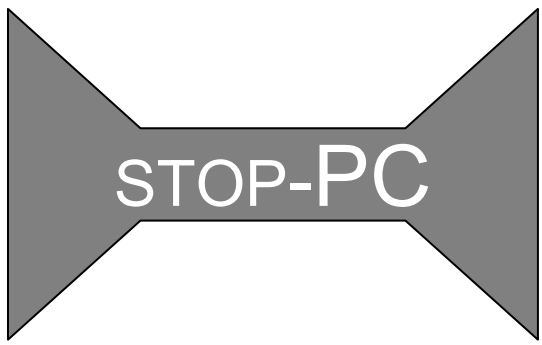
VADEMECUM STOP

TIMBER WALL TO WALL SHORES (horizontal and sloped)



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ABRUZZO EARTHQUAKE 2009
COORDINATION TEAM FOR TEMPORARY WORKS

WORKING GROUP FOR THE VADEMECUM STOP
under the supervision of Sergio Basti - Central director for emergency and urgent technical rescue manual licensed by note no. EM3064/5001-11 dated 2009-06-15

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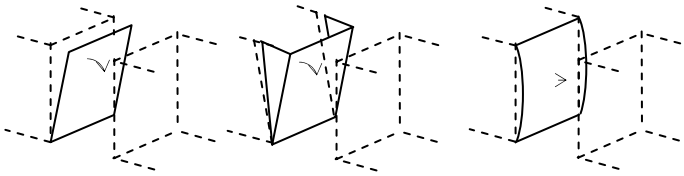
TIMBER WALLL TO WALL SHORES: general recommendations

STOP-**PC**

Movement to constrain:



rotation bulging

Description

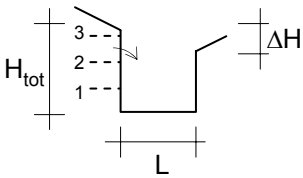
The intervention consists of the placement of a supporting timber structure between buildings that are not too far apart.

Warning

The intervention is allowed only under the permission of local Authorities because of the possibilities of damages to the support building due to aftershocks.

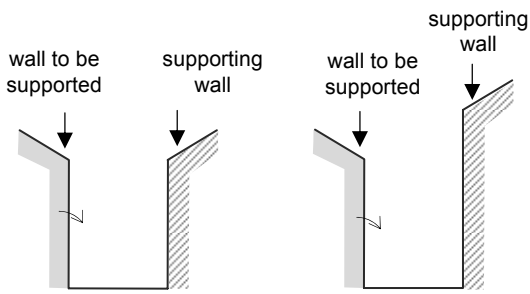
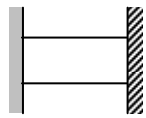
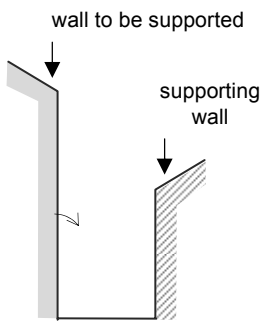
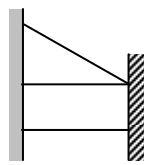
Function of the shore: to prevent further rotation or bulging of the wall.

SELECTION CRITERIA



The use of the present procedure is allowed if:
$L \leq 8.0$ m, $H_{tot} \leq 9.0$m, $\Delta H \leq 4.0$m
(see below)

If $L > 8.0$ m or $\Delta H > 4.0$m or the number of the floors is more than 3 or $H_{tot} > 9.0$m, other specific procedures are required

SCENARIO		SOLUTION
The heigth of the wall to be supported is the same as the heigth of the supporting wall		P PARALLEL SHAPE 
The wall to be supported is higher than the supporting wall		S SLOPE SHAPE 

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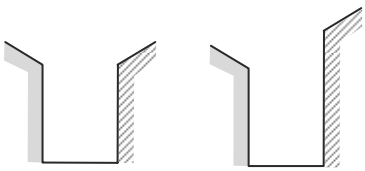
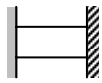
PARALLEL SHAPE SHORE: main scenarios

