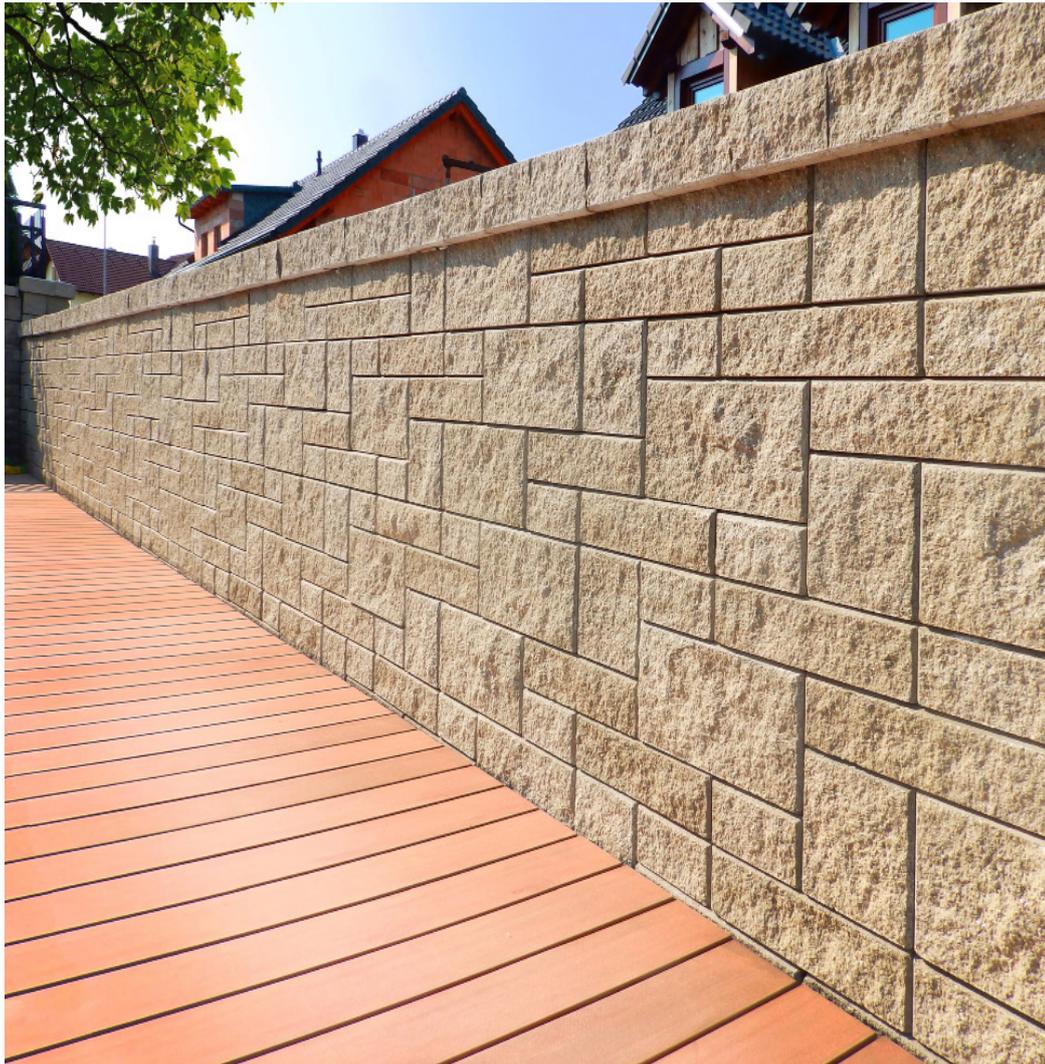




VIBROCOMPACTING CONCRETE ELEMENT SYSTEM



PARTITION WALLS

- RECOMMENDED INSTRUCTION MANUAL -

Elements of STAVOBLOCK partition walls
Methods of use in partition wall structures
Recommended constructional procedure for partition wall structure
Design tables

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1. INTRODUCTION

STAVOBLOCK modular building system is designed for creation of retaining and/or partition walls with use of STAVOBLOCK concrete forming elements together with STAVOBLOCK anchoring elements.

AESTHETIC APPEARANCE

The partition wall made from the STAVOBLOCK system are very aesthetic and practical. During the implementation design it is possible to select from four types of face blocks or their combinations in split, smooth or grinded finish in several colour variants.

UNIVERSAL USE

The STAVOBLOCK partition wall constructional system adopts to any ground-plan shape. The walls may be flat, as well as externally / internally angled. The STAVOBLOCK system elements enable building of auxiliary structures, such as staircases, platforms, ledges, height stepping in variable terrain slope etc.

REALISATION

The STAVOBLOCK system elements are intended particularly for mortar-free constructions. Dry-assembled structures enable relative displacement between individual shape elements caused by uneven settling, different loading and other effects. Dry joints prevent ugly cracks in support and contacting joints, where the water may be pressed in front of the wall and this decreases hydrostatic pressure behind the wall.

The STAVOBLOCK system elements may be also integrated into the construction by penetration with concrete or mortar. This method is used particularly in construction of fence pillars in partition walls to increase their static load capacity.

ASSEMBLY

Assembly of the STAVOBLOCK partition walls is simple. It represents only few simple repeated actions, which do not require qualified or professionally trained workers. Optimum productivity is achieved after relatively short praxis, generally after several constructions. Upon request, the manufacturer can provide professional training for fee.

DURABILITY

The STAVOBLOCK shape elements are made by vibrocompacting of high-strength concrete mixture with low water-cement ratio. If the retaining or partition wall from the STAVOBLOCK system is positioned in typical environment, then its quality will not deteriorate for expected lifetime, i.e. ca 100 years.

MAINTENANCE

The Stavoblock shape elements need not be fitted with any finishing coat. The shape elements may be cleaned with pressure water as needed. When the shape elements are contaminated with cement bloom, remove it by cleaning agent for cement products Betonclener produced by Stachema Kolín, www.stachema.cz, in compliance with the manufacturer's instruction manual. The concrete products may be fitted with protecting coating Terratex produced by Xintex Czech, www.xintex-group.com, in compliance with the manufacturer's instruction manual. This coating provides protection against weather and/or chemical effects, increases lifetime of the treated surfaces, prevents deposition of algae, must and moss on the treated surface.

PRICE

Investment costs related to acquisition of the STAVOBLOCK system partition wall are comparable with other systems and are substantially lower than acquisition costs of monolithic concrete wall. The price depends on type of used shape elements, face surface finish, colour, as well as transport. With view to achieve most accurate calculation, it is recommended to have the budget and price calculation processed by trained technicians of the system manufacturer or by authorised designers.

2. OVERVIEW OF ELEMENTS

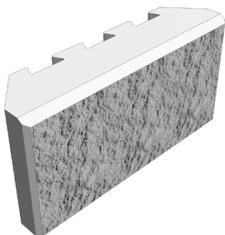
The STAVOBLOCK modular building system includes particularly concrete elements, which can make retaining and/or partition walls, incl. their combination, of various surface finish and colour variants. In the STAVOBLOCK system the walls and panels may be modified in many ways to significantly increase the aesthetic design. The system includes also anchoring elements ensuring stability of the retaining and/or partition walls.

2.1. CONCRETE ELEMENTS

The STAVOBLOCK modular system consists from ten concrete elements. These may be subdivided into two basic groups, i.e. the forming elements providing the „face“ of the construction, and anchoring elements ensuring stability of the construction. Individual groups of the elements can be used for building of separate retaining or partition walls, or they can be combined together and thus create various face variants of both retaining, and partition walls. All elements of these four groups are produced in three basic colours and in split or smooth surface finishes.

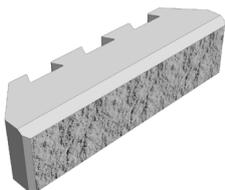
2.1.1 FORMING ELEMENTS

The forming elements are produced in four different modules. The construction itself may be made either from single module, or from combination of all four modules. The largest element is STAVOBLOCK JUMBO, the STAVOBLOCK FLAT element features half height, the STAVOBLOCK STANDARD element features half width and the STAVOBLOCK PONY element features other half height. Whole set of the elements is supplemented with cover panels, which are also



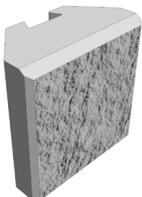
STAVOBLOCK JUMBO

The JUMBO element is largest element of whole group. Its back part is fitted with three vertical dovetail grooves for positioning of anchoring elements and it can be used for construction of retaining and partition walls separately, or in combination with the other forming elements. It is particularly intended to construction of fence pillars. Its face size is 400 x 200 mm, depth 100 mm and weight 15 kg.



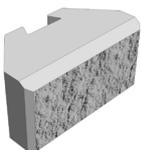
STAVOBLOCK FLAT

Back part of the FLAT element is fitted with three vertical dovetail grooves for positioning of anchoring elements and it can be used for construction of retaining and partition walls separately, or in combination with the other forming elements. It is particularly intended to construction of staircase steps and fence pillars. Its face size is 400 x 100 mm, depth 100 mm and weight 7 kg.



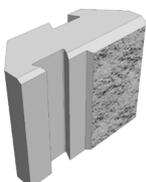
STAVOBLOCK STANDARD

Back part of the STANDARD element features one vertical dovetail groove for positioning of anchoring elements and it can be used for construction of retaining and partition walls separately, or in combination with the other forming elements. Its face size is 200 x 200 mm, depth 100 mm and weight 6.5 kg.



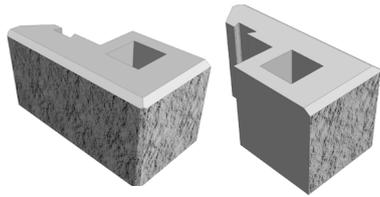
STAVOBLOCK PONY

Back part of the PONY element is fitted with single vertical dovetail groove for positioning of anchoring elements and it can be used for construction of retaining and partition walls separately, or in combination with the other forming elements. Its face size is 200 x 100 mm, depth 100 mm and weight 3.4 kg.



ANGLED COUPLER

The ratchet has a vertical dovetail groove in the rear part for the placement of anchoring elements and is used to divide the dividing wall with a post in the corner. Dimensions are 250 x 200 MM, width 100 MM, Weight 8.5 kg.

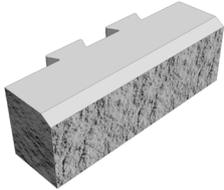


ANGLED ELEMENT

Back part of the angled element features single vertical dovetail groove for positioning of anchoring elements and cavity for eventual pouring with concrete. This is universal element for construction of both retaining, and partition walls. Its face size is 400 x 200 x 200 mm, depth 100 mm and weight 20 kg. The angular element is produced in left-hand and right-hand variant.

The right-hand angled element viewed to larger face surface of the block (size 400 x 200 mm) features the smaller face area at the right side (size 200 x 200 mm).

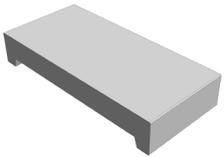
The left-hand angled element viewed to larger face surface of the block (size 400 x 200 mm) features the smaller face area at the left side (size 200 x 200 mm).



