1,25	0,240		150,50		0,00		inside the cross section
4	1,00	0,240		102,30		0,00		inside the cross section
5	1,75	0,175		278,50		0,00		inside the cross section
6	1,40	0,240		115,20		0,00		inside the cross section
7	1,25	0,240		236,00		0,00		inside the cross section
8	1,75	0,240		264,60		0,00		inside the cross section
9	1,00	0,240		74,30		0,00		inside the cross section
Sum				0	1476,8			

Sum wallbase list 1476,8  
Sum wallbase soil 4825,80

Section 2,625 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H #DIV/0!	Position of the resulting force N inside the cross section
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1	1,00	0,240		60,10		0,00
2	1,25	0,240		176,20		0,00
3	1,25	0,240		136,00		0,00
4	1,00	0,240		90,30		0,00
5	1,75	0,175		311,20		0,00
6	1,40	0,240		129,10		0,00
7	1,25	0,240		221,20		0,00
8	1,75	0,240		242,80		0,00
9	1,00	0,240		73,70		0,00
<b>Sum</b>			<b>0</b>	<b>1440,6</b>		

#DIV/0!  
inside the cross section  
#DIV/0!  
inside the cross section  
#DIV/0!  
inside the cross section  
#DIV/0!  
inside the cross section  
#DIV/0!  
inside the cross section  
#DIV/0!  
inside the cross section  
#DIV/0!  
inside the cross section  
#DIV/0!  
inside the cross section

10						
11						
12						
13						
14						
15						
16						
<b>Sum</b>						<b>0</b>

Sum wallcap list  
Sum wallcap soll

1440,6  
4825,80

wall	cap	middle	base
1	#DIV/0!	#DIV/0!	#DIV/0!
2	#DIV/0!	#DIV/0!	#DIV/0!
3	#DIV/0!	#DIV/0!	#DIV/0!
4	#DIV/0!	#DIV/0!	#DIV/0!
5	#DIV/0!	#DIV/0!	#DIV/0!
6	#DIV/0!	#DIV/0!	#DIV/0!
7	#DIV/0!	#DIV/0!	#DIV/0!
8	#DIV/0!	#DIV/0!	#DIV/0!
9	#DIV/0!	#DIV/0!	#DIV/0!
<b>Sum</b>	#DIV/0!	#DIV/0!	#DIV/0!

Normal face N	cap	middle	base
	60,10	60,30	60,90
	176,20	179,90	194,50
	136,00	139,10	150,50
	90,30	94,60	102,30
	311,20	280,60	278,50
	129,10	121,10	115,20
	221,20	220,40	236,00
	242,80	248,10	264,60
	73,70	73,70	74,30
	1440,60	1417,80	1476,80

**Horizontal force H 100 KN**

**NON-LINEAR RESULTS** [tension strength 0,3 Mpa]

Section 1,375 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
1	1,00	0,240	3,09	82,40	0,099	8,16	3%	inside the cross section
2	1,25	0,240	7,69	187,60	0,070	13,13	8%	inside the cross section
3	1,25	0,240	8,89	147,10	0,079	11,62	9%	inside the cross section
4	1,00	0,240	4,54	81,60	0,076	6,20	4%	inside the cross section
5	1,75	0,175	13,70	300,90	0,080	24,07	23%	inside the cross section
6	1,40	0,240	23,70	98,70	0,127	12,53	14%	inside the cross section
7	1,25	0,240	14,30	248,50	0,060	14,91	15%	inside the cross section
8	1,75	0,240	14,80	248,60	0,155	38,53	10%	inside the cross section
9	1,00	0,240	10,40	45,00	0,106	4,88		
<b>Sum</b>			<b>101,11</b>	<b>1441,4</b>				

Sum wallmiddle ist 4826  
Sum wallmiddle soll 4825,80

Section 0,125 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
1	1,00	0,240	3,67	89,80	0,089	7,99	4%	inside the cross section
2	1,25	0,240	8,45	204,60	0,089	18,21	8%	inside the cross section
3	1,25	0,240	9,29	161,10	0,128	20,62	9%	inside the cross section
4	1,00	0,240	2,94	81,50	0,136	11,08	3%	inside the cross section
5	1,75	0,175	15,10	303,30	0,135	40,95	15%	inside the cross section
6	1,40	0,240	21,40	82,60	0,350	28,91	21%	inside the cross section
7	1,25	0,240	16,50	273,50	0,061	16,88	16%	inside the cross section
8	1,75	0,240	15,40	265,40	0,205	54,41	15%	inside the cross section
9	1,00	0,240	8,99	38,40	0,343	13,17	9%	inside the cross section
<b>Sum</b>			<b>101,74</b>	<b>1500,2</b>				

Sum wallbase ist 4825,6  
Sum wallbase soll 4825,80

Section 2,625 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
------	-------	-------	--------	--------	-------	---------	----------------	-----------------------------------

1	1.00	0.240	5.20	74.30	0.094	6.98
2	1.25	0.240	6.10	180.00	0.033	5.94
3	1.25	0.240	7.33	140.70	0.016	2.25
4	1.00	0.240	9.29	85.90	0.013	1.12
5	1.75	0.175	11.00	326.90	-0.014	-4.58
6	1.40	0.240	23.00	118.20	-0.015	-1.77
7	1.25	0.240	10.50	228.60	0.048	10.97
8	1.75	0.240	13.50	242.40	0.085	20.60
9	1.00	0.240	7.50	54.70	-0.032	-1.75
<b>Sum</b>			<b>93,42</b>	<b>1451,7</b>		

6% inside the cross section  
7% inside the cross section  
8% inside the cross section  
10% inside the cross section  
12% inside the cross section  
25% inside the cross section  
11% inside the cross section  
14% inside the cross section  
8% inside the cross section

10	668,2
11	499,8
12	426
13	511,6
14	580,1
15	401,6
16	286,7
<b>Sum</b>	<b>3374</b>

Sum wallcap ist  
Sum wallcap soll

4825,7  
4825,80

proportion Q/H	cap	middle	base
1	6%	3%	4%
2	7%	8%	8%
3	8%	9%	9%
4	10%	4%	3%
5	12%	14%	15%
6	25%	23%	21%
7	11%	14%	16%
8	14%	15%	15%
9	8%	10%	9%
<b>Sum</b>	100%	100%	100%

Normal force N

cap	middle	base
74,30	82,40	89,80
180,00	187,60	204,60
140,70	147,10	161,10
85,90	81,60	81,50
326,90	300,90	303,30
118,20	98,70	82,60
228,60	248,50	273,50
242,40	248,60	265,40
54,70	46,00	38,40
1451,70	1441,40	1500,20



Horizontal force H 200 KN

NON-LINEAR RESULTS tension strength 0,3 Mpa

Section 1,375 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	9,73	104,20	0,140	14,59
2	1,25	0,240	15,20	196,40	0,130	25,53
3	1,25	0,240	16,90	155,70	0,151	23,51
4	1,00	0,240	12,50	67,90	0,180	12,22
5	1,75	0,175	29,20	323,00	0,145	46,84
6	1,40	0,240	35,80	81,10	0,320	25,95
7	1,25	0,240	26,30	277,70	0,102	28,33
8	1,75	0,240	30,10	249,10	0,295	73,48
9	1,00	0,240	15,90	24,50	0,374	9,16
<b>Sum</b>			<b>191,63</b>	<b>1479,6</b>		

proportion Q/H Position of the resulting force N  
 5% inside the cross section  
 8% inside the cross section  
 9% inside the cross section  
 7% inside the cross section  
 15% inside the cross section  
 19% inside the cross section  
 14% inside the cross section  
 16% inside the cross section  
 8% inside the cross section

Sum wallmiddle ist 4825,8  
 Sum wallmiddle soil 4825,80

10	538,5
11	474,7
12	409,9
13	552,7
14	561,8
15	515,5
16	233,1
<b>Sum</b>	<b>3346,2</b>

Section 0,125 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	9,60	119,10	0,153	18,22
2	1,25	0,240	15,40	216,30	0,179	38,72
3	1,25	0,240	16,90	172,80	0,241	41,64
4	1,00	0,240	10,00	59,00	0,369	21,77
5	1,75	0,175	29,50	329,90	0,235	77,53
6	1,40	0,240	31,90	57,10	0,790	45,11
7	1,25	0,240	27,30	313,90	0,118	37,04
8	1,75	0,240	30,10	266,50	0,405	107,93
9	1,00	0,240	13,40	9,72	1,760	17,11
<b>Sum</b>			<b>184,1</b>	<b>1544,32</b>		

proportion Q/H Position of the resulting force N  
 5% inside the cross section  
 8% inside the cross section  
 9% inside the cross section  
 5% inside the cross section  
 16% inside the cross section  
 17% outside the cross section  
 15% inside the cross section  
 16% inside the cross section  
 7% outside the cross section

Sum wallbase ist 4832,92  
 Sum wallbase soil 4825,80

10	533,5
11	447,5
12	392,8
13	561,7
14	196,7
15	544,4
16	562
<b>Sum</b>	<b>3288,6</b>

Section 2,625 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
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proportion Q/H Position of the resulting force N

1	1,00	0,240	11,40	88,40	0,114	10,08
2	1,25	0,240	12,80	185,40	0,062	11,49
3	1,25	0,240	14,50	146,50	0,042	6,15
4	1,00	0,240	16,70	80,60	0,032	2,58
5	1,75	0,175	26,10	344,50	0,010	3,45
6	1,40	0,240	35,70	109,00	0,035	3,82
7	1,25	0,240	20,80	247,90	0,073	18,10
8	1,75	0,240	28,00	242,30	0,165	39,98
9	1,00	0,240	13,00	39,10	-0,020	-0,78
<b>Sum</b>			<b>179</b>	<b>1483,7</b>		

6% inside the cross section  
7% inside the cross section  
8% inside the cross section  
9% inside the cross section  
15% inside the cross section  
20% inside the cross section  
12% inside the cross section  
16% inside the cross section  
7% inside the cross section

10	614,3
11	464,1
12	419
13	540
14	568
15	473
16	262,8
<b>Sum</b>	<b>3341,2</b>

Sum wallcap list 4824,9  
Sum wallcap soil 4825,80

wall	cap	middle	base
1	6%	5%	5%
2	7%	8%	8%
3	8%	9%	9%
4	9%	7%	5%
5	15%	15%	16%
6	20%	19%	17%
7	12%	14%	15%
8	16%	16%	16%
9	7%	8%	7%
<b>Sum</b>	100%	100%	100%

Normal face N	cap	middle	base
	88,40	104,20	119,10
	185,40	196,40	216,30
	146,50	155,70	172,80
	80,60	67,90	59,00
	344,50	323,00	329,90
	109,00	81,10	57,10
	247,90	277,70	313,90
	242,30	249,10	286,50
	39,10	24,50	9,72
	1483,70	1479,60	1544,32

**Horizontal force H 300 KN**

tension strength 0,3 Mpa

**NON-LINEAR RESULTS**

**Section 1,375 m**

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	18,70	131,00	0,171	22,40
2	1,25	0,240	25,60	210,20	0,194	40,78
3	1,25	0,240	26,80	168,00	0,216	36,29
4	1,00	0,240	16,30	65,80	0,213	14,02
5	1,75	0,175	50,70	353,90	0,215	76,09
6	1,40	0,240	35,70	92,40	0,248	22,92
7	1,25	0,240	43,80	317,10	0,142	45,03
8	1,75	0,240	43,00	259,80	0,395	102,62
9	1,00	0,240	13,00	28,90	0,167	4,83
<b>Sum</b>			<b>273,6</b>	<b>1627,1</b>		

**proportion Q/H Position of the resulting force N**

- 7% inside the cross section
- 9% inside the cross section
- 10% inside the cross section
- 6% inside the cross section
- 19% inside the cross section
- 13% inside the cross section
- 16% inside the cross section
- 16% inside the cross section
- 5% inside the cross section

10	516,9
11	427,4
12	398
13	571,2
14	540,8
15	549,5
16	194,1
<b>Sum</b>	<b>3197,9</b>

Sum wallmiddle ist 4825  
Sum wallmiddle soil 4825,80

**Section 0,125 m**

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	18,10	155,20	0,209	32,44
2	1,25	0,240	25,30	234,90	0,277	65,07
3	1,25	0,240	26,40	192,60	0,337	64,91
4	1,00	0,240	12,10	46,50	0,424	19,72
5	1,75	0,175	49,90	368,10	0,349	128,47
6	1,40	0,240	27,20	55,40	0,590	32,69
7	1,25	0,240	43,30	369,70	0,173	63,96
8	1,75	0,240	42,60	290,20	0,515	149,45
9	1,00	0,240	6,76	9,04	0,602	5,44
<b>Sum</b>			<b>251,66</b>	<b>1721,64</b>		

**proportion Q/H Position of the resulting force N**

- 7% inside the cross section
- 10% inside the cross section
- 10% inside the cross section
- 5% inside the cross section
- 20% inside the cross section
- 11% inside the cross section
- 17% inside the cross section
- 3% outside the cross section

10	492,9
11	387,8
12	374
13	593,7
14	513,3
15	616,4
16	141,1
<b>Sum</b>	<b>3119,2</b>

Sum wallbase ist 4840,84  
Sum wallbase soil 4825,80

**Section 2,625 m**

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
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**proportion Q/H Position of the resulting force N**

1	1,00	0,240	19,60	104,40	0,125	13,05
2	1,25	0,240	21,60	194,00	0,084	16,30
3	1,25	0,240	22,70	154,40	0,054	8,34
4	1,00	0,240	20,60	81,30	0,009	0,73
5	1,75	0,175	45,70	370,30	0,025	9,26
6	1,40	0,240	37,00	118,80	-0,012	-1,43
7	1,25	0,240	35,30	271,50	0,093	25,25
8	1,75	0,240	39,60	247,80	0,225	55,76
9	1,00	0,240	12,10	39,70	-0,140	-5,56
<b>Sum</b>			<b>254,20</b>	<b>1582,2</b>		

8% inside the cross section  
 8% inside the cross section  
 9% inside the cross section  
 8% inside the cross section  
 18% inside the cross section  
 15% inside the cross section  
 14% inside the cross section  
 16% inside the cross section  
 5% inside the cross section

10	543,5
11	427,6
12	411,8
13	556
14	553,4
15	514,7
16	239,8
<b>Sum</b>	<b>3246,8</b>

Sum wallcap list  
 Sum wallcap soil

4829  
 4825,80

wall	cap	middle	base
1	8%	7%	7%
2	8%	9%	10%
3	9%	10%	10%
4	8%	6%	5%
5	18%	19%	20%
6	15%	13%	11%
7	14%	16%	17%
8	16%	16%	17%
9	5%	5%	3%
<b>Sum</b>	100%	100%	100%

Normal force N

cap	middle	base
104,40	131,00	155,20
194,00	210,20	234,90
154,40	168,00	192,60
81,30	65,60	46,50
370,30	353,90	368,10
118,80	92,40	55,40
271,50	317,10	369,70
247,80	258,60	290,20
39,70	28,90	9,04
1582,20	1627,10	1721,64

Horizontal force H 400 KN

NON-LINEAR RESULTS

tension strength 0,3 Mpa

Section 1,375 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
1	1,00	0,240	27,90	157,60	0,191	30,10	8%	inside the cross section
2	1,25	0,240	35,30	224,00	0,246	55,10	10%	inside the cross section
3	1,25	0,240	35,30	180,70	0,268	48,43	10%	inside the cross section
4	1,00	0,240	20,00	64,90	0,250	16,23	6%	inside the cross section
5	1,75	0,175	70,70	382,70	0,265	101,42	20%	inside the cross section
6	1,40	0,240	39,70	92,50	0,310	28,68	11%	inside the cross section
7	1,25	0,240	61,30	355,00	0,173	61,42	17%	inside the cross section
8	1,75	0,240	54,40	274,00	0,475	130,15	15%	inside the cross section
9	1,00	0,240	13,40	20,60	0,288	5,93	4%	inside the cross section
<b>Sum</b>			<b>358</b>	<b>1752</b>				

Sum wallmiddle ist  
Sum wallmiddle soil

4823,6  
4825,80

10	442,6
11	377,9
12	383,3
13	593,3
14	512,7
15	608,1
16	153,7
<b>Sum</b>	<b>3071,6</b>

Section 0,125 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
1	1,00	0,240	27,00	189,60	0,245	46,45	8%	inside the cross section
2	1,25	0,240	34,50	255,60	0,344	87,93	11%	inside the cross section
3	1,25	0,240	34,70	216,50	0,385	83,35	11%	inside the cross section
4	1,00	0,240	13,60	37,70	0,500	18,85	4%	inside the cross section
5	1,75	0,175	68,70	408,00	0,415	169,32	21%	inside the cross section
6	1,40	0,240	28,50	49,90	0,640	31,94	9%	inside the cross section
7	1,25	0,240	59,50	420,90	0,215	90,49	18%	inside the cross section
8	1,75	0,240	53,40	921,10	0,565	181,42	16%	inside the cross section
9	1,00	0,240	5,00	2,04	1,590	3,24	2%	outside the cross section
<b>Sum</b>			<b>324,9</b>	<b>1901,34</b>				

Sum wallbase ist  
Sum wallbase soil

4854,44  
4825,80

10	410,9
11	320,5
12	350,1
13	625,9
14	471,5
15	687,5
16	86,7
<b>Sum</b>	<b>2953,1</b>

Section 2,625 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
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1	1,00	0,240	28,20	119,20	0,132	15,73
2	1,25	0,240	30,50	201,40	0,104	20,95
3	1,25	0,240	30,40	161,20	0,069	11,12
4	1,00	0,240	24,80	82,80	-0,008	-0,50
5	1,75	0,175	65,80	390,70	0,041	16,02
6	1,40	0,240	42,40	122,40	0,000	0,00
7	1,25	0,240	51,00	292,00	0,109	31,83
8	1,75	0,240	50,70	254,40	0,265	67,42
9	1,00	0,240	12,90	31,20	-0,195	-6,08
<b>Sum</b>			<b>336,7</b>	<b>1655,3</b>		

8% inside the cross section  
 9% inside the cross section  
 9% inside the cross section  
 7% inside the cross section  
 20% inside the cross section  
 13% inside the cross section  
 15% inside the cross section  
 15% inside the cross section  
 4% inside the cross section

10	480,9
11	392,3
12	402,8
13	575,1
14	532,8
15	569,9
16	216,6
<b>Sum</b>	<b>3170,4</b>

Sum wallcap list 4825,7  
 Sum wallcap soil 4825,80

wall	cap	middle	base
1	8%	8%	8%
2	9%	10%	11%
3	9%	10%	11%
4	7%	6%	4%
5	20%	20%	21%
6	13%	11%	9%
7	15%	17%	18%
8	15%	15%	16%
9	4%	4%	2%
<b>Sum</b>	100%	100%	100%

cap	middle	base
119,20	157,60	189,60
201,40	224,00	255,60
161,20	180,70	216,50
82,80	64,90	37,70
390,70	382,70	408,00
122,40	92,50	49,90
292,00	355,00	420,90
254,40	274,00	321,10
31,20	20,60	2,04
1655,30	1752,00	1901,34

Normal face N

**Horizontal force H 500 KN**

**NON-LINEAR RESULTS** tension strength 0,3 Mpa

Section 1,375 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	36,00	185,20	0,199	36,85
2	1,25	0,240	44,20	241,20	0,280	67,54
3	1,25	0,240	43,00	195,60	0,292	57,12
4	1,00	0,240	22,00	70,40	0,229	16,12
5	1,75	0,175	91,30	419,40	0,305	127,92
6	1,40	0,240	43,90	99,20	0,320	31,74
7	1,25	0,240	79,40	394,80	0,197	77,78
8	1,75	0,240	64,70	296,90	0,495	146,97
9	1,00	0,240	15,10	21,30	0,210	4,47
<b>Sum</b>			<b>439,6</b>	<b>1924</b>		

proportion Q/H Position of the resulting force N  
 8% inside the cross section  
 10% inside the cross section  
 10% inside the cross section  
 5% inside the cross section  
 21% inside the cross section  
 10% inside the cross section  
 18% inside the cross section  
 15% inside the cross section  
 3% inside the cross section

Sum wallmiddle ist 4820,8  
 Sum wallmiddle soil 4825,80

Section 0,125 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	36,90	221,20	0,278	61,49
2	1,25	0,240	43,60	289,90	0,366	106,10
3	1,25	0,240	41,90	248,80	0,395	98,28
4	1,00	0,240	13,30	34,80	0,461	16,04
5	1,75	0,175	89,40	464,70	0,455	211,44
6	1,40	0,240	28,80	50,60	0,600	30,36
7	1,25	0,240	78,10	471,30	0,261	123,01
8	1,75	0,240	64,10	368,10	0,595	213,07
9	1,00	0,240	3,99	2,11	0,890	1,86
<b>Sum</b>			<b>400,09</b>	<b>2141,51</b>		

proportion Q/H Position of the resulting force N  
 9% inside the cross section  
 11% inside the cross section  
 10% inside the cross section  
 3% inside the cross section  
 22% inside the cross section  
 7% inside the cross section  
 20% inside the cross section  
 16% inside the cross section  
 1% outside the cross section

Sum wallbase ist 4860,11  
 Sum wallbase soil 4825,80

Section 2,625 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
------	-------	-------	--------	--------	-------	---------

proportion Q/H Position of the resulting force N

1	1,00	0,240	34,60	137,20	0,136	18,66
2	1,25	0,240	37,60	211,50	0,118	24,96
3	1,25	0,240	35,70	169,70	0,073	12,39
4	1,00	0,240	27,00	89,40	-0,048	-4,29
5	1,75	0,175	83,60	419,90	0,049	20,58
6	1,40	0,240	47,30	132,70	-0,033	-4,38
7	1,25	0,240	64,50	315,60	0,123	38,82
8	1,75	0,240	58,90	268,40	0,285	76,49
9	1,00	0,240	15,30	33,40	-0,338	-11,29
<b>Sum</b>			<b>404,5</b>	<b>1777,8</b>		

9% inside the cross section  
 9% inside the cross section  
 9% inside the cross section  
 7% inside the cross section  
 21% inside the cross section  
 12% inside the cross section  
 16% inside the cross section  
 15% inside the cross section  
 4% inside the cross section

10	407,3
11	353,3
12	394,6
13	585,8
14	508,7
15	613,2
16	193,9
<b>Sum</b>	<b>3056,8</b>

Sum wallcap list 4834,6  
 Sum wallcap soil 4825,80

wall	cap	middle	base
1	9%	8%	9%
2	9%	10%	11%
3	9%	10%	10%
4	7%	5%	3%
5	21%	21%	22%
6	12%	10%	7%
7	16%	18%	20%
8	15%	15%	16%
9	4%	3%	1%
<b>Sum</b>	100%	100%	100%

Normal force N	cap	middle	base
	137,20	185,20	221,20
	211,50	241,20	289,90
	169,70	185,60	248,80
	89,40	70,40	34,80
	419,90	419,40	464,70
	132,70	99,20	50,60
	315,60	394,80	471,30
	268,40	286,90	358,10
	33,40	21,30	2,11
<b>Sum</b>	<b>1777,80</b>	<b>1924,00</b>	<b>2141,51</b>



Horizontal force H 600 KN

NON-LINEAR RESULTS tension strength 0,3 Mpa

outside the cross section

Section 1,375 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	42,40	212,10	0,197	41,78
2	1,25	0,240	54,60	262,50	0,302	79,28
3	1,25	0,240	52,40	213,30	0,314	66,98
4	1,00	0,240	24,70	73,90	0,219	16,18
5	1,75	0,175	114,30	452,10	0,335	154,80
6	1,40	0,240	51,80	103,40	0,340	35,16
7	1,25	0,240	92,20	431,80	0,210	90,68
8	1,75	0,240	77,00	324,10	0,525	170,15
9	1,00	0,240	17,60	20,70	0,131	2,71
<b>Sum</b>			<b>527</b>	<b>2103,9</b>		

proportion Q/H Position of the resulting force N  
 8% inside the cross section  
 10% inside the cross section  
 10% inside the cross section  
 5% inside the cross section  
 22% inside the cross section  
 10% inside the cross section  
 15% inside the cross section  
 3% inside the cross section

h

Sum wallmiddle ist 4820,3  
 Sum wallmiddle soll 4825,80

Section 0,125 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	42,80	247,00	0,306	75,58
2	1,25	0,240	53,90	325,40	0,385	125,28
3	1,25	0,240	51,20	282,20	0,415	117,11
4	1,00	0,240	13,50	31,10	0,495	15,39
5	1,75	0,175	112,60	524,30	0,485	254,29
6	1,40	0,240	30,30	49,20	0,640	31,49
7	1,25	0,240	93,10	499,60	0,313	156,37
8	1,75	0,240	75,50	395,90	0,615	243,48
9	1,00	0,240	5,37	-0,21	-2,010	0,42
<b>Sum</b>			<b>478,27</b>	<b>2354,493</b>		

proportion Q/H Position of the resulting force N  
 9% inside the cross section  
 11% inside the cross section  
 11% inside the cross section  
 3% inside the cross section  
 24% inside the cross section  
 6% inside the cross section  
 19% inside the cross section  
 16% inside the cross section  
 1% inside the cross section

Sum wallbase ist 4903,793  
 Sum wallbase soll 4825,80

Section 2,625 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	42,80	247,00	0,306	75,58
2	1,25	0,240	53,90	325,40	0,385	125,28
3	1,25	0,240	51,20	282,20	0,415	117,11
4	1,00	0,240	13,50	31,10	0,495	15,39
5	1,75	0,175	112,60	524,30	0,485	254,29
6	1,40	0,240	30,30	49,20	0,640	31,49
7	1,25	0,240	93,10	499,60	0,313	156,37
8	1,75	0,240	75,50	395,90	0,615	243,48
9	1,00	0,240	5,37	-0,21	-2,010	0,42
<b>Sum</b>			<b>478,27</b>	<b>2354,493</b>		

proportion Q/H Position of the resulting force N

1	1,00	0,240	39,30	156,60	0,135	21,14
2	1,25	0,240	46,70	221,80	0,127	28,17
3	1,25	0,240	44,20	177,70	0,069	12,26
4	1,00	0,240	29,80	95,80	-0,067	-6,42
5	1,75	0,175	106,00	448,40	0,061	27,35
6	1,40	0,240	54,10	141,60	-0,039	-5,52
7	1,25	0,240	73,30	341,20	0,132	45,04
8	1,75	0,240	69,80	283,20	0,285	80,71
9	1,00	0,240	17,30	35,00	-0,406	-14,21
<b>Sum</b>			<b>480,50</b>	<b>1901,3</b>		

8% inside the cross section  
 10% inside the cross section  
 9% inside the cross section  
 6% inside the cross section  
 22% inside the cross section  
 11% inside the cross section  
 15% inside the cross section  
 4% inside the cross section

10	330,4
11	313,8
12	386,3
13	594,4
14	479,7
15	658,8
16	171,6
<b>Sum</b>	<b>2935</b>

Sum wallcap list  
 Sum wallcap soll

4836,3  
 4825,80

wall	cap	middle	base
1	8%	8%	9%
2	10%	10%	11%
3	9%	10%	11%
4	6%	5%	3%
5	22%	22%	24%
6	11%	10%	6%
7	15%	17%	19%
8	15%	15%	16%
9	4%	3%	1%
<b>Sum</b>	100%	100%	100%

Normal force N	cap	middle	base
	156,60	212,10	247,00
	221,80	282,50	325,40
	177,70	213,30	282,20
	95,80	73,90	31,10
	448,40	462,10	524,30
	141,60	103,40	49,20
	341,20	431,80	499,60
	283,20	324,10	395,90
	35,00	20,70	-0,21
	1901,30	2103,90	2354,49