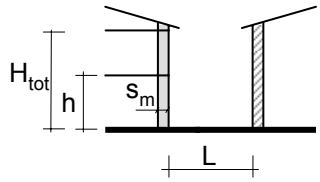
STOP-**PC**



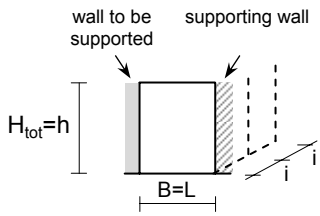
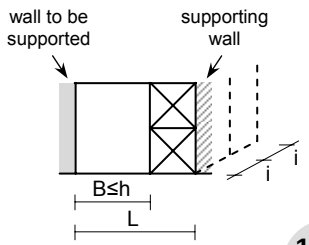
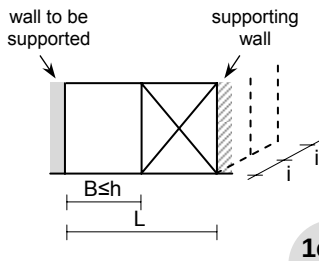
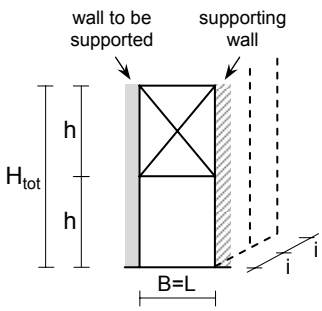
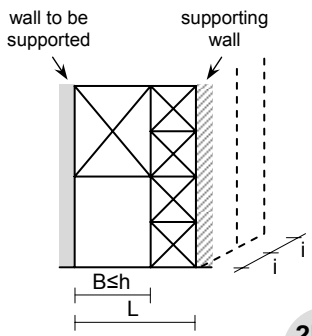
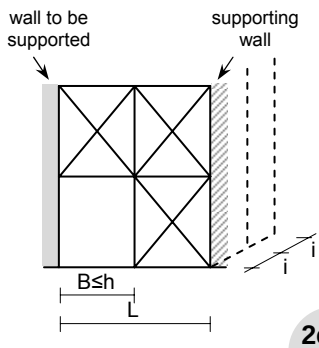
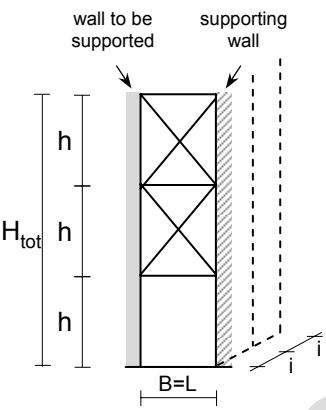
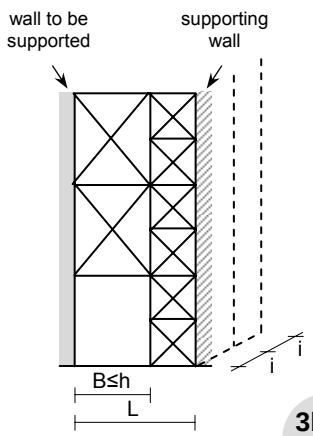
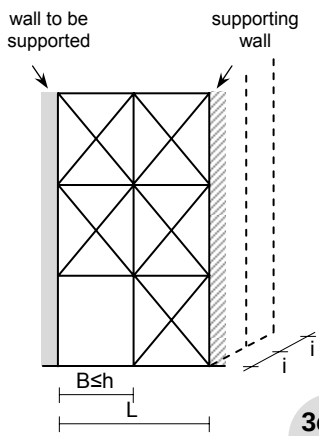
P



PARALLEL SHAPE



MAIN SCENARIOS

P	a L ≤ h	b h < L ≤ 1.5h	c 1.5h < L ≤ 2h
1 Shoring at the first floor	 1a	 1b	 1c
2 Shoring at the second floor	 2a	 2b	 2c
3 Shoring at the third floor	 3a	 3b	 3c

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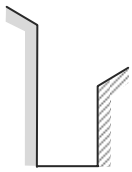
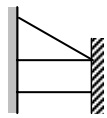
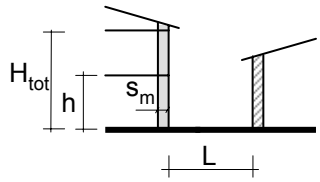
SLOPED SHORE: main scenarios