ENDNESS ELEMENT

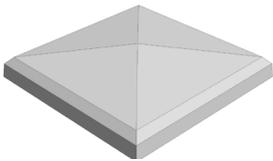
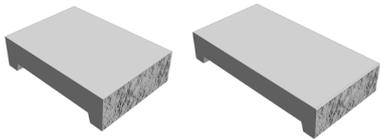
Endness element splitted from three sides, designed to end a 300 mm wide dividing wall. The dovetail groove is compatible with the T-coupling.

Dimensions are 300 x 100 MM, width 100 MM, Weight 5.2 kg.



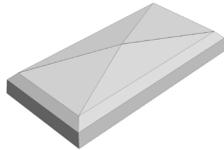
CONTINUOUS COVERING PANEL for 200, 300 and 400 mm width wall

Retaining and partition walls are terminated by means of two types of covering panels, either by means of reverse covering panel, or by means of right-angled covering panel. Size of smooth surface is 470x200x75 mm, weight 12 kg, 360x200x75 mm, weight 10 kg. Unilaterally splitted is 330x200x75 mm, weight 7 kg, both sides splitted 300x200x75, weight 7kg. Installed to freeze-resistant glue.



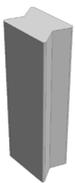
PILLAR COVERING PLATE

The pillar covering panel element may be used for termination of fence pillars and creation of their head. The non-armoured continuous pillar of ground-plan size 400 x 200 mm, weight 18 kg, the armoured pillar of ground-plan size 400 x 400 mm, weight 25 kg. The covering panels are anchored to the pillars by means of freeze-resistant glue.



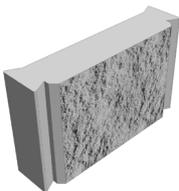
2.1.2 ANCHORING ELEMENTS

The anchoring elements are used for construction of all types of the retaining and partition walls, incl. auxiliary structures, such as staircases, garden benches, barbecue grills or garden kitchens. Within the partition wall structure, they are mainly indented to connection function for left-hand and right-hand face sides, as well as to stabilization function.



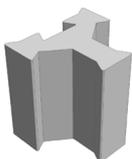
SHORT COUPLER

The short coupler is element used mainly for construction of partition walls. This X-shape element is designed as both-side dovetail key. Such design enables simple fixing and connection of individual forming elements together. Its height differs from heights of the forming element to enable bonding of the wall face elements. The element ground-plan size is 58 x 40 mm and height 150 mm. The element weight is 0.6 kg.



LONG COUPLER

The long coupler is element used mainly for construction of partition walls, which require higher stability or pouring with concrete, and also for construction of pillars. This element is designed as both-side dovetail key linked by a neck. The element ground-plan size is 58 x 245 mm and height 150 mm. The element weight is 4 kg. It is delivered in split and grinded finish.



T-COUPLER

Element designed for connecting visual elements of a 300 mm wide dividing wall.

Element size 140x125 MM, height 150 MM
Weight 3 kg



CORNER PEG

Element designed for cornering the corner. It is inserted into the cavity of the docking cube. Element size 40x40 MM, height 150 mm.
Weight 1 kg

3. STRUCTURE OF PARTITION WALLS

3.1. HORIZONTALLY FLAT PARTITION WALLS

3.1.1 Flat partition walls from separated JUMBO, FLAT, STANDARD and PONY elements

The JUMBO, FLAT, STANDARD and PONY concrete elements are also intended for construction of partition walls, incl. pillars. These elements may be used for construction of partition walls with very variable width and/or height. When the stability requires armouring of the partition wall, this can be achieved by means of steel reinforcement and concreting. The concrete forming elements are laid in individual layers above each other by dry method, without any mortar and/or glue, and the connecting element, i.e. short, long or closing coupler, is inserted into the dovetail grooves in back part of the back-to-back positioned elements.

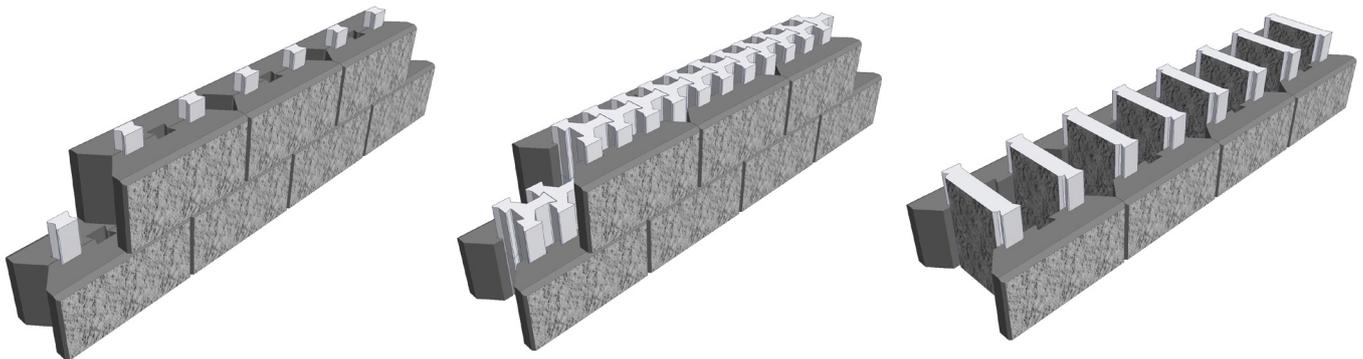


Fig. 3.1.1a Basic positioning of JUMBO blocks - from the left - width 200, 300, 400 mm

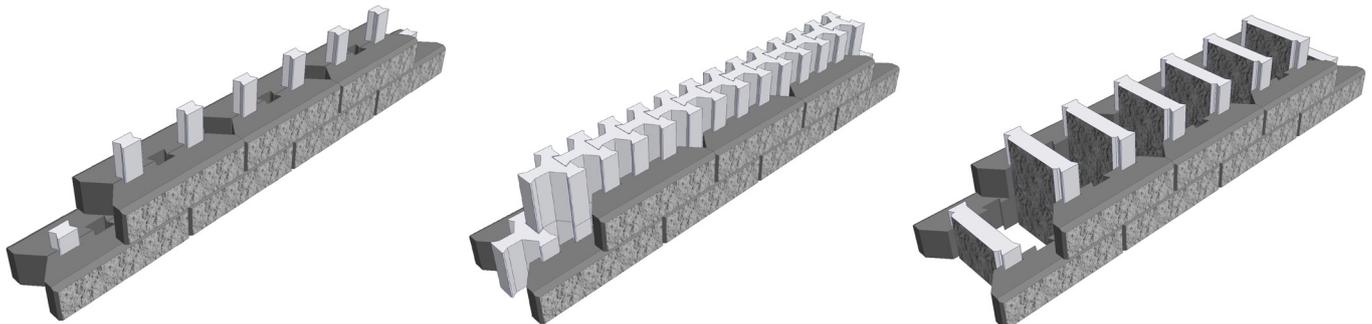


Fig. 3.1.1b Basic positioning of FLAT blocks - from the left - width 200, 300, 400 mm

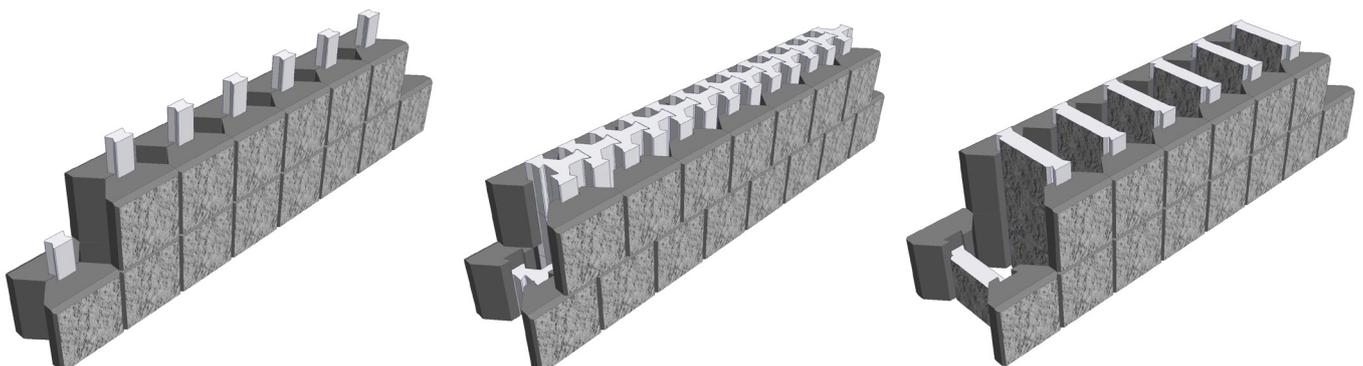


Fig. 3.1.1c Basic positioning of STANDARD blocks - from the left - width 200, 300, 400 mm

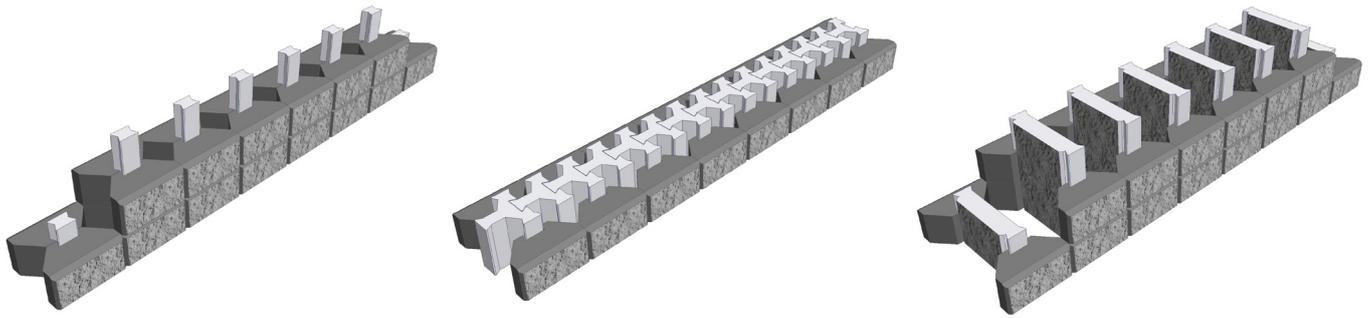


Fig. 3.1.1d Basic positioning of PONY blocks - from the left - width 200, 300, 400 mm

3.1.2 Flat partition walls from combination elements

The JUMBO, FLAT, STANDARD and PONY concrete elements can be mutually combined and they thus create architectonic sophisticated face surfaces. Two-row and three-row models are examples for basic combinations. It is however possible to make a combination, where a combination of the blocks is used from one face surface and only one face elements is used for the other side. The system enables combination of various surface finishes in one face surface, or combination, when the split or smooth face element is used for one side and e.g. grinded element, perhaps in different colour, is used for the other side.