Horizontal force H 700 KN

NON-LINEAR RESULTS

tension strength 0,3 Mpa

Section 1,375 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	50,40	245,50	0,209	51,31
2	1,25	0,240	74,50	307,40	0,314	95,52
3	1,25	0,240	72,80	288,70	0,326	84,34
4	1,00	0,240	58,60	84,60	0,198	16,75
5	1,75	0,175	155,70	573,10	0,325	186,26
6	1,40	0,240	67,40	125,10	0,370	46,29
7	1,25	0,240	103,20	485,80	0,239	111,33
8	1,75	0,240	103,90	385,70	0,525	202,49
9	1,00	0,240	20,40	11,10	0,343	3,81
<b>Sum</b>			<b>686,9</b>	<b>2457</b>		

proportion Q/H Position of the resulting force N

- 7% inside the cross section
- 11% inside the cross section
- 11% inside the cross section
- 6% inside the cross section
- 23% inside the cross section
- 10% inside the cross section
- 15% inside the cross section
- 15% inside the cross section
- 3% inside the cross section

10	111,6
11	106,2
12	307,6
13	628,9
14	342,1
15	797,2
16	68,3
<b>Sum</b>	<b>2361,9</b>

Sum wallmiddle ist 4818,9  
Sum wallmiddle soil 4825,80

Section 0,125 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	45,00	266,40	0,318	84,72
2	1,25	0,240	64,30	358,30	0,405	145,11
3	1,25	0,240	61,20	318,40	0,425	135,32
4	1,00	0,240	15,00	33,10	0,491	16,25
5	1,75	0,175	136,00	580,70	0,515	299,06
6	1,40	0,240	32,90	54,50	0,630	34,34
7	1,25	0,240	100,90	513,80	0,352	180,86
8	1,75	0,240	89,60	433,30	0,645	279,48
9	1,00	0,240	7,45	-2,25	0,456	-1,03
<b>Sum</b>			<b>552,35</b>	<b>2556,25</b>		

proportion Q/H Position of the resulting force N

- 8% inside the cross section
- 12% inside the cross section
- 11% inside the cross section
- 3% inside the cross section
- 25% inside the cross section
- 6% inside the cross section
- 18% inside the cross section
- 1% inside the cross section

10	240,8
11	71,9
12	261,4
13	683,6
14	334,2
15	877,5
16	19,4
<b>Sum</b>	<b>2488,8</b>

Sum wallbase ist 5045,05  
Sum wallbase soil 4825,80

Section 2,625 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	41,60	176,70	0,126	22,26
2	1,25	0,240	55,00	232,60	0,073	2,91

proportion Q/H Position of the resulting force N

- 8% inside the cross section
- 10% inside the cross section

10	248,4
11	269,9

3	1,25	0,240	51,90	189,30	0,057	10,79
4	1,00	0,240	34,00	107,20	-0,113	-12,11
5	1,75	0,175	126,00	484,40	0,059	28,58
6	1,40	0,240	64,60	155,90	-0,073	-11,38
7	1,25	0,240	75,10	363,00	0,133	48,28
8	1,75	0,240	81,40	307,60	0,265	81,57
9	1,00	0,240	20,80	41,20	-0,450	-18,54
<b>Sum</b>			<b>550,40</b>	<b>2058,1</b>		

9% inside the cross section  
6% inside the cross section  
23% inside the cross section  
12% inside the cross section  
14% inside the cross section  
15% inside the cross section  
4% inside the cross section

12	380,9
13	598,4
14	442,6
15	699,2
16	160,1
<b>Sum</b>	<b>2799,5</b>

Sum wallcap ist 4857,6  
Sum wallcap soil 4825,80

wall	cap	middle	base
1	8%	7%	8%
2	10%	11%	12%
3	9%	11%	11%
4	6%	6%	3%
5	23%	23%	25%
6	12%	10%	6%
7	14%	15%	18%
8	15%	15%	16%
9	4%	3%	1%
<b>Sum</b>	100%	100%	100%

Normal force N	cap	middle	base
	176,70	245,50	266,40
	232,60	307,40	358,30
	189,30	258,70	318,40
	107,20	84,60	33,10
	484,40	573,10	680,70
	155,90	125,10	54,50
	363,00	466,80	513,80
	307,60	385,70	433,30
	41,20	11,10	-2,25
	2058,10	2457,00	2556,25

**Horizontal force H 800 KN**

**NON-LINEAR RESULTS** tension strength 0,3 Mpa

**Section 1,375 m**

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
1	1,00	0,240	50,00	245,50	0,208	51,06	7%	inside the cross section
2	1,25	0,240	74,00	307,30	0,313	96,18	11%	inside the cross section
3	1,25	0,240	72,40	258,30	0,324	83,69	11%	inside the cross section
4	1,00	0,240	38,40	85,40	0,194	16,57	6%	inside the cross section
5	1,75	0,175	154,90	573,10	0,325	186,26	23%	inside the cross section
6	1,40	0,240	67,60	125,70	0,370	46,51	10%	inside the cross section
7	1,25	0,240	102,60	465,80	0,238	110,86	15%	inside the cross section
8	1,75	0,240	103,50	385,10	0,525	202,18	15%	inside the cross section
9	1,00	0,240	20,80	11,50	0,339	3,90	3%	inside the cross section
<b>Sum</b>			<b>684,2</b>	<b>2457,7</b>				

Sum wallmiddle ist 4819,5  
Sum wallmiddle soil 4825,80

**Section 0,125 m**

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
1	1,00	0,240	46,20	280,30	0,336	94,18	7%	inside the cross section
2	1,25	0,240	72,70	386,10	0,425	164,09	12%	inside the cross section
3	1,25	0,240	71,70	353,80	0,435	153,90	12%	inside the cross section
4	1,00	0,240	17,00	35,70	0,479	17,10	3%	inside the cross section
5	1,75	0,175	157,70	632,30	0,545	344,60	25%	inside the cross section
6	1,40	0,240	38,30	60,50	0,630	38,12	6%	inside the cross section
7	1,25	0,240	107,50	529,60	0,385	203,90	17%	inside the cross section
8	1,75	0,240	103,50	468,20	0,655	306,67	17%	inside the cross section
9	1,00	0,240	8,43	-2,50	0,565	-1,41	1%	outside the cross section
<b>Sum</b>			<b>623,03</b>	<b>2744</b>				

Sum wallbase ist 5289,3  
Sum wallbase soil 4825,80

**Section 2,625 m**

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	proportion Q/H	Position of the resulting force N
10	1,00	0,240	50,00	245,50	0,208	51,06	7%	inside the cross section
11	1,25	0,240	74,00	307,30	0,313	96,18	11%	inside the cross section
12	1,25	0,240	72,40	258,30	0,324	83,69	11%	inside the cross section
13	1,00	0,240	38,40	85,40	0,194	16,57	6%	inside the cross section
14	1,75	0,175	154,90	573,10	0,325	186,26	23%	inside the cross section
15	1,40	0,240	67,60	125,70	0,370	46,51	10%	inside the cross section
16	1,25	0,240	102,60	465,80	0,238	110,86	15%	inside the cross section
17	1,75	0,240	103,50	385,10	0,525	202,18	15%	inside the cross section
18	1,00	0,240	20,80	11,50	0,339	3,90	3%	inside the cross section
<b>Sum</b>			<b>684,2</b>	<b>2457,7</b>				

Sum wallbase ist 5289,3  
Sum wallbase soil 4825,80

1	1,00	0,240	43,50	193,00	0,114	22,00
2	1,25	0,240	62,40	245,90	0,112	27,54
3	1,25	0,240	59,40	205,00	0,038	7,79
4	1,00	0,240	37,70	120,70	-0,153	-18,47
5	1,75	0,175	145,50	521,60	0,050	26,08
6	1,40	0,240	76,20	174,10	-0,094	-16,37
7	1,25	0,240	78,80	377,20	0,133	50,17
8	1,75	0,240	92,20	336,80	0,245	82,52
9	1,00	0,240	24,00	50,80	-0,458	-23,27
<b>Sum</b>			<b>619,70</b>	<b>2225,1</b>		

7% inside the cross section  
 10% inside the cross section  
 10% inside the cross section  
 6% inside the cross section  
 23% inside the cross section  
 12% inside the cross section  
 13% inside the cross section  
 15% inside the cross section  
 4% inside the cross section

10	188,5
11	228
12	380,2
13	601,1
14	407,8
15	739
16	161,8
<b>Sum</b>	<b>2686,4</b>

Sum wallcap ist 4911,5  
 Sum wallcap soll 4825,80

wall	cap	middle	base
1	7%	7%	7%
2	10%	11%	12%
3	10%	11%	12%
4	6%	6%	3%
5	23%	23%	25%
6	12%	10%	6%
7	13%	15%	17%
8	15%	15%	17%
9	4%	3%	1%
<b>Sum</b>	100%	100%	100%

Normal force N	cap	middle	base
	193,00	245,50	280,30
	245,90	307,30	366,10
	205,00	258,30	353,80
	120,70	85,40	35,70
	521,60	573,10	632,30
	174,10	125,70	60,50
	377,20	465,80	529,60
	336,80	385,10	468,20
	50,80	11,50	-2,50
	2225,10	2457,70	2744,00

Horizontal force H 900 KN

NON-LINEAR RESULTS

tension strength 0,3 Mpa

Section 1.375 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240				0,00
2	1,25	0,240				0,00
3	1,25	0,240				0,00
4	1,00	0,240				0,00
5	1,75	0,175				0,00
6	1,40	0,240				0,00
7	1,25	0,240				0,00
8	1,75	0,240				0,00
9	1,00	0,240				0,00
Sum			0	0	0	0

proportion Q/H Position of the resulting force N

#DIV/0!	Position of the resulting force N
#DIV/0!	inside the cross section
#DIV/0!	inside the cross section
#DIV/0!	inside the cross section
#DIV/0!	inside the cross section
#DIV/0!	inside the cross section
#DIV/0!	inside the cross section
#DIV/0!	inside the cross section
#DIV/0!	inside the cross section
#DIV/0!	inside the cross section

10	
11	
12	
13	
14	
15	
16	
Sum	0

Sum wallmiddle list  
Sum wallmiddle soil

0  
4825,80

Section 0.125 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	47,50	283,70	0,355	104,26
2	1,25	0,240	80,90	408,90	0,435	177,70
3	1,25	0,240	81,30	387,00	0,445	172,22
4	1,00	0,240	19,90	37,70	0,468	17,64
5	1,75	0,175	177,10	680,50	0,565	384,48
6	1,40	0,240	44,80	67,70	0,630	42,65
7	1,25	0,240	114,40	552,40	0,405	223,72
8	1,75	0,240	114,60	502,30	0,665	334,03
9	1,00	0,240	9,46	-0,13	7,280	-0,94
Sum			689,96	2929,671		

proportion Q/H Position of the resulting force N

proportion Q/H	Position of the resulting force N
7%	inside the cross section
12%	inside the cross section
12%	inside the cross section
3%	inside the cross section
26%	inside the cross section
6%	inside the cross section
17%	inside the cross section
17%	inside the cross section
1%	outside the cross section

10	265,8
11	1,25
12	250,3
13	754
14	289
15	1064
16	21,3
Sum	2635,65

Sum wallbase list  
Sum wallbase soil

5565,321  
4825,80

Section 2.625 m

wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
------	-------	-------	--------	--------	-------	---------

proportion Q/H Position of the resulting force N

1	1,00	0,240	45,60	204,60	0,105	21,48
2	1,25	0,240	69,40	259,10	0,103	26,69
3	1,25	0,240	67,90	222,40	0,025	5,56
4	1,00	0,240	44,90	130,60	-0,174	-22,72
5	1,75	0,175	165,20	558,20	0,045	25,12
6	1,40	0,240	90,90	193,10	-0,094	-18,15
7	1,25	0,240	86,10	383,10	0,140	53,63
8	1,75	0,240	103,20	361,80	0,235	85,02
9	1,00	0,240	29,70	54,30	-0,482	-26,17
<b>Sum</b>			<b>703,90</b>	<b>2367,2</b>		

6% inside the cross section  
 10% inside the cross section  
 10% inside the cross section  
 6% inside the cross section  
 24% inside the cross section  
 13% inside the cross section  
 12% inside the cross section  
 15% inside the cross section  
 4% inside the cross section

10	96,6
11	190,8
12	380,8
13	604,6
14	390,8
15	783,1
16	165
<b>Sum</b>	<b>2611,7</b>

Sum walkcap ist  
 Sum walkcap soll

4978,9  
 4825,80

wall	cap	middle	base
1	6%	#DIV/0!	7%
2	10%	#DIV/0!	12%
3	10%	#DIV/0!	12%
4	6%	#DIV/0!	3%
5	24%	#DIV/0!	26%
6	13%	#DIV/0!	6%
7	12%	#DIV/0!	17%
8	15%	#DIV/0!	17%
9	4%	#DIV/0!	1%
<b>Sum</b>	100%	#DIV/0!	100%



House 1-mod; H positive

Shear-Walls

transverse walls

N positive Tension  
N negative Compression  
Q positive compared to the direction of the horizontal force H  
Q negative compared to the direction of the horizontal force H  
e positive compared to the direction of the horizontal force H  
e negative compared to the direction of the horizontal force H

N [kN]	sumV actual	sumV target	discrepancy in %
-861,71	-4952,050	4954,90	0%
-264,46			
-322,20			
-557,96			
-405,31			
-465,96			
-501,50			
-3179,12			

N [kN]	sumV actual	sumV target	discrepancy in %
-612,42	-4955,881	4954,90	0%
-224,46			
-475,93			
-401,60			
-542,93			
-429,31			
-485,46			
-3182,13			

N [kN]
-556,62
-184,93
-452,02
-398,02
-528,52
-534,45

H= 100,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wwand 1	0,550	0,000	0,050	0,500	1,000	-75,698	-3,79	-1,90	-2%	inside the cross section
Wwand 2	0,993	0,000	0,118	0,875	1,750	-233,866	-27,55	-7,48	-7%	inside the cross section
Wwand 3	0,700	0,000	0,075	0,625	1,250	-155,353	-11,70	-5,17	-8%	inside the cross section
Wwand 4	0,571	0,000	0,071	0,500	1,000	-91,847	-6,50	-0,09	0%	inside the cross section
Wwand 6	1,562	5,500	0,362	1,200	2,400	-160,238	-58,04	-32,84	-33%	inside the cross section
Wwand 9	0,639	10,000	0,139	0,500	1,000	-59,031	-8,22	-5,70	-8%	inside the cross section
Wwand 7	0,989	10,000	0,114	0,875	1,750	-257,876	-29,42	-9,88	-10%	inside the cross section
Wwand 8	0,941	10,000	0,066	0,875	1,750	-325,340	-21,37	-16,71	-17%	inside the cross section
Wwand 5	1,545	4,250	0,170	1,375	2,750	-415,678	-70,62	-21,94	-22%	inside the cross section
					Sum	-1772,93		-102,71		

H= 200,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wwand 1	0,608	0,000	0,108	0,500	1,000	-92,686	-10,04	-5,63	-3%	inside the cross section
Wwand 2	1,128	0,000	0,253	0,875	1,750	-229,985	-58,16	-15,62	-8%	inside the cross section
Wwand 3	0,772	0,000	0,147	0,625	1,250	-166,126	-24,35	-10,79	-5%	inside the cross section
Wwand 4	0,660	0,000	0,160	0,500	1,000	-81,358	-12,38	-4,08	-2%	inside the cross section
Wwand 6	2,234	5,500	1,034	1,200	2,400	-117,874	-121,89	-55,92	-28%	inside the cross section
Wwand 9	0,882	10,000	0,392	0,500	1,000	-35,566	-15,10	-9,84	-5%	inside the cross section
Wwand 7	1,123	10,000	0,248	0,875	1,750	-253,245	-62,78	-16,51	-9%	inside the cross section
Wwand 8	1,019	10,000	0,144	0,875	1,750	-362,413	-52,08	-25,25	-15%	inside the cross section
Wwand 5	1,714	4,250	0,339	1,375	2,750	-431,498	-146,36	-41,82	-21%	inside the cross section
					Sum	-1773,75		-191,47		

H= 300,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wwand 1	0,652	0,000	0,152	0,500	1,000	-111,224	-16,89	-9,84	-3%	inside the cross section
Wwand 2	1,260	0,000	0,405	0,875	1,750	-226,913	-91,79	-25,11	-8%	inside the cross section
Wwand 3	0,842	0,000	0,217	0,625	1,250	-177,913	-38,32	-16,04	-5%	inside the cross section
Wwand 4	0,784	0,000	0,284	0,500	1,000	-68,368	-20,14	-8,76	-3%	inside the cross section
Wwand 6	2,509	5,500	1,309	1,200	2,400	-102,887	-134,44	-67,65	-23%	outside the cross section
Wwand 9	1,544	10,000	1,044	0,500	1,000	-18,319	-19,74	-13,44	-4%	outside the cross section

Wand 7	1,274	10,000	0,399	0,875	1,750	-248,318	-99,43	-28,84	-10%
Wand 8	1,085	10,000	0,210	0,875	1,750	-405,068	-85,19	-43,66	-15%
Wand 5	1,882	4,250	0,507	1,375	2,750	-450,025	228,16	-64,43	-21%
Sum						-1809,46	Sum	-277,77	

Wand 1	0,667	10,000	0,187	0,500	1,000	-132,491	-24,83	-14,90	-4%
Wand 2	1,424	0,000	0,549	0,875	1,750	-227,538	-124,92	-35,12	-9%
Wand 3	0,914	0,000	0,289	0,625	1,250	-188,550	-54,47	22,38	-6%
Wand 4	0,992	0,000	0,482	0,500	1,000	-54,388	-25,19	-13,69	-3%
Wand 6	2,388	5,500	1,188	1,200	2,400	-104,514	-122,22	-87,64	-17%
Wand 9	2,266	10,000	1,786	0,500	1,000	-9,026	-16,12	-13,87	-3%
Wand 7	1,412	10,000	0,537	0,875	1,750	-250,511	-134,50	-39,72	-10%
Wand 8	1,146	10,000	0,271	0,875	1,750	-453,283	-122,93	-81,29	-15%
Wand 5	2,034	4,250	0,658	1,375	2,750	-475,850	-313,68	-90,09	-23%
Sum						-1886,25	Sum	-356,69	

H= 400,000

Position of the resulting force N

inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section

Wand 1	0,724	0,000	0,224	0,500	1,000	-161,538	-36,12	-22,83	-5%
Wand 2	1,463	0,000	0,588	0,875	1,750	-245,984	-144,61	-42,20	-8%
Wand 3	0,993	0,000	0,358	0,625	1,250	-204,656	-73,18	-30,49	-6%
Wand 4	1,009	0,000	0,509	0,500	1,000	-46,328	-23,55	-15,78	-3%
Wand 6	2,256	5,500	1,056	1,200	2,400	-95,671	-101,05	-61,24	-12%
Wand 9	1,331	10,000	0,831	0,500	1,000	-8,944	-5,68	-8,34	-2%
Wand 7	1,450	10,000	0,575	0,875	1,750	-272,151	-156,35	-47,85	-10%
Wand 8	1,212	10,000	0,337	0,875	1,750	-515,198	-173,87	-87,14	-17%
Wand 5	2,117	4,250	0,742	1,375	2,750	-528,934	-392,45	-117,90	-24%
Sum						-2078,39	Sum	-433,77	

H= 600,000

Position of the resulting force N

inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
outside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section

Wand 1	0,782	0,000	0,282	0,500	1,000	-208,979	-58,97	-35,98	-6%
Wand 2	1,493	0,000	0,618	0,875	1,750	-282,919	-180,99	-53,32	-8%

H= 700,000

Position of the resulting force N

inside the cross section  
inside the cross section

-524,15	sumV actual	sumV target	discrepancy in %
-3181,72	-4991,181	4954,90	1%

N [kN]	sumV actual	sumV target	discrepancy in %
-497,64 -143,21 -428,71 -394,07 -515,80 -635,29 -552,27 -3168,98	-5063,229	4954,90	2%

N [kN]	sumV actual	sumV target	discrepancy in %
-430,13 -96,19 -400,46 -388,94 -497,61 -723,36 -579,64 -3116,33	-5194,726	4954,90	5%

N [kN]	sumV actual	sumV target	discrepancy in %
-343,64 -37,40 -337,35 -378,28 -468,47 -771,72 -598,61 -2925,46	-5185,838	4954,90	5%

N [kN]	sumV actual	sumV target	discrepancy in %
-279,23 1,13			

Wand	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wand 3	1,017	0,000	0,392	0,625	1,250	-233,692	-99,52	-43,74	-5%
Wand 4	0,961	0,000	0,461	0,500	1,000	-40,823	-18,81	-15,59	-2%
Wand 6	2,248	5,500	1,048	1,200	2,400	-100,163	-104,95	-68,28	-10%
Wand 9	1,511	10,000	1,011	0,500	1,000	-3,850	-3,89	-5,96	-1%
Wand 7	1,487	10,000	0,612	0,875	1,750	-322,845	-187,52	-83,14	-9%
Wand 8	1,340	10,000	0,465	0,875	1,750	-567,188	-272,75	-124,94	-18%
Wand 5	2,199	4,250	0,824	1,375	2,750	-648,392	-534,08	-172,95	-25%
Sum						-2458,64		-586,51	

H= 800,000

Wand	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wand 1	0,806	0,000	0,306	0,500	1,000	-229,939	-70,41	-45,12	-6%	inside the cross section
Wand 2	1,506	0,000	0,631	0,875	1,750	-321,299	-202,84	-61,36	-8%	inside the cross section
Wand 3	1,026	0,000	0,401	0,625	1,250	-283,994	-113,80	-51,35	-6%	inside the cross section
Wand 4	0,958	0,000	0,459	0,500	1,000	-39,272	-18,02	-15,82	-2%	inside the cross section
Wand 6	2,237	5,500	1,037	1,200	2,400	-104,186	-108,03	-73,06	-9%	inside the cross section
Wand 9	1,423	10,000	0,923	0,500	1,000	-3,009	-2,78	-5,65	-1%	inside the cross section
Wand 7	1,502	10,000	0,627	0,875	1,750	-350,773	-220,07	-73,35	-9%	inside the cross section
Wand 8	1,386	10,000	0,511	0,875	1,750	-600,816	-306,78	-131,51	-16%	inside the cross section
Wand 5	2,230	4,250	0,855	1,375	2,750	-715,327	-611,32	-204,06	-26%	inside the cross section
Sum						-2648,61		-661,30		

H= 900,000

Wand	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wand 1	0,811	0,000	0,311	0,500	1,000	-251,591	-78,35	-47,61	-5%	inside the cross section
Wand 2	1,513	0,000	0,638	0,875	1,750	-348,814	-223,15	-68,90	-8%	inside the cross section
Wand 3	1,032	0,000	0,407	0,625	1,250	-313,261	-127,43	-57,98	-6%	inside the cross section
Wand 4	0,962	0,000	0,462	0,500	1,000	-39,765	-18,38	-17,04	-2%	inside the cross section
Wand 6	2,232	5,500	1,032	1,200	2,400	-119,533	-117,12	-82,10	-9%	inside the cross section
Wand 9	1,319	10,000	0,919	0,500	1,000	-2,743	-2,25	-7,17	-1%	inside the cross section
Wand 7	1,513	10,000	0,638	0,875	1,750	-376,073	-241,02	-81,07	-9%	inside the cross section
Wand 8	1,408	10,000	0,534	0,875	1,750	-629,026	-335,90	-138,39	-15%	inside the cross section
Wand 5	2,251	4,250	0,876	1,375	2,750	-775,266	-678,82	-228,27	-25%	inside the cross section
Sum						-2853,07		-726,54		

H= 1000,000

Wand	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wand 1	0,816	0,000	0,316	0,500	1,000	-267,579	-84,92	-49,96	-5%	inside the cross section
Wand 2	1,522	0,000	0,647	0,875	1,750	-378,015	-244,42	-77,85	-8%	inside the cross section
Wand 3	1,038	0,000	0,413	0,625	1,250	-345,098	-142,39	-66,22	-7%	inside the cross section
Wand 4	0,974	0,000	0,474	0,500	1,000	-40,409	-19,16	-17,96	-2%	inside the cross section
Wand 6	2,227	5,500	1,027	1,200	2,400	-122,719	-125,98	-94,17	-9%	inside the cross section
Wand 9	1,157	10,000	0,657	0,500	1,000	-1,777	-1,17	-9,00	-1%	inside the cross section
Wand 7	1,526	10,000	0,651	0,875	1,750	-403,253	-262,44	-88,40	-9%	inside the cross section
Wand 8	1,435	10,000	0,550	0,875	1,750	-645,414	-361,63	-143,86	-14%	inside the cross section
Wand 5	2,274	4,250	0,899	1,375	2,750	-832,730	-748,79	-253,71	-25%	inside the cross section
Sum						-3036,80		-908,11		

-289,44	sumV actual	sumV target	discrepancy in %
-369,26		4854,90	7%
-427,15			
-669,87			
-623,95			
-2856,78			
-5315,621			

N [kN]	sumV actual	sumV target	discrepancy in %
-130,42		4854,90	6%
15,78			
-181,18			
-343,58			
-369,24			
-904,57			
-627,02			
-2595,23			
-5247,849			

N [kN]	sumV actual	sumV target	discrepancy in %
-138,65		4854,90	8%
-3,37			
-101,61			
-323,94			
-327,12			
-965,52			
-637,62			
-2496,04			
-5351,107			

N [kN]	sumV actual	sumV target	discrepancy in %
-118,84		4854,90	11%
-11,08			
-1040,20			
-298,94			
-309,96			
-655,05			
-47,96			
-2482,04			
-5518,634			

**H-LAST -100 KN**

Non-linear results

Tension strength 0,3 Mpa

**Section 1.375m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	9,79	39,50	0,107	4,23	13%	inside the cross section
2	1,25	0,240	5,91	170,70	0,068	11,61	8%	inside the cross section
3	1,25	0,240	5,91	131,60	0,083	12,24	8%	inside the cross section
4	1,00	0,240	9,87	107,50	0,085	5,91	13%	inside the cross section
5	1,75	0,175	14,20	259,70	0,085	22,07	19%	inside the cross section
6	1,40	0,240	4,35	144,40	0,150	21,66	6%	inside the cross section
7	1,25	0,240	7,74	190,90	0,057	10,88	10%	inside the cross section
8	1,75	0,240	12,60	247,90	0,143	35,45	17%	inside the cross section
9	1,00	0,240	3,82	100,70	0,082	8,26	5%	inside the cross section
<b>Sum</b>				<b>74,19</b>	<b>1392,9</b>			

Sum Wallmiddle ist  
Sum Wallmiddle soil

4825,6  
4825,80

10	774,4
11	606,7
12	443,1
13	437,1
14	598,6
15	236,3
16	336,5
<b>Sum</b>	<b>3432,7</b>

**Section 0.125m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	8,41	32,80	0,369	12,10	13%	inside the cross section
2	1,25	0,240	5,12	182,70	0,116	21,19	8%	inside the cross section
3	1,25	0,240	5,46	140,30	0,143	20,06	8%	inside the cross section
4	1,00	0,240	10,20	123,50	0,078	9,63	15%	inside the cross section
5	1,75	0,175	12,50	252,80	0,136	34,38	19%	inside the cross section
6	1,40	0,240	4,63	148,00	0,163	24,12	7%	inside the cross section
7	1,25	0,240	4,65	196,50	0,115	22,60	7%	inside the cross section
8	1,75	0,240	12,00	284,10	0,198	51,76	18%	inside the cross section
9	1,00	0,240	4,11	109,00	0,077	8,39	6%	inside the cross section
<b>Sum</b>				<b>67,08</b>	<b>1449,7</b>			

Sum Wallbase ist  
Sum Wallbase soil

4825,2  
4825,80

10	781,2
11	601,7
12	433,5
13	421,2
14	582,4
15	224,5
16	331
<b>Sum</b>	<b>3375,5</b>