STOP-**PC**

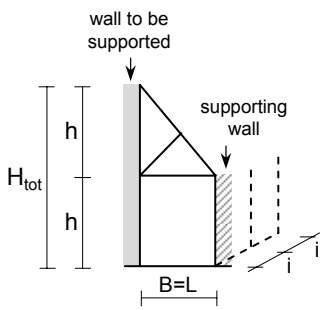
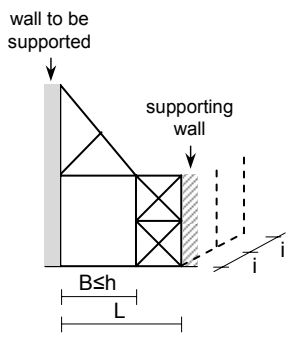
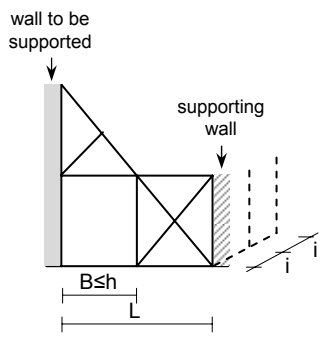
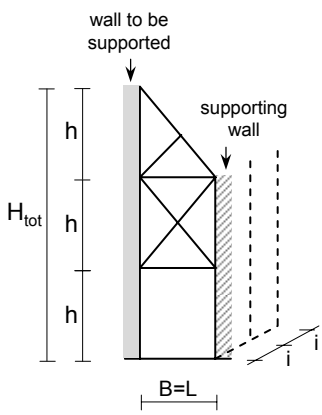
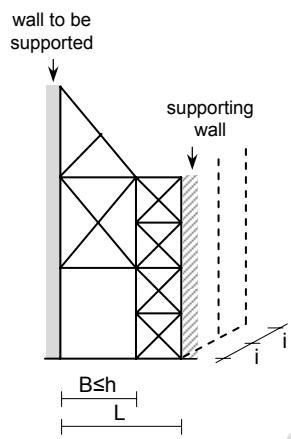
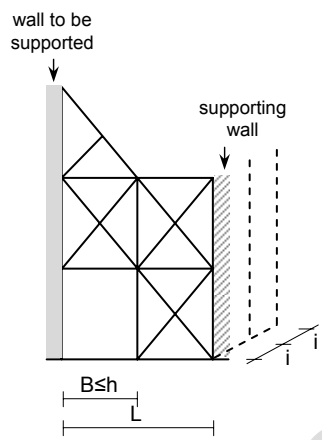


S SLOPING SHAPE





MAIN SCENARIOS

S	a L ≤ h	b h < L ≤ 1.5h	c 1.5h < L ≤ 2h
2 Shoring from the second to the first floor	 2a	 2b	 2c
3 Shoring from the third to the second floor	 3a	 3b	 3c

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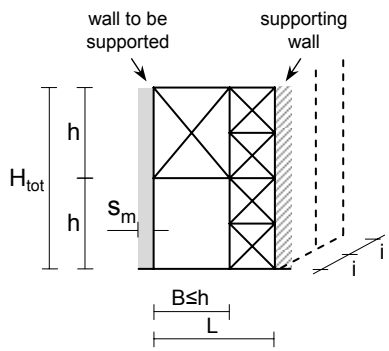
HORIZONTAL SHORE: sizing

STOP-**PC**

Structural sketches



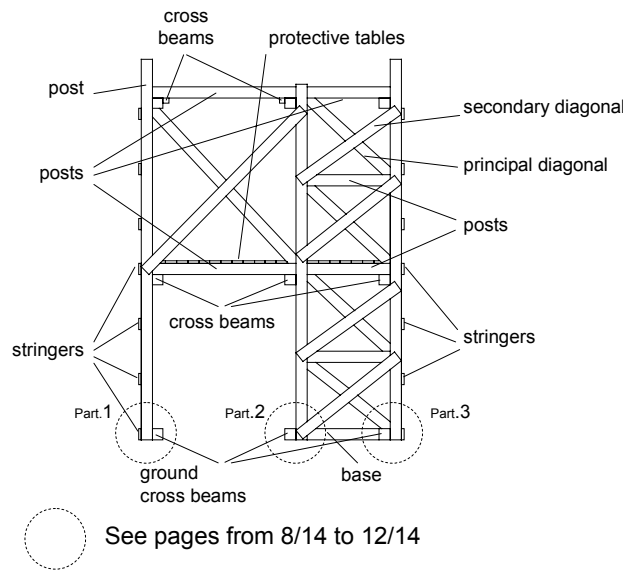


Table 1 – Horizontal shore: sizing of the main elements

P	Minimum dimensions of UPRIGHTS, POSTS, CROSS BEAMS AND DIAGONAL TIMBERS							
	Seismic class A *				Seismic class B *			
Height H_{tot} (m)	Maximum width of the wall to be supported: $s_m \leq 0.6$ m		Maximum width of the wall to be supported: $0.6 \text{ m} < s_m \leq 1.0$ m		Maximum width of the wall to be supported: $s_m \leq 0.6$ m		Maximum width of the wall to be supported: $0.6 \text{ m} < s_m \leq 1.0$ m	
	Section (cmxcm)	Distance between the axes i (m)	Section (cmxcm)	Distance between the axes i (m)	Section (cmxcm)	Distance between the axes i (m)	Section (cmxcm)	Distance between the axes i (m)
$6\text{m}<H_{tot} \leq 9\text{m}$	20 x 20	max 2.0	20 x 20	max 1.5	20 x 20	max 2.0	20 x 20	max 2.0
$3\text{m}<H_{tot} \leq 6\text{m}$	18 x 18	max 2.0	20 x 20	max 2.0	15 x 15	max 2.0	18 x 18	max 2.0
$H_{tot} \leq 3\text{m}$	15 x 15	max 2.0	18 x 18	max 2.0	13 x 13	max 2.0	15 x 15	max 2.0