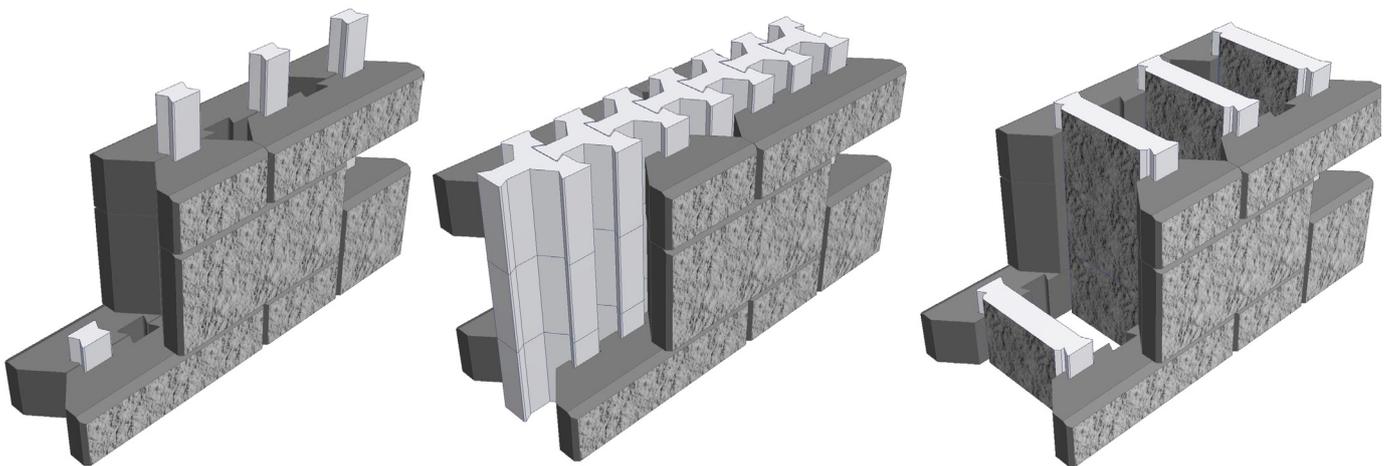


Fig. 3.1.2a Combined partition wall - from the left - width 200, 300, 400 mm

3.1.3 All blocks combination composition

The three-row model features constructional height of single-layer module 600 mm.

Consumption per 1 m²: JUMBO 6 pcs.; FLAT 5 pcs.; STANDARD 6 pcs.; PONY 4 pcs., long coupler 33 pcs.

Scheme of recommended setting:

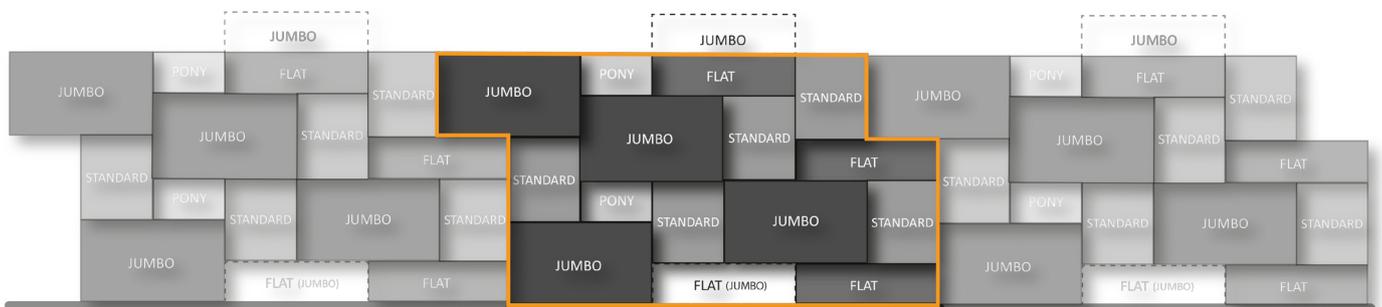


Fig. 3.1.3a All blocks combination composition

3.1.4 Greening of straight partitions

In order not to make the view of the concrete wall too dull and if required by the architectural design or other circumstances, dividing walls 400 MM and larger can be greened in a simple way by planting climbing or overhanging plants by simply omitting one of the blocks at the required height. by placing the soil tank in the wall cavity with subsequent planting of greenery.

3.2 HORIZONTALLY ANGLED PARTITION WALLS

3.2.1 Angled walls

Also angled walls, i.e. right-angled, acute ($>90^\circ$) or obtuse ($<90^\circ$) angle walls, can be simply crated from the STAVOB-LOCK system elements. Angled element is used for realisation of the right-angled walls.

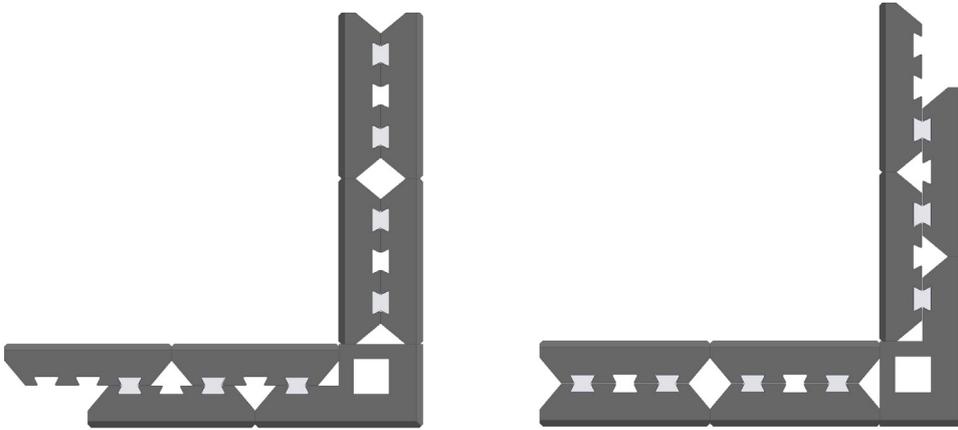


Fig. 3.2.1a Right-angled partition wall of width 200 mm - First layer, Second layer

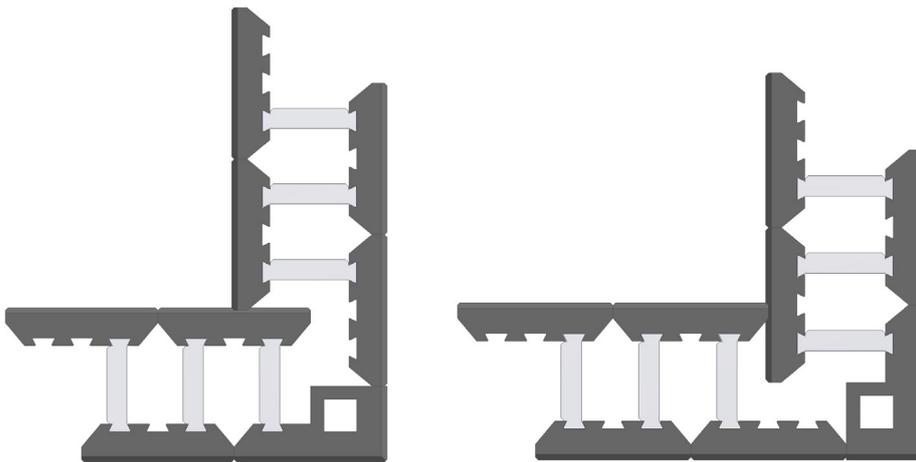


Fig. 3.2.1b Right-angled partition wall of width 400 mm - First layer, Second layer

The acute ($>90^\circ$) or obtuse ($<90^\circ$) angled inner and outer corners are realised by cutting of the elements by diamond wheel at required angle.

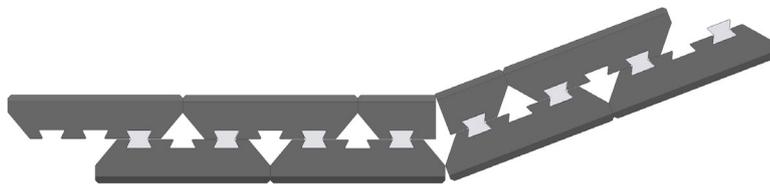


Fig. 3.2.1c Acute or obtuse angled partition wall of width 200 mm

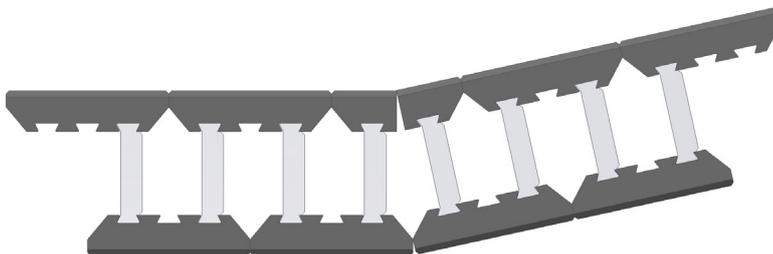


Fig. 3.2.1d Acute or obtuse angled partition wall of width 400 mm

3.2.2 Pillars

The STAVOBLOCK system elements may be used for building of fence pillars.

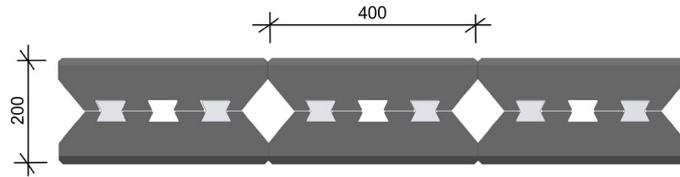


Fig. 3.2.2a Pillar 200 x 400 mm, partition wall of width 200 mm

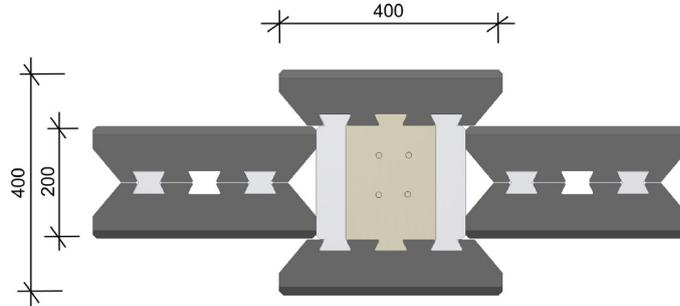


Fig. 3.2.2b Pillar 400 x 400 mm, partition wall of width 200 mm

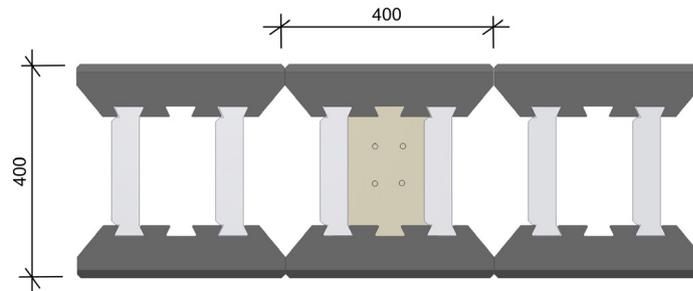


Fig. 3.2.2c Pillar 400 x 400 mm armoured, non-filled partition wall of width 400 mm