**Section 2.625m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	6,92	47,00	-0,046	-2,16	10%	inside the cross section
2	1,25	0,240	5,89	171,10	0,028	4,79	8%	inside the cross section
3	1,25	0,240	5,69	131,80	0,042	5,54	8%	inside the cross section
4	1,00	0,240	4,20	94,90	0,027	2,56	6%	inside the cross section
5	1,75	0,175	16,10	285,50	0,076	22,46	23%	inside the cross section
6	1,40	0,240	5,28	140,60	0,131	18,42	7%	inside the cross section
7	1,25	0,240	8,32	192,30	0,015	2,88	12%	inside the cross section

Sum Wallbase ist  
Sum Wallbase soil

4825,2  
4825,80

10	767
11	570,4
12	442,9
13	449,8
14	602,7
15	249
16	335,1

8	1,75	0,240	12,40	243,70	0,082	19,98
9	1,00	0,240	5,92	91,80	0,076	6,98
Sum			70,7	1408,7		

18% inside the cross section  
8% inside the cross section

Sum	3416,9
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Sum Wallcap ist 4825,6  
Sum Wallcap soil 4825,80

Wall	cap	middle	base
1	18%	13%	13%
2	8%	8%	8%
3	8%	8%	8%
4	6%	13%	15%
5	23%	19%	19%
6	7%	6%	7%
7	12%	10%	7%
8	15%	17%	15%
9	8%	5%	6%
Sum	100%	100%	100%

Normal force N	cap	middle	base
	47,00	39,50	32,80
	171,10	170,70	182,70
	131,80	131,60	140,30
	94,90	107,50	123,50
	295,50	259,70	252,80
	140,60	144,40	148,00
	192,30	190,80	196,50
	243,70	247,90	264,10
	91,80	100,70	109,00
	1408,70	1392,90	1449,70

**H-LAST -200 KN**

Non-linear results

Tension strength 0,3 Mpa

Section 1.375m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	14,70	24,00	0,353	8,47	8%	inside the cross section
2	1,25	0,240	12,80	160,20	0,150	24,03	8%	inside the cross section
3	1,25	0,240	13,50	123,80	0,197	24,39	8%	inside the cross section
4	1,00	0,240	17,00	122,90	0,099	12,11	11%	inside the cross section
5	1,75	0,175	28,80	238,40	0,189	45,06	18%	inside the cross section
6	1,40	0,240	17,90	168,90	0,232	39,18	11%	inside the cross section
7	1,25	0,240	19,20	160,80	0,148	23,80	12%	inside the cross section
8	1,75	0,240	26,60	248,40	0,288	71,54	17%	inside the cross section
9	1,00	0,240	10,30	127,80	0,117	14,95	6%	inside the cross section
<b>Sum</b>				<b>160,6</b>		<b>1374,6</b>		

Sum Wallmiddle ist 4825,9  
Sum Wallmiddle soil 4825,80

Section 0.125m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	12,50	10,00	0,163	1,63	8%	inside the cross section
2	1,25	0,240	12,10	169,40	0,242	40,99	8%	inside the cross section
3	1,25	0,240	13,10	129,70	0,314	40,73	9%	inside the cross section
4	1,00	0,240	17,00	145,90	0,137	19,99	11%	inside the cross section
5	1,75	0,175	27,00	226,70	0,316	71,64	18%	inside the cross section
6	1,40	0,240	17,50	181,90	0,277	50,39	12%	inside the cross section
7	1,25	0,240	15,80	156,20	0,272	42,49	10%	inside the cross section
8	1,75	0,240	26,20	284,00	0,395	104,28	17%	inside the cross section
9	1,00	0,240	10,30	143,20	0,132	18,90	7%	inside the cross section
<b>Sum</b>				<b>151,5</b>		<b>1427</b>		

Sum Wallbase ist 4827,7  
Sum Wallbase soil 4825,80

Section 2.625m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	11,80	36,90	-0,041	-1,51	8%	inside the cross section
2	1,25	0,240	11,90	164,60	0,061	10,04	8%	inside the cross section
3	1,25	0,240	12,30	127,40	0,071	9,05	8%	inside the cross section
4	1,00	0,240	10,90	100,70	0,044	4,43	7%	inside the cross section
5	1,75	0,175	30,00	280,00	0,109	30,52	20%	inside the cross section
6	1,40	0,240	18,80	153,00	0,181	27,59	12%	inside the cross section
7	1,25	0,240	18,10	172,70	0,052	8,96	12%	inside the cross section

Sum Wallmiddle ist 820,9  
Sum Wallmiddle soil 600  
Sum Wallbase ist 450,2  
Sum Wallbase soil 421,5  
Sum Wallmiddle ist 614,6  
Sum Wallmiddle soil 171,8  
Sum Wallbase ist 356,6  
Sum Wallbase soil 356,6

8	1,75	0,240	25,50	245,20	0,161	39,48
9	1,00	0,240	12,70	110,00	0,092	10,12
<b>Sum</b>			<b>151,4</b>	<b>1390,5</b>		

17% inside the cross section  
8% inside the cross section

<b>Sum</b>	<b>3435,6</b>
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Sum Wallcap ist 4826,1  
Sum Wallcap soil 4825,80

Wall	cap	middle	base
1	8%	9%	8%
2	8%	8%	8%
3	8%	8%	9%
4	7%	11%	11%
5	20%	18%	18%
6	12%	11%	12%
7	12%	12%	10%
8	17%	17%	17%
9	8%	6%	7%
<b>Sum</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Normal force N	cap	middle	base
	36,90	24,00	10,00
	184,30	160,20	169,40
	127,40	123,80	129,70
	100,70	122,30	145,90
	280,00	238,40	226,70
	153,00	168,90	181,90
	172,70	160,80	156,20
	245,20	248,40	264,00
	110,00	127,80	143,20
	1380,50	1374,60	1427,00

**H-LAST -300 KN**

**Non-linear results**

Tension strength 0,3 Mpa

**Section 1,375m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	14,60	18,00	0,510	9,18	6%	outside the cross section
2	1,25	0,240	20,90	149,20	0,245	36,55	8%	inside the cross section
3	1,25	0,240	21,00	118,00	0,292	34,46	8%	inside the cross section
4	1,00	0,240	25,50	138,80	0,135	18,74	10%	inside the cross section
5	1,75	0,175	44,10	220,00	0,298	65,56	18%	inside the cross section
6	1,40	0,240	35,60	195,50	0,294	57,48	14%	inside the cross section
7	1,25	0,240	29,80	133,70	0,257	34,36	12%	inside the cross section
8	1,75	0,240	39,20	253,30	0,408	103,35	16%	inside the cross section
9	1,00	0,240	18,20	156,70	0,142	22,25	7%	inside the cross section
<b>Sum</b>			<b>248,9</b>	<b>1383,2</b>				

Sum

Sum Wallmiddle ist  
Sum Wallmiddle soll

4825,5  
4825,80

3442,3

10	881,1
11	684,8
12	462
13	361,2
14	621,3
15	32,5
16	399,4
<b>Sum</b>	<b>3442,3</b>

**Section 0,125m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	10,70	5,04	2,940	10,28	5%	outside the cross section
2	1,25	0,240	20,10	155,80	0,398	62,01	9%	inside the cross section
3	1,25	0,240	20,60	123,90	0,475	58,85	9%	inside the cross section
4	1,00	0,240	24,80	172,30	0,165	31,88	11%	inside the cross section
5	1,75	0,175	42,20	204,30	0,516	105,42	18%	inside the cross section
6	1,40	0,240	32,90	218,00	0,371	80,88	14%	inside the cross section
7	1,25	0,240	25,50	118,30	0,475	56,19	11%	inside the cross section
8	1,75	0,240	38,90	273,50	0,544	148,78	17%	inside the cross section
9	1,00	0,240	17,70	181,20	0,171	30,99	8%	inside the cross section
<b>Sum</b>			<b>233,4</b>	<b>1452,34</b>				

Sum

Sum Wallbase ist  
Sum Wallbase soll

4842,24  
4825,80

3389,9

10	905,2
11	696,7
12	457,8
13	327,6
14	412,2
15	604,3
16	-13,9
<b>Sum</b>	<b>3389,9</b>

**Section 2,625m**



Proportion Q/H Position of the resulting force N

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	14,60	18,00	0,510	9,18
2	1,25	0,240	20,90	149,20	0,245	36,55
3	1,25	0,240	21,00	118,00	0,292	34,46
4	1,00	0,240	25,50	138,80	0,135	18,74
5	1,75	0,175	44,10	220,00	0,298	65,56
6	1,40	0,240	35,60	195,50	0,294	57,48
7	1,25	0,240	29,80	133,70	0,257	34,36
8	1,75	0,240	39,20	253,30	0,408	103,35
9	1,00	0,240	18,20	156,70	0,142	22,25
<b>Sum</b>			<b>248,9</b>	<b>1383,2</b>		

10	881,1
11	684,8
12	462
13	361,2
14	621,3
15	32,5
16	399,4
<b>Sum</b>	<b>3442,3</b>

Sum Wallcap ist 4825,5  
Sum Wallcap soil 4825,80

Wall	cap	middle	base
1	6%	6%	5%
2	8%	8%	9%
3	8%	8%	9%
4	10%	10%	11%
5	18%	18%	18%
6	14%	14%	14%
7	12%	12%	11%
8	16%	16%	17%
9	7%	7%	8%
<b>Sum</b>	100%	100%	100%

Normal force N	cap	middle	base
	18,00	18,00	5,04
	149,20	149,20	155,80
	118,00	118,00	123,90
	138,80	138,80	172,30
	220,00	220,00	204,30
	195,50	195,50	218,00
	133,70	133,70	118,30
	253,30	253,30	273,50
	156,70	156,70	181,20
	1383,20	1383,20	1452,34

H-LAST -400 KN

Non-linear results

Tension strength 0,3 Mpa

Section 1.375m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	14,00	20,30	0,360	7,31	4%	inside the cross section
2	1,25	0,240	26,30	143,10	0,304	43,50	8%	inside the cross section
3	1,25	0,240	26,20	120,10	0,323	38,79	8%	inside the cross section
4	1,00	0,240	37,70	158,80	0,166	26,36	12%	inside the cross section
5	1,75	0,175	54,40	211,50	0,355	75,08	17%	inside the cross section
6	1,40	0,240	50,20	224,50	0,328	73,64	16%	inside the cross section
7	1,25	0,240	34,90	117,10	0,316	37,00	11%	inside the cross section
8	1,75	0,240	49,20	272,80	0,460	125,49	15%	inside the cross section
9	1,00	0,240	30,60	191,60	0,162	31,04	9%	inside the cross section
Sum			323,5	1459,8				

Sum Wallmiddle ist  
Sum Wallmiddle soil

4829,8  
4825,80

10	927,2
11	710,1
12	462,4
13	314,8
14	618,6
15	-84,4
16	421,3
Sum	3370

Section 0.125m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	8,24	4,04	-0,425	-1,72	3%	inside the cross section
2	1,25	0,240	26,00	155,00	0,465	72,08	8%	inside the cross section
3	1,25	0,240	25,90	136,90	0,488	66,81	8%	inside the cross section
4	1,00	0,240	38,00	202,60	0,241	48,83	12%	inside the cross section
5	1,75	0,175	51,40	197,70	0,607	120,00	17%	inside the cross section
6	1,40	0,240	50,20	253,90	0,444	112,73	16%	inside the cross section
7	1,25	0,240	29,10	94,50	0,529	49,99	9%	inside the cross section
8	1,75	0,240	50,00	308,40	0,582	179,49	16%	inside the cross section
9	1,00	0,240	30,70	228,90	0,209	47,84	10%	inside the cross section
Sum			309,54	1581,94				

Sum Wallbase ist  
Sum Wallbase soil

4819,54  
4825,80

10	958,1
11	731
12	455
13	271,5
14	594,2
15	-129,5
16	457,3
Sum	3337,6

Section 2.625m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	13,10	31,30	-0,064	-2,00	4%	inside the cross section
2	1,25	0,240	23,80	154,60	0,104	16,08	8%	inside the cross section
3	1,25	0,240	23,40	127,00	0,074	9,40	8%	inside the cross section
4	1,00	0,240	30,20	112,80	0,062	6,99	10%	inside the cross section

Sum Wallbase ist  
Sum Wallbase soil

915,8  
647,6  
455,7  
361

10	915,8
11	647,6
12	455,7
13	361

5	1,75	0,175	55,30	262,30	0,134	35,15
6	1,40	0,240	50,20	181,00	0,240	43,44
7	1,25	0,240	31,50	145,30	0,101	14,68
8	1,75	0,240	47,20	263,90	0,251	66,24
9	1,00	0,240	31,50	147,10	0,105	15,45
<b>Sum</b>			<b>306,2</b>	<b>1425,3</b>		

18% inside the cross section  
16% inside the cross section  
10% inside the cross section  
15% inside the cross section  
10% inside the cross section

14	627,3
15	4,07
16	393,4
<b>Sum</b>	<b>3404,87</b>

Sum Wallcap Ist 4830,17  
Sum Wallcap soll 4825,80

Wall	cap	middle	base
1	4%	4%	3%
2	8%	8%	8%
3	8%	8%	8%
4	10%	12%	12%
5	18%	17%	17%
6	16%	16%	16%
7	10%	11%	9%
8	15%	15%	16%
9	10%	100%	100%
<b>Sum</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Normal force N	cap	middle	base
	31,30	20,30	4,04
	154,60	143,10	155,00
	127,00	120,10	136,90
	112,80	158,80	202,60
	262,30	211,50	197,70
	181,00	224,50	253,90
	145,30	117,10	94,50
	263,90	272,80	308,40
	147,10	191,60	228,30
	1425,30	1459,80	1581,94

**H-LAST -500 KN**

Non-linear results Tension strength 0,3 Mpa

**Section 1.375m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	15,40	27,20	0,232	6,31
2	1,25	0,240	30,40	146,30	0,309	45,82
3	1,25	0,240	34,30	129,60	0,307	39,79
4	1,00	0,240	53,00	184,40	0,180	33,19
5	1,75	0,175	67,70	219,70	0,349	76,68
6	1,40	0,240	50,30	228,10	0,355	80,98
7	1,25	0,240	38,60	115,70	0,298	34,48
8	1,75	0,240	66,60	312,10	0,481	150,12
9	1,00	0,240	46,90	224,20	0,180	40,36
<b>Sum</b>			<b>403,2</b>	<b>1589,3</b>		

**Proportion Q/H Position of the resulting force N**

- 4% inside the cross section
- 8% inside the cross section
- 9% inside the cross section
- 13% inside the cross section
- 17% inside the cross section
- 12% inside the cross section
- 10% inside the cross section
- 17% inside the cross section
- 12% inside the cross section

10	957,2
11	720,3
12	450,1
13	248,3
14	440,2
15	-190,2
16	594,3
<b>Sum</b>	<b>3221,2</b>

Sum Wallmiddle ist  
4810,5  
Sum Wallmiddle soil  
4825,80

**Section 0.125m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	4,93	6,84	0,651	4,45
2	1,25	0,240	27,40	167,70	0,478	80,16
3	1,25	0,240	31,50	164,60	0,478	78,68
4	1,00	0,240	54,20	237,10	0,300	71,13
5	1,75	0,175	59,90	206,60	0,656	135,53
6	1,40	0,240	47,20	253,70	0,495	125,58
7	1,25	0,240	27,10	72,10	0,549	39,60
8	1,75	0,240	63,80	372,70	0,808	226,60
9	1,00	0,240	48,10	268,60	0,278	74,67
<b>Sum</b>			<b>364,13</b>	<b>1749,94</b>		

**Proportion Q/H Position of the resulting force N**

- 1% outside the cross section
- 8% inside the cross section
- 9% inside the cross section
- 15% inside the cross section
- 16% inside the cross section
- 13% inside the cross section
- 7% inside the cross section
- 18% inside the cross section
- 13% inside the cross section

10	1001
11	733,5
12	425,4
13	214,6
14	494,2
15	-104,4
16	545,2
<b>Sum</b>	<b>3309,5</b>

Sum Wallbase ist  
5059,44  
Sum Wallbase soil  
4825,80

**Section 2.625m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	15,30	39,10	-0,174	-6,80
2	1,25	0,240	26,30	159,10	0,082	13,05
3	1,25	0,240	29,80	134,70	0,000	0,00
4	1,00	0,240	41,90	119,00	0,064	7,62

**Proportion Q/H Position of the resulting force N**

- 4% inside the cross section
- 7% inside the cross section
- 8% inside the cross section
- 11% inside the cross section

10	952,1
11	657,3
12	446,3
13	315,4

14	408,6
15	-80,7
16	616,9
<b>Sum</b>	<b>3315,9</b>

18% inside the cross section  
13% inside the cross section  
9% inside the cross section  
17% inside the cross section  
12% inside the cross section

5	1,75	0,175	67,20	273,20	0,076	20,76
6	1,40	0,240	48,70	196,30	0,224	43,97
7	1,25	0,240	33,50	148,80	0,055	9,67
8	1,75	0,240	62,00	292,00	0,230	67,16
9	1,00	0,240	44,30	162,30	0,104	16,88
<b>Sum</b>			<b>369</b>	<b>1524,5</b>		

Sum Wallcap list	4840,4
Sum Wallcap soll	4825,80

Wall	cap	middle	base
1	39,10	27,20	6,84
2	159,10	148,30	167,70
3	134,70	129,60	164,60
4	119,00	184,40	237,10
5	273,20	219,70	206,60
6	196,30	228,10	253,70
7	148,80	115,70	72,10
8	292,00	312,10	372,70
9	162,30	224,20	268,60
<b>Sum</b>	<b>1524,50</b>	<b>1589,30</b>	<b>1749,94</b>

Wall	cap	middle	base
1	4%	4%	1%
2	7%	8%	8%
3	8%	9%	9%
4	11%	13%	15%
5	18%	17%	16%
6	13%	12%	13%
7	9%	10%	7%
8	17%	17%	18%
9	12%	12%	13%
<b>Sum</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

**H-LAST -600 KN**

Non-linear results

Tension strength 0,3 Mpa

**Section 1,375m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	21,30	29,70	0,168	4,99	4%	inside the cross section
2	1,25	0,240	37,80	155,10	0,310	48,08	8%	inside the cross section
3	1,25	0,240	45,10	140,40	0,298	41,84	9%	inside the cross section
4	1,00	0,240	62,00	209,10	0,164	34,29	13%	inside the cross section
5	1,75	0,175	84,80	226,60	0,353	79,99	18%	inside the cross section
6	1,40	0,240	44,90	195,20	0,439	85,69	9%	inside the cross section
7	1,25	0,240	46,80	110,50	0,300	33,15	10%	inside the cross section
8	1,75	0,240	89,20	350,30	0,504	176,55	19%	inside the cross section
9	1,00	0,240	46,30	206,50	0,327	67,53	10%	inside the cross section
<b>Sum</b>			<b>478</b>	<b>1623,4</b>				

Sum Wallmiddle ist  
Sum Wallmiddle soil

4875,2  
4825,80

10	1013
11	719,4
12	436
13	182
14	565,1
15	-119,1
16	455,4
<b>Sum</b>	<b>3251,8</b>

**Section 0,125m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	6,95	7,30	0,453	3,30	2%	inside the cross section
2	1,25	0,240	33,30	190,90	0,486	92,78	8%	inside the cross section
3	1,25	0,240	41,70	195,00	0,488	85,16	10%	inside the cross section
4	1,00	0,240	62,20	262,30	0,322	84,46	15%	inside the cross section
5	1,75	0,175	71,60	227,40	0,686	156,00	17%	inside the cross section
6	1,40	0,240	40,50	232,90	0,538	125,30	10%	inside the cross section
7	1,25	0,240	27,80	61,40	0,538	33,05	7%	inside the cross section
8	1,75	0,240	85,60	443,70	0,651	279,97	21%	inside the cross section
9	1,00	0,240	40,20	242,60	0,333	80,79	10%	inside the cross section
<b>Sum</b>			<b>409,85</b>	<b>1863,5</b>				

Sum Wallbase ist  
Sum Wallbase soil

5283,1122  
4825,80

10	1107
11	716,5
12	398,8
13	178,9
14	492,3
15	-0,0878
16	526,2
<b>Sum</b>	<b>3419,6122</b>

**Section 2,625m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	20,30	47,70	-0,244	-11,64	5%	inside the cross section
2	1,25	0,240	32,90	164,40	0,043	7,07	8%	inside the cross section
3	1,25	0,240	37,80	142,50	-0,071	-10,12	9%	inside the cross section
4	1,00	0,240	46,50	130,20	0,060	7,81	11%	inside the cross section

Sum Wallbase ist  
Sum Wallbase soil

1016  
658,2  
499,3  
262,3

10	1016
11	658,2
12	499,3
13	262,3

5	1,75	0,175	82,50	282,50	0,019	5,37
6	1,40	0,240	45,60	182,80	0,220	40,22
7	1,25	0,240	38,50	150,60	0,026	3,92
8	1,75	0,240	82,30	317,70	0,210	66,72
9	1,00	0,240	42,80	156,50	0,105	16,43
<b>Sum</b>			<b>429</b>	<b>1574,9</b>		

19% inside the cross section  
11% inside the cross section  
9% inside the cross section  
19% inside the cross section  
10% inside the cross section

14	601,9
15	-99,5
16	418,6
<b>Sum</b>	<b>3296,8</b>

Sum Waitcap list  
Sum Waitcap soll

4871,7  
4825,80

Wall	cap	middle	base
1	5%	4%	2%
2	8%	8%	8%
3	9%	9%	10%
4	11%	13%	15%
5	19%	18%	17%
6	11%	9%	10%
7	9%	10%	7%
8	19%	19%	21%
9	10%	10%	10%
<b>Sum</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Normal force N	cap	middle	base
	47,70	29,70	7,30
	164,40	155,10	190,90
	142,50	140,40	195,00
	130,20	209,10	262,30
	282,50	226,60	227,40
	182,80	195,20	232,90
	150,60	110,50	61,40
	317,70	350,30	443,70
	156,50	206,50	242,60
	1574,90	1623,40	1863,50

**H-LAST -700 KN**

Non-linear results

Tension strength 0,3 Mpa

**Section 1.375m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	27,50	22,50	0,342	7,70	5%	inside the cross section
2	1,25	0,240	46,90	162,00	0,318	51,52	9%	inside the cross section
3	1,25	0,240	58,30	147,60	0,316	46,64	11%	inside the cross section
4	1,00	0,240	68,00	224,50	0,170	36,17	12%	inside the cross section
5	1,75	0,175	102,60	237,20	0,358	84,92	19%	inside the cross section
6	1,40	0,240	39,10	167,20	0,491	82,10	7%	inside the cross section
7	1,25	0,240	55,00	105,50	0,318	33,55	10%	inside the cross section
8	1,75	0,240	111,90	396,40	0,514	203,75	20%	inside the cross section
9	1,00	0,240	38,50	167,50	0,285	47,74	7%	inside the cross section
<b>Sum</b>			<b>547,8</b>	<b>1630,4</b>				

Sum Wallmiddle ist 4952,2  
Sum Wallmiddle soil 4825,80

10	1077
11	713,6
12	414,7
13	133,1
14	530,3
15	-15,1
16	468,2
<b>Sum</b>	<b>3321,8</b>

**Section 0.125m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	10,90	6,87	0,473	3,25	2%	inside the cross section
2	1,25	0,240	39,90	216,50	0,497	107,60	9%	inside the cross section
3	1,25	0,240	53,30	230,80	0,487	112,40	12%	inside the cross section
4	1,00	0,240	64,80	280,40	0,347	97,30	14%	inside the cross section
5	1,75	0,175	85,10	258,70	0,698	180,57	19%	inside the cross section
6	1,40	0,240	38,10	211,50	0,588	120,13	8%	inside the cross section
7	1,25	0,240	29,20	52,60	0,562	29,58	6%	inside the cross section
8	1,75	0,240	106,60	521,60	0,643	335,39	23%	inside the cross section
9	1,00	0,240	31,10	212,80	0,375	79,80	7%	inside the cross section
<b>Sum</b>			<b>459</b>	<b>1991,77</b>				

Sum Wallbase ist 5463,264  
Sum Wallbase soil 4825,80

10	1242
11	692,4
12	377,9
13	155,4
14	447,6
15	-0,006
16	556,3
<b>Sum</b>	<b>3471,494</b>

**Section 2.625m**

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240	24,60	57,30	-0,297	-17,02	5%	inside the cross section
2	1,25	0,240	38,70	171,10	0,004	0,68	8%	inside the cross section
3	1,25	0,240	45,20	151,70	-0,144	-21,84	9%	inside the cross section
4	1,00	0,240	47,90	143,80	0,034	4,89	10%	inside the cross section

10	1102
11	654,3
12	433,3
13	216,9



5	1,75	0,175	98,20	293,00	-0,031	-9,08
6	1,40	0,240	44,50	154,80	0,247	38,24
7	1,25	0,240	42,40	152,80	-0,027	-4,13
8	1,75	0,240	100,60	346,10	0,197	88,18
9	1,00	0,240	36,20	142,70	0,110	15,70
<b>Sum</b>			<b>478,3</b>	<b>1613,3</b>		

21% inside the cross section  
9% inside the cross section  
9% inside the cross section  
21% inside the cross section  
8% inside the cross section

14	585,2
15	-131,3
16	426,5
<b>Sum</b>	<b>3286,9</b>

Sum Wallcap ist 4900,2  
Sum Wallcap soll 4825,80

Wall	cap	middle	base
1	5%	5%	2%
2	8%	9%	9%
3	9%	11%	12%
4	10%	12%	14%
5	21%	19%	19%
6	9%	7%	8%
7	9%	10%	6%
8	21%	20%	23%
9	8%	7%	7%
<b>Sum</b>	100%	100%	100%

Normal force N	cap	middle	base
	57,30	22,50	6,87
	171,10	162,00	216,50
	151,70	147,60	230,80
	143,80	224,50	280,40
	293,00	237,20	258,70
	154,80	167,20	211,50
	152,80	105,50	52,60
	346,10	396,40	521,60
	142,70	167,50	212,80
	1613,30	1630,40	1991,77

**H-LAST -800 KN**

Non-linear results

Tension strength 0,3 Mpa

Section 1.375m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	33,20	34,10	0,245	8,35
2	1,25	0,240	57,80	170,30	0,347	59,09
3	1,25	0,240	72,50	162,10	0,299	48,47
4	1,00	0,240	68,70	233,60	0,183	42,75
5	1,75	0,175	112,20	257,90	0,334	86,14
6	1,40	0,240	36,00	142,60	0,517	73,72
7	1,25	0,240	59,60	103,10	0,342	35,26
8	1,75	0,240	129,40	450,40	0,526	236,91
9	1,00	0,240	30,90	134,00	0,344	46,10
<b>Sum</b>			<b>600,3</b>	<b>1688,1</b>		

Proportion Q/H Position of the resulting force N  
 6% inside the cross section  
 10% inside the cross section  
 12% inside the cross section  
 11% inside the cross section  
 19% inside the cross section  
 6% inside the cross section  
 10% inside the cross section  
 22% inside the cross section  
 5% inside the cross section

Section 0.125m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	13,60	6,16	0,400	2,46
2	1,25	0,240	49,80	251,10	0,502	126,05
3	1,25	0,240	65,80	265,90	0,490	130,29
4	1,00	0,240	68,60	291,70	0,359	104,72
5	1,75	0,175	99,20	293,10	0,708	207,51
6	1,40	0,240	36,00	191,90	0,594	113,99
7	1,25	0,240	30,90	48,40	0,551	27,13
8	1,75	0,240	128,80	594,60	0,654	388,87
9	1,00	0,240	27,30	178,60	0,389	68,70
<b>Sum</b>			<b>520</b>	<b>2119,46</b>		

Proportion Q/H Position of the resulting force N  
 3% inside the cross section  
 10% inside the cross section  
 13% inside the cross section  
 13% inside the cross section  
 19% inside the cross section  
 7% inside the cross section  
 6% inside the cross section  
 25% inside the cross section  
 5% inside the cross section