(*) For the seismic classes see the Annex 1
If no Annex 1 is provided, seismic class A should be used

Secondary elements	
base	as the main elements
locking elements (see page 7/14)	as the main elements
ground cross beams	sections 15x15 cm or more
cross beams	sections 10x10 cm
secondary diagonal	boards 5x20 cm screwed/nailed by 3 screws Ø5x100 mm or by 3 nails L = 100 mm each edge placed on both the sides of the principal diagonal
stringers	boards 5 x 20 cm with 1 m as the max distance between centres placed on the continuous parts of the wall
protective tables	boards 5x20 cm

The dimensions in table 1 can be used for all the configurations showed on page 2/14

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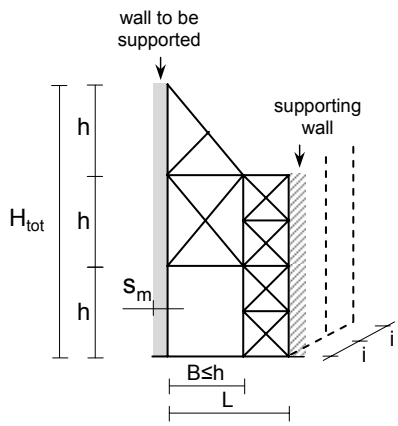
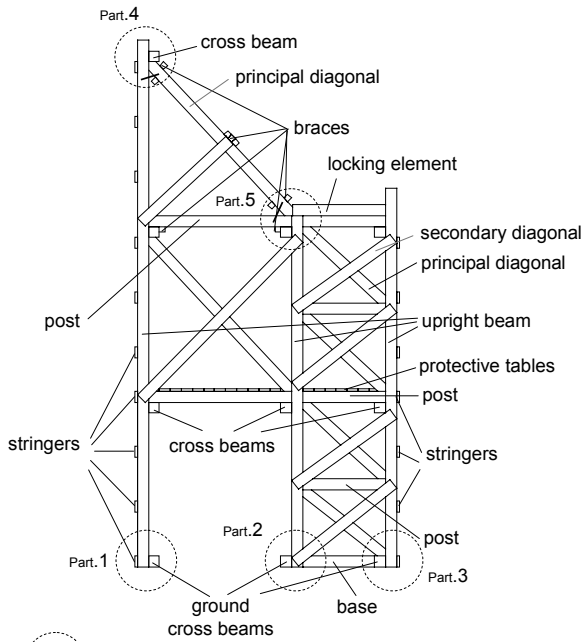
HORIZONTAL SHORE: sizing

STOP-**PC**

Structural sketches





See pages from 8/14 to 12/14

Table 2 - Sloped shore: sizing of the main elements

S	Minimum dimensions of UPRIGHTS, POSTS, CROSS BEAMS AND PRINCIPAL DIAGONAL TIMBERS							
	Seismic class A *				Seismic class B *			
Height H_{tot} (m)	Maximum width of the wall to be supported: $s_m \leq 0.6$ m		Maximum width of the wall to be supported: $0.6 \text{ m} < s_m \leq 1.0$ m		Maximum width of the wall to be supported: $s_m \leq 0.6$ m		Maximum width of the wall to be supported: $0.6 \text{ m} < s_m \leq 1.0$ m	
	Section (cmxcm)	Distance between the axes i (m)	Section (cmxcm)	Distance between the axes i (m)	Section (cmxcm)	Distance between the axes i (m)	Section (cmxcm)	Distance between the axes i (m)
$6\text{m}<H_{tot} \leq 9\text{m}$	18 x 18	max 2.0	20 x 20	max 2.0	15 x 15	max 2.0	18 x 18	max 2.0
$3\text{m}<H_{tot} \leq 6\text{m}$	15 x 15	max 2.0	18 x 18	max 2.0	15 x 15	max 2.0	15 x 15	max 2.0

(*) For the seismic classes see the Annex 1
If no Annex 1 is provided, seismic class A should be used

Secondary elements	
base	as the main elements
locking elements (see page 7/14)	as the main elements
ground cross beams	sections 15x15 cm or more
cross beams	sections 10x10 cm
secondary diagonal	boards 5x20 cm screwed/nailed by 3 screws Ø5x100 mm or by 3 nails L = 100 mm each edge placed on both the sides of the principal diagonal
stringers	boards 5 x 20 cm with 1 m as the max distance between centres placed on the continuous parts of the wall
protective tables	boards 5x20 cm

The dimensions in table 2 can be used for all the configurations showed on page 3/14