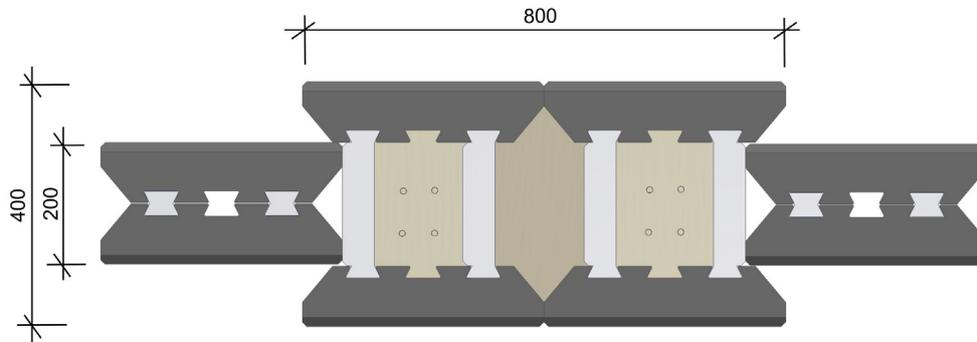


Fig. 3.2.2d Pillar 400 x 800 mm armoured, filled partition wall of width 200 mm

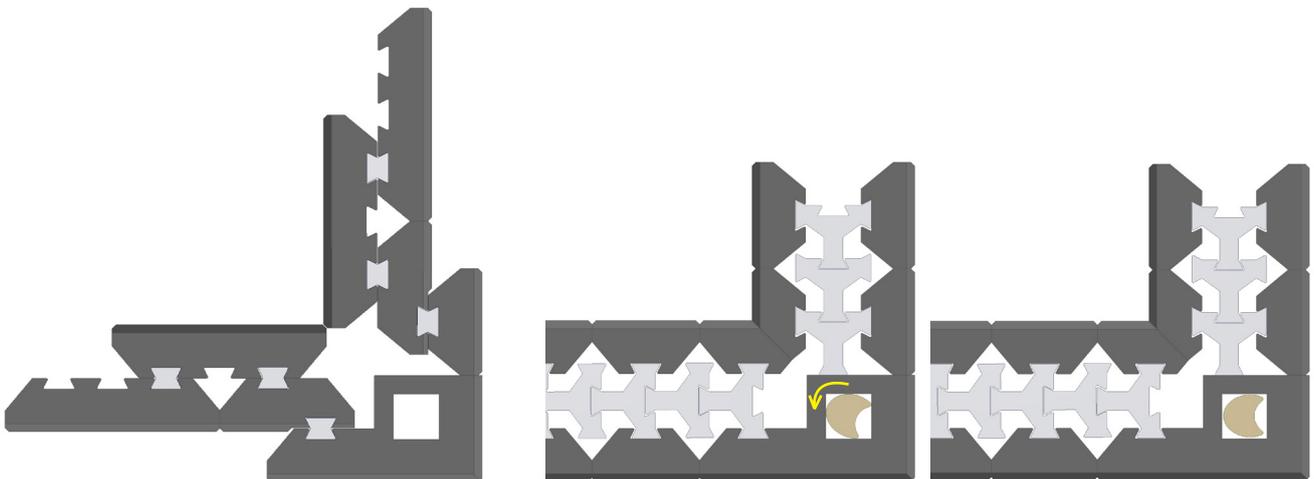


Fig. 3.2.2g Corner pillar connected by Angled Coupler

Fig.3.2.2. f - Corner elements secured with a corner peg, ideal interconnection ensured by turning the corner peg

4. DESIGN OF PARTITION WALL FROM STAVOBLOCK SYSTEM

Successful realisation of the partition / retaining wall from the STAVOBLOCK system starts with a design. A design project and geological survey should be elaborated before realisation of each construction in scope in compliance with the size and complexity of the construction.

4.1. DESIGN OF PARTITION WALL

The design shall cover decision on the type of the partition wall suitable for the construction. Partition walls from the STAVOBLOCK system may be divided to two main groups acc. to the use of the pillars, see Table 4.1 Specification of partition walls.

4.1.1 Partition walls with pillars:

Partition walls of width 200 mm with pillars 200 x 400 mm made from the STAVOBLOCK shape elements are connected by short coupling key. They are suitable in situations with limited space for the wall, height of the partition wall above the ground does not exceed 0.8 m and height of the pillar above the partition wall does not exceed 0.8 m. The pillar span should not exceed 3.0 m and the fence filling must be wind permeable (wire mesh or similar material). It is used particularly for smaller land fencing installations.

The partition walls of width 200 mm with non-armoured pillars 400 x 400 mm made from the STAVOBLOCK shape elements are connected by short coupling key in the partition wall and by long coupling key in the pillar. The partition wall is embedded into the pillar at depth 100 mm. Then the pillar elements above the partition wall are connected and also blinded by means of the closing coupler. Recommended height of the partition wall above the ground should not exceed 1.2 m and pillar height above the partition wall should not exceed 0.8 m. The pillar span should not exceed 3.0 m and the fence filling must be wind permeable (wire mesh or similar material).

The partition walls of width 200 mm with armoured pillars 400 x 400 mm made from the STAVOBLOCK shape elements are connected by short coupling key in the partition wall and by long coupling key in the pillar. The partition wall is embedded into the pillar at depth 100 mm. Then the pillar elements above the partition wall are connected and also blinded by means of the closing coupler. The pillars are vertically armoured by armouring steel with diameter of single bar 8 mm in minimum quantity 4 pcs. per pillar, and poured into the concrete mortar in the pillar inner cavity and into the pillar concrete base. Recommended height of the partition wall above the ground should not exceed 2.4 m (depending on the pillar base height) and the pillar height above the partition wall should not exceed 1.2 m. The pillar span should not exceed 4.0 m and the fence filling shall be used for 50 % wind permeability (such as lath filling of lath width 50 mm and gaps between the laths 50 mm).

The partition walls of width 400 mm with non-armoured pillars 400 x 400 mm made from the STAVOBLOCK shape elements are connected by long coupling key in the partition wall and in the pillar. The pillar extends directly above the partition wall and thus it is boded with the wall. Then the pillar elements above the partition wall are connected and also blinded by means of the closing coupler. Recommended height of the partition wall above the ground should not exceed 1.6 m and pillar height above the partition wall should not exceed 0.8 m. The pillar span should not exceed 4.0 m and the fence filling must be wind permeable (wire mesh or similar material).

The partition walls of width 400 mm with armoured pillars 400 x 400 mm made from the STAVOBLOCK shape elements are connected by long coupling key in the partition wall and in the pillar. The pillar extends directly above the partition wall and thus it is boded with the wall. Then the pillar elements above the partition wall are connected and also blinded by means of the closing coupler. The pillars are vertically armoured by armouring steel with diameter of single bar 8 mm in minimum quantity 4 pcs. per pillar, and poured into the concrete mortar in the pillar inner cavity and into the pillar concrete base. Recommended height of the partition wall above the ground should not exceed 2.4 m (depending on the pillar base height) and the pillar height above the partition wall should not exceed 1.6 m. The pillar span should not exceed 4.0 m and the fence filling should be used for 50 % wind permeability (such as lath filling of lath width 50 mm and gaps between the laths 50 mm).

Partition walls armoured of width 400 mm with armoured pillars 400 x 400 mm made from the STAVOBLOCK shape elements are connected by long coupling key in the partition wall and in the pillar, armoured by steel, poured with concrete mortar and anchored to the base. The pillar extends directly above the partition wall and thus it is boded with coupler. The pillars are vertically armoured by armouring steel with diameter of single bar 8 mm in minimum quantity 4 pcs. per pillar, and poured into the concrete mortar in the pillar inner cavity and into the pillar concrete base. Recommended height of the partition wall above the ground should not exceed 3.4 m and pillar height above the partition wall should not exceed 1.6 m. The pillar span should not exceed 4.0 m and the fence filling should be used for 50 % wind permeability (such as lath filling of lath width 50 mm and gaps between the laths 50 mm).

4.1.2 Partition walls without pillars

Partition walls of width 200 mm made from the STAVOBLOCK shape elements connected by long coupling key. They are suitable in situations with limited space for the wall and where the height above the ground does not exceed 0.8 m. It is mainly used for smaller installations, such as pedestals of wired fences, decorative walls, dry base below garden cottages, bowers etc.

Partition walls of width 400 mm non-armed made from the STAVOBLOCK shape elements connected by long coupling key. Height of the wall above the ground should not exceed 1.6 m. It is used for installations of fence pedestals, partition walls, dry base of garden houses, pergolas, terraces.

Partition walls of width 400 mm, filled, armoured made from the STAVOBLOCK shape elements are connected by long coupling keys, armoured by steel, poured by concrete mortar and anchored to the base. Height of the wall above the ground should not exceed 3.4 m. It is used for installations of fence pedestals, partition walls, support walls, face basement of houses, garages, pergolas, terraces.

Partition walls of width 580 mm, 760 mm, 940 mm and higher, non-armoured made from the STAVOBLOCK shape elements, are connected by long coupling key and join rods. Height of the wall above the ground should not exceed 2.0 m at partition wall of width 580 mm; 2.4 m at partition wall of width 760 mm; 2.8 m at partition wall of width 940 mm. They are used for installations of partition wall as alternative to gabion walls, installations of anti-noise walls etc.

Partition walls of width 580 mm, 760 mm, 940 mm and higher, filled, armoured made from the STAVOBLOCK shape elements are connected with the long coupling key and join rods and filled with compacted packing material. Height of the wall above the ground should not exceed 4.0 m at partition wall of width 580 mm; 4.8 m at partition wall of width 760 mm; 6.0 m at partition wall of width 940 mm. They are used for installations of partition wall as alternative to gabion walls, installations of anti-noise walls etc.

Width of the partition walls made from the STAVOBLOCK system may be enlarged evenly by 180 mm.

Both groups may be combined within structure of single partition walls and thus the local conditions may be covered as much as possible. The designs specified above are recommended only and may not be suitable for all designs or orders, thus the manufacturer recommends consultations with manufacturer or static engineer regarding the construction of partition walls.

Partition walls with pillars				Partition walls without pillars		
	Recommended height of wall above terrain	Recommended height of pillar above terrain	Recommended span of pillars	Recommended fence filling		Recommended height of wall above terrain
	m	m	m			m
Partition wall width 200 mm, pillars 200 x 400 mm	< 0,8	< 0,8	3	wind permeable > 90%	Partition wall width 200 mm	< 0,8
Partition wall width 200 mm, pillars 400 x 400 mm	< 1,2	< 0,8	3	wind permeable > 90%	Partition wall width 400 mm non-armoured	< 1,6
Partition wall width 200 mm, pillars 400 x 400 mm	< 2,4	< 1,2	4	wind permeable > 90%	Partition wall width 580 mm non-armoured	< 2
Partition wall width 400 mm, pillars 400 x 400 mm	< 1,6	< 0,8	4	wind permeable > 90%	Partition wall width 760 mm non-armoured	< 2,4
Partition wall width 400 mm, pillars 400 x 400 mm	< 2,4	< 1,6	4	wind permeable > 90%	Partition wall width 940 mm non-armoured	< 2,8
Partition wall width 400 mm, pillars 400 x 400 mm	< 3,4	< 1,6	4	wind permeable > 90%	Partition wall width 400 mm filled, armoured	< 3,4
					Partition wall width 580 mm filled, armoured	< 4
					Partition wall width 760 mm filled, armoured	< 4,8
					Partition wall width 940 mm filled, armoured	< 6

Table 4.1 Specification of partition walls

4.2. CALCULATION OF FILLING MATERIAL CONSUMPTION

Simple calculation program, which is available to the manufacturer, may be used for basic calculation of the STAVOBLOCK shape elements for realisation of the partition walls. In principle, the quantity of the shape elements is calculated on basis of ground-plan (length) and height regarding the type of selected wall. Quantity of the filling material is calculated acc. to procedure given in this part of the recommended instruction manual.