Section 2.625m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]
1	1,00	0,240	28,50	67,00	-0,330	-22,11
2	1,25	0,240	44,30	178,80	-0,030	-5,36
3	1,25	0,240	53,60	159,50	-0,212	-33,81
4	1,00	0,240	47,70	152,30	0,048	7,46

Proportion Q/H Position of the resulting force N  
 5% inside the cross section  
 8% inside the cross section  
 10% inside the cross section  
 9% inside the cross section

10	1145
11	700,1
12	700,1
13	382,7
14	96
15	487,4
16	0,895
	478,8
<b>Sum</b>	<b>3990,955</b>

Sum Wallmiddle ist 5679,095  
 Sum Wallmiddle soil 4825,80

10	1373
11	665,2
12	357,9
13	130,1
14	420,1
15	0,0083
16	586,4
<b>Sum</b>	<b>3532,7063</b>

Sum Wallbase ist 5652,1663  
 Sum Wallbase soil 4825,80

10	1224
11	644,8
12	426,3
13	206,5

5	1,75	0,175	113,30	309,30	-0,079	-24,43
6	1,40	0,240	46,80	116,20	0,300	34,86
7	1,25	0,240	46,00	155,00	-0,076	-11,78
8	1,75	0,240	118,50	382,60	0,187	71,55
9	1,00	0,240	28,40	122,40	0,127	15,54
<b>Sum</b>			<b>527,1</b>	<b>1643,1</b>		

21% inside the cross section  
9% inside the cross section  
9% inside the cross section  
22% inside the cross section  
5% inside the cross section

14	567,6
15	-86,1
16	436,3
<b>Sum</b>	<b>3419,4</b>

Sum Wallcap ist 5062,5  
Sum Wallcap soll 4825,80

Wall	cap	middle	base
1	5%	6%	3%
2	8%	10%	10%
3	10%	12%	13%
4	9%	11%	13%
5	21%	19%	19%
6	9%	6%	7%
7	9%	10%	6%
8	22%	22%	25%
9	5%	5%	5%
<b>Sum</b>	100%	100%	100%

Normal force N	cap	middle	base
	67,00	34,10	6,16
	178,80	170,30	251,10
	159,50	162,10	265,90
	152,30	233,60	291,70
	309,30	257,90	293,10
	116,20	142,60	191,90
	155,00	103,10	48,40
	382,60	450,40	594,60
	122,40	134,00	176,60
	1643,10	1688,10	2119,46

H-LAST -900 KN

Non-linear results

Tension strength 0,3 Mpa

Section 1.375m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240				0,00		inside the cross section
2	1,25	0,240				0,00		inside the cross section
3	1,25	0,240				0,00		inside the cross section
4	1,00	0,240				0,00		inside the cross section
5	1,75	0,175				0,00		inside the cross section
6	1,40	0,240				0,00		inside the cross section
7	1,25	0,240				0,00		inside the cross section
8	1,75	0,240				0,00		inside the cross section
9	1,00	0,240				0,00		inside the cross section
Sum				0	0			

Sum Walmiddle ist 0  
Sum Walmiddle soil 4825,80

Section 0.125m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240				0,00		inside the cross section
2	1,25	0,240				0,00		inside the cross section
3	1,25	0,240				0,00		inside the cross section
4	1,00	0,240				0,00		inside the cross section
5	1,75	0,175				0,00		inside the cross section
6	1,40	0,240				0,00		inside the cross section
7	1,25	0,240				0,00		inside the cross section
8	1,75	0,240				0,00		inside the cross section
9	1,00	0,240				0,00		inside the cross section
Sum				0	0			

Sum Walbase ist 0  
Sum Walbase soil 4825,80

Section 2.625m

Wall	L [m]	D [m]	Q [kN]	N [kN]	e [m]	M [kNm]	Proportion Q/H	Position of the resulting force N
1	1,00	0,240				0,00		inside the cross section
2	1,25	0,240				0,00		inside the cross section
3	1,25	0,240				0,00		inside the cross section
4	1,00	0,240				0,00		inside the cross section

Sum Walbase ist 0  
Sum Walbase soil 4825,80

5	1,75	0,175		0,00
6	1,40	0,240		0,00
7	1,25	0,240		0,00
8	1,75	0,240		0,00
9	1,00	0,240		0,00
Sum		0	0	0

inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section

14	
15	
16	
Sum	0

Sum Wallcap list 0  
Sum Wallcap soll 4825,80

Wall	cap	middle	base
1			
2			
3			
4			
5			
6			
7			
8			
9			
Sum			

Normal force N	cap	middle	base
	0,00	0,00	0,00
	0,00	0,00	0,00
	0,00	0,00	0,00
	0,00	0,00	0,00
	0,00	0,00	0,00
	0,00	0,00	0,00
	0,00	0,00	0,00
	0,00	0,00	0,00
	0,00	0,00	0,00
	0,00	0,00	0,00
Sum	0,00	0,00	0,00

House 1-mod; H negative

Shear-Walls

transverse walls

- N positive Tension
- N negative Compression
- Q positive compared to the direction of the horizontal force H
- Q negative compared to the direction of the horizontal force H
- e negative compared to the direction of the horizontal force H
- e positive compared to the direction of the horizontal force H

H= 100,000										
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	0.445	0.000	0.055	0.500	1.000	-45.784	-2.51	7.02	7%	inside the cross section
Wall 2	0.775	0.000	0.100	0.875	1.750	-226.785	-22.63	8.82	9%	inside the cross section
Wall 3	0.557	0.000	0.088	0.625	1.250	-125.506	-8.53	3.27	3%	inside the cross section
Wall 4	0.460	0.000	0.040	0.500	1.000	-99.475	-3.97	7.16	7%	inside the cross section
Wall 6	0.930	5.000	0.270	1.200	2.400	-242.179	-65.39	13.95	14%	inside the cross section
Wall 9	0.431	10.000	0.099	0.500	1.000	-93.646	-6.44	1.31	1%	inside the cross section
Wall 7	0.772	10.000	0.103	0.875	1.750	-251.783	-25.86	7.40	7%	inside the cross section
Wall 8	0.790	10.000	0.095	0.875	1.750	-241.049	-20.39	12.20	12%	inside the cross section
Wall 5	1.215	4.250	0.180	1.375	2.750	-391.456	-62.48	17.46	17%	inside the cross section
					Sum	-1717.66		78.58		

H= 200,000										
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	0.328	0.000	0.172	0.500	1.000	-34.919	-6.01	11.58	6%	inside the cross section
Wall 2	0.667	0.000	0.188	0.875	1.750	-228.571	-42.95	16.89	8%	inside the cross section
Wall 3	0.491	0.000	0.134	0.625	1.250	-117.494	-15.71	7.90	4%	inside the cross section
Wall 4	0.428	0.000	0.072	0.500	1.000	-105.468	-7.61	11.50	6%	inside the cross section
Wall 6	0.789	5.000	0.411	1.200	2.400	-276.085	-113.36	38.56	19%	inside the cross section
Wall 9	0.403	10.000	0.097	0.500	1.000	-106.699	-10.50	5.28	3%	inside the cross section
Wall 7	0.667	10.000	0.188	0.875	1.750	-256.291	-48.08	15.92	8%	inside the cross section
Wall 8	0.693	10.000	0.192	0.875	1.750	-210.372	-40.48	26.62	13%	inside the cross section
Wall 5	1.071	4.250	0.304	1.375	2.750	-376.377	-114.53	36.78	18%	inside the cross section
					Sum	-1714.27		171.04		

H= 300,000										
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	0.148	0.000	0.853	0.500	1.000	-25.320	-8.93	14.86	5%	inside the cross section
Wall 2	0.598	0.000	0.277	0.875	1.750	-230.342	-63.74	23.35	8%	inside the cross section
Wall 3	0.415	0.000	0.211	0.625	1.250	-109.231	-22.99	12.78	4%	inside the cross section
Wall 4	0.398	0.000	0.102	0.500	1.000	-112.024	-11.39	15.85	5%	inside the cross section
Wall 6	0.679	5.000	0.521	1.200	2.400	-311.294	-162.28	63.18	21%	inside the cross section
Wall 9	0.392	10.000	0.118	0.500	1.000	-124.130	-14.68	9.30	3%	inside the cross section

N [kN]	sumV actual	sumV target	discrepancy in %
-710.62	-4955,335	4954,90	0%
-309,36			
-228,06			
-589,51			
-417,52			
-449,99			
-534,62			
-3237,57			

N [kN]	sumV actual	sumV target	discrepancy in %
-764,80	-4955,348	4954,90	0%
-337,45			
-552,86			
-419,13			
-604,02			
-135,95			
-426,87			
-3243,07			

N [kN]	sumV actual	sumV target	discrepancy in %
-816,05	-4955,348	4954,90	0%
-366,43			
-579,93			
-420,82			
-618,55			
-43,08			

Wall 7	0,604	10,000	0,271	0,875	1,750	-260,849	-70,74	24,91	8%
Wall 8	0,543	10,000	0,332	0,875	1,750	-180,586	-59,97	39,96	13%
Wall 5	0,915	4,250	0,460	1,375	2,750	-361,665	-166,44	57,13	19%
<b>Sum</b>						<b>-1715,42</b>	<b>Sum</b>	<b>263,32</b>	

H= 400,000

Wall 1	-0,115	0,000	0,615	0,500	1,000	-17,788	-10,84	16,79	4%
Wall 2	0,509	0,000	0,366	0,875	1,750	-231,768	-84,90	35,06	9%
Wall 3	0,329	0,000	0,296	0,625	1,250	-101,033	-29,92	17,92	4%
Wall 4	0,370	0,000	0,130	0,500	1,000	-118,638	-15,41	21,05	5%
Wall 6	0,597	5,500	0,603	1,200	2,400	-346,151	-208,76	87,91	22%
Wall 9	0,364	10,000	0,136	0,500	1,000	-140,721	-19,18	14,53	4%
Wall 7	0,521	10,000	0,355	0,875	1,750	-265,532	-94,13	35,31	9%
Wall 8	0,387	10,000	0,468	0,875	1,750	-152,918	-74,69	50,56	13%
Wall 5	0,767	4,250	0,608	1,375	2,750	-349,710	-212,62	75,94	19%
<b>Sum</b>						<b>-1724,26</b>	<b>Sum</b>	<b>355,08</b>	

H= 500,000

Wall 1	-0,186	0,000	0,686	0,500	1,000	-15,878	-10,90	17,92	4%
Wall 2	0,429	0,000	0,446	0,875	1,750	-236,593	-105,59	45,38	9%
Wall 3	0,256	0,000	0,369	0,625	1,250	-83,896	-34,66	22,51	5%
Wall 4	0,357	0,000	0,163	0,500	1,000	-125,082	-20,37	28,62	6%
Wall 6	0,519	5,500	0,691	1,200	2,400	-375,822	-255,86	107,16	21%
Wall 9	0,345	10,000	0,155	0,500	1,000	-161,395	-25,03	22,26	4%
Wall 7	0,450	10,000	0,425	0,875	1,750	-277,228	-117,91	46,69	9%
Wall 8	0,253	10,000	0,822	0,875	1,750	-128,560	-80,00	58,33	12%
Wall 5	0,562	4,250	0,713	1,375	2,750	-347,853	-248,05	94,28	19%
<b>Sum</b>						<b>-1763,32</b>	<b>Sum</b>	<b>443,08</b>	

H= 600,000

Wall 1	-0,382	0,000	0,882	0,500	1,000	-12,780	-11,27	19,85	3%
Wall 2	0,366 <td>0,000 <td>0,510 <td>0,875</td> <td>1,750</td> <td>-243,277</td> <td>-123,95</td> <td>55,21</td> <td>9%</td> </td></td>	0,000 <td>0,510 <td>0,875</td> <td>1,750</td> <td>-243,277</td> <td>-123,95</td> <td>55,21</td> <td>9%</td> </td>	0,510 <td>0,875</td> <td>1,750</td> <td>-243,277</td> <td>-123,95</td> <td>55,21</td> <td>9%</td>	0,875	1,750	-243,277	-123,95	55,21	9%
Wall 3	0,201 <td>0,000 <td>0,424</td> <td>0,625</td> <td>1,250</td> <td>-86,987</td> <td>-37,70</td> <td>26,33</td> <td>4%</td> </td>	0,000 <td>0,424</td> <td>0,625</td> <td>1,250</td> <td>-86,987</td> <td>-37,70</td> <td>26,33</td> <td>4%</td>	0,424	0,625	1,250	-86,987	-37,70	26,33	4%
Wall 4	0,308 <td>0,000 <td>0,193 <td>0,500</td> <td>1,000</td> <td>-133,930</td> <td>-25,78</td> <td>37,49</td> <td>6%</td> </td></td>	0,000 <td>0,193 <td>0,500</td> <td>1,000</td> <td>-133,930</td> <td>-25,78</td> <td>37,49</td> <td>6%</td> </td>	0,193 <td>0,500</td> <td>1,000</td> <td>-133,930</td> <td>-25,78</td> <td>37,49</td> <td>6%</td>	0,500	1,000	-133,930	-25,78	37,49	6%
Wall 6	0,470	5,500	0,730	1,200	2,400	-401,150	-292,80	121,79	20%
Wall 9	0,325 <td>10,000</td> <td>0,175 <td>0,500</td> <td>1,000</td> <td>-178,574</td> <td>-31,30</td> <td>30,39</td> <td>5%</td> </td>	10,000	0,175 <td>0,500</td> <td>1,000</td> <td>-178,574</td> <td>-31,30</td> <td>30,39</td> <td>5%</td>	0,500	1,000	-178,574	-31,30	30,39	5%
Wall 7	0,385 <td>10,000</td> <td>0,480 <td>0,875</td> <td>1,750</td> <td>-291,957</td> <td>-140,08</td> <td>56,82</td> <td>9%</td> </td>	10,000	0,480 <td>0,875</td> <td>1,750</td> <td>-291,957</td> <td>-140,08</td> <td>56,82</td> <td>9%</td>	0,875	1,750	-291,957	-140,08	56,82	9%
Wall 8	0,055 <td>10,000</td> <td>0,820 <td>0,875</td> <td>1,750</td> <td>-102,000</td> <td>-83,60</td> <td>66,38</td> <td>11%</td> </td>	10,000	0,820 <td>0,875</td> <td>1,750</td> <td>-102,000</td> <td>-83,60</td> <td>66,38</td> <td>11%</td>	0,875	1,750	-102,000	-83,60	66,38	11%
Wall 5	0,559 <td>4,250</td> <td>0,916</td> <td>1,375</td> <td>2,750</td> <td>-346,816</td> <td>-282,86</td> <td>115,19</td> <td>19%</td>	4,250	0,916	1,375	2,750	-346,816	-282,86	115,19	19%
<b>Sum</b>						<b>-1799,47</b>	<b>Sum</b>	<b>529,44</b>	

H= 700,000

Wall 1	0,266	0,000	0,244	0,500	1,000	-32,251	-7,86	20,78	3%
Wall 2	0,368 <td>0,000 <td>0,507 <td>0,875</td> <td>1,750</td> <td>-275,466</td> <td>-139,74</td> <td>71,40</td> <td>10%</td> </td></td>	0,000 <td>0,507 <td>0,875</td> <td>1,750</td> <td>-275,466</td> <td>-139,74</td> <td>71,40</td> <td>10%</td> </td>	0,507 <td>0,875</td> <td>1,750</td> <td>-275,466</td> <td>-139,74</td> <td>71,40</td> <td>10%</td>	0,875	1,750	-275,466	-139,74	71,40	10%

-404,09	sumV actual	sumV target	discrepancy in %
-3339,96	-4955,379	4954,90	0%

N [kN]	sumV actual	sumV target	discrepancy in %
-867,85	-4954,730	4954,90	0%
-383,10			
-586,68			
-421,59			
-631,62			
50,07			
-379,62			
<b>-3230,47</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-910,57	-4958,371	4954,90	0%
-417,39			
-585,98			
-418,53			
-641,99			
137,83			
-348,43			
<b>-3195,06</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-959,19	-4975,449	4954,90	0%
-439,40			
-584,64			
-411,91			
-645,48			
185,37			
-310,73			
<b>-3175,98</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-994,46			
-447,86			

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion O/H
Wall 3	0.285	0.000	0.340	0.625	1.250	-47,907	-33,29	32,34	5%
Wall 4	0.298	0.000	0.202	0.500	1.000	-150,811	-30,49	50,96	7%
Wall 6	0.427	5.000	0.773	1.200	2.400	-386,477	-288,79	106,12	15%
Wall 9	0.238	10.000	0.262	0.500	1.000	-144,571	-37,92	30,12	4%
Wall 7	0.393	10.000	0.482	0.875	1.750	-333,589	-160,82	72,27	10%
Wall 8	0.299	10.000	0.576	0.875	1.750	-115,907	-66,75	66,53	10%
Wall 5	0.630	4.250	0.745	1.375	2.750	-394,206	-293,60	146,88	21%
Sum						-1931,19		587,40	

H= 800,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion O/H	Position of the resulting force N
Wall 1	0.288	0.000	0.212	0.500	1.000	-33,466	-7,11	24,33	3%	inside the cross section
Wall 2	0.330	0.000	0.548	0.875	1,750	-292,632	-159,37	83,49	10%	inside the cross section
Wall 3	0.272	0.000	0.353	0.625	1,250	-99,675	-35,15	38,83	5%	inside the cross section
Wall 4	0.295	0.000	0.203	0.500	1,000	-162,680	-33,40	56,37	7%	inside the cross section
Wall 6	0.412	5,000	0,768	1,200	2,400	-400,596	-315,67	116,25	15%	inside the cross section
Wall 9	0,151	10,000	0,349	0,500	1,000	-118,767	-41,47	27,10	3%	inside the cross section
Wall 7	0,360	10,000	0,515	0,875	1,750	-353,980	-182,29	83,70	10%	inside the cross section
Wall 8	0,264	10,000	0,611	0,875	1,750	-105,255	-64,28	70,62	9%	inside the cross section
Wall 5	0,618	4,250	0,757	1,375	2,750	-417,144	-315,78	161,63	20%	inside the cross section
Sum						-1984,17		662,82		

H= 800,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion O/H	Position of the resulting force N
Wall 1	0.160	0.000	0.340	0.500	1.000	-28,639	-9,74	29,49	3%	inside the cross section
Wall 2	0.326	0.000	0.540	0.875	1,750	-322,590	-176,97	86,96	11%	inside the cross section
Wall 3	0.266	0.000	0.339	0.625	1,250	-106,292	-36,04	46,17	5%	inside the cross section
Wall 4	0.291	0.000	0.209	0.500	1,000	-173,041	-36,10	60,72	7%	inside the cross section
Wall 6	0.398	5,000	0,602	1,200	2,400	-408,641	-327,85	121,15	13%	inside the cross section
Wall 9	0,067	10,000	0,434	0,500	1,000	-88,574	-38,40	21,56	2%	inside the cross section
Wall 7	0,344	10,000	0,531	0,875	1,750	-381,901	-202,94	97,20	11%	inside the cross section
Wall 8	0,285	10,000	0,590	0,875	1,750	-102,066	-60,14	69,13	8%	inside the cross section
Wall 5	0,619	4,250	0,756	1,375	2,750	-448,333	-339,79	173,60	19%	inside the cross section
Sum						-2081,02		716,00		

H= 1000,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion O/H	Position of the resulting force N
Wall 1	0.219	0.000	0.281	0.500	1.000	-31,011	-8,73	31,64	3%	inside the cross section
Wall 2	0.314	0.000	0.561	0.875	1,750	-351,487	-197,08	106,44	11%	inside the cross section
Wall 3	0.243	0.000	0.382	0.625	1,250	-108,156	-40,59	54,30	5%	inside the cross section
Wall 4	0.263	0.000	0.217	0.500	1,000	-179,618	-38,92	62,46	6%	inside the cross section
Wall 6	0.393	5,000	0,607	1,200	2,400	-423,782	-342,16	126,92	13%	inside the cross section
Wall 9	0,048	10,000	0,451	0,500	1,000	-72,398	-32,62	18,79	2%	inside the cross section
Wall 7	0,338	10,000	0,537	0,875	1,750	-414,333	-222,50	109,15	11%	inside the cross section
Wall 8	0,264	10,000	0,591	0,875	1,750	-97,189	-57,48	67,66	7%	inside the cross section
Wall 5	0,612	4,250	0,763	1,375	2,750	-466,737	-366,90	192,24	19%	inside the cross section
Sum						-2156,71		771,59		

-552,72	sumV actual	sumV target	discrepancy in %
-381,65	-5043,822	4954,90	2%
-618,55			
112,28			
-229,69			
-3112,64			

N [kN]	sumV actual	sumV target	discrepancy in %
-1655,66	-5136,735	4954,90	4%
-464,86			
-525,67			
-366,72			
-607,51			
44,11			
-176,28			
-3152,57			

N [kN]	sumV actual	sumV target	discrepancy in %
-1118,60	-5199,326	4954,90	6%
-478,75			
-484,64			
-348,15			
-589,65			
3,53			
-122,04			
-3136,31			

N [kN]	sumV actual	sumV target	discrepancy in %
-1184,08	-5251,242	4954,90	6%
-490,33			
-438,25			
-330,06			
-572,85			
-1,12			
-77,85			
-3094,53			



## House 2; H negative

Shear-Walls

transverse walls

N positive Tension  
N negative Compression  
Q positive compared to the direction of the horizontal force H  
Q negative compared to the direction of the horizontal force H  
e negative compared to the direction of the horizontal force H  
e positive compared to the direction of the horizontal force H

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force
Wall 1	0.479	0.000	-0.041	0.438	0.875	-86.680	3.56	6.75	7%	N
Wall 2	0.881	0.000	-0.068	0.875	1.750	-232.797	1.49	-2.60	-3%	inside the cross section
Wall 3	0.768	0.000	-0.018	0.750	1.500	-182.516	3.19	2.06	2%	inside the cross section
Wall 4	0.248	0.000	0.002	0.250	0.500	-160.317	-0.29	-0.86	-1%	inside the cross section
Wall 7	1.375	5.300	-0.063	1.313	2.625	-485.212	30.42	15.32	15%	inside the cross section
Wall 5	1.160	3.750	-0.035	1.125	2.250	-312.133	10.95	5.81	6%	inside the cross section
Wall 6	2.631	5.300	-0.258	2.375	4.750	-647.461	165.62	53.51	54%	inside the cross section
Wall 10	0.479	10.600	-0.042	0.438	0.875	-77.477	3.22	7.42	7%	inside the cross section
Wall 11	0.746	10.600	0.004	0.750	1.500	-248.471	-0.92	-0.75	-1%	inside the cross section
Wall 12	0.304	10.600	0.008	0.313	0.625	-91.654	-0.71	-1.47	-1%	inside the cross section
Wall 9	0.506	9.300	-0.006	0.500	1.000	-116.500	0.73	0.12	0%	inside the cross section
Wall 8	1.501	7.450	-0.001	1.500	3.000	-408.410	0.37	-7.12	-7%	inside the cross section
				Sum		-3038.61		78.20		
H=	100,000									
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force
Wall 1	0.488	0.000	-0.031	0.438	0.875	-84.988	2.59	7.87	4%	N
Wall 2	0.847	0.000	0.028	0.875	1.750	-232.872	-6.45	0.94	0%	inside the cross section
Wall 3	0.739	0.000	0.011	0.750	1.500	-178.668	-1.97	4.58	2%	inside the cross section
Wall 4	0.247	0.000	0.003	0.250	0.500	-146.751	-0.46	-0.66	0%	inside the cross section
Wall 7	1.324	5.300	-0.011	1.313	2.625	-462.269	5.22	27.99	14%	inside the cross section
Wall 5	1.122	3.750	0.003	1.125	2.250	-297.331	-0.93	14.94	7%	inside the cross section
Wall 6	2.484	5.300	-0.109	2.375	4.750	-587.378	63.73	96.71	48%	inside the cross section
Wall 10	0.485	10.600	-0.027	0.438	0.875	-75.825	2.05	8.67	4%	inside the cross section
Wall 11	0.723	10.600	0.027	0.750	1.500	-254.387	-6.97	2.24	1%	inside the cross section
Wall 12	0.300	10.600	0.012	0.313	0.625	-84.227	-1.16	-0.68	0%	inside the cross section
Wall 9	0.494	9.300	0.006	0.500	1.000	-106.706	-0.62	1.84	1%	inside the cross section
Wall 8	1.417	7.450	0.083	1.500	3.000	-429.303	-35.50	10.66	5%	inside the cross section
				Sum		-2954.70		175.10		
H=	300,000									

N [kN]	sumV actual	sumV target	discrepancy in %
-882.76	-6076	6076	0%
-467.60			
-461.27			
-660.11			
-357.23			
-207.34			
-3036.37			
N [kN]	sumV actual	sumV target	discrepancy in %
-971.31	-6076	6076	0%
-466.94			
-474.38			
-671.56			
-335.13			
-201.59			
-3121.21			
N [kN]	sumV actual	sumV target	discrepancy in %
-1059.95	-6076	6076	0%
-466.48			
-487.61			

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Wall	a	D [m]	e [m]	L2	L [m]	N [kN]	M [kNm]	Q [kN]	#VERTI
Wall 1	0.457	0.000	-0.020	0.438	0.875	-83.291	1.62	8.99	3%
Wall 2	0.813	0.000	0.062	0.875	1.750	-233.049	-14.43	4.48	1%
Wall 3	0.709	0.000	0.041	0.750	1.500	-174.828	-7.12	7.10	2%
Wall 4	0.246	0.000	0.004	0.250	0.500	-147.161	-0.63	-0.46	0%
Wall 7	1.257	5.300	0.046	1.313	2.625	-439.295	-19.99	40.68	14%
Wall 5	1.080	3.750	0.045	1.125	2.250	-282.545	-12.60	24.07	8%
Wall 6	2.303	5.360	0.072	2.375	4.750	-527.185	-36.22	139.93	47%
Wall 10	0.450	10.600	-0.012	0.438	0.875	-74.161	0.90	9.93	3%
Wall 11	0.700	10.600	0.050	0.750	1.500	-260.439	-13.02	5.20	2%
Wall 12	0.297	10.600	0.016	0.313	0.625	-86.786	-1.55	0.12	0%
Wall 9	0.481	9.300	0.019	0.500	1.000	-100.879	-1.96	3.56	1%
Wall 8	1.341	7.450	0.159	1.500	3.000	-450.200	-71.40	28.41	

H= 400,000

Wall	a	D [m]	e [m]	L2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0.446	0.000	0.004	0.438	0.875	-81.571	0.85	10.10	3%
Wall 2	0.779	0.000	0.096	0.875	1.750	-233.281	-22.42	8.00	2%
Wall 3	0.878	0.000	0.072	0.750	1.500	-171.013	-12.26	9.61	2%
Wall 4	0.245	0.000	0.006	0.250	0.500	-145.520	-0.80	-0.26	0%
Wall 7	1.204	5.300	0.108	1.313	2.625	-416.327	-45.09	53.40	13%
Wall 5	1.034	3.750	0.091	1.125	2.250	-267.744	-24.42	33.17	8%
Wall 6	2.075	5.300	0.300	2.375	4.750	-466.904	-140.02	183.28	46%
Wall 10	0.434	10.600	0.004	0.438	0.875	-72.480	-0.25	11.19	
Wall 11	0.678	10.600	0.072	0.750	1.500	-266.568	-19.08	8.14	2%
Wall 12	0.293	10.600	0.020	0.313	0.625	-99.334	-1.95	0.90	0%
Wall 9	0.464	9.300	0.036	0.500	1.000	-93.020	-3.31	5.27	1%
Wall 8	1.272	7.450	0.228	1.500	3.000	-471.154	-107.33	46.11	12%
Sum						-2784.92		368.91	