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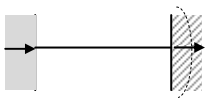
TIMBER WALLL TO WALL SHORES: critical considerations

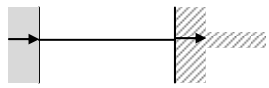
STOP-**PC**

Critical consideration
Posts could punch through the supporting wall



Plan

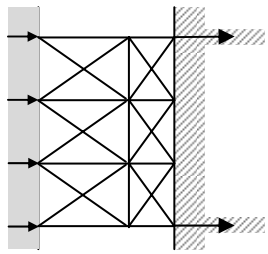
Safety criteria:
position the posts in line with perpendicular walls attached to the supporting wall



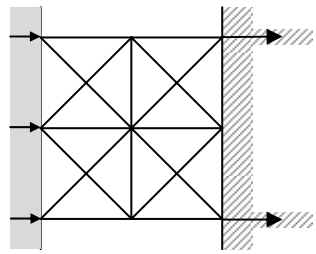
Plan

Critical consideration
The supported structure could impact on the supporting wall.

Safety criteria:
if it is not possible to position the posts in line with perpendicular walls a 10x10 sections horizontal distribution substructure should be provided.

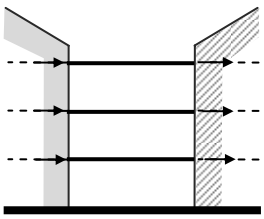


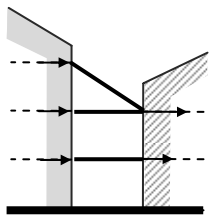
Plan



Plan

Floors at the same height

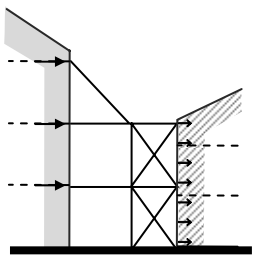




Vertical section

Safety criteria:
the principal diagonals and the posts should be positioned in line with the floors.

Floors at different height



Vertical section

Critical consideration
The supported structure could impact on the supporting wall

Safety criteria:
a vertical distribution substructure should be provided

KEY wall to be supported supporting wall

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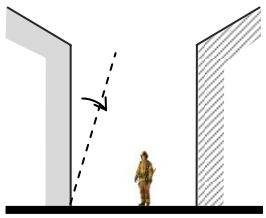
TIMBER WALLL TO WALL SHORES: safety instructions

STOP-**PC**



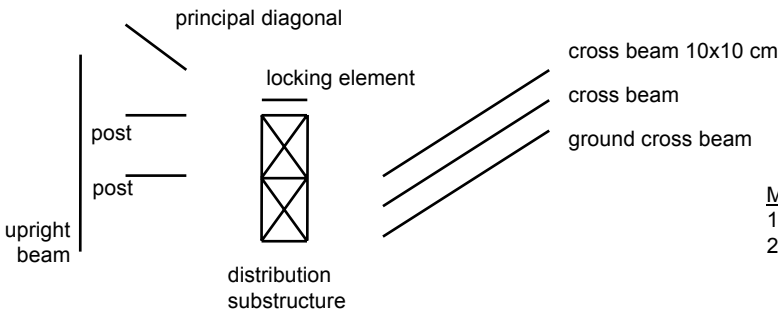
Vertical section

Critical consideration

The wall to be supported could collapse during the shoring operations.

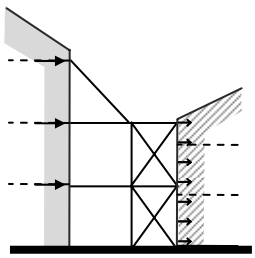
Safety instruction:
build the modular elements of the shore in a safe zone

ASSEMBLING THE ELEMENTS



Main phases:
1 – measuring of the elements
2 – building of the shore in a safe zone

K9



Vertical section

Assembling criteria:
1 – positioning of the upright beams on the side of the wall to be supported and the distribution substructure on the opposite side
2 – positioning of the posts
3 – positioning of the principal diagonals and the locking elements
4 – positioning of the protective tables
5 – complete the shore