Determination of unit areas of the filling material for modular walls:

1. Modular width of the shape element is 200 mm (STANDARD, PONY), i.e. 1 running meter of the wall requires 5 pcs. of the shape elements.
2. Modular width of the shape element is 400 mm (JUMBO, FLAT), i.e. 1 running meter of the wall requires 2.5 pcs. of the shape elements.

Unit area of filling material is determined acc. to point 1.

Area of inner space of the face module (face element + long drawbar + face element):

- Space inside the element $5 * (0.2 * 0.16) = 0.16 \text{ m}^2/\text{running meter}$

Unit filling area - face elements $A1 = 0.16 \text{ m}^2/\text{running meter}$

5. STRUCTURE OF STAVOBLOCK PARTITION WALL SYSTEM

Partition walls from the STAVOBLOCK system consists from mutually replaceable parts, which may be used in various combinations and thus different cases of partition walls may be solved. The designer should make acquainted with this simple system to be able to use its universal features.

5.1 System concrete elements

STAVOBLOCK system concrete elements are made by vibrocompacting technology. This technology presumes use of very low water-cement ratio. The production technology, consistency of concrete mixture and use of high-strength cements enable shaping of special system of vertical keys and grooves, which mutually interlock. This joint is also simply called dovetail lock. The dovetail lock connects individual elements of the system, enables mutual exchangeability and ensures fixed joint between individual elements of the system, which are specified in sections 2.1.1 and 2.1.2.

5.2 STAVOBLOCK system anchoring principle

Individual elements of the system are mutually jointed into various anchoring assemblies to create required shape of the partition wall. The connection is realised by key and groove of the dovetail lock, which is shaped in each element, where the face elements are positioned back-to-back. It is quick and simple connection, which does not require any tools, mortar or glue, if it is not required by realisation, such as armoured walls and/or pillars. We distinguish three main groups of the anchoring arrangement:

5.2.1 Dense anchoring

This arrangement consists from main face elements located back-to-back and mutually connected by short key. Total width of the arrangement is 200 mm.

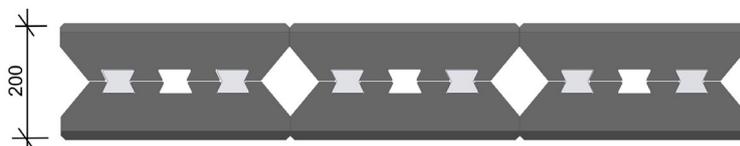


Fig. 5.2.1a: Jumbo or Flat

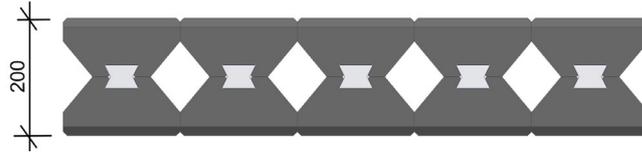


Fig. 5.2.1b: Standard or Pony

5.2.2 Single anchoring

This arrangement consists from main face elements located back-to-back and mutually connected by T-coupler. Total width of the arrangement is 300 mm.

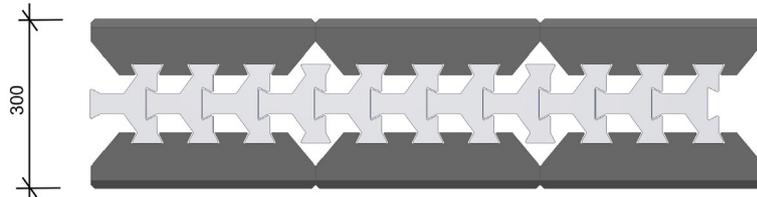


Fig. 5.2.2a: Jumbo or Flat

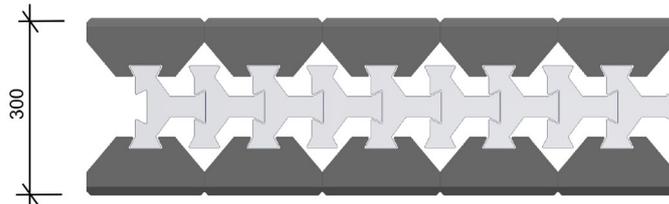


Fig. 5.2.2b: Standard or Pony

5.2.2 Single anchoring

This arrangement consists from main face elements located back-to-back and mutually connected by Long coupler. Total width of the arrangement is 400 mm.

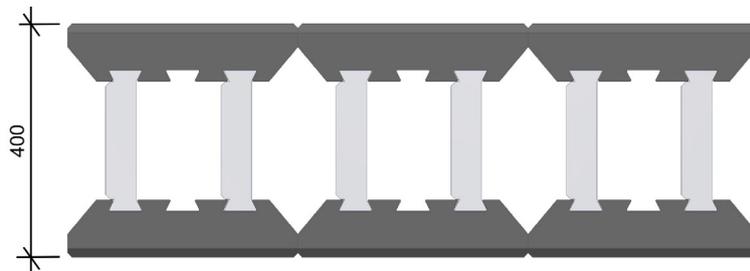


Fig. 5.2.2c: Jumbo or Flat

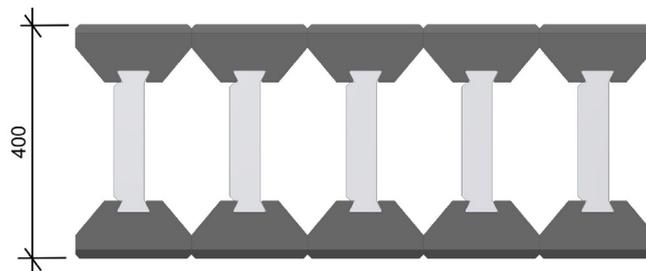


Fig. 5.2.2d: Standard or Pony

5.2.3 Multiply anchoring

This arrangement consists from main face elements located back-to-back and mutually connected by join rods and long key.

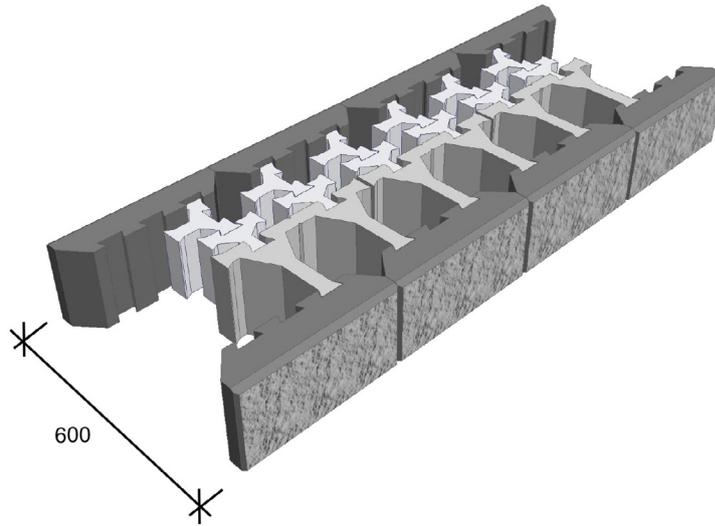


Fig. 5.2.3a: Doubled anchoring: Face element – Join rod – 2x T coupler – Face element

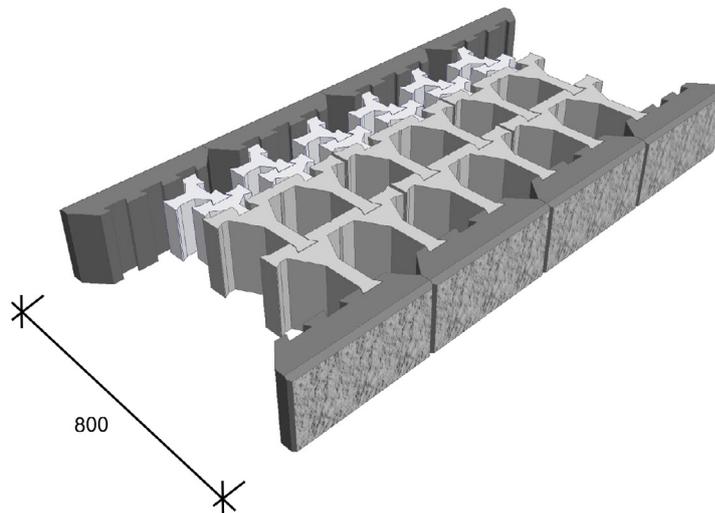


Fig. 5.2.3b: Triple anchoring: Face element – 2 x Join rod – 2x T-coupler – Face element

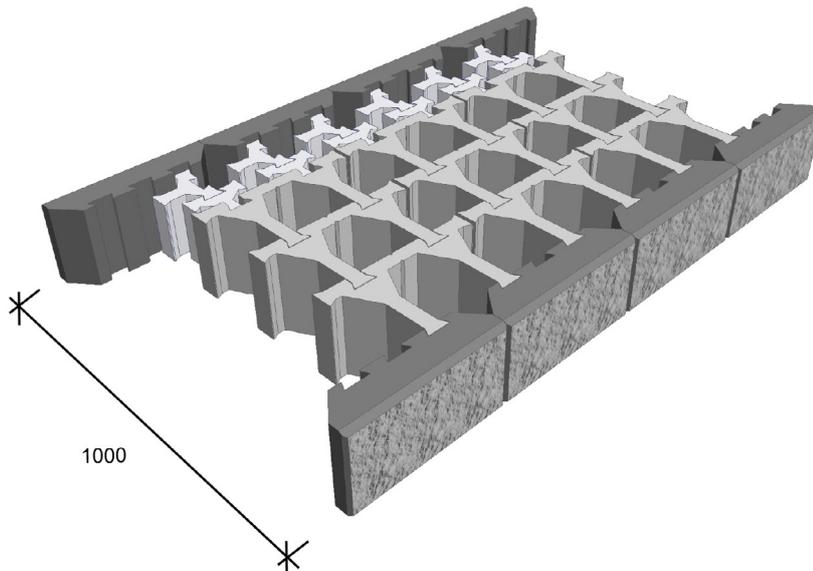


Fig. 5.2.3a: Quadruple anchoring: Face element – 3 x Join rod – 2x T-coupler – Face element
Arrangement total width: + each new anchoring: + 180 mm

5.3 Assembly of STAVOBLOCK partition walls

Construction of partition walls from the STAVOBLOCK system is realised mainly by dry assembly method, but the pillars are armoured in majority cases, the construction is simpler and quicker to construction of traditional mortar

walls. Assembly of walls is simple and may be performed by non-qualified workers under supervision of experienced and trained foreman.