H= 500,000

Wall	a	D [m]	e [m]	L2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0.434	0.000	0.004	0.438	0.875	-79.804	-0.32	11.22	2%
Wall 2	0.745	0.000	0.130	0.875	1.750	-233.601	-30.44	11.50	2%
Wall 3	0.646	0.000	0.104	0.750	1.500	-187.185	-17.44	12.11	2%
Wall 4	0.243	0.000	0.007	0.250	0.500	-143.801	-0.98	-0.06	0%
Wall 7	1.134	5.300	0.179	1.313	2.625	-393.281	-70.24	66.11	13%
Wall 5	0.982	3.750	0.144	1.125	2.250	-252.989	-36.30	42.20	8%
Wall 6	1.762	5.300	0.593	2.375	4.750	-406.336	-240.79	226.92	45%
Wall 10	0.418	10.600	0.020	0.438	0.875	-70.763	-1.42	12.44	2%
Wall 11	0.658	10.600	0.092	0.750	1.500	-272.837	-25.18	11.05	
Wall 12	0.290	10.600	0.023	0.313	0.625	-101.887	-2.33	1.69	0%
Wall 9	0.445	9.300	0.055	0.500	1.000	-85.081	-4.66	6.97	1%
Wall 8	1.208	7.450	0.232	1.500	3.000	-492.347	-143.62	63.68	13%
Sum						-2699.91		465.83	

H= 600,000

Wall	a	D [m]	e [m]	L2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
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Wall collapsed

N [kN]	-682.99
sumV actual	-312.81
sumV target	-196.42
discrepancy in %	-3206.26

Position of the resulting force  
N

N [kN]	-1147.92
sumV actual	-607.6
sumV target	607.6
discrepancy in %	0%

Position of the resulting force  
N

N [kN]	-1236.12
sumV actual	-607.6
sumV target	607.6
discrepancy in %	0%

Position of the resulting force  
N

N [kN]	
sumV actual	
sumV target	
discrepancy in %	

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0.420	0.000	0.018	0.438	0.875	-77,525	-1,39	12,56	2%
Wall 2	0.707	0.000	0.168	0.875	1,750	-233,865	-39,24	15,56	3%
Wall 3	0.608	0.000	0.142	0.750	1,500	-169,100	-23,11	15,04	3%
Wall 4	0.242	0.000	0.008	0.250	0.500	-141,974	-1,16	0,16	0%
Wall 7	1.049	5.900	0.264	1.313	2,625	-368,636	-97,25	80,73	13%
Wall 5	0.918	3,750	0.208	1,125	2,250	-296,983	-49,17	52,64	9%
Wall 6	1.475	5,900	0.900	2,375	4,750	-348,221	-313,36	261,92	44%
Wall 10	0.398	10,600	0.039	0.438	0,875	-68,537	-2,88	13,95	
Wall 11	0.636	10,600	0.114	0,750	1,500	-279,497	-31,86	14,44	2%
Wall 12	0.286	10,600	0.028	0,313	0,625	-104,707	-2,78	2,59	0%
Wall 9	0.420	9,300	0.080	0,500	1,000	-76,527	-5,15	8,92	1%
Wall 8	1,145	7,450	0,355	1,500	3,000	-515,218	-182,90	63,70	14%
					Sum	-2514,78		562,23	

H= 700,000

Position of the resulting force

Wall	N	M	Q
Wall 1	-74,093	-2,95	14,32
Wall 2	-233,796	-49,56	20,76
Wall 3	-158,568	-29,75	18,75
Wall 4	-139,904	-1,39	0,44
Wall 7	-340,856	-127,51	98,43
Wall 5	-217,948	-63,88	65,88
Wall 6	-299,475	-331,28	281,20
Wall 10	-65,146	-4,18	15,91
Wall 11	-266,902	-39,88	18,70
Wall 12	-108,005	-3,27	3,71
Wall 9	-66,669	-7,87	11,34
Wall 8	-541,466	-228,44	108,33
	Sum	-2532,83	657,79

H= 800,000

Position of the resulting force

Wall	N	M	Q
Wall 1	-69,130	-4,15	16,64
Wall 2	-233,225	-61,83	27,42
Wall 3	-153,717	-37,81	23,51
Wall 4	-137,561	-1,66	0,79
Wall 7	-312,436	-153,22	114,79
Wall 5	-197,381	-76,96	78,46
Wall 6	-267,009	-315,87	288,87
Wall 10	-60,611	-5,81	18,24
Wall 11	-294,980	-48,88	24,11
Wall 12	-111,622	-3,87	5,11
Wall 9	-55,233	-9,85	14,30
Wall 8	-571,845	-281,00	138,94
	Sum	-2464,75	752,19

H= 900,000

Position of the resulting force

Wall	N	M	Q
Wall 1	-68,130	-4,15	16,64
Wall 2	-233,225	-61,83	27,42
Wall 3	-153,717	-37,81	23,51
Wall 4	-137,561	-1,66	0,79
Wall 7	-312,436	-153,22	114,79
Wall 5	-197,381	-76,96	78,46
Wall 6	-267,009	-315,87	288,87
Wall 10	-60,611	-5,81	18,24
Wall 11	-294,980	-48,88	24,11
Wall 12	-111,622	-3,87	5,11
Wall 9	-55,233	-9,85	14,30
Wall 8	-571,845	-281,00	138,94
	Sum	-2464,75	752,19

N [kN]	sumV actual	sumV target	discrepancy in %
-1324,94	-6076	6076	0%
-465,61			
-528,88			
-718,50			
-243,71			
-179,23			
-3480,87			

N [kN]	sumV actual	sumV target	discrepancy in %
-1412,38	-6076	6076	0%
-464,54			
-544,70			
-732,97			
-215,58			
-172,54			
-3542,71			

N [kN]	sumV actual	sumV target	discrepancy in %
-1492,94	-6075	6076	0%
-462,78			
-560,23			
-747,16			
-182,85			
-164,93			
-3610,69			

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Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,344	0,000	0,094	0,438	0,875	-62,658	-5,89	19,72	2%
Wall 2	0,543	0,000	0,332	0,875	1,750	-231,549	-76,97	36,89	4%
Wall 3	0,435	0,000	0,315	0,750	1,500	-149,211	-47,03	30,06	3%
Wall 4	0,235	0,000	0,015	0,250	0,500	-134,810	-2,00	1,29	0%
Wall 7	0,753	5,300	0,560	1,313	2,625	-285,024	-161,18	123,36	14%
Wall 5	0,701	3,750	0,424	1,125	2,250	-182,415	-77,36	86,31	10%
Wall 6	1,182	5,300	1,193	2,375	4,750	-253,250	-302,18	291,78	32%
Wall 10	0,305	10,600	0,131	0,438	0,875	-55,793	-7,32	20,63	2%
Wall 11	0,582	10,600	0,188	0,750	1,500	-303,390	-60,04	31,67	4%
Wall 12	0,273	10,600	0,040	0,313	0,625	-115,047	-4,60	7,02	1%
Wall 9	0,238	9,300	0,262	0,500	1,000	-43,443	-11,38	16,79	2%
Wall 8	0,940	7,450	0,560	1,500	3,000	-609,381	-341,44	179,25	20%
Sum						-2428,97	Sum	844,76	

H= 1000,000

Position of the resulting force

Wall	N [kN]	sumV actual	sumV target	discrepancy in %
Wall 1	-56,600	-6075	6076	0%
Wall 2	-231,065	-6075	6076	0%
Wall 3	-145,411	-6075	6076	0%
Wall 4	-131,853	-6075	6076	0%
Wall 7	-265,884	-6075	6076	0%
Wall 5	-169,081	-6075	6076	0%
Wall 6	-259,325	-6075	6076	0%
Wall 10	-54,370	-6075	6076	0%
Wall 11	-312,764	-6075	6076	0%
Wall 12	-118,243	-6075	6076	0%
Wall 9	-37,494	-6075	6076	0%
Wall 8	-665,189	-6075	6076	0%
Sum	-2428,97	-6075	6076	0%

H= 1100,000

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,305	0,000	0,132	0,438	0,875	-55,204	-7,30	22,43	2%
Wall 2	0,448	0,000	0,426	0,875	1,750	-235,206	-100,10	51,18	5%
Wall 3	0,345	0,000	0,406	0,750	1,500	-144,997	-89,80	38,63	4%
Wall 4	0,227	0,000	0,023	0,250	0,500	-127,887	-2,91	2,73	0%
Wall 7	0,639	5,300	0,673	1,313	2,625	-246,565	-187,38	136,15	12%
Wall 5	0,682	3,750	0,443	1,125	2,250	-163,585	-72,50	99,41	9%
Wall 6	1,303	5,300	1,072	2,375	4,750	-277,424	-297,51	328,52	30%
Wall 10	0,293	10,600	0,144	0,438	0,875	-54,548	-7,87	20,99	2%
Wall 11	0,478	10,600	0,271	0,750	1,500	-324,384	-87,97	51,94	5%
Wall 12	0,259	10,600	0,054	0,313	0,625	-120,403	-6,49	12,68	1%
Wall 9	0,161	9,300	0,339	0,500	1,000	-30,252	-10,25	14,26	1%
Wall 8	0,871	7,450	0,629	1,500	3,000	-707,603	-444,95	255,62	23%
Sum						-2488,76	Sum	1034,44	

H= 1200,000

Position of the resulting force

Wall	N [kN]	sumV actual	sumV target	discrepancy in %
Wall 1	-55,204	-6072	6076	0%
Wall 2	-235,206	-6072	6076	0%
Wall 3	-144,997	-6072	6076	0%
Wall 4	-127,887	-6072	6076	0%
Wall 7	-246,565	-6072	6076	0%
Wall 5	-163,585	-6072	6076	0%
Wall 6	-277,424	-6072	6076	0%
Wall 10	-54,548	-6072	6076	0%
Wall 11	-324,384	-6072	6076	0%
Wall 12	-120,403	-6072	6076	0%
Wall 9	-30,252	-6072	6076	0%
Wall 8	-707,603	-6072	6076	0%
Sum	-2488,76	-6072	6076	0%

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0.293	0.000	0.145	0.438	0.875	-53,415	-7.74	23.20	2%
Wall 2	0.410	0.000	0.465	0.875	1.750	-239,084	-111.27	88.54	5%
Wall 3	0.289	0.000	0.463	0.750	1.500	-142,876	-65.88	44.29	4%
Wall 4	0.222	0.000	0.028	0.250	0.500	-123,828	-3.43	3.55	0%
Wall 7	0.610	5.300	0.703	1.313	2.625	-235,292	-165.32	138.70	12%
Wall 5	0.683	3.750	0.443	1.125	2.250	-158,468	-70.12	106.87	9%
Wall 6	1.270	5.300	1.105	2.375	4.750	-290,714	-321.21	355.73	30%
Wall 10	0.262	10.600	0.175	0.438	0.875	-51,318	-8.99	22.78	2%
Wall 11	0.455	10.600	0.295	0.750	1.500	-337,547	-99.84	60.11	5%
Wall 12	0.282	10.600	0.060	0.313	0.625	-121,574	-7.34	15.52	1%
Wall 9	0.149	9.300	0.351	0.500	1.000	-24,968	-8.77	12.48	1%
Wall 8	0.827	7.450	0.643	1.500	3.000	-754,661	-465.32	285.73	24%
Sum						-2533,74	Sum	1127,51	

H= 1300,000

Position of the resulting force N

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0.279	0.000	0.159	0.438	0.875	-51,565	-8.19	24.71	2%
Wall 2	0.398	0.000	0.477	0.875	1.750	-248,905	-118.76	65.79	5%
Wall 3	0.269	0.000	0.481	0.750	1.500	-145,101	-69.78	48.79	4%
Wall 4	0.216	0.000	0.034	0.250	0.500	-119,050	-4.08	4.71	0%
Wall 7	0.589	5.300	0.723	1.313	2.625	-225,648	-163.21	142.52	11%
Wall 5	0.714	3.750	0.411	1.125	2.250	-160,332	-85.90	114.24	9%
Wall 6	1.308	5.300	1.057	2.375	4.750	-322,070	-343.71	363.20	28%
Wall 10	0.275	10.600	0.162	0.438	0.875	-52,836	-8.59	22.50	2%
Wall 11	0.433	10.600	0.318	0.750	1.500	-354,557	-112.57	70.33	5%
Wall 12	0.244	10.600	0.068	0.313	0.625	-118,501	-8.07	18.25	1%
Wall 9	0.081	9.300	0.420	0.500	1.000	-18,012	-7.56	11.75	1%
Wall 8	0.841	7.450	0.659	1.500	3.000	-797,987	-525.87	315.27	24%
Sum						-2614,36	Sum	1203,05	

N [kN]	sumV actual	sumV target	discrepancy in %
-1694,38	-6072	6076	0%
-439,37			
-573,89			
-735,73			
-7,58			
-87,70			
-3538,15			

N [kN]	sumV actual	sumV target	discrepancy in %
-1726,14	-6082	6076	0%
-425,62			
-561,13			
-709,86			
15,38			
-61,73			
-3468,09			

### House 2; H positive

Shear-Walls

transverse walls

N positive Tension  
 N negative Compression  
 Q positive compared to the direction of the horizontal force H  
 Q negative compared to the direction of the horizontal force H  
 e negative compared to the direction of the horizontal force H  
 e positive compared to the direction of the horizontal force H

H= 100,000											
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N	
Wall 1	0.499	0.000	0.062	0.438	0.875	-90.21	-5.58	4.43	4%	inside the cross section	
Wall 2	0.949	0.000	0.074	0.875	1.750	-232.12	-17.25	-9.82	-10%	inside the cross section	
Wall 3	0.821	0.000	0.071	0.750	1.500	-190.06	-13.46	-3.09	-3%	inside the cross section	
Wall 4	0.250	0.000	0.009	0.250	0.500	-153.76	-0.05	-1.34	-1%	inside the cross section	
Wall 7	1.465	5.300	0.153	1.313	2.625	-531.43	-81.20	-10.17	-10%	inside the cross section	
Wall 5	1.226	3.750	0.101	1.125	2.250	-341.56	-34.50	-12.59	-13%	inside the cross section	
Wall 6	2.866	5.300	0.481	2.375	4.750	-768.54	-369.82	-33.44	-33%	inside the cross section	
Wall 10	0.507	10.600	0.068	0.438	0.875	-81.03	-5.62	4.86	5%	inside the cross section	
Wall 11	0.797	10.600	0.047	0.750	1.500	-236.07	-11.02	-6.81	-7%	inside the cross section	
Wall 12	0.312	10.600	0.000	0.313	0.625	-86.61	0.02	-3.12	-3%	inside the cross section	
Wall 9	0.528	9.300	0.026	0.500	1.000	-132.20	-3.41	-3.38	-3%	inside the cross section	
Wall 8	1.697	7.450	0.197	1.500	3.000	-366.28	-71.97	-42.81	-43%	inside the cross section	
				Sum		-3209.87		-117.26			

H= 200,000											
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N	
Wall 1	0.509	0.000	0.071	0.438	0.875	-91.99	-6.55	3.32	2%	inside the cross section	
Wall 2	0.994	0.000	0.109	0.875	1.750	-231.84	-25.18	-13.36	-7%	inside the cross section	
Wall 3	0.846	0.000	0.096	0.750	1.500	-193.87	-18.59	-5.62	-3%	inside the cross section	
Wall 4	0.251	0.000	0.001	0.250	0.500	-155.85	-0.22	-1.54	-1%	inside the cross section	
Wall 7	1.505	5.300	0.192	1.313	2.625	-554.72	-106.67	-22.73	-11%	inside the cross section	
Wall 5	1.285	3.750	0.130	1.125	2.250	-356.26	-46.28	-21.71	-11%	inside the cross section	
Wall 6	2.944	5.300	0.569	2.375	4.750	-829.54	-472.34	-76.72	-38%	inside the cross section	
Wall 10	0.520	10.600	0.082	0.438	0.875	-82.80	-6.70	3.62	2%	inside the cross section	
Wall 11	0.824	10.600	0.074	0.750	1.500	-229.75	-17.00	-9.81	-5%	inside the cross section	
Wall 12	0.317	10.600	0.004	0.313	0.625	-84.06	-0.36	-3.92	-2%	inside the cross section	
Wall 9	0.534	9.300	0.034	0.500	1.000	-140.13	-4.75	-5.10	-5%	inside the cross section	
Wall 8	1.813	7.450	0.313	1.500	3.000	-344.93	-107.89	-60.62	-30%	inside the cross section	
				Sum		-3295.33		-214.21			

N [kN]	sumV actual	sumV target	discrepancy in %
-706.28	-6078	6076	0%
-488.16			
-434.36			
-636.97			
-401.66			
-218.52			
-2865.96			

N [kN]	sumV actual	sumV target	discrepancy in %
-618.24	-6076	6076	0%
-468.24			
-420.58			
-685.22			
-423.83			
-224.21			
-2780.33			

N [kN]	sumV actual	sumV target	discrepancy in %
-629.58	-6075	6076	0%

TECHNICAL UNIVERSITY MUNICH  
DEPARTMENT OF CIVIL ENGINEERING AND GEODESY  
INSTITUTE OF CONCRETE AND MASONRY STRUCTURES

	-466,80
	-405,92
	-613,23
	-445,70
	-229,88
	-2694,10

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,518	0,000	0,080	0,438	0,875	-93,72	-7,52	2,21	1%
Wall 2	1,018	0,000	0,143	0,875	1,750	-231,27	-33,09	-16,95	-6%
Wall 3	0,870	0,000	0,120	0,750	1,500	-197,66	-23,74	-8,14	-3%
Wall 4	0,292	0,000	0,032	0,250	0,500	-157,61	-0,98	-1,74	-1%
Wall 7	1,541	5,300	0,229	1,313	2,625	-577,98	-132,18	-35,24	-12%
Wall 6	1,282	3,750	0,157	1,125	2,250	-371,13	-58,12	-30,81	-10%
Wall 10	0,532	10,600	0,094	0,438	0,875	-84,57	-7,95	2,41	1%
Wall 11	0,853	10,600	0,103	0,750	1,500	-223,69	-22,98	-12,80	-4%
Wall 12	0,322	10,600	0,009	0,313	0,625	-81,42	-0,75	-4,73	-2%
Wall 9	0,541	9,300	0,041	0,500	1,000	-148,08	-6,10	-6,80	-2%
Wall 8	1,943	7,450	0,443	1,500	3,000	-323,44	-143,38	-78,76	-26%
Sum						-3381,40		-311,19	

H= 400,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,527	0,000	0,089	0,438	0,875	-95,99	-8,50	1,12	0%
Wall 2	1,053	0,000	0,178	0,875	1,750	-231,09	-41,06	-20,53	-5%
Wall 3	0,894	0,000	0,144	0,750	1,500	-201,45	-28,93	-10,66	-3%
Wall 4	0,254	0,000	0,004	0,250	0,500	-159,50	-0,56	-1,94	0%
Wall 7	1,575	5,900	0,263	1,313	2,625	-601,27	-158,01	-47,74	-12%
Wall 5	1,306	3,750	0,181	1,125	2,250	-385,33	-70,04	-39,92	-10%
Wall 6	3,068	5,300	0,713	2,375	4,750	-679,54	-162,90	-41,1%	
Wall 10	0,543	10,600	0,108	0,438	0,875	-96,93	-9,13	1,21	0%
Wall 11	0,853	10,600	0,133	0,750	1,500	-217,62	-29,93	-15,76	-4%
Wall 12	0,327	10,600	0,014	0,313	0,625	-78,59	-1,13	-5,54	-1%
Wall 9	0,548	9,300	0,048	0,500	1,000	-156,00	-7,46	-8,50	-2%
Wall 8	2,087	7,450	0,587	1,500	3,000	-302,09	-177,93	-97,05	-24%
Sum						-3488,72		-408,21	

H= 500,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,536	0,000	0,098	0,438	0,875	-97,01	-9,53	-0,03	0%
Wall 2	1,089	0,000	0,214	0,875	1,750	-230,88	-49,34	-24,33	-5%
Wall 3	0,917	0,000	0,167	0,750	1,500	-205,29	-34,50	-13,33	-3%
Wall 4	0,255	0,000	0,005	0,250	0,500	-161,98	-0,73	-2,16	0%
Wall 7	1,608	5,900	0,298	1,313	2,625	-625,28	-184,86	-61,39	-12%
Wall 5	1,330	3,750	0,205	1,125	2,250	-402,23	-82,46	-49,71	-10%
Wall 6	3,148	5,300	0,774	2,375	4,750	-1017,50	-787,85	-208,93	-42%
Wall 10	0,555	10,600	0,117	0,438	0,875	-88,44	-10,37	-0,16	0%
Wall 11	0,917	10,600	0,167	0,750	1,500	-211,41	-35,39	-19,14	-4%
Wall 12	0,333	10,600	0,021	0,313	0,625	-75,05	-1,85	-6,49	-1%
Wall 9	0,554	9,300	0,054	0,500	1,000	-164,10	-8,89	-10,41	-2%
Wall 8	2,191	7,450	0,691	1,500	3,000	-285,05	-195,63	-108,91	-22%
Sum						-3553,60		-504,99	

H= 600,000

Position of the resulting force	N
inside the cross section	-466,80
inside the cross section	-405,92
inside the cross section	-613,23
inside the cross section	-445,70
inside the cross section	-229,88
inside the cross section	-2694,10
Sum	-6075

Position of the resulting force	N	sumV actual	sumV target	discrepancy in %
inside the cross section	-466,80	-6075	6076	0%
inside the cross section	-470,11			
inside the cross section	-388,48			
inside the cross section	-680,89			
inside the cross section	-466,87			
inside the cross section	-235,51			
inside the cross section	-2806,61			
Sum				

Position of the resulting force	N	sumV actual	sumV target	discrepancy in %
inside the cross section	-346,42	-6075	6076	0%
inside the cross section	-471,44			
inside the cross section	-379,57			
inside the cross section	-587,69			
inside the cross section	-485,50			
inside the cross section	-240,93			
inside the cross section	-2511,55			
Sum				

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,545	0,000	0,107	0,438	0,875	-98,64	-10,58	-1,22	0%
Wall 2	1,126	0,000	0,251	0,875	1,750	-230,37	-57,87	-28,32	-5%
Wall 3	0,941	0,000	0,191	0,750	1,500	-209,13	-39,85	-16,10	-3%
Wall 4	0,256	0,000	0,006	0,250	0,500	-163,33	-0,91	-2,38	0%
Wall 7	1,640	5,300	0,328	1,313	2,625	-650,05	-212,89	-75,93	-13%
Wall 5	1,353	3,750	0,228	1,125	2,250	-418,44	-95,24	-60,00	-10%
Wall 6	3,205	5,300	0,830	2,375	4,750	-1084,04	-899,21	-267,02	-43%
Wall 10	0,566	10,600	0,129	0,438	0,875	-90,82	-11,67	-1,66	
Wall 11	0,955	10,600	0,205	0,750	1,500	-204,74	-41,97	-22,82	-4%
Wall 12	0,941	10,600	0,028	0,313	0,625	-70,91	-1,99	-7,55	-1%
Wall 9	0,560	9,300	0,060	0,500	1,000	-172,35	-10,39	-12,45	-2%
Wall 8	2,262	7,450	0,752	1,500	3,000	-272,49	-204,82	-116,23	-19%
Sum						-3865,29		-601,57	

H= 700,000

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,654	0,000	0,117	0,438	0,875	-100,17	-11,69	-2,43	0%
Wall 2	1,166	0,000	0,290	0,875	1,750	-229,84	-66,72	-32,47	-5%
Wall 3	0,964	0,000	0,214	0,750	1,500	-213,00	-45,62	-18,97	-3%
Wall 4	0,257	0,000	0,007	0,250	0,500	-165,06	-1,09	-2,61	0%
Wall 7	1,671	5,300	0,358	1,313	2,625	-675,64	-242,01	-90,85	-13%
Wall 5	1,374	3,750	0,249	1,125	2,250	-435,97	-108,49	-70,66	-10%
Wall 6	3,255	5,300	0,890	2,375	4,750	-1154,09	-1015,14	-306,49	-44%
Wall 10	0,577	10,600	0,140	0,438	0,875	-95,40	-13,03	-3,21	0%
Wall 11	0,996	10,600	0,246	0,750	1,500	-198,09	-48,81	-26,68	-4%
Wall 12	0,950	10,600	0,037	0,313	0,625	-65,77	-2,44	-8,66	-1%
Wall 9	0,566	9,300	0,066	0,500	1,000	-180,73	-11,98	-14,56	-2%
Wall 8	2,260	7,450	0,760	1,500	3,000	-268,05	-202,07	-120,44	-17%
Sum						-3777,23		-688,04	

H= 800,000

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,554	0,000	0,126	0,438	0,875	-101,75	-12,82	-3,71	0%
Wall 2	1,204	0,000	0,329	0,875	1,750	-229,16	-75,44	-36,62	-5%
Wall 3	0,998	0,000	0,238	0,750	1,500	-216,74	-51,47	-21,99	-3%
Wall 4	0,258	0,000	0,008	0,250	0,500	-167,16	-1,29	-2,84	0%
Wall 7	1,700	5,300	0,387	1,313	2,625	-701,62	-271,53	-106,76	-13%
Wall 5	1,395	3,750	0,270	1,125	2,250	-452,38	-121,92	-81,95	-10%
Wall 6	3,298	5,300	0,923	2,375	4,750	-1224,44	-1129,79	-356,93	-45%
Wall 10	0,598	10,600	0,150	0,438	0,875	-96,04	-14,42	-4,94	-1%
Wall 11	1,038	10,600	0,288	0,750	1,500	-191,36	-55,19	-30,45	-4%
Wall 12	0,961	10,600	0,048	0,313	0,625	-60,83	-2,91	-9,93	-1%
Wall 9	0,572	9,300	0,072	0,500	1,000	-189,22	-13,59	-16,86	-2%
Wall 8	2,254	7,450	0,764	1,500	3,000	-261,13	-196,64	-121,63	-15%
Sum						-3891,52		-794,52	

H= 900,000

N [kN]	sumV actual	sumV target	discrepancy in %
-251,08	-6075	6076	0%
-472,17			
-364,81			
-573,90			
-501,54			
-246,20			
-2409,70			

N [kN]	sumV actual	sumV target	discrepancy in %
-151,53	-6075	6076	0%
-473,28			
-349,55			
-659,06			
-513,02			
-251,15			
-2297,59			

N [kN]	sumV actual	sumV target	discrepancy in %
-52,19	-5960	6076	-2%
-473,23			
-333,64			
-543,87			
-524,19			
-256,06			
-2183,18			



Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,573	0,000	0,136	0,438	0,875	-103,27	-14,01	-5,10	-1%
Wall 2	1,240	0,000	0,365	0,875	1,750	-229,05	-63,69	-40,52	-5%
Wall 3	1,011	0,000	0,261	0,750	1,500	-220,58	-57,59	-25,30	-3%
Wall 4	0,259	0,000	0,009	0,250	0,500	-169,12	-1,49	-3,10	0%
Wall 7	1,728	5,300	0,415	1,313	2,625	-728,57	-302,36	-123,80	-14%
Wall 5	1,414	3,327	0,289	1,125	2,250	-469,94	-135,95	-94,15	-10%
Wall 6	3,327	5,300	0,952	2,375	4,750	-1237,63	-1234,69	-404,03	-45%
Wall 10	0,589	10,600	0,161	0,438	0,875	-98,51	-15,90	-6,78	-1%
Wall 11	1,073	10,600	0,323	0,750	1,500	-186,93	-59,98	-32,94	-4%
Wall 12	0,374	10,600	0,061	0,313	0,625	-54,92	-3,96	-11,19	-1%
Wall 9	0,571	9,300	0,077	0,500	1,000	-197,95	-15,28	-19,32	-2%
Wall 8	2,255	7,450	0,755	1,500	3,000	-258,70	-195,21	-124,88	-14%
				Sum		-4014,15		-891,12	