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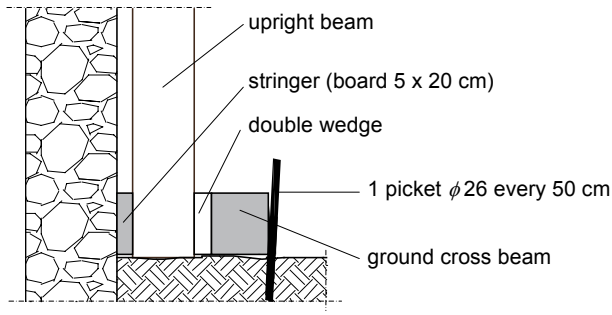
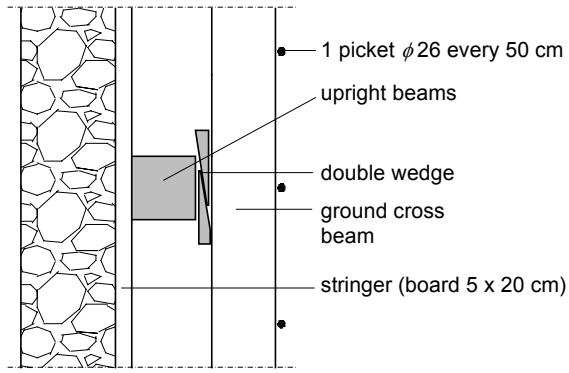
Diapositiva 9

K9 removed "ty"
Bellamy; 22/06/2012

TIMBER WALLL TO WALL SHORES: construction details

STOP-**PC**

Detail **1**	BASE ANCHORAGE ON THE SIDE OF THE WALL TO BE SUPPORTED
BASE ANCHORAGE WITH EXTERNAL SUPPORT	VERTICAL SECTION  PLAN 

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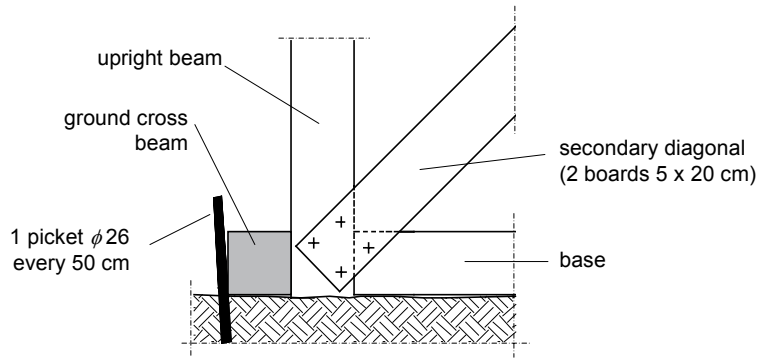
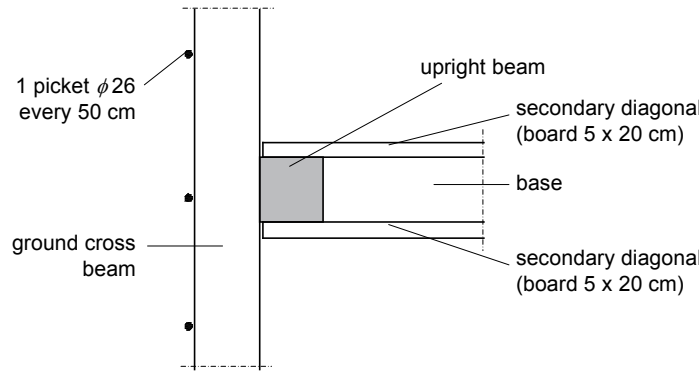
TIMBER WALLL TO WALL SHORES: construction details

STOP-**PC**

Detail **2**	BASE ANCHORAGE ON THE SIDE FURTHEST FROM THE SUPPORTING WALL
BASE ANCHORAGE WITH EXTERNAL SUPPORT	 VERTICAL SECTION  PLAN

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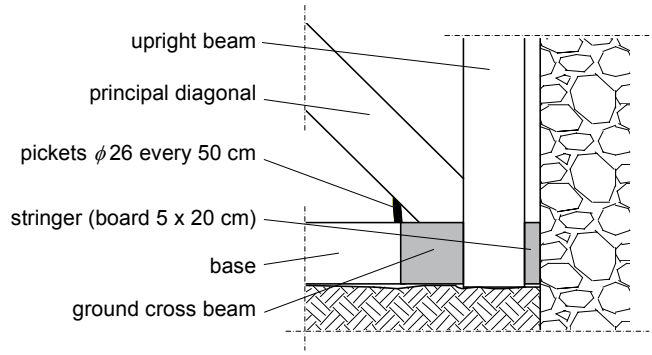
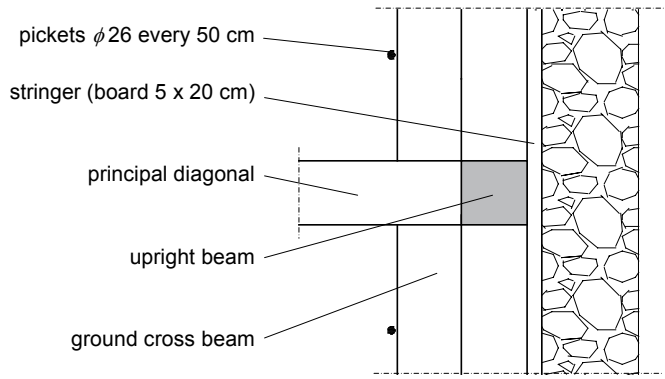
TIMBER WALLL TO WALL SHORES: construction details