5.3.1 Wall bond

The shape elements from the STAVOBLOCK JUMBO, STANDARD and FLAT system are erected to the facing bond in each row, i.e. upper shape element is offset by its half to the shape element below, as shown on fig. 3.1.1a, 3.1.1b and 3.1.1c. The shape element from the STAVOBLOCK PONY system is erected to the facing bond in each other row in case of separate use for construction of support wall, as shown in fig. 3.1.1d. Butt joints between adjacent shape elements need not be necessarily adjusted in top to bottom direction, but may vary.

Following instructions are recommended for erection of the wall to prevent the occurrence of major inaccuracies during erection:

- In walls with foundation base at different levels, start the erection at lowest point
- Select face elements alternatively from various pallets to uniformly mix eventual slight deviations in colours within face area of the wall
- Adjacent blocks in the same layer are positioned mutually closely
- In flat wall, start the erection in the centre and proceed towards both ends
- In angled wall, start the erection in corner and proceed towards the ends
- In walls, which are angled simultaneously, start the erection in corners, which feature angle 90° or angle closes to the right angle
- In setting of other row start at the same points, as in the previous row
- Regularly inspect level of the layers both along the wall, and along the width of the wall or vertical line of the pillars
- Never perform backfilling and compacting of the wall for more than two layers of the blocks

5.3.2 Wall backfilling

During backfilling of the retaining walls follow instructions given in par. 5.3.2 and 5.3.2.1 in the instruction manual for Assembly of Supporting Walls.

6. RULES FOR CONSTRUCTION OF PARTITION WALLS FROM STAVOBLOCK SYSTEM

Building of the wall from the STAVOBLOCK system is quick and simple in case the construction standard procedures are adhered to. This section describes the basic rules, which should be adhered to during construction of the partition wall. The construction schedule should be elaborated before launching of the construction. If the detailed design project specifies other rules, then the design project takes priority.

6.1 Partition wall position layout

The partition wall layout must be positioned acc. to preliminary or detailed design project. In more complex cases the position layout shall be made by geodesist, in simpler cases the layout may be made by qualified worker, if the company does not have a geodesist available. The position layout shall be made by means of theodolite in relation to actual structures, parking lots, buildings etc.

6.2 Dugout for partition wall structure

Stable and uniform foundation is required for successful realisation and long lifetime of the partition walls from the STAVOBLOCK system.

Dugout for partition wall may be divided to following stages:

6.2.1 Main dugout

Main dugout ensures relatively flat working surface to whole width of the wall. The dugout shall be made for whole length of the wall. If the terrain is sloppy in the longitudinal direction, then a stepped dugout shall be made. The dugout shall enable comfort construction of the wall and easy access for supply of material. Typical dugout is shown in fig. 6.2.2a and should fulfil following conditions:

- Total volume of the dugout should be minimized. Bottom of the main dugout should be flat as much as possible. The level of the dugout bottom should be ca 150 mm to 200 mm below lower face of future gravel bed. The dugout width should exceed 250 mm before and after the wall.
 - During realisation of the dugout, special attention shall be paid to prevent undercutting of the foundation of adjacent buildings, roads, parking lots etc. or endangering of their stability. In more complex cases, the stability of back wall and adjacent structures can be ensured by some of the methods of special building settlement.
 - Dugout soil should be sorted acc. to type and stored in separate dumps. The soil can be used acc. to the type and need as compacted soil, backfill or clay seal.
 - Before making the dugout the measures against the storm water shall be taken. The dugout should be protected against running water by drainage ditches, kennels, dams, resp. dewatering wells.

6.2.2 Dugout for gravel bed

The dugout for gravel bed, which form base of the wall, is made in narrow dugout, which exceeds ca 200 mm on both sides of the wall width at lowest point - see fig. 6.2.2a. Dugout for gravel bed should fulfil following criteria:

- Upper face of the gravel bed (i.e. bed joint between the gravel bed and shape element) shall be minimum 200 mm, resp. min. 150 mm below adjusted terrain.
- Upper face of the gravel bed should be determined by designer.
- The gravel bed need not to be necessarily below the non-freezing depth.
- The dugout bottom for gravel bed should be sloped at min. angle 1:12, i.e. ca 5°, or ca 8% towards the wall centre line.

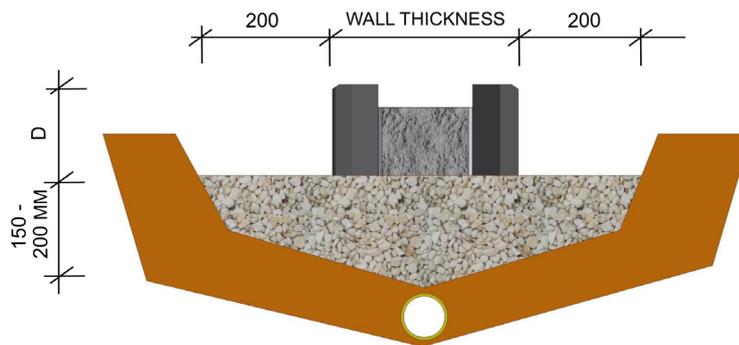


Fig. 6.2.2a Example of dugout for gravel bed

Gravel bed thickness

The gravel bed should guarantee uniform and flat base, onto which first layer of the STAVOBLOCK system shape elements shall be established. Thickness of the gravel bed varies, as the dugout bottom shall follow slope of the drainage pipe. The bed thickness should range from 150 to 200 mm.

Height location of gravel bed

The gravel bed need not to be necessarily below the non-freezing depth. It is expected that gravel bed interrupts the capillary ascension of the water from bedrock. In addition it is expected that the water contained in the gravel bed main expand after freezing into the space between grains and thus it does not apply the pressure to the structure of partition wall. Exceptions are soils, which tend to freeze and are running and instable after de-freezing. With these soils it is necessary to prevent their freezing, i.e. the foundation base must be situated between the gravel bed and foundation soil below the non-freezing depth. In this case, the structure of the wall below terrain may form higher thickness of the gravel bed and/or minimum thickness of the gravel bed and further the blocks of the partition wall. Height location of the gravel bed also depends on slope of the terrain in front of the partition wall.

Compacting of the dugout bottom:

The dugout bottom for gravel bed shall be compacted. Before compacting it is necessary to remove the running soil from the dugout bottom and replace it with stable soil. The dugout bottom should be compacted to min. 95% of Proctor standard test.

6.2.3 Sunk dugout for drain pipe

The drain pipe may be alternatively located to sunk dugout before or after the STAVOBLOCK wall. Such design may increase slope of the drain pipe and thus to improve the water gravitation drainage. Fig. 6.2.3a shows example realisation of the dugout for drain pipe, whose width is minimum 200 mm and height depends on slope of the drain

pipe. All other instructions and recommendations remain the same as in dugout for standard gravel bed.

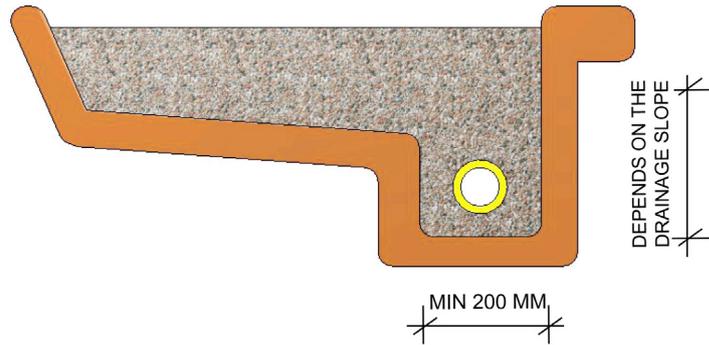


Fig. 6.2.3a Example sunk dugout for drain pipe

6.2.4 Positioning of gravel bed and drain system

The gravel bed form base for partition wall composed from individual shape elements. Its quality principally affects quality of whole partition wall. The gravel bed is also key element in whole drain system of the partition wall. Following section describes individual conditions, which shall be met to fully use the function of the gravel bed.

6.2.5 Positioning of main collecting drain pipe

The main collecting drain pipe is to be positioned to lowest point of the gravel bed and ensures drain of water from whole drain system of the wall. The drain pipe is usually sloped toward ends of the wall. When the wall is too long or when sufficient slope cannot be achieved, it is necessary to make interim outfalls. Position of the main collecting pipe, its slope and outfalls should be drafted in the project documentation. Requirements to the drain pipes are as follows: **Main collecting drain pipe and outlet pipe** should have diameter 100 mm or 150 mm and made from corrugated or profiled HDPE or PVC

Main collecting drain pipe serves to collecting of water, which penetrated through the wall, and to its drainage into the outlet pipe. Installation is as follows - slight layer of drainage material is to be housed in required slope to treated dugout bottom and then it is to be well compacted. Then main drain pipe is located; a perforated pipe is to be used.

Outlet pipe serves to drainage of water from the main collecting drain pipe out of the wall. It is to be located in dugout, which is perpendicular to the gravel bed. The outlet pipe is not perforated and dugout outside the gravel bed. may be backfilled by dugout soil.

Pipe joints perforated main drain pipe and non-perforated outlet pipe are mostly jointed by the T-shape coupler.

6.2.6 S Standard gravel bed

Mostly the standard gravel bed is used, as its realisation is quick and simple. By standard bed we mean the bed with flat upper face. Following rules shall be adhered to during positioning of the gravel bed:

- Positioning of the gravel bed should start from lowest level point
- Drain material (gravel bed material) is positioned ca by 30 mm above the value specified by the design project
- Level adjustment of the bed upper face shall be inspected before setting of other row of the shape elements. Setting depth of the shape elements below the treated terrain shall be min. 100 mm below the terrain or acc. to the design project.

Alternatively, the gravel bed may be established as follows:

- Lean plain concrete, resp. other liquid fill, which will gain certain strength
- Well sorted and worked stones, which forms zero layer of the masonry

In all cases the drainage of water from the wall to the drain pipe shall be enabled. It for example means that eventual concrete layer must not be continuous, but interrupted, to enable drainage of water in points without concrete cover. The concrete layer significantly simplifies establishment of the masonry first layer.

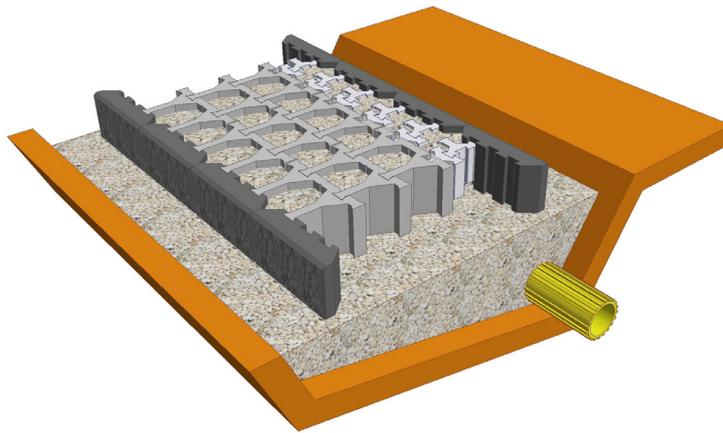


Fig. 6.2.6a Compacting of gravel bed

6.3 Setting of first layer of shape elements

First layer of the shape elements is set onto prepared gravel bed. This stage is most demanding regarding the time. Preparation of the gravel bed and laying of first layer of the shape elements take ca 15% to 25% from total wall construction time. Proper setting of the first layer is very important for proper construction of whole wall.