H= 1000,000

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,585	0,000	0,147	0,438	0,875	-105,23	-15,48	-5,83	-1%
Wall 2	1,269	0,000	0,384	0,875	1,750	-230,82	-90,92	-43,18	-4%
Wall 3	1,038	0,000	0,288	0,750	1,500	-225,14	-64,75	-29,12	-3%
Wall 4	0,260	0,000	0,010	0,250	0,500	-171,50	-1,73	-3,41	0%
Wall 7	1,798	5,300	0,446	1,313	2,625	-759,69	-338,52	-144,58	-14%
Wall 5	1,437	3,750	0,312	1,125	2,250	-489,53	-152,64	-108,88	-11%
Wall 6	3,365	5,300	0,980	2,375	4,750	-1357,33	-1330,77	-441,02	-44%
Wall 10	0,613	10,600	0,175	0,438	0,875	-101,01	-17,72	-9,06	-1%
Wall 11	1,089	10,600	0,339	0,750	1,500	-192,65	-61,83	-32,88	-3%
Wall 12	0,390	10,600	0,077	0,313	0,625	-48,84	-3,78	-12,45	-1%
Wall 9	0,583	9,300	0,083	0,500	1,000	-207,94	-17,26	-22,31	-2%
Wall 8	2,251	7,450	0,751	1,500	3,000	-256,61	-192,63	-130,12	-13%
				Sum		-4135,35		-983,84	

H= 1100,000

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,597	0,000	0,159	0,438	0,875	-107,37	-17,11	-8,90	-1%
Wall 2	1,293	0,000	0,408	0,875	1,750	-235,08	-95,96	-44,43	-4%
Wall 3	1,062	0,000	0,312	0,750	1,500	-230,46	-71,90	-32,80	-3%
Wall 4	0,262	0,000	0,012	0,250	0,500	-173,99	-2,02	-3,71	0%
Wall 7	1,787	5,300	0,474	1,313	2,625	-795,30	-376,03	-166,54	-15%
Wall 5	1,460	3,750	0,335	1,125	2,250	-509,70	-170,54	-125,12	-11%
Wall 6	3,374	5,300	0,989	2,375	4,750	-1414,17	-1412,61	-476,61	-43%
Wall 10	0,630	10,600	0,193	0,438	0,875	-101,97	-19,64	-11,36	-1%
Wall 11	1,109	10,600	0,359	0,750	1,500	-179,13	-64,22	-33,52	-3%
Wall 12	0,400	10,600	0,088	0,313	0,625	-44,33	-3,98	-12,99	-1%
Wall 9	0,559	9,300	0,088	0,500	1,000	-218,62	-19,50	-25,67	-2%
Wall 8	2,264	7,450	0,764	1,500	3,000	-254,89	-194,66	-137,96	-13%
				Sum		-4263,00		-1079,76	

H= 1200,000

N [kN]	sumV actual	sumV target	discrepancy in %
49,80	-6075	6076	0%
-472,24			
-316,57			
-527,80			
-533,01			
-260,80			
-2060,62			

N [kN]	sumV actual	sumV target	discrepancy in %
136,23	-6079	6076	0%
-467,26			
-294,48			
-508,45			
-542,79			
-265,80			
-1942,55			

N [kN]	sumV actual	sumV target	discrepancy in %
223,98	-6078	6076	0%
-462,11			
-268,36			
-487,21			
-550,95			
-270,62			
-1815,38			

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Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,612	0,000	0,174	0,438	0,875	-109,05	-19,01	-11,27	-1%
Wall 2	1,303	0,000	0,428	0,875	1,750	-239,61	-102,63	-46,81	-4%
Wall 3	1,080	0,000	0,330	0,750	1,500	-237,96	-78,55	-35,97	-3%
Wall 4	0,263	0,000	0,013	0,250	0,500	-178,82	-2,33	-4,19	0%
Wall 7	1,811	5,300	0,468	1,313	2,625	-831,21	-414,44	-188,46	-16%
Wall 5	1,482	3,750	0,357	1,125	2,250	-551,90	-190,10	-143,16	-12%
Wall 6	3,395	5,300	1,020	2,375	4,750	-1488,17	-510,35	-43%	
Wall 10	0,654	10,600	0,216	0,438	0,875	-100,77	-21,80	-13,84	-1%
Wall 11	1,146	10,600	0,366	0,750	1,500	-173,27	-68,87	-35,98	-3%
Wall 12	0,388	10,600	0,086	0,313	0,625	-41,51	-3,65	-12,59	-1%
Wall 9	0,596	9,300	0,086	0,500	1,000	-230,52	-22,06	-28,58	-2%
Wall 8	2,261	7,450	0,761	1,500	3,000	-255,01	-194,04	-144,21	-12%
				Sum		-4386,21	Sum	-1176,42	

H= 1300,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,649	0,000	0,212	0,438	0,875	-103,70	-21,94	-14,15	-1%
Wall 2	1,326	0,000	0,451	0,875	1,750	-247,13	-111,38	-49,95	-4%
Wall 3	1,087	0,000	0,337	0,750	1,500	-252,63	-85,18	-37,84	-3%
Wall 4	0,266	0,000	0,016	0,250	0,500	-190,88	-2,82	-4,85	0%
Wall 7	1,835	5,300	0,523	1,313	2,625	-882,83	-481,54	-210,93	-16%
Wall 5	1,505	3,750	0,380	1,125	2,250	-581,66	-213,31	-164,82	-13%
Wall 6	3,445	5,300	1,070	2,375	4,750	-1465,30	-1556,45	-526,59	-41%
Wall 10	0,725	10,600	0,287	0,438	0,875	-85,47	-24,53	-15,30	-1%
Wall 11	1,167	10,600	0,417	0,750	1,500	-168,02	-70,10	-35,58	-3%
Wall 12	0,383	10,600	0,080	0,313	0,625	-38,89	-2,96	-11,94	-1%
Wall 9	0,605	9,300	0,105	0,500	1,000	-247,52	-26,01	-35,15	-3%
Wall 8	2,227	7,450	0,727	1,500	3,000	-264,55	-182,22	-157,03	-12%
				Sum		-4486,56	Sum	-1283,84	

H= 1400,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,655	0,000	0,218	0,438	0,875	-106,41	-23,19	-15,09	-1%
Wall 2	1,351	0,000	0,476	0,875	1,750	-248,59	-118,23	-53,99	-4%
Wall 3	1,099	0,000	0,349	0,750	1,500	-259,95	-80,67	-40,97	-3%
Wall 4	0,287	0,000	0,017	0,250	0,500	-183,58	-3,10	-5,26	0%
Wall 7	1,844	5,300	0,532	1,313	2,625	-914,97	-486,58	-226,65	-17%
Wall 5	1,514	3,750	0,389	1,125	2,250	-581,17	-225,79	-178,82	-14%
Wall 6	3,444	5,300	1,069	2,375	4,750	-1525,66	-1631,39	-573,15	-44%
Wall 10	0,723	10,600	0,285	0,438	0,875	-89,67	-25,56	-16,50	-1%
Wall 11	1,193	10,600	0,443	0,750	1,500	-164,13	-72,71	-37,62	-3%
Wall 12	0,402	10,600	0,089	0,313	0,625	-39,60	-3,00	-12,49	-1%
Wall 9	0,610	9,300	0,110	0,500	1,000	-257,94	-28,27	-39,12	-3%
Wall 8	2,274	7,450	0,774	1,500	3,000	-259,88	-201,20	-161,86	-12%
				Sum		-4625,55	Sum	-1382,32	

N [kN]	sumV actual	sumV target	discrepancy in %
298,59	-6078	6076	0%
-456,92			
-238,21			
-462,13			
-555,35			
-275,71			
-1685,73			

N [kN]	sumV actual	sumV target	discrepancy in %
305,52	-6079	6076	0%
-444,91			
-192,83			
-424,56			
-553,71			
-282,23			
-1892,79			

N [kN]	sumV actual	sumV target	discrepancy in %
410,31	-6075	6076	0%
-438,21			
-170,06			
-403,09			
-561,60			
-286,64			
-1449,28			

House 2-modified; H negative

Shear-Walls

transverse walls

- N positive Tension
- N negative Compression
- Q positive compared to the direction of the horizontal force H
- Q negative compared to the direction of the horizontal force H
- e negative compared to the direction of the horizontal force H
- e positive compared to the direction of the horizontal force H

H= 100,000												
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force		
										N		
Wall 1	0,370	0,000	0,067	0,438	0,875	-69,878	-4,70	5,39	5%	inside the cross section		
Wall 2	0,843	0,000	0,032	0,875	1,750	-262,609	-8,32	-0,58	-1%	inside the cross section		
Wall 3	0,714	0,000	0,036	0,750	1,500	-172,072	-6,19	3,46	3%	inside the cross section		
Wall 4	0,252	0,000	-0,002	0,250	0,500	-141,510	0,23	-0,64	-1%	inside the cross section		
Wall 5	1,237	5,300	0,076	1,313	2,625	-437,513	-33,25	21,64	22%	inside the cross section		
Wall 6	1,084	3,750	0,041	1,125	2,250	-328,230	-13,82	-0,39	0%	inside the cross section		
Wall 7	1,342	7,450	0,158	1,500	3,000	-405,497	-63,91	12,48	12%	inside the cross section		
Wall 8	0,470	9,300	0,030	0,500	1,000	-100,608	-2,98	0,24	0%	inside the cross section		
Wall 11	0,314	10,600	-0,001	0,313	0,625	-95,906	0,10	0,48	0%	inside the cross section		
Wall 10	0,720	10,600	0,031	0,750	1,500	-302,988	-9,24	1,84	2%	inside the cross section		
Wall 9	0,359	10,600	0,079	0,438	0,875	-72,878	-5,74	5,50	6%	inside the cross section		
					Sum	-2388,59		49,52				
H= 200,000												
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force		
										N		
Wall 1	0,301	0,000	0,136	0,438	0,875	-57,902	-7,88	7,64	4%	inside the cross section		
Wall 2	0,759	0,000	0,116	0,875	1,750	-264,350	-30,66	5,23	3%	inside the cross section		
Wall 3	0,623	0,000	0,128	0,750	1,500	-164,751	-21,01	7,53	4%	inside the cross section		
Wall 4	0,246	0,000	0,004	0,250	0,500	-138,126	-0,50	-0,30	0%	inside the cross section		
Wall 6	1,056	5,300	0,257	1,313	2,625	-386,257	-99,11	42,98	21%	inside the cross section		
Wall 5	0,967	3,750	0,158	1,125	2,250	-291,260	-46,08	15,26	8%	inside the cross section		
Wall 7	1,155	7,450	0,346	1,500	3,000	-487,815	-158,11	41,81	21%	inside the cross section		
Wall 8	0,410	9,300	0,090	0,500	1,000	-81,808	-7,34	3,04	2%	inside the cross section		
Wall 11	0,298	10,600	0,014	0,313	0,625	-102,989	-1,47	1,64	1%	inside the cross section		
Wall 10	0,667	10,600	0,083	0,750	1,500	-318,518	-26,53	6,71	3%	inside the cross section		
Wall 9	0,279	10,600	0,159	0,438	0,875	-59,705	-9,48	8,14	4%	inside the cross section		
					Sum	-2323,28		139,70				
H= 300,000												
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force		
										N		
Wall 1	0,199	0,000	0,238	0,438	0,875	-46,348	-11,04	9,92	3%	inside the cross section		

N [kN]	sumV actual	sumV target	discrepancy in %
-1031,70	-5867	5866,8	0%
-503,95			
-811,80			
-643,42			
-300,83			
-185,74			
<b>-3477,44</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-1069,83	-5867	5866,8	0%
-506,87			
-867,90			
-672,24			
-248,91			
-178,02			
<b>-3543,76</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-1109,33	-5867	5866,8	0%

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Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 2	0,676	0,000	0,199	0,875	1,750	-265,729	-52,888	10,981	4%
Wall 3	0,523	0,000	0,227	0,750	1,500	-157,500	-35,721	11,601	4%
Wall 4	0,241	0,000	0,009	0,250	0,500	-134,920	-1,231	0,031	0%
Wall 5	0,824	5,300	0,488	1,313	2,625	-336,051	-164,311	64,751	22%
Wall 6	0,816	3,750	0,309	1,125	2,250	-254,089	-78,411	30,791	10%
Wall 7	1,006	7,450	0,494	1,500	3,000	-509,197	-251,491	70,961	24%
Wall 8	0,316	9,300	0,184	0,500	1,000	-63,200	-11,651	5,821	2%
Wall 11	0,285	10,600	0,028	0,313	0,625	-110,010	-3,031	2,771	1%
Wall 10	0,619	10,600	0,131	0,750	1,500	-333,471	-43,681	11,511	4%
Wall 9	0,157	10,600	0,281	0,438	0,875	-47,161	-13,231	10,741	4%
Sum						-2257,67		228,87	

H= 400,000

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,002	0,000	0,436	0,438	0,875	-32,856	-14,311	12,171	3%
Wall 2	0,593	0,000	0,282	0,875	1,750	-268,390	-75,741	16,641	4%
Wall 3	0,410	0,000	0,340	0,750	1,500	-149,687	-50,891	15,671	4%
Wall 4	0,295	0,000	0,015	0,250	0,500	-131,393	-1,961	0,371	0%
Wall 5	0,523	5,300	0,789	1,313	2,625	-285,889	-225,441	85,931	21%
Wall 6	0,607	3,750	0,518	1,125	2,250	-216,452	-112,101	46,691	12%
Wall 7	0,880	7,450	0,620	1,500	3,000	-563,765	-349,371	100,251	25%
Wall 8	0,128	9,300	0,372	0,500	1,000	-43,255	-16,101	6,631	2%
Wall 11	0,273	10,600	0,040	0,313	0,625	-117,006	-4,621	3,891	1%
Wall 10	0,575	10,600	0,175	0,750	1,500	-350,818	-61,391	16,291	4%
Wall 9	-0,072	10,600	0,510	0,438	0,875	-32,998	-16,821	13,181	3%
Sum						-2192,29		319,72	

H= 500,000

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	-0,497	0,000	0,844	0,438	0,875	-20,019	-16,901	14,351	3%
Wall 2	0,495	0,000	0,360	0,875	1,750	-269,747	-102,611	24,041	5%
Wall 3	0,257	0,000	0,483	0,750	1,500	-141,995	-65,641	20,931	4%
Wall 4	0,228	0,000	0,022	0,250	0,500	-127,976	-2,841	0,781	0%
Wall 5	0,375	5,300	0,937	1,313	2,625	-248,753	-233,161	82,861	19%
Wall 6	0,339	3,750	0,786	1,125	2,250	-175,903	-139,301	62,741	13%
Wall 7	0,763	7,450	0,797	1,500	3,000	-623,095	-459,261	137,241	27%
Wall 8	-0,377	9,300	0,877	0,500	1,000	-22,191	-19,451	11,081	2%
Wall 11	0,260	10,600	0,052	0,313	0,625	-124,567	-6,491	5,311	1%
Wall 10	0,526	10,600	0,224	0,750	1,500	-366,290	-61,941	22,491	4%
Wall 9	-0,441	10,600	0,678	0,438	0,875	-20,869	-16,331	14,571	3%
Sum						-2141,41		406,39	

H= 600,000

Position of the resulting force

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	-0,710	0,000	1,148	0,438	0,875	-11,117	-12,761	12,741	2%
Wall 2	0,361	0,000	0,514	0,875	1,750	-139,531	-271,553	35,651	6%
Wall 3	0,141	0,000	0,609	0,750	1,500	-159,983	-85,211	26,331	4%
Wall 4	0,216	0,000	0,034	0,250	0,500	-123,338	-4,161	1,481	0%

-509,12
-822,50
-700,51
-197,45
-170,49
<b>-3609,39</b>

N [kN]	sumV actual	sumV target	discrepancy in %
-1144,98	-5867	5866,8	0%
-513,99			
-982,78			
-728,94			
-142,82			
-161,48			
<b>-3675,00</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-1188,22	-5873	5866,8	0%
-515,30			
-1040,40			
-751,24			
-83,86			
-152,90			
<b>-3731,92</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-1217,77	-5911	5866,8	1%
-518,30			
-1102,82			
-763,77			

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Wall	a	D [m]	e [m]	L/Z	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 6	0,273	5,300	1,040	1,313	2,625	-214,649	-223,21	96,56	16%
Wall 5	0,286	3,750	0,859	1,126	2,250	-147,356	-126,58	70,50	12%
Wall 7	0,671	7,450	0,829	1,500	3,000	-696,989	-578,01	182,42	30%
Wall 8	-0,427	9,300	0,927	0,500	1,000	-11,395	-10,56	6,87	1%
Wall 11	0,243	10,600	0,070	0,313	0,625	-133,385	-9,32	7,80	1%
Wall 10	0,461	10,600	0,289	0,750	1,500	-386,979	-111,91	33,05	6%
Wall 9	-0,266	10,600	0,723	0,438	0,875	-16,022	-11,59	10,96	2%
Sum						-2152,77	Sum	484,34	

H= 700,000

Wall	a	D [m]	e [m]	L/Z	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force
Wall 1	-0,405	0,000	0,842	0,438	0,875	-8,001	-6,74	8,52	1%	N
Wall 2	0,317	0,000	0,658	0,875	1,750	-290,155	-161,91	43,92	6%	outside the cross section
Wall 3	0,184	0,000	0,567	0,750	1,500	-169,802	-90,36	29,88	4%	inside the cross section
Wall 4	0,196	0,000	0,052	0,250	0,500	-117,726	-6,07	2,51	0%	inside the cross section
Wall 6	0,223	5,300	1,089	1,313	2,625	-185,905	-202,49	96,20	14%	inside the cross section
Wall 5	0,211	3,750	0,914	1,125	2,250	-121,294	-110,81	76,34	11%	inside the cross section
Wall 7	0,601	7,450	0,889	1,500	3,000	-767,976	-680,56	223,80	32%	inside the cross section
Wall 8	-1,064	9,300	1,564	0,500	1,000	-3,471	-5,43	3,43	0%	outside the cross section
Wall 11	0,217	10,600	0,096	0,313	0,625	-139,508	-13,38	10,84	2%	inside the cross section
Wall 10	0,386	10,600	0,362	0,750	1,500	-412,711	-149,19	46,84	7%	inside the cross section
Wall 9	-0,193	10,600	0,631	0,438	0,875	-12,540	-7,91	8,92	1%	outside the cross section
Sum						-2216,79	Sum	551,20		

H= 800,000

Wall	a	D [m]	e [m]	L/Z	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force
Wall 1	-0,923	0,000	1,360	0,438	0,875	-4,250	-5,78	7,20	1%	N
Wall 2	0,284	0,000	0,591	0,875	1,750	-318,001	-187,91	52,75	7%	outside the cross section
Wall 3	0,164	0,000	0,998	0,750	1,500	-175,279	-102,71	36,06	5%	inside the cross section
Wall 4	0,175	0,000	0,075	0,250	0,500	-111,509	-8,34	3,71	0%	inside the cross section
Wall 6	0,195	5,300	1,117	1,313	2,625	-161,638	-180,57	94,13	12%	inside the cross section
Wall 5	0,191	3,750	0,934	1,125	2,250	-104,450	-97,51	79,87	10%	inside the cross section
Wall 7	0,554	7,450	0,966	1,500	3,000	-823,600	-795,83	256,05	32%	inside the cross section
Wall 8	2,713	9,300	-2,213	0,500	1,000	0,733	-1,82	1,76	0%	outside the cross section
Wall 11	0,175	10,600	0,137	0,313	0,625	-136,651	-18,78	15,13	2%	inside the cross section
Wall 10	0,350	10,600	0,401	0,750	1,500	-448,724	-178,71	58,63	7%	inside the cross section
Wall 9	-0,279	10,600	0,716	0,438	0,875	-8,339	-5,97	5,99	1%	outside the cross section
Sum						-2291,61	Sum	611,33		

H= 900,000

Wall	a	D [m]	e [m]	L/Z	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force
Wall 1	-0,449	0,000	0,866	0,438	0,875	-4,705	-4,17	4,84	1%	N
Wall 2	0,269	0,000	0,606	0,875	1,750	-357,751	-216,80	63,76	7%	outside the cross section
Wall 3	0,158	0,000	0,992	0,750	1,500	-194,295	-116,04	44,05	5%	inside the cross section
Wall 4	0,142	0,000	0,108	0,250	0,500	-104,057	-11,21	5,37	1%	inside the cross section
Wall 6	0,171	5,300	1,142	1,313	2,625	-139,248	-158,97	91,76	10%	inside the cross section
Wall 5	0,183	3,750	0,942	1,125	2,250	-91,889	-86,61	82,08	9%	inside the cross section
Wall 7	0,469	7,450	1,031	1,500	3,000	-865,056	-891,70	282,26	31%	inside the cross section

-24,69	sumV actual	sumV target	discrepancy in %
-130,40	-5939	5866,8	1%
-3757,75			
N [kN]			
-1240,25			
-517,99			
-1151,26			
-744,40			
33,09			
-99,72			
-3720,53			

-1271,83	sumV actual	sumV target	discrepancy in %
-508,61	-5976	5866,8	2%
-1185,55			
-716,76			
69,23			
-70,93			
-3684,46			

Wall collapsed

-1310,02	sumV actual	sumV target	discrepancy in %
-489,53	-6049	5866,8	3%
-1202,77			
-680,00			
61,91			
-50,55			
-3670,96			

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Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 8	0,381	9,300	0,119	0,500	1,000	3,091	0,37	1,72	0%
Wall 11	0,117	10,600	0,195	0,313	0,625	-121,031	-23,63	21,09	2%
Wall 10	0,322	10,600	0,429	0,750	1,500	-496,548	-212,57	71,24	8%
Wall 9	-0,333	10,600	0,620	0,438	0,875	-6,769	-5,55	4,60	1%
Sum						-2378,27	Sum	672,76	

H= 1000,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	-0,178	0,000	0,616	0,438	0,875	-3,511	-2,16	2,42	0%
Wall 2	0,248	0,000	0,627	0,875	1,750	-411,633	-259,18	79,35	8%
Wall 3	0,153	0,000	0,597	0,750	1,500	-209,197	-124,87	51,92	5%
Wall 4	0,096	0,000	0,154	0,250	0,500	-94,450	-14,55	7,36	1%
Wall 6	0,156	5,300	1,157	1,313	2,625	-115,200	-133,23	86,37	9%
Wall 5	0,180	3,750	0,945	1,125	2,250	-82,003	-77,48	89,35	8%
Wall 7	0,398	7,450	1,104	1,500	3,000	-878,415	-959,68	301,13	30%
Wall 8	0,017	9,300	0,483	0,500	1,000	3,108	1,50	4,10	0%
Wall 11	0,057	10,600	0,256	0,313	0,625	-78,241	-20,03	11,56	1%
Wall 10	0,297	10,600	0,453	0,750	1,500	-563,751	-255,38	86,39	9%
Wall 9	-0,030	10,600	0,468	0,438	0,875	-5,794	-2,71	2,42	0%
Sum						-2439,09	Sum	714,37	

H= 1100,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	-0,170	0,000	0,607	0,438	0,875	-0,487	-0,30	2,87	0%
Wall 2	0,237	0,000	0,638	0,875	1,750	-484,501	-290,02	92,85	8%
Wall 3	0,140	0,000	0,610	0,750	1,500	-219,350	-133,74	57,32	5%
Wall 4	0,079	0,000	0,175	0,250	0,500	-88,857	-15,54	5,54	1%
Wall 6	0,153	5,300	1,160	1,313	2,625	-105,306	-122,13	85,76	8%
Wall 5	0,187	3,750	0,938	1,125	2,250	-77,761	-72,91	81,51	7%
Wall 7	0,367	7,450	1,133	1,500	3,000	-926,631	-1049,87	326,37	30%
Wall 8	-0,129	9,300	0,629	0,500	1,000	1,567	0,98	4,69	0%
Wall 11	0,054	10,600	0,258	0,313	0,625	-66,879	-17,33	9,49	1%
Wall 10	0,283	10,600	0,467	0,750	1,500	-620,199	-289,63	102,38	9%
Wall 9	-0,025	10,600	0,462	0,438	0,875	-2,646	-1,22	3,00	0%
Sum						-2560,96	Sum	774,97	

H= 1200,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,121	0,000	0,316	0,438	0,875	3,632	1,15	4,13	0%
Wall 2	0,227	0,000	0,648	0,875	1,750	-503,759	-326,64	108,35	9%
Wall 3	0,127	0,000	0,623	0,750	1,500	-227,844	-141,97	61,62	5%
Wall 4	0,062	0,000	0,188	0,250	0,500	-82,282	-15,44	9,08	1%
Wall 6	0,155	5,300	1,157	1,313	2,625	-93,669	-106,40	83,72	7%
Wall 5	0,197	3,750	0,928	1,125	2,250	-73,587	-68,27	82,30	7%
Wall 7	0,340	7,450	1,160	1,500	3,000	-988,935	-1124,35	351,16	29%
Wall 8	0,702	8,300	-0,202	0,500	1,000	0,11	6,00	1%	
Wall 11	0,044	10,600	0,268	0,313	0,625	-53,621	-14,39	9,50	1%
Wall 10	0,268	10,600	0,482	0,750	1,500	-683,299	-325,14	120,50	10%

Wall collapsed

N [kN]	sumV actual	sumV target	discrepancy in %
-1349,56	-6096	5866,8	4%
-450,29			
-1209,54			
-635,69			
9,69			
-21,79			
<b>-3657,18</b>			

Wall collapsed

N [kN]	sumV actual	sumV target	discrepancy in %
-1418,07	-8240	5866,8	6%
-421,22			
-1220,12			
-616,98			
0,41			
-3,23			
<b>-3679,21</b>			

Wall collapsed

N [kN]	sumV actual	sumV target	discrepancy in %
-1502,62	-6398	5866,8	9%
-391,35			
-1232,11			
-596,75			
-0,01			
7,73			
<b>-3717,11</b>			

Wall collapsed

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Wall 9	0,158	10,600	0,279	0,438	0,875	2,674	0,75	4,20	0%
					Sum	-2681,23	Sum	840,36	

Wall collapsed

H= 1300,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion O/H
Wall 1	0,023	0,000	0,414	0,438	0,875	4,092	1,70	5,21	0%
Wall 2	0,214	0,000	0,661	0,875	1,750	-552,790	-365,17	122,93	9%
Wall 3	0,126	0,000	0,624	0,750	1,500	-234,926	-146,62	66,09	5%
Wall 4	0,051	0,000	0,199	0,250	0,500	-74,919	-14,88	7,96	1%
Wall 6	0,172	5,900	1,141	1,313	2,625	-84,866	-96,62	85,69	7%
Wall 5	0,208	3,750	0,917	1,125	2,250	-71,466	-65,54	85,83	7%
Wall 7	0,317	7,450	1,184	1,500	3,000	-1003,535	-1187,68	375,65	29%
Wall 8	0,270	9,500	0,230	0,500	1,000	-1,525	-0,35	5,71	0%
Wall 11	0,019	10,600	0,294	0,313	0,625	-43,670	-12,53	8,75	1%
Wall 10	0,267	10,600	0,493	0,750	1,500	-744,423	-367,15	137,17	11%
Wall 9	0,001	10,600	0,437	0,438	0,875	-5,511	1,53	5,68	0%
				Sum	Sum	-2803,54	Sum	906,66	

Position of the resulting force

N	Position of the resulting force
-1594,16	inside the cross section
-364,93	inside the cross section
-1254,78	inside the cross section
-574,31	inside the cross section
-0,01	inside the cross section
6,39	inside the cross section
<b>-3781,80</b>	

Wall collapsed

Wall collapsed

N [kN]	sumV actual	sumV target	discrepancy in %
-1594,16	-6585	5866,8	12%
-364,93			
-1254,78			
-574,31			
-0,01			
6,39			
<b>-3781,80</b>			

House 2-modified; H positive

Shear-Walls

transverse walls

N positive Tension  
 N negative Compression  
 Q positive compared to the direction of the horizontal force H  
 Q negative compared to the direction of the horizontal force H  
 e negative compared to the direction of the horizontal force H  
 e positive compared to the direction of the horizontal force H