STOP-**PC**

Detail **3**	BASE ANCHORAGE ON THE SIDE NEAREST THE SUPPORTING WALL
BASE ANCHORAGE WITH EXTERNAL SUPPORT	 VERTICAL SECTION  PLAN

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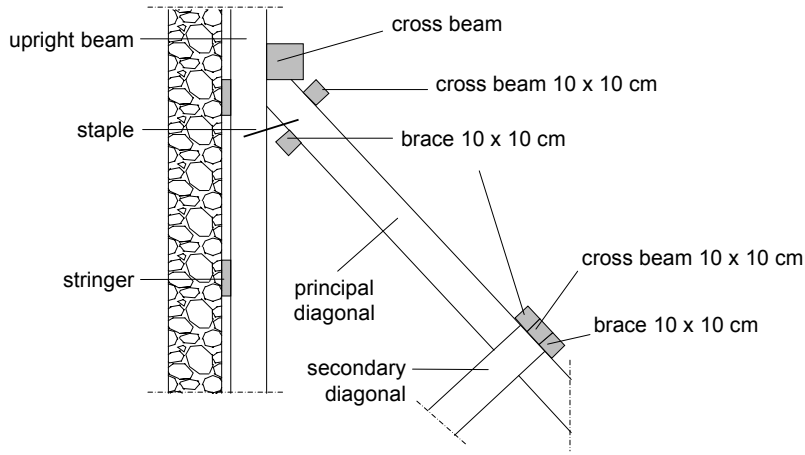
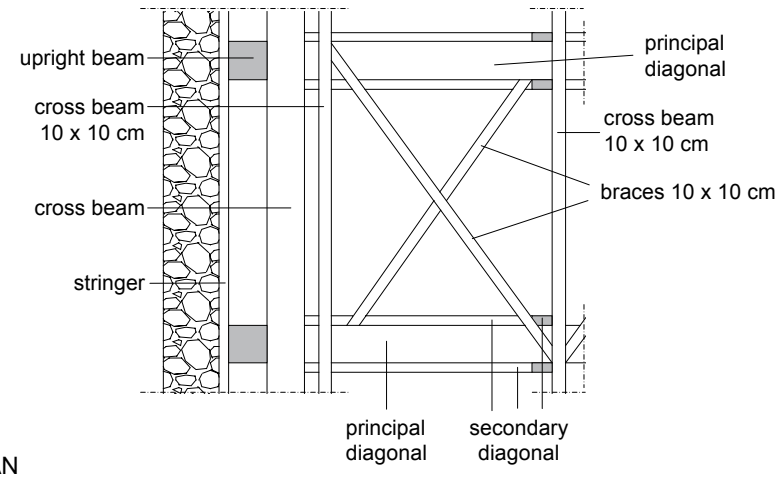
TIMBER WALLL TO WALL SHORES: construction details

STOP-**PC**

Detail **4**	UPPER CONNECTION
CONNECTION BETWEEN THE UPRIGHT BEAM AND THE PRINCIPAL DIAGONAL ON THE SIDE OF THE WALL TO BE SUPPORTED	



VERTICAL SECTION



PLAN

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TIMBER WALLL TO WALL SHORES: construction details