The construction usually starts at the wall lowest point. The procedures described below apply both for flat, and for sloped gravel bed.

6.3.1 Laying of first layer

Procedure for laying of the first layer is as follows:

- Precise horizontal position is ensured by tracing picket and cord
- In partition walls, at which the first layer is set to the lean concrete layer, the correct position (street line) of the face elements may be marked with chalk
- The face element is set to correct horizontal position and height-adjusted in relation to the adjacent elements, the anchoring coupling elements are inserted to dovetail grooves and back face element is inserted. Minor adjustments downward are carried out by rubber hammer, upward by adding the drainage material.

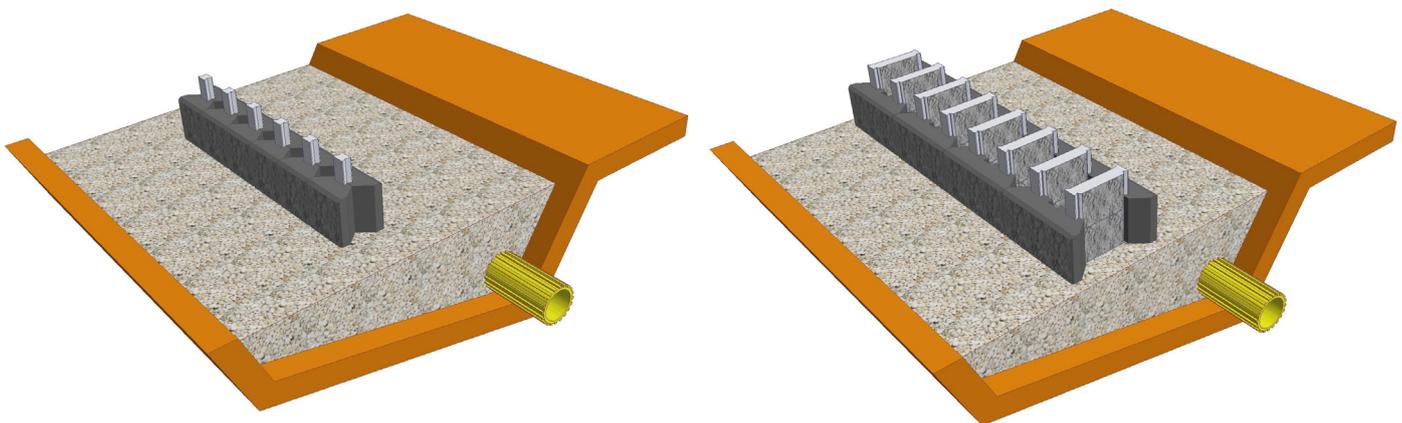


Fig. 6.3.1a,b Setting of first row of width 200/400 mm (face elements with short coupler)

6.3.2 Laying of second and other rows of anchoring elements

Anchoring elements of the STAVOBLOCK system are used to create required width of the partition wall. Procedure for laying of the first layer is as follows:

- When the first row of right-hand (street) face elements with join rods is laid, then the anchoring elements (join rods) of the second and other row are laid by simple insertion of the join rod dovetail key into dovetail groove of previous element
- Each element is located into correct horizontal position and height-adjusted in relation to the adjacent elements - both laterally, and in forward-backward direction. Minor adjustments of the elements downward are carried out by rubber hammer, upward by adding the drainage material.
- When the required width is achieved, last row of elongation is formed from long coupler and positioned to the left-hand face element.

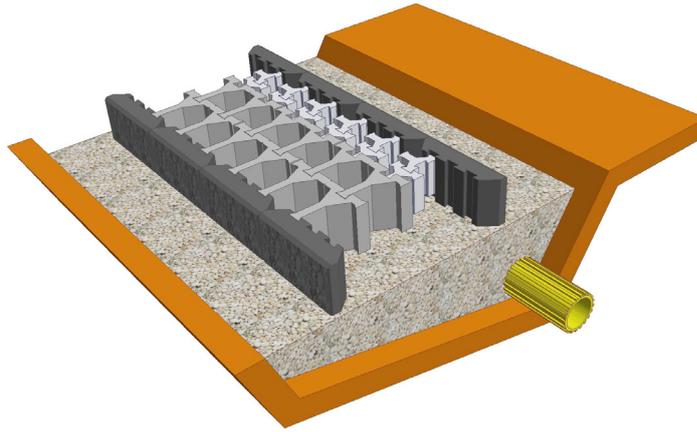


Fig. 6.3.2a: Adjustment of second and other row of the anchoring elements with positioning of the left-hand face element

6.3.3 Filling of first layer

When required by the design project, it is possible to back-fill the partition wall of width 400 mm and larger. Standard procedure for filling of shape elements and requirements to backfill material are given in par. 4.4. of the instruction manual for construction of support wall. During backfilling it is recommended to increase the backfill material by ca 40 mm to 50 mm above the shape element upper face. This material both serves for adding of material during compacting, and covers and protects the shape elements during compacting.

6.3.4 Compacting of first layer

The backfill material is compacted manually. To prevent damage of the shape elements the manual pounder shall not impact directly the shape elements. During whole compacting, the shape element surface shall be protected by layer of backfill material of minimum thickness 30 mm.

6.3.5 Height adjustments in laying of first layer of shape elements

In certain cases of the partition walls the terrain along the wall - and also wall height - lowers. Bed joint between the gravel bed and establishing shape elements are in this case adjusted in steps according to the terrain. Even the gravel bed must be adjusted in steps. Height of individual step mostly equals to height of the shape element. With heavy slopes or at walls around the terrain staircases, the step height may equal to the height of two shape elements. Procedure for laying of the first layer of shape elements is the same as for laying of the first layer of shape elements with flat setting with following exceptions:

- Slope of the drain pipe will usually follow the terrain slope. At point of the drain pipe it is necessary to adjust the stepped bottom to the sloped bottom
- In inclined walls it is necessary to take into account that base shape elements of the higher step cannot be set in the same ground-plan line as the base shape elements of the lower step, but they shall be offset. This fact must be taken into account during realisation of the main dugout for the wall, resp. - acc. to the terrain slope - in dugouts for gravel bed, which are usually done simultaneously before the wall construction is started
- The wall construction usually starts at the wall lowest point.
- It is recommended to lay the first layer of the shape elements only in such length of the wall, which is at the same level. After completion of this layer, i.e. after it is backfilled and compacted, proceed with laying of the layer of the next step. The base layer of this level continually became the second layer in area of deeper wall. If the base layers are laid in various height levels, then the horizontal and vertical inaccuracies may occur.

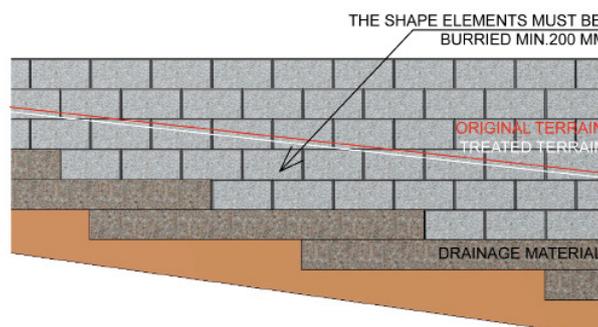


Fig. 6.3.5a: View to partition wall with height adjustments in laying

6.4 Laying of partition wall

Laying of other layers of the STAVOBLOCK shape elements should continue up to planned head of the partition wall acc. to below specified rules. This part of the construction covers mostly repeated the actions, which leads to more effective construction and time savings.

6.4.1 Cleaning of STAVOBLOCK shape element upper surface

Upper surface of the STAVOBLOCK blocks shall be cleaned and prepared for laying of next layer. Residual backfill material on the shape elements after compacting of previous layer must be removed e.g. by flat spade, then the shape elements shall be wiped by broom. Other recommendations are as follows:

- For easier positioning of the anchoring join rods it is recommended to level the backfill material between anchoring join rods of previous layer of masonry
- Anchoring join rods of the lower layer need not to be cleaned, if they do not support other join rods
- Redundant backfill material may be accumulated above the anchoring join rods of previous layer, i.e. at points between anchoring join rods of following layer
- Cleaning shall be carried out properly, as small grains of sand and gravel, which eventually remain on the shape element surface, onto which shape elements of next layer will be fitted, can cause masonry inaccuracies

6.4.2 Laying of next layer of STAVOBLOCK shape elements

Each additional layer of masonry from the STAVOBLOCK shape elements should be laid to running bond as described in chapter 3.1 and shown in fig. 3.1.1a -d. (Each second and additional layer in PONY shape elements.)

Following recommendations should be followed during construction of other wall layers:

- Select the face elements from different pallets. This will ensure uniform alternation of eventual minor differences in colour tone
- Inspect in each layer, whether the shape elements are adjusted both horizontally, and in height
- Occasionally adjusting backing shall be used under the shape elements. Bituminous shingles or preferably backfill by fine (cut-out) sand may be used as backing. Max. backing thickness is 3 mm.
- Adjacent face elements are positioned closely
- Butt joints need not to be aligned from top to bottom in line, but they may deviate
- Embedding of cut face elements shall be minimized as much as possible. The elements should be laid as close to the ends of walls or wall corners as possible and they shall enable fitting of anchoring join rod.

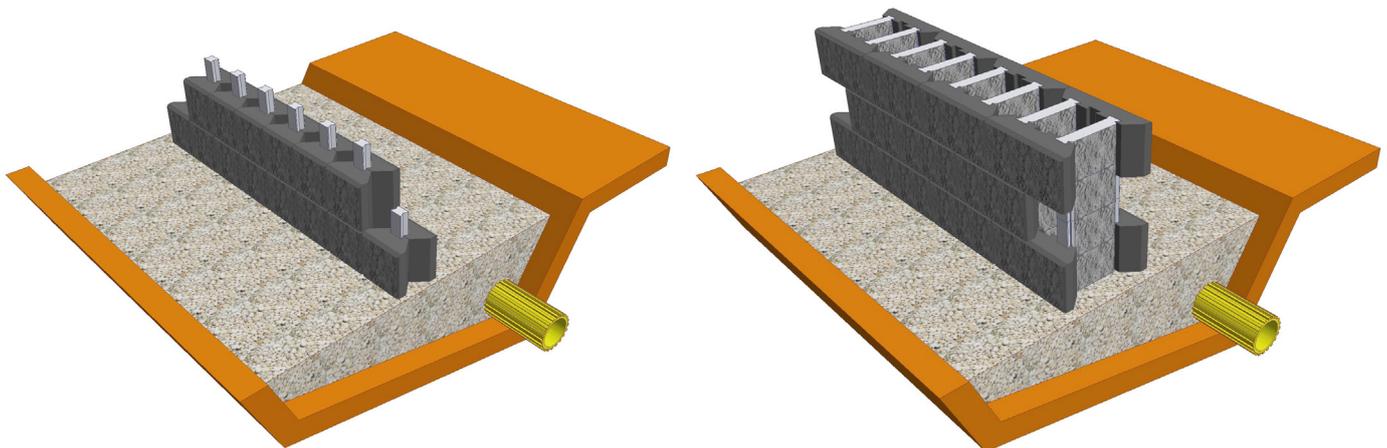


Fig. 6.4.2a: Laying of next layer of STAVOBLOCK shape elements - wall width 200/400 mm

6.4.3 Termination of masonry individual layers

During wall construction it is recommended to terminate and inspect the performed works after each layer of masonry, max. after two layers. Such inspection of quality minimizes effects of eventual errors to total work and saves time and money caused by eventual repairs. Particularly following items are to be checked:

- Horizontal levelling of the wall, verticality, resp. inclination of the wall, eventual offset of shape elements, level adjustment of the layer, alignment between designed and actual height level of the layer.