140,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	-0,503	0,000	0,065	0,438	0,875	-93,216	-6,08	2,36	2%	inside the cross section
Wall 2	-0,987	0,000	0,092	0,675	1,750	-241,910	-22,28	-12,36	-12%	inside the cross section
Wall 3	-0,845	0,000	0,095	0,750	1,500	-175,357	-16,64	-5,17	-5%	inside the cross section
Wall 4	-0,251	0,000	0,001	0,250	0,500	-148,603	-0,18	-1,34	-1%	inside the cross section
Wall 5	-1,484	5,300	0,171	1,313	2,625	-534,474	-91,51	-18,69	-18%	inside the cross section
Wall 6	-1,207	3,750	0,092	1,125	2,250	-388,713	-31,87	-28,55	-29%	inside the cross section
Wall 7	-1,796	7,450	0,286	1,500	3,000	-312,239	-92,33	-49,84	-50%	inside the cross section
Wall 8	-0,531	9,300	0,031	0,500	1,000	-132,371	-4,06	-4,29	-4%	inside the cross section
Wall 11	-0,315	10,600	0,003	0,313	0,625	-83,336	-0,23	-3,37	-3%	inside the cross section
Wall 10	-0,808	10,600	0,066	0,750	1,500	-254,728	-14,16	-8,43	-8%	inside the cross section
Wall 9	-0,501	10,600	0,063	0,438	0,875	-97,240	-6,16	2,65	2%	inside the cross section
					Sum	-2462,19		-427,65		

200,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	-0,315	0,000	0,077	0,438	0,875	-104,948	-5,08	0,27	0%	inside the cross section
Wall 2	-1,035	0,000	0,160	0,675	1,750	-239,082	-38,18	-16,42	-8%	inside the cross section
Wall 3	-0,887	0,000	0,147	0,750	1,500	-183,136	-26,88	-9,39	-5%	inside the cross section
Wall 4	-0,253	0,000	0,003	0,250	0,500	-152,281	-0,52	-1,70	-1%	inside the cross section
Wall 6	-1,558	5,300	0,246	1,313	2,625	-583,082	-143,44	-40,21	-20%	inside the cross section
Wall 5	-1,258	3,750	0,133	1,125	2,250	-417,082	-55,56	-45,64	-23%	inside the cross section
Wall 7	-2,126	7,450	0,626	1,500	3,000	-264,264	-165,38	-80,75	-40%	inside the cross section
Wall 8	-0,345	9,300	0,045	0,500	1,000	-148,949	-6,76	-7,25	-4%	inside the cross section
Wall 11	-0,325	10,600	0,013	0,313	0,625	-78,158	-1,01	-4,74	-2%	inside the cross section
Wall 10	-0,860	10,600	0,110	0,750	1,500	-238,743	-26,24	-13,57	-7%	inside the cross section
Wall 9	-0,516	10,600	0,078	0,438	0,875	-109,591	-8,55	-0,32	0%	inside the cross section
					Sum	-2519,32		-221,71		

300,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	-0,538	0,000	0,100	0,438	0,875	-130,591	-13,06	-2,30	-1%	inside the cross section
Wall 2	-1,206	0,000	0,331	0,675	1,750	-231,756	-76,62	-26,05	-9%	inside the cross section

N [kN]	sumV actual	sumV target	discrepancy in %
-987,56	-5867	5866,8	0%
-509,50			
-720,73			
-606,29			
-391,20			
-209,36			
<b>-3404,65</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-938,97	-5867	5866,8	0%
-502,84			
-686,34			
-582,44			
-435,19			
-221,70			
<b>-3347,49</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-904,47	-5973	5866,8	2%
-496,29			



-604,36
-551,28
-468,68
-234,15
<b>-3259,23</b>

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 3	1,010	0,000	0,260	0,750	1,500	-199,366	-51,84	-14,61	-5%
Wall 4	0,258	0,000	0,006	0,250	0,500	-161,517	-1,34	-2,12	-1%
Wall 6	1,700	5,300	0,388	1,313	2,625	-698,679	-271,02	-68,12	-23%
Wall 5	1,357	3,750	0,232	1,125	2,250	-488,065	-113,08	-67,27	-22%
Wall 7	2,315	7,450	0,815	1,500	3,000	-216,501	-176,36	-91,45	-30%
Wall 8	0,573	9,300	0,073	0,500	1,000	-187,269	-13,61	-11,18	-4%
Wall 11	0,365	10,600	0,052	0,313	0,625	-57,388	-2,98	-6,81	-2%
Wall 10	1,028	10,600	0,278	0,750	1,500	-201,006	-55,92	-20,65	-7%
Wall 9	0,541	10,600	0,104	0,438	0,875	-141,165	-14,61	-3,55	-1%
Sum						<b>-2713,30</b>	<b>Sum</b>	<b>-314,12</b>	

400,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,538	0,000	0,000	0,438	0,875	-130,591	-13,06	-5,00	-1%
Wall 2	1,206	0,000	0,331	0,875	1,750	-231,756	-76,62	-34,02	-9%
Wall 3	1,010	0,000	0,260	0,750	1,500	-199,366	-51,84	-20,10	-5%
Wall 4	0,258	0,000	0,008	0,250	0,500	-161,517	-1,34	-2,57	-1%
Wall 6	1,700	5,300	0,388	1,313	2,625	-698,679	-271,02	-67,04	-24%
Wall 5	1,357	3,750	0,232	1,125	2,250	-488,065	-113,08	-59,98	-22%
Wall 7	2,315	7,450	0,815	1,500	3,000	-216,501	-176,36	-98,21	-25%
Wall 8	0,573	9,300	0,073	0,500	1,000	-187,269	-13,61	-15,22	-4%
Wall 11	0,365	10,600	0,052	0,313	0,625	-57,388	-2,98	-9,03	-2%
Wall 10	1,028	10,600	0,278	0,750	1,500	-201,006	-55,92	-27,99	-7%
Wall 9	0,541	10,600	0,104	0,438	0,875	-141,165	-14,61	-6,99	-2%
Sum						<b>-2713,30</b>	<b>Sum</b>	<b>-406,10</b>	

600,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,567	0,000	0,120	0,438	0,875	-157,472	-16,85	-11,80	-2%
Wall 2	1,303	0,000	0,428	0,875	1,750	-236,825	-101,31	-40,38	-7%
Wall 3	1,100	0,000	0,350	0,750	1,500	-218,421	-76,47	-30,39	-5%
Wall 4	0,263	0,000	0,013	0,250	0,500	-171,356	-2,30	-3,64	-1%
Wall 6	1,811	5,300	0,489	1,313	2,625	-826,620	-411,66	-162,41	-27%
Wall 5	1,441	3,750	0,316	1,125	2,250	-562,943	-177,89	-145,42	-24%
Wall 7	2,264	7,450	0,764	1,500	3,000	-214,354	-163,75	-112,85	-19%
Wall 8	0,595	9,300	0,095	0,500	1,000	-227,934	-21,56	-24,37	-4%
Wall 11	0,408	10,600	0,096	0,313	0,625	-37,965	-3,64	-11,06	-2%
Wall 10	1,126	10,600	0,376	0,750	1,500	-179,113	-67,42	-29,55	-5%
Wall 9	0,561	10,600	0,123	0,438	0,875	-176,188	-21,67	-15,33	-3%
Sum						<b>-3009,19</b>	<b>Sum</b>	<b>-557,61</b>	

700,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,666	0,000	0,128	0,438	0,875	-172,694	-22,04	-15,61	-2%
Wall 2	1,352	0,000	0,477	0,875	1,750	-240,332	-114,66	-45,36	-7%
Wall 3	1,111	0,000	0,361	0,750	1,500	-233,878	-84,45	-32,51	-5%
Wall 4	0,266	0,000	0,016	0,250	0,500	-175,784	-2,83	-4,29	-1%
Wall 6	1,841	5,300	0,529	1,313	2,625	-869,641	-470,53	-189,26	-27%
Wall 5	1,470	3,750	0,345	1,125	2,250	-601,654	-207,69	-176,31	-25%

N [kN]	sumV actual	sumV target	discrepancy in %
-868,36	-5867	5866,8	0%
-488,68			
-540,37			
-517,51			
-492,58			
-245,98			
<b>-3153,48</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-782,90	-5867	5866,8	0%
-459,23			
-400,15			
-437,72			
-511,05			
-266,51			
<b>-2857,57</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-738,91	-5862	5866,8	0%
-440,45			
-323,91			
-395,91			
-516,51			
-275,67			

N [kN]	sumV actual	sumV target	discrepancy in %
-738,91	-5862	5866,8	0%
-440,45			
-323,91			
-395,91			
-516,51			
-275,67			

Wall 7	2,345	7,450	0,845	1,500	3,000	-208,206	-175,91	-121,83	-17%
Wall 8	0,604	9,300	0,104	0,500	1,000	-248,564	-25,92	-30,92	-4%
Wall 11	0,404	10,600	0,092	0,313	0,625	-33,846	-3,11	-10,69	-2%
Wall 10	1,171	10,600	0,421	0,750	1,500	-169,509	-71,38	-31,80	-5%
Wall 9	0,569	10,600	0,131	0,438	0,875	-195,629	-25,63	-20,53	-3%
Sum						-3170,62		-879,69	

800,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,302	0,000	-0,166	0,438	0,875	-190,478	25,89	-21,14	-3%
Wall 2	1,375	0,000	0,500	0,875	1,750	-248,302	-124,08	-50,34	-6%
Wall 3	1,195	0,000	0,395	0,750	1,500	-248,652	-95,68	-37,88	-5%
Wall 4	0,269	0,000	0,019	0,250	0,500	-182,438	-3,47	-5,15	-1%
Wall 6	1,884	5,300	0,552	1,313	2,625	-92,749	-211,83	-26%	
Wall 5	1,486	3,750	0,341	1,125	2,250	-643,983	-219,94	-197,63	-25%
Wall 7	2,293	7,450	0,793	1,500	3,000	-217,805	-127,45	-127,45	-18%
Wall 8	0,614	9,300	0,114	0,500	1,000	-272,143	-31,11	-38,42	-5%
Wall 11	0,211	10,600	-0,102	0,313	0,625	-26,914	2,74	-11,22	-1%
Wall 10	1,212	10,600	0,462	0,750	1,500	-161,966	-74,81	-34,41	-4%
Wall 9	0,576	10,600	0,138	0,438	0,875	-217,647	-30,08	-28,57	-3%
Sum						-3383,07		-762,05	

900,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,580	0,000	0,142	0,438	0,875	-211,690	-30,10	-27,89	-3%
Wall 2	1,469	0,000	0,525	0,875	1,750	-255,236	-134,05	-57,55	-6%
Wall 3	1,140	0,000	0,390	0,750	1,500	-267,499	-104,40	-42,28	-5%
Wall 4	0,273	0,000	0,023	0,250	0,500	-188,840	-4,24	-6,23	-1%
Wall 6	1,898	5,300	0,586	1,313	2,625	-1004,349	-589,35	-234,31	-26%
Wall 5	1,469	3,750	0,344	1,125	2,250	-674,996	-231,93	-216,98	-24%
Wall 7	2,351	7,450	0,851	1,500	3,000	-213,454	-181,65	-131,40	-15%
Wall 8	0,624	9,300	0,124	0,500	1,000	-298,513	-36,93	-47,89	-5%
Wall 11	0,384	10,600	0,072	0,313	0,625	-23,224	-1,67	-10,90	-1%
Wall 10	1,240	10,600	0,490	0,750	1,500	-186,769	-76,85	-37,48	-4%
Wall 9	0,582	10,600	0,144	0,438	0,875	-241,691	-34,88	-33,69	-4%
Sum						-3538,06		-846,62	

1000,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,584	0,000	0,147	0,438	0,875	-234,588	-34,38	-34,81	-3%
Wall 2	1,433	0,000	0,558	0,875	1,750	-258,331	-144,15	-65,21	-7%
Wall 3	1,159	0,000	0,409	0,750	1,500	-283,249	-115,79	-48,64	-5%
Wall 4	0,276	0,000	0,026	0,250	0,500	-195,124	-5,07	-7,39	-1%
Wall 6	1,918	5,300	0,605	1,313	2,625	-1058,313	-640,38	-253,99	-25%
Wall 5	1,466	3,750	0,343	1,125	2,250	-702,631	-241,28	-235,07	-24%
Wall 7	2,323	7,450	0,823	1,500	3,000	-226,644	-166,41	-135,59	-14%
Wall 8	0,632	9,300	0,132	0,500	1,000	-328,857	-42,95	-57,66	-6%
Wall 11	0,368	10,600	0,056	0,313	0,625	-17,051	-0,95	-11,28	-1%
Wall 10	1,264	10,600	0,514	0,750	1,500	-152,590	-78,42	-38,69	-4%

N [kN]	sumV actual	sumV target	discrepancy in %
-685,71	-5868	5866,8	0%
-419,08			
-242,34			
-359,52			
-514,50			
-283,87			
<b>-2505,01</b>			

-2691,35

N [kN]	sumV actual	sumV target	discrepancy in %
-625,79	-5865	5866,8	0%
-396,98			
-173,86			
-332,52			
-507,87			
-281,62			
<b>-2328,66</b>			

N [kN]

N [kN]	sumV actual	sumV target	discrepancy in %
-562,80	-5873	5866,8	0%
-370,88			
-115,45			
-304,16			
-500,62			
-298,53			
<b>-2152,45</b>			

N [kN]

Wall im Aresch

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N [kN]	sumV actual	sumV target	discrepancy in %
-490,32	-5874	5866,8	0%
-343,45			
-63,33			
-279,73			
-481,69			
-303,07			
<b>-1961,59</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-419,30	-5875	5866,8	0%
-316,23			
-11,84			
-256,64			
-463,71			
-308,06			
<b>-1775,78</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-320,25	-5884	5866,8	0%
-281,10			
-6,76			
-232,01			
-422,91			
-305,27			
<b>-1568,29</b>			

Wall	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 9	0,587	10,600	0,149	0,438	0,875	-38,76	-40,90	-4%
				Sum	-266,155	-3720,83	-930,21	
1100,000								
Wall 1	0,588	0,000	0,150	0,438	0,875	-39,13	-42,44	-4%
Wall 2	1,442	0,000	0,567	0,875	1,750	-148,58	-70,87	-6%
Wall 3	1,168	0,000	0,418	0,750	1,500	-299,661	-53,49	-3%
Wall 4	0,280	0,000	0,030	0,250	0,500	-8,79	-8,79	-1%
Wall 6	1,938	5,300	0,625	1,313	2,625	-893,37	-271,02	-25%
Wall 5	1,486	3,750	0,343	1,125	2,250	-725,648	-262,58	-23%
Wall 7	2,298	7,450	0,796	1,500	3,000	-188,66	-150,75	-14%
Wall 8	0,638	9,300	0,138	0,500	1,000	-358,738	-67,83	-6%
Wall 10	0,282	10,600	-0,090	0,313	0,625	0,43	-11,12	-1%
Wall 11	1,284	10,600	0,534	0,750	1,500	-149,474	-41,06	-4%
Wall 9	0,591	10,600	0,153	0,438	0,875	-293,646	-44,93	-4%
				Sum	-3912,40	-1017,33		

inside the cross section

Position of the resulting force N  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
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inside the cross section  
inside the cross section  
inside the cross section

Wall	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,590	0,000	0,152	0,438	0,875	-43,42	-49,39	-4%
Wall 2	1,459	0,000	0,584	0,875	1,750	-264,066	-75,11	-6%
Wall 3	1,183	0,000	0,453	0,750	1,500	-316,261	-80,68	-5%
Wall 4	0,284	0,000	0,034	0,250	0,500	-7,12	-10,20	-1%
Wall 6	1,955	5,300	0,642	1,313	2,625	-1161,499	-746,93	-24%
Wall 5	1,476	3,750	0,351	1,125	2,250	-747,722	-262,80	-23%
Wall 7	2,293	7,450	0,793	1,500	3,000	-243,210	-192,82	-13%
Wall 8	0,642	9,300	0,142	0,500	1,000	-390,382	-55,43	-6%
Wall 11	1,285	10,600	-0,127	0,313	0,625	-13,166	-11,97	-1%
Wall 10	1,285	10,600	0,535	0,750	1,500	-148,123	-79,22	-4%
Wall 9	0,593	10,600	0,155	0,438	0,875	-320,059	-49,67	-4%
				Sum	-4099,42	-1109,37		

Position of the resulting force N  
inside the cross section  
inside the cross section  
inside the cross section  
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inside the cross section

Wall	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,590	0,000	0,152	0,438	0,875	-48,75	-56,40	-4%
Wall 2	1,465	0,000	0,580	0,875	1,750	-251,758	-77,52	-6%
Wall 3	1,193	0,000	0,443	0,750	1,500	-332,243	-89,15	-5%
Wall 4	0,290	0,000	0,040	0,250	0,500	-2,18,952	-12,37	-1%
Wall 6	1,976	5,300	0,663	1,313	2,625	-1214,142	-805,22	-24%
Wall 5	1,478	3,750	0,353	1,125	2,250	-753,903	-269,03	-22%
Wall 7	2,241	7,450	0,741	1,500	3,000	-262,775	-184,39	-14%
Wall 8	0,639	9,300	0,139	0,500	1,000	-435,758	-60,84	-7%
Wall 11	1,088	10,600	-0,225	0,313	0,625	-14,732	-13,74	-1%
Wall 10	1,252	10,600	0,502	0,750	1,500	-152,725	-76,62	-4%
Wall 9	0,590	10,600	0,153	0,438	0,875	-356,748	-54,40	-5%
				Sum	-4315,28	-1215,22		

Position of the resulting force N  
inside the cross section  
inside the cross section  
inside the cross section  
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inside the cross section

House 2-modified; H positive

Shear-Walls

- N positive Tension
- N negative Compression
- Q positive compared to the direction of the horizontal force H
- Q negative compared to the direction of the horizontal force H
- e negative compared to the direction of the horizontal force H
- e positive compared to the direction of the horizontal force H

H= 100,000												
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N		
Wall 1	0.333	0,000	-0,105	0,438	0,875	-87,668	9,17	-1,12	-1%	inside the cross section		
Wall 2	0,913	0,000	0,038	0,875	1,750	-240,088	-9,46	-9,46	-9%	inside the cross section		
Wall 3	0,804	0,000	0,054	0,750	1,500	-173,591	-9,32	-7,02	-7%	inside the cross section		
Wall 4	0,241	0,000	-0,009	0,250	0,500	-148,609	1,35	-1,20	-1%	inside the cross section		
Wall 5	1,480	5,300	0,168	1,313	2,625	-521,749	-87,55	-12,90	-13%	inside the cross section		
Wall 6	1,244	3,750	0,119	1,125	2,250	-359,453	-42,60	0,08	0%	inside the cross section		
Wall 7	1,580	7,450	0,180	1,500	3,000	-329,280	-59,24	-49,61	-50%	inside the cross section		
Wall 8	0,510	9,300	0,010	0,500	1,000	-129,605	-1,33	-1,05	-1%	inside the cross section		
Wall 11	0,341	10,600	0,029	0,313	0,625	-86,766	-2,51	-4,06	-4%	inside the cross section		
Wall 10	0,773	10,600	0,023	0,750	1,500	-256,221	-5,84	-5,82	-6%	inside the cross section		
Wall 9	0,538	10,600	0,100	0,438	0,875	-80,944	-8,13	-1,63	-2%	inside the cross section		
					Sum	-2423,99		-83,76				

H= 200,000												
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N		
Wall 1	0,540	0,000	0,102	0,438	0,875	-86,775	-9,88	-3,08	-2%	inside the cross section		
Wall 2	0,951	0,000	0,076	0,875	1,750	-237,067	-17,97	-15,18	-8%	inside the cross section		
Wall 3	0,831	0,000	0,081	0,750	1,500	-181,074	-14,72	-10,83	-5%	inside the cross section		
Wall 4	0,241	0,000	-0,009	0,250	0,500	-152,278	1,43	-1,64	-1%	inside the cross section		
Wall 5	1,535	5,300	0,222	1,313	2,625	-562,226	-124,87	-33,21	-17%	inside the cross section		
Wall 6	1,276	3,750	0,151	1,125	2,250	-378,482	-57,15	-15,68	-8%	inside the cross section		
Wall 7	1,878	7,450	0,378	1,500	3,000	-290,582	-109,93	-79,43	-40%	inside the cross section		
Wall 8	0,519	9,300	0,019	0,500	1,000	-142,831	-2,64	-2,84	-1%	inside the cross section		
Wall 11	0,286	10,600	-0,027	0,313	0,625	-84,329	2,28	-4,84	-2%	inside the cross section		
Wall 10	0,801	10,600	0,051	0,750	1,500	-242,144	-12,30	-10,41	-5%	inside the cross section		
Wall 9	0,538	10,600	0,180	0,438	0,875	-100,385	-10,07	-3,78	-2%	inside the cross section		
					Sum	-2468,09		-180,93				

H= 300,000												
Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N		
Wall 1	0,539	0,000	0,101	0,438	0,875	-105,336	-10,78	-5,48	-2%	inside the cross section		
Wall 2	0,995	0,000	0,120	0,875	1,750	-233,521	-27,91	-22,38	-7%	inside the cross section		

transverse walls

N [kN]	sumV actual	sumV target	discrepancy in %
-879,52	-5867	5866,8	0%
-507,95			
-751,87			
-620,80			
-370,80			
-212,11			
<b>-3443,06</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-956,55	-5867	5866,8	0%
-402,80			
-489,38			
-707,10			
-605,39			
-227,81			
<b>-3399,02</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-929,69	-5868	5866,8	0%
-490,42			

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Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 3	0,860	0,000	0,110	0,750	1,500	-168,752	-20,84	-15,55	-5%
Wall 4	0,240	0,000	-0,010	0,250	0,500	-166,760	1,54	-2,07	-1%
Wall 5	1,588	5,300	0,276	1,313	2,625	-608,227	-167,87	-69,71	-20%
Wall 6	1,309	3,750	0,184	1,125	2,250	-401,110	-73,84	-36,56	-12%
Wall 7	1,938	7,450	0,458	1,500	3,000	-266,401	-121,91	-89,37	-30%
Wall 8	0,525	9,300	0,025	0,500	1,000	-157,370	-3,97	-5,39	-2%
Wall 11	0,285	10,600	-0,027	0,313	0,625	-79,122	2,17	-6,17	-2%
Wall 10	0,835	10,600	0,085	0,750	1,500	-226,145	-19,13	-16,84	-6%
Wall 9	0,538	10,600	0,101	0,438	0,875	-111,458	-11,21	-8,82	-2%
Sum						-2635,20		-265,33	

400,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	0,540	0,000	0,103	0,438	0,875	-115,367	-11,83	-8,01	-2%	inside the cross section
Wall 2	1,041	0,000	0,166	0,875	1,750	-229,662	-36,10	-29,92	-7%	inside the cross section
Wall 3	0,889	0,000	0,139	0,750	1,500	-196,254	-27,26	-20,53	-5%	inside the cross section
Wall 4	0,240	0,000	-0,010	0,250	0,500	-161,553	1,65	-2,62	-1%	inside the cross section
Wall 5	1,538	5,300	0,326	1,313	2,625	-656,490	-213,69	-87,16	-22%	inside the cross section
Wall 5	1,342	3,750	0,217	1,125	2,250	-424,490	-91,94	-56,12	-14%	inside the cross section
Wall 7	1,963	7,450	0,463	1,500	3,000	-254,240	-117,74	-85,92	-24%	inside the cross section
Wall 8	0,532	9,300	0,032	0,500	1,000	-172,346	-5,43	-8,03	-2%	inside the cross section
Wall 11	0,283	10,600	-0,030	0,313	0,625	-72,160	2,13	-7,85	-2%	inside the cross section
Wall 10	0,874	10,600	0,124	0,750	1,500	-209,565	-23,48	-23,48	-6%	inside the cross section
Wall 9	0,540	10,600	0,103	0,438	0,875	-122,507	-12,56	-10,00	-2%	inside the cross section
Sum						-2614,65		-348,95		

600,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	0,544	0,000	0,106	0,438	0,875	-132,901	-14,10	-14,20	-2%	inside the cross section
Wall 2	1,115	0,000	0,240	0,875	1,750	-229,262	-65,02	-36,02	-6%	inside the cross section
Wall 3	0,937	0,000	0,167	0,750	1,500	-213,123	-39,90	-29,76	-5%	inside the cross section
Wall 4	0,239	0,000	-0,011	0,250	0,500	-171,430	1,95	-3,62	-1%	inside the cross section
Wall 6	1,725	5,300	0,412	1,313	2,625	-757,613	-312,44	-148,67	-25%	inside the cross section
Wall 5	1,429	3,750	0,304	1,125	2,250	-465,998	-139,40	-105,00	-17%	inside the cross section
Wall 7	1,850	7,450	0,350	1,500	3,000	-252,447	-88,33	-109,32	-18%	inside the cross section
Wall 8	0,541	9,300	0,041	0,500	1,000	-202,432	-8,32	-14,60	-2%	inside the cross section
Wall 11	0,269	10,600	-0,044	0,313	0,625	-56,464	2,48	-6,72	-1%	inside the cross section
Wall 10	0,938	10,600	0,188	0,750	1,500	-165,498	-34,86	-24,84	-4%	inside the cross section
Wall 9	0,544	10,600	0,107	0,438	0,875	-144,840	-15,43	-17,89	-3%	inside the cross section
Sum						-2804,98		-512,83		

700,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N
Wall 1	0,544	0,000	0,107	0,438	0,875	-142,167	-15,17	-17,94	-3%	inside the cross section
Wall 2	1,143	0,000	0,268	0,875	1,750	-229,561	-61,59	-41,31	-6%	inside the cross section
Wall 3	0,950	0,000	0,200	0,750	1,500	-224,878	-45,00	-31,55	-5%	inside the cross section
Wall 4	0,238	0,000	-0,012	0,250	0,500	-176,860	2,19	-4,29	-1%	inside the cross section
Wall 6	1,754	5,300	0,441	1,313	2,625	-807,723	-356,45	-173,48	-25%	inside the cross section
Wall 5	1,466	3,750	0,341	1,125	2,250	-472,474	-161,16	-132,54	-19%	inside the cross section

-657,49
-585,12
-424,83
-244,58
<b>-3332,32</b>

<b>N [kN]</b>	<b>sumV actual</b>	<b>sumV target</b>	<b>discrepancy in %</b>
-902,44	-5369	5866,8	0%
-480,40			
-607,36			
-562,81			
-440,16			
-260,88			
<b>-3254,06</b>			

<b>N [kN]</b>	<b>sumV actual</b>	<b>sumV target</b>	<b>discrepancy in %</b>
-808,82	-5789	5866,8	-1%
-438,52			
-477,28			
-489,67			
-451,93			
-307,70			
<b>-2983,92</b>			

<b>N [kN]</b>	<b>sumV actual</b>	<b>sumV target</b>	<b>discrepancy in %</b>
-772,87	-5773	5866,8	-2%
-421,56			
-428,39			
-461,07			
-460,84			
-324,64			

Wall	7	8	9	10	11	Sum
a	1,850	7,450	0,350	1,500	3,000	-251,133
D [m]	0,000	0,000	0,044	0,500	1,000	-216,510
e [m]	0,000	0,000	-0,051	0,313	0,625	-51,097
L/2	0,000	0,000	0,210	0,750	1,500	-237,116
L [m]	0,000	0,000	0,420	1,500	3,000	-474,232
M [kNm]	0,000	0,000	0,000	0,000	0,000	3,12
N [kN]	0,000	0,000	0,000	0,000	0,000	-3,12
Q [kN]	0,000	0,000	0,000	0,000	0,000	-87,97
Proportion Q/H						-13,92
Proportion Q/H						-16%
Sum						-581,58