6.5 Completion of partition wall

Completion of the partition wall represents realisation of several final details, which are to lead to increase of its durability and improve its aesthetic appearance.

6.5.1 Z Covering of partition wall

When the wall is built up to design edge, it shall be terminated. The wall is terminated by means of the covering elements. Surface of last face elements must be cleaned acc. to procedure described above. Choice and position of the covering elements may create different architectonic appearance of the wall. The covering elements may be located onto the face elements in shear (one covering element per each face element) or to running bond (offset of half length of the shape element), as in lower rows. The covering elements may be set in cross direction:

With offset

- Standard offset is 15 mm. This type of covering is selected in case the whole wall in each layer is offset by 15 mm
- Minimizes perception of covering elements
- Perceived covering elements match their geometric pattern

Aligned with the face shape elements below

- Covering shape elements are perceived as the boundary element

With offset

- Standard offset is 15 mm
- It features strong boundary effect
- Offset puts shade to the lower shape elements
- It enables covering of minor inaccuracies at the wall plane

The covering element features flat surface, as it is suitable also as the thread board of terrain staircases.

In some cases the covering elements require adjustment. Preferably they can be adjusted by means of high-speed saw with diamond wheels, resp. by booster. To prevent vandalism and fall it is recommended to bond the covering elements to the face elements by anti-freeze glue. Before gluing the covering and face elements must be clean and dry. The glue is applied in two continuous beads parallel to the wall, before and after the holes for connecting pins. The covering elements are laid onto face elements and pressed to distribute the glue to width. Maximum three elements shall be glued simultaneously. Then it is necessary to follow the glue setting time, usually 24 hours.

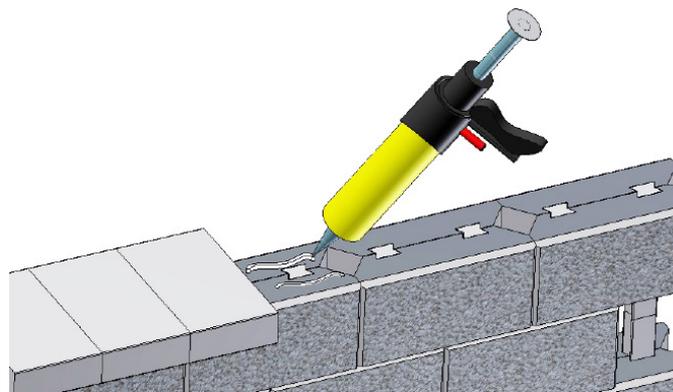


Fig. 6.5.1a Covering of wall

6.5.2 Covering of pillars

Covering of pillars is usually performed by means of termination head. Pillar of ground-plan size 200 x 400 mm is to be covered by head of size 250 x 500 mm, pillar of ground-plan size 400 x 400 mm is to be covered by the head of size 500 x 500 mm. These heads are anchored to the pillars by means of anti-freeze glue or standard glue similarly as the covering plates - see par. 6.5.1.

7. OTHERS

7.1 Built-in switchboard

Pillars made from the STAVOBLOCK system elements can easily accommodate e.g. switchboard, main gas shut-off etc. Within ground-plan, the pillar width always exceeds the width of built-in distribution box by 200 mm, and the depth exceeds the depth of built-in distribution box by 100 mm.

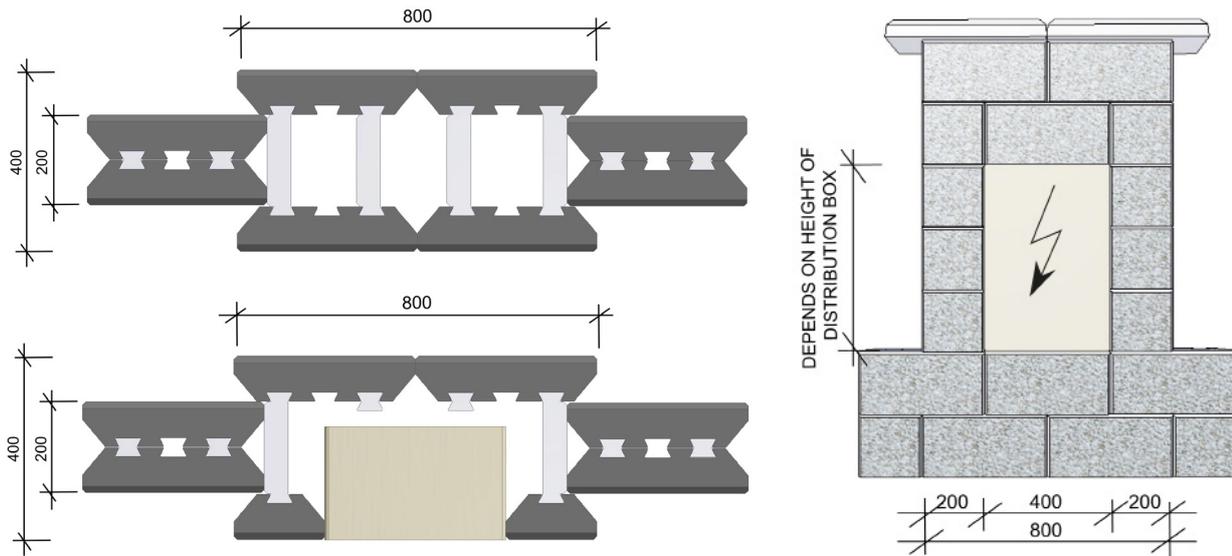


Fig. 7.1a Built-in switchboard 600 x 400 mm

7.2 Fixing of fence filling

The fence filling is anchored between two pillars made from the STAVOBLOCK system by means of dowel pins and angle-piece drilled directly into the block or closing coupler. Use e.g. dowel pins MUNGO 8 x 80 mm for anchoring.

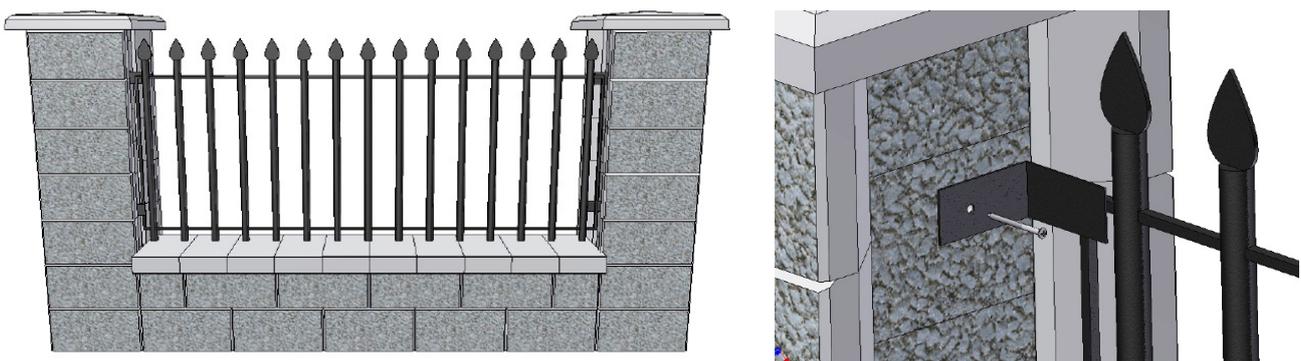


Fig. 7.2a Fixing detail - Anchoring angular piece screwed to closing coupler

7.3 Fixing of hinges for gates and wickets

The gates and wickets are fitted to armoured pillars 400 x 400 mm. Anchoring of the hinges is realised by means of dowel pins through covering couplers into the armoured core of the pillar. For anchoring, it is necessary to use the dowel pins of minimum length 160 mm and diameter and quantity acc. to the gate weight.

For heavy gates and wickets, it is possible to concrete the thick-walled tube into the pillar cavities up to the foundation and to open the anchoring irons through closing couplers to install the hinges.

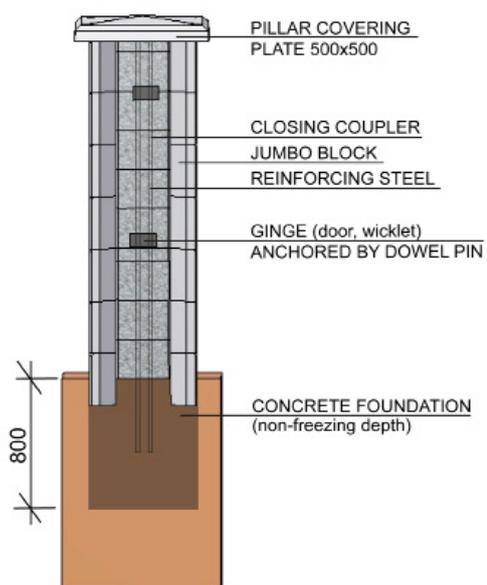


Fig. 8.3a Fixing of hinges by means of dowel pins directly to the pillar

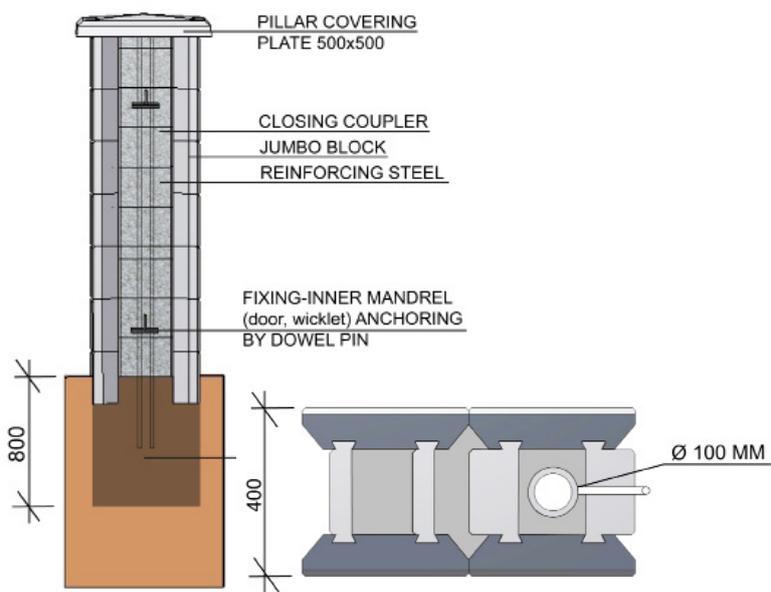


Fig. 8.3b Fixing of hinges by means of steel mandrel concreted into the pillar cavity



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