800,000

Wall	1	2	3	4	5	6	7	8	9	10	11	Sum
a	1,544	0,000	0,706	0,438	0,875	1,500	3,000	1,000	2,313,355	10,800	-24,32	-3%
D [m]	0,000	0,000	0,283	0,875	1,750	2,313,974	-65,56	-45,33	-381,68	-431,31	-454,06	-381,68
e [m]	0,000	0,000	0,210	0,750	1,500	2,313,116	-49,68	-36,41	-5,17	-343,77	-2749,09	-1%
L/2	0,000	0,000	0,420	1,500	3,000	4,500	6,000	7,500	9,000	10,500	12,000	5866,8
L [m]	0,000	0,000	0,840	3,000	6,000	9,000	12,000	15,000	18,000	21,000	24,000	11733,6
M [kNm]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	-733,42
N [kN]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	-5785
Q [kN]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	5866,8
Proportion Q/H												-1%

900,000

Wall	1	2	3	4	5	6	7	8	9	10	11	Sum
a	0,544	0,000	0,286	0,875	1,750	2,313,781	-65,53	-51,65	-40,43	-6,76	-212,46	-18%
D [m]	0,000	0,000	0,209	0,750	1,500	2,313,150	-52,67	-40,43	-6,76	-212,46	-18%	
e [m]	0,000	0,000	-0,016	0,250	0,500	-183,787	3,08	-6,76	-212,46	-18%		
L/2	0,000	0,000	0,375	1,250	2,250	3,250	4,250	5,250	6,250	7,250	8,250	2646,13
L [m]	0,000	0,000	0,750	2,500	4,500	7,000	9,000	11,000	13,000	15,000	17,000	5292,26
M [kNm]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	-590,24
N [kN]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	-5625
Q [kN]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	5866,8
Proportion Q/H												-1%

1000,000

Wall	1	2	3	4	5	6	7	8	9	10	11	Sum
a	0,538	0,000	0,289	0,875	1,750	2,313,911	-66,82	-57,61	-46,22	-7,44	-230,22	-4%
D [m]	0,000	0,000	0,212	0,750	1,500	2,313,032	-66,24	-46,22	-7,44	-230,22	-4%	
e [m]	0,000	0,000	0,000	0,000	0,000	-195,297	3,61	-7,44	-230,22	-4%		
L/2	0,000	0,000	0,375	1,250	2,250	3,250	4,250	5,250	6,250	7,250	8,250	2749,09
L [m]	0,000	0,000	0,750	2,500	4,500	7,000	9,000	11,000	13,000	15,000	17,000	5498,18
M [kNm]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	-690,24
N [kN]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	-5952
Q [kN]	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	5866,8
Proportion Q/H												1%

-2669,38

N [kN]	sumV actual	sumV target	discrepancy in %
-733,42	-5785	5866,8	-1%
-404,85			
-381,68			
-431,31			
-454,06			
-343,77			
<b>-2749,09</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-590,24	-5625	5866,8	-1%
-386,54			
-345,93			
-413,24			
-447,39			
-362,80			
<b>-2646,13</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-690,24	-5952	5866,8	1%
-386,54			
-345,93			
-413,24			
-447,39			
-362,80			
<b>-2646,13</b>			

TECHNICAL UNIVERSITY MUNICH  
DEPARTMENT OF CIVIL ENGINEERING AND GEODESY  
INSTITUTE OF CONCRETE AND MASONRY STRUCTURES

Wall 9	0.544	10,600	0,107	0,438	0,875	-197,713	-21,10	-40,87	-4%
							Sum	-809,13	

1100,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0.537	0,000	0,100	0,438	0,875	-181,552	-19,08	-41,80	-4%
Wall 2	1.163	0,000	0,268	0,875	1,750	-230,262	-66,22	-60,84	-6%
Wall 3	0.963	0,000	0,213	0,750	1,500	-277,589	-59,07	-50,58	-3%
Wall 4	0.229	0,000	-0,021	0,250	0,500	-202,500	4,25	-8,87	-1%
Wall 5	1,776	5,300	0,464	1,313	2,625	-1026,028	-476,70	-243,08	-22%
Wall 6	1,364	3,750	0,269	1,125	2,250	-860,069	-150,71	-183,57	-18%
Wall 7	1,687	7,450	0,187	1,500	3,000	-282,343	-62,77	-151,37	-14%
Wall 8	0.557	9,300	0,057	0,500	1,000	-280,576	-15,86	-45,73	-4%
Wall 11	0.001	10,600	-0,312	0,313	0,625	-26,212	8,80	-8,88	-1%
Wall 10	0.938	10,600	0,188	0,750	1,500	-147,829	-27,77	-29,84	-3%
Wall 9	0.545	10,600	0,107	0,438	0,875	-216,409	-33,20	-45,84	-4%
					Sum	-3445,16		-881,20	

inside the cross section

Position of the resulting force N  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section

1200,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0.535	0,000	0,098	0,438	0,875	-207,100	-26,25	-47,30	-4%
Wall 2	1.153	0,000	0,278	0,875	1,750	-231,095	-64,31	-63,16	-5%
Wall 3	0.982	0,000	0,212	0,750	1,500	-288,671	-61,50	-56,65	-5%
Wall 4	0.227	0,000	-0,023	0,250	0,500	-208,597	4,88	-10,31	-1%
Wall 6	1,765	5,300	0,472	1,313	2,625	-1077,968	-508,80	-260,52	-22%
Wall 5	1,384	3,750	0,259	1,125	2,250	-875,636	-148,09	-208,25	-17%
Wall 7	1.621	7,450	0,121	1,500	3,000	-288,051	-34,85	-186,97	-14%
Wall 8	0.562	9,300	0,062	0,500	1,000	-299,156	-18,46	-52,03	-4%
Wall 11	-0,057	10,600	-0,369	0,313	0,625	-26,355	10,47	-10,85	-1%
Wall 10	0.902	10,600	0,152	0,750	1,500	-146,568	-22,20	-30,86	-3%
Wall 9	0.544	10,600	0,107	0,438	0,875	-235,066	-25,06	-50,36	-4%
					Sum	-3588,28		-957,25	

Position of the resulting force N  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
outside the cross section  
inside the cross section  
inside the cross section  
inside the cross section

1300,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0.532	0,000	0,095	0,438	0,875	-228,964	-21,73	-54,12	-4%
Wall 2	1.129	0,000	0,254	0,875	1,750	-236,246	-68,37	-59,83	-5%
Wall 3	0.955	0,000	0,205	0,750	1,500	-298,213	-61,34	-63,37	-6%
Wall 4	0.223	0,000	-0,027	0,250	0,500	-218,107	5,87	-12,53	-1%
Wall 6	1,783	5,300	0,470	1,313	2,625	-1137,523	-554,64	-276,95	-21%
Wall 5	1,359	3,750	0,234	1,125	2,250	-879,685	-135,65	-221,53	-17%
Wall 7	1,514	7,450	0,014	1,500	3,000	-304,768	-41,14	-182,19	-15%
Wall 8	0.569	9,300	0,069	0,500	1,000	-325,818	-22,42	-56,87	-5%
Wall 11	-0,046	10,600	-0,368	0,313	0,625	-26,480	12,35	-11,50	-1%
Wall 10	0.856	10,600	0,106	0,750	1,500	-145,637	-15,38	-33,59	-3%
Wall 9	0.542	10,600	0,105	0,438	0,875	-263,609	-27,63	-54,34	-4%
					Sum	-3770,04		-1839,02	

Position of the resulting force N  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
inside the cross section  
outside the cross section  
inside the cross section  
inside the cross section

N [kN]	sumV actual	sumV target	discrepancy in %
-336,72	-5972	5866,8	2%
-366,48			
-312,82			
-398,54			
-431,20			
-381,35			
<b>-2527,11</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-582,30	-6004	5866,8	2%
-344,06			
-286,43			
-388,96			
-414,41			
-399,79			
<b>-2415,96</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-502,96	-6028	5866,8	3%
-318,88			
-269,68			
-372,47			
-376,99			
-417,25			
<b>-2258,24</b>			

House 2-modified; H positive

Shear-Walls

transverse walls

- N positive Tension
- N negativ Compression
- Q positive compared to the direction of the horizontal force H
- Q negativ compared to the direction of the horizontal force H
- e negativ compared to the direction of the horizontal force H
- e positive compared to the direction of the horizontal force H

H= 100,000												
Wall	a	D [m]	e [m]	L2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N		
Wall 1	0,420	0,000	-0,018	0,438	0,875	-96,390	1,70	1,23	1%	inside the cross section		
Wall 2	1,019	0,000	0,144	0,875	1,750	-257,468	-37,10	-12,35	-12%	inside the cross section		
Wall 3	0,877	0,000	0,127	0,750	1,500	-187,649	-23,89	-4,71	-5%	inside the cross section		
Wall 4	0,262	0,000	0,012	0,250	0,500	-146,603	-1,71	-1,34	-1%	inside the cross section		
Wall 6	1,500	5,300	0,187	1,313	2,625	-543,878	-101,71	-20,65	-21%	inside the cross section		
Wall 5	1,257	3,750	0,132	1,125	2,250	-401,719	-52,99	-3,195	-32%	inside the cross section		
Wall 7	1,933	7,450	0,433	1,500	3,000	-297,965	-129,05	-46,57	-47%	inside the cross section		
Wall 8	0,542	9,300	0,042	0,500	1,000	-139,362	-5,87	-5,43	-5%	inside the cross section		
Wall 11	0,272	10,600	-0,041	0,313	0,625	-81,497	3,31	-1,98	-2%	inside the cross section		
Wall 10	0,847	10,600	0,097	0,750	1,500	-269,126	-26,02	-8,11	-8%	inside the cross section		
Wall 9	0,466	10,600	0,018	0,438	0,875	-101,111	-1,83	0,99	1%	inside the cross section		
					Sum	-2524,77		-130,88				
H= 200,000												
Wall	a	D [m]	e [m]	L2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N		
Wall 1	0,482	0,000	0,044	0,438	0,875	-110,832	-4,91	-0,66	0%	inside the cross section		
Wall 2	1,112	0,000	0,237	0,875	1,750	-254,273	-60,16	-18,27	-9%	inside the cross section		
Wall 3	0,950	0,000	0,200	0,750	1,500	-195,823	-39,16	-6,79	-4%	inside the cross section		
Wall 4	0,266	0,000	0,016	0,250	0,500	-152,280	-2,47	-1,59	-1%	inside the cross section		
Wall 6	1,598	5,300	0,285	1,313	2,625	-598,649	-170,65	-41,60	-21%	inside the cross section		
Wall 5	1,323	3,750	0,198	1,125	2,250	-436,670	-86,86	-47,81	-24%	inside the cross section		
Wall 7	2,437	7,450	0,937	1,500	3,000	-342,337	-227,05	-76,58	-38%	inside the cross section		
Wall 8	0,585	9,300	0,065	0,500	1,000	-159,316	-10,36	-8,26	-4%	inside the cross section		
Wall 11	0,379	10,600	0,067	0,313	0,625	-73,985	-3,94	-3,08	-2%	inside the cross section		
Wall 10	0,925	10,600	0,175	0,750	1,500	-261,239	-43,92	-13,14	-7%	inside the cross section		
Wall 9	0,486	10,600	0,048	0,438	0,875	-116,447	-5,62	-1,26	-1%	inside the cross section		
					Sum	-2593,85		-221,15				
H= 300,000												
Wall	a	D [m]	e [m]	L2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H	Position of the resulting force N		
Wall 1	0,507	0,000	0,070	0,438	0,875	-125,977	-8,85	-2,96	-1%	inside the cross section		

N [kN]	sumV actual	sumV target	discrepancy in %
-926,25	-5798	5866,8	-1%
-951,68			
-193,72			
-554,25			
-211,35			
-435,85			
<b>-3273,10</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-926,25	-5867	5866,8	0%
-490,40			
-629,57			
-554,25			
-461,28			
-211,35			
<b>-3273,11</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-884,16	-5867	5866,8	0%



Wall 2	1,227	0,000	0,352	0,875	1,750	-250,432	-88,03	-25,72	-9%
Wall 3	1,031	0,000	0,281	0,750	1,500	-204,759	-67,54	-13,85	-5%
Wall 4	0,272	0,000	0,022	0,250	0,500	-156,736	-3,37	-2,12	-1%
Wall 6	1,698	5,300	0,986	1,313	2,625	-662,718	-255,48	-68,75	-23%
Wall 5	1,389	3,750	0,264	1,125	2,250	-484,060	-127,55	-67,87	-23%
Wall 7	2,676	7,450	1,176	1,500	3,000	-201,338	-236,69	-86,06	-29%
Wall 8	0,589	9,300	0,088	0,500	1,000	-182,483	-16,17	-12,00	-4%
Wall 11	0,429	10,600	0,116	0,313	0,625	-60,405	-7,01	-4,97	-2%
Wall 10	1,040	10,600	0,290	0,750	1,500	-230,418	-66,71	-20,07	-7%
Wall 9	0,514	10,600	0,076	0,438	0,875	-136,421	-10,40	-4,20	-1%
Sum						-2696,75	Sum	-308,59	

H= 400,000

Position of the resulting force

Wall 1	0,528	0,000	0,091	0,438	0,875	-143,189	-12,86	-5,37	-1%
Wall 2	1,350	0,000	0,475	0,875	1,750	-245,973	-116,94	-33,48	-8%
Wall 3	1,110	0,000	0,360	0,750	1,500	-213,282	-76,87	-19,17	-5%
Wall 4	0,277	0,000	0,027	0,250	0,500	-161,488	-4,31	-2,56	-1%
Wall 6	1,783	5,300	0,471	1,313	2,625	-729,888	-343,49	-96,84	-24%
Wall 5	1,445	3,750	0,320	1,125	2,250	-531,859	-170,19	-88,95	-22%
Wall 7	2,742	7,450	1,242	1,500	3,000	-180,200	-223,75	-80,24	-23%
Wall 8	0,608	9,300	0,108	0,500	1,000	-206,367	-22,23	-15,63	-4%
Wall 11	0,519	10,600	0,206	0,313	0,625	-44,359	-9,16	-7,04	-2%
Wall 10	1,181	10,600	0,431	0,750	1,500	-206,995	-90,06	-27,22	-7%
Wall 9	0,535	10,600	0,098	0,438	0,875	-157,091	-15,33	-7,27	-2%
Sum						-2822,69	Sum	-393,99	

H= 500,000

Position of the resulting force

Wall 1	0,328	0,000	0,109	0,438	0,875	-159,767	-17,43	-7,93	-2%
Wall 2	1,445	0,000	0,570	0,875	1,750	-245,875	-140,17	-38,87	-8%
Wall 3	1,186	0,000	0,438	0,750	1,500	-222,135	-96,76	-24,89	-5%
Wall 4	0,282	0,000	0,032	0,250	0,500	-166,223	-5,32	-2,95	-1%
Wall 6	1,860	5,300	0,548	1,313	2,625	-800,190	-438,10	-127,44	-25%
Wall 5	1,494	3,750	0,369	1,125	2,250	-583,490	-215,31	-112,15	-22%
Wall 7	2,768	7,450	1,268	1,500	3,000	-165,209	-209,45	-94,04	-19%
Wall 8	0,624	9,300	0,124	0,500	1,000	-230,999	-28,74	-19,90	-4%
Wall 11	-0,098	10,600	0,410	0,313	0,625	-25,774	-10,57	-8,88	-2%
Wall 10	1,263	10,600	0,513	0,750	1,500	-196,605	-100,94	-28,95	-6%
Wall 9	0,553	10,600	0,116	0,438	0,875	-179,155	-20,71	-10,67	-2%
Sum						-2975,42	Sum	-476,47	

H= 600,000

Position of the resulting force

Wall 1	0,564	0,000	0,126	0,438	0,875	-178,723	-22,52	-11,23	-2%
Wall 2	1,446	0,000	0,571	0,875	1,750	-258,362	-148,10	-38,93	-6%
Wall 3	1,233	0,000	0,483	0,750	1,500	-235,359	-113,61	-28,79	-5%
Wall 4	0,288	0,000	0,038	0,250	0,500	-171,252	-6,52	-3,63	-1%

-486,15
-557,08
-514,50
-509,22
-219,50
<b>-3170,61</b>

N [kN]	sumV actual	sumV target	discrepancy in %
-839,88	-5671	5866,8	0%
-480,74			
-481,97			
-471,82			
-547,27			
-226,90			
<b>-3048,58</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-789,21	-5868	5866,8	0%
-467,99			
-401,15			
-425,39			
-575,92			
-232,73			
<b>-2892,40</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-733,82	-5870	5866,8	0%
-443,03			
-304,06			
<b>-375,75</b>			

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 6	1,936	5,300	0,624	1,313	2,625	-870,487	-543,02	-162,65	-27%
Wall 5	1,543	3,750	0,418	1,125	2,250	-635,870	-265,60	-140,50	-23%
Wall 7	2,771	7,450	1,271	1,500	3,000	-157,953	-200,79	-99,96	-17%
Wall 8	0,641	9,300	0,141	0,500	1,000	-257,216	-36,14	-24,89	-4%
Wall 11	0,852	10,800	0,540	0,513	0,625	-13,529	-7,30	-6,90	-1%
Wall 10	1,277	10,600	0,527	0,750	1,500	-196,040	-103,33	-27,54	-5%
Wall 9	0,569	10,800	0,131	0,438	0,875	-204,079	-26,82	-14,30	-2%
<b>Sum</b>						<b>-3179,88</b>	<b>Sum</b>	<b>-559,83</b>	

H= 700,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,578	0,000	0,141	0,438	0,875	-199,122	-27,98	-14,79	-2%
Wall 2	1,471	0,000	0,596	0,875	1,750	-275,345	-164,00	-45,36	-6%
Wall 3	1,238	0,000	0,478	0,750	1,500	-257,598	-123,18	-30,50	-4%
Wall 4	0,294	0,000	0,044	0,250	0,500	-176,599	-7,81	-4,28	-1%
Wall 6	1,986	5,300	0,674	1,313	2,625	-935,906	-630,71	-191,14	-27%
Wall 5	1,594	3,750	0,469	1,125	2,250	-684,881	-321,14	-171,72	-25%
Wall 7	2,797	7,450	1,297	1,500	3,000	-182,221	-197,48	-103,15	-15%
Wall 8	0,656	9,300	0,156	0,500	1,000	-284,084	-44,29	-30,53	-4%
Wall 11	0,850	10,800	0,538	0,513	0,625	-7,978	-3,81	-4,47	-1%
Wall 10	1,310	10,600	0,560	0,750	1,500	-198,192	-109,85	-28,74	-4%
Wall 9	0,583	10,600	0,145	0,438	0,875	-230,841	-33,52	-19,60	-3%
<b>Sum</b>						<b>-3399,80</b>	<b>Sum</b>	<b>-644,27</b>	

H= 800,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,593	0,000	0,156	0,438	0,875	-224,317	-34,93	-19,76	-2%
Wall 2	1,485	0,000	0,610	0,875	1,750	-294,997	-180,07	-48,54	-6%
Wall 3	1,247	0,000	0,497	0,750	1,500	-279,140	-138,65	-36,81	-5%
Wall 4	0,302	0,000	0,052	0,250	0,500	-182,176	-9,45	-5,14	-1%
Wall 6	2,041	5,300	0,728	1,313	2,625	-992,706	-722,89	-213,68	-27%
Wall 5	1,675	3,750	0,560	1,125	2,250	-703,864	-387,34	-199,80	-25%
Wall 7	2,804	7,450	1,304	1,500	3,000	-149,352	-194,68	-108,35	-14%
Wall 8	0,671	9,300	0,171	0,500	1,000	-315,720	-53,96	-37,57	-5%
Wall 11	1,939	10,800	0,626	0,513	0,625	-2,48	-4,11	-4,11	-1%
Wall 10	1,322	10,600	0,572	0,750	1,500	-202,468	-115,88	-31,93	-4%
Wall 9	0,597	10,600	0,160	0,438	0,875	-260,533	-41,58	-25,36	-3%
<b>Sum</b>						<b>-3606,82</b>	<b>Sum</b>	<b>-751,23</b>	

H= 900,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,610	0,000	0,173	0,438	0,875	-263,254	-43,71	-26,43	-3%
Wall 2	1,498	0,000	0,623	0,875	1,750	-316,893	-197,42	-55,23	-6%
Wall 3	1,256	0,000	0,506	0,750	1,500	-304,442	-154,05	-38,84	-4%
Wall 4	0,311	0,000	0,061	0,250	0,500	-188,292	-11,49	-6,21	-1%
Wall 6	2,094	5,300	0,781	1,313	2,625	-1043,852	-815,46	-236,25	-26%
Wall 5	1,728	3,750	0,603	1,125	2,250	-728,955	-438,64	-227,12	-25%
Wall 7	2,801	7,450	1,301	1,500	3,000	-146,978	-191,19	-109,48	-12%

-596,09
-236,97
<b>-2689,73</b>

N [kN]	sumV actual	sumV target	discrepancy in %
-677,26	-5893	5866,8	0%
-416,33			
-210,74			
-336,01			
-613,62			
-239,72			
<b>-2493,68</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-609,22	-5898	5866,8	1%
-383,81			
-136,74			
-297,66			
-624,18			
-239,57			
<b>-2291,18</b>			

N [kN]	sumV actual	sumV target	discrepancy in %
-534,89	-5902	5866,8	1%
-351,69			
-52,22			
-265,89			
-626,55			
-237,58			
<b>-2068,82</b>			

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Position of the resulting force  
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Position of the resulting force  
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Position of the resulting force  
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Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 8	0,688	9,300	0,188	0,500	1,000	-351,704	-86,12	-46,86	-5%
Wall 11	-0,553	10,600	-0,845	0,313	0,625	1,030	-0,87	-0,85	0%
Wall 10	1,355	10,600	0,585	0,750	1,500	-270,554	-123,11	-36,13	-4%
Wall 9	0,617	10,600	0,179	0,438	0,875	-291,450	-52,17	-32,79	-4%
Sum						-3833,34		-816,26	

H= 1000,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,629	0,000	0,192	0,438	0,875	-282,038	-94,04	-33,80	-3%
Wall 2	1,519	0,000	0,644	0,875	1,750	-335,205	-215,84	-65,27	-7%
Wall 3	1,270	0,000	0,520	0,750	1,500	-331,030	-172,20	-44,48	-4%
Wall 4	0,320	0,000	0,070	0,250	0,500	-194,704	-7,36	-1%	
Wall 6	2,133	5,300	0,820	1,313	2,625	-1096,746	-899,44	-257,70	-26%
Wall 5	1,786	3,750	0,641	1,125	2,250	-750,837	-481,25	-251,25	-25%
Wall 7	2,803	7,450	1,303	1,500	3,000	-145,259	-189,27	-112,86	-11%
Wall 8	0,705	9,300	0,205	0,500	1,000	-388,320	-79,45	-56,86	-6%
Wall 11	0,461	10,600	0,149	0,313	0,625	4,102	0,61	-0,59	0%
Wall 10	1,347	10,600	0,597	0,750	1,500	-216,161	-128,98	-39,36	-4%
Wall 9	0,636	10,600	0,198	0,438	0,875	-321,196	-63,69	-40,59	-4%
Sum						-4857,39		-910,21	

H= 1100,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,646	0,000	0,206	0,438	0,875	-314,828	-65,61	-42,84	-4%
Wall 2	1,535	0,000	0,660	0,875	1,750	-349,533	-230,83	-74,24	-7%
Wall 3	1,277	0,000	0,527	0,750	1,500	-359,627	-189,38	-48,23	-4%
Wall 4	0,331	0,000	0,081	0,250	0,500	-201,782	-16,32	-8,76	-1%
Wall 6	2,169	5,300	0,857	1,313	2,625	-1144,794	-990,52	-275,93	-25%
Wall 5	1,806	3,750	0,681	1,125	2,250	-767,432	-522,62	-271,69	-25%
Wall 7	2,788	7,450	1,298	1,500	3,000	-147,011	-190,76	-124,95	-11%
Wall 8	0,719	9,300	0,219	0,500	1,000	-428,538	-94,11	-67,58	-6%
Wall 11	0,666	10,600	0,254	0,313	0,625	5,884	1,49	-0,50	0%
Wall 10	1,355	10,600	0,605	0,750	1,500	-223,043	-134,40	-43,23	-4%
Wall 9	0,651	10,600	0,214	0,438	0,875	-353,418	-75,95	-49,16	-4%
Sum						-4284,12		-1007,31	

H= 1200,000

Wall	a	D [m]	e [m]	L/2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,659	0,000	0,221	0,438	0,875	-345,707	-76,54	-51,61	-4%
Wall 2	1,550	0,000	0,675	0,875	1,750	-366,688	-240,62	-76,50	-7%
Wall 3	1,283	0,000	0,533	0,750	1,500	-392,249	-209,15	-55,83	-5%
Wall 4	0,341	0,000	0,091	0,250	0,500	-208,964	-18,97	-10,16	-1%
Wall 6	2,196	5,300	0,893	1,313	2,625	-1200,874	-1060,37	-296,44	-25%
Wall 5	1,844	3,750	0,719	1,125	2,250	-766,820	-565,95	-285,15	-24%
Wall 7	2,787	7,450	1,287	1,500	3,000	-150,467	-193,62	-135,12	-11%
Wall 8	0,732	9,300	0,232	0,500	1,000	-467,847	-108,45	-76,88	-6%
Wall 11	0,590	10,600	0,277	0,313	0,625	3,928	1,09	-1,62	0%
Wall 10	1,365	10,600	0,615	0,750	1,500	-229,589	-141,13	-47,94	-4%

Wall im Arsch

N [kN]	sumV actual	sumV target	discrepancy in %
-461,81	-5939	5866,8	1%
-319,10			
8,72			
-242,14			
-631,15			
-235,74			
<b>-1881,22</b>			

Wall im Arsch

N [kN]	sumV actual	sumV target	discrepancy in %
-383,44	-6010	5866,8	2%
-288,31			
17,60			
-214,47			
-625,69			
-231,54			
<b>-1725,86</b>			

Wall im Arsch

N [kN]	sumV actual	sumV target	discrepancy in %
-320,52	-6106	5866,8	4%
-269,23			
43,12			
-186,32			
-624,20			
-231,25			
<b>-1587,40</b>			

Wall im Arsch

Wall 9	10,600	0,228	0,438	0,875	-382,899	-87,34	-55,65	-5%
				Sum	-4518,18	Sum	-1084,69	

H= 1300,000									
Wall	a	D [m]	e [m]	L2	L [m]	N [kN]	M [kNm]	Q [kN]	Proportion Q/H
Wall 1	0,677	0,000	0,239	0,438	0,875	-386,864	-92,54	-62,19	-5%
Wall 2	1,682	0,000	0,707	0,875	1,750	-330,500	-233,50	-76,44	-6%
Wall 3	1,299	0,000	0,549	0,750	1,500	-426,672	-234,07	-67,34	-5%
Wall 4	0,855	0,000	0,105	0,250	0,500	-218,560	-23,04	-12,30	-1%
Wall 6	2,231	5,300	0,919	1,313	2,625	-1252,344	-1150,28	-316,65	-24%
Wall 5	1,893	3,750	0,768	1,125	2,250	-782,809	-600,96	-298,24	-23%
Wall 7	2,767	7,450	1,267	1,500	3,000	-155,499	-197,03	-155,42	-12%
Wall 8	0,748	9,300	0,248	0,500	1,000	-512,916	-127,20	-87,28	-7%
Wall 11	0,213	10,600	-0,099	0,313	0,625	-0,555	0,06	-3,96	0%
Wall 10	1,373	10,600	0,623	0,750	1,500	-230,479	-143,57	-53,83	-4%
Wall 9	0,685	10,600	0,248	0,438	0,875	-415,777	-102,90	-61,12	-5%
				Sum	Sum	-4712,97	Sum	-1194,77	

inside the cross section

Position of the resulting force

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N [KN]	sumV actual	sumV target	discrepancy in %
-266,55	-6207	5866,8	6%
-242,05			
1,96			
-151,68			
-605,02			
-230,86			
<b>-1494,31</b>			