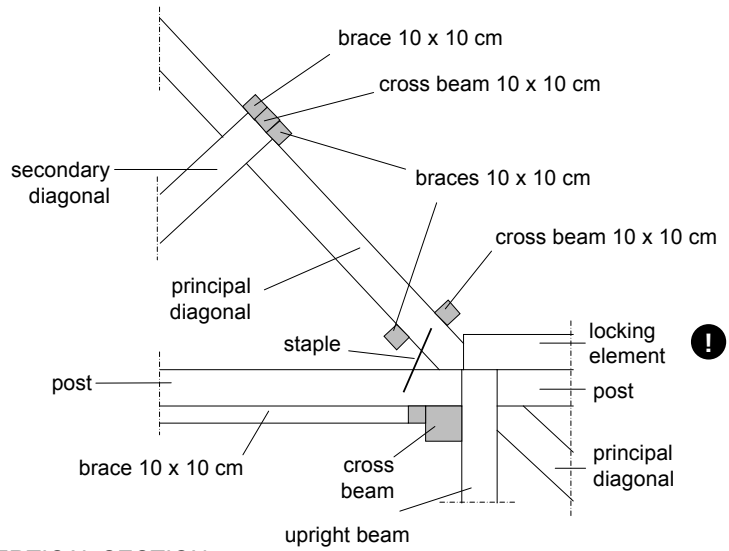
STOP-**PC**

Detail **5** LOWER CONNECTION

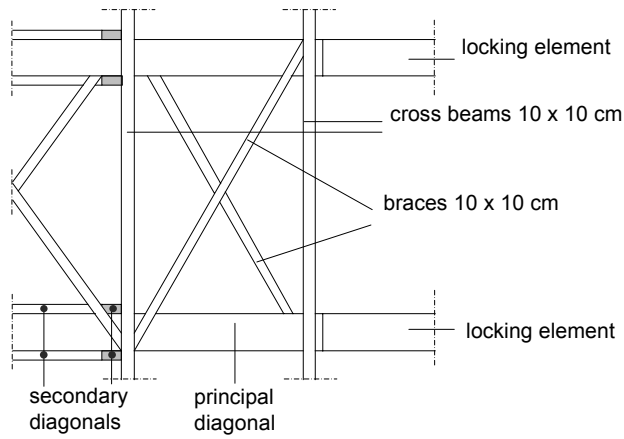
CONNECTION BETWEEN THE PRINCIPAL DIAGONAL AND THE POST

! WARNING

The locking element should be linked to the post using at least 1 bolt ϕ10 every 50cm.



VERTICAL SECTION



PLAN

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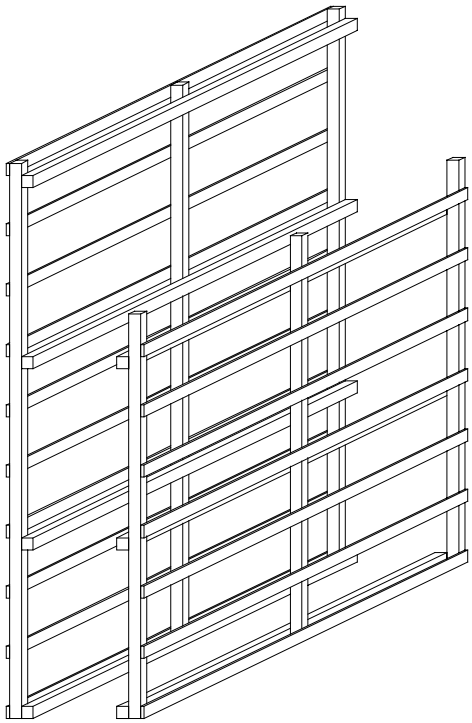
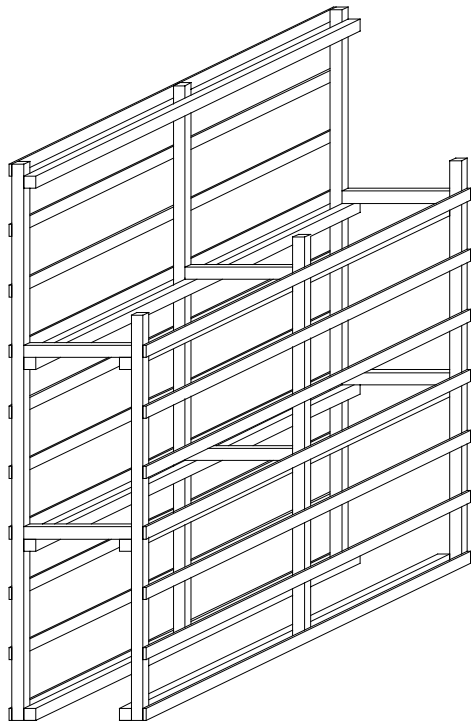
TIMBER WALLL TO WALL SHORES: assembling phases

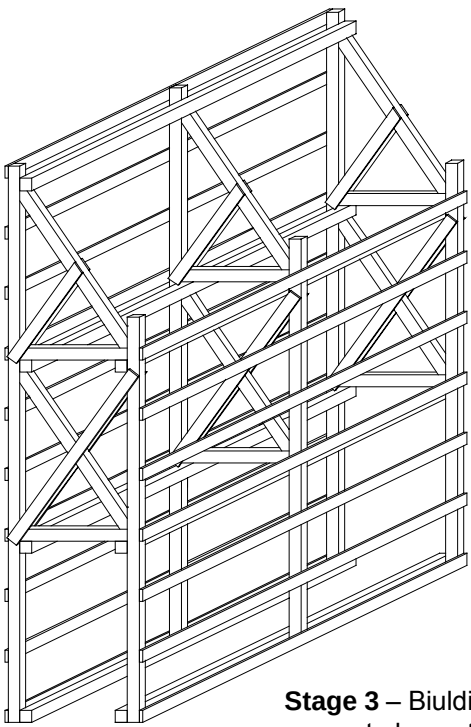
STOP-**PC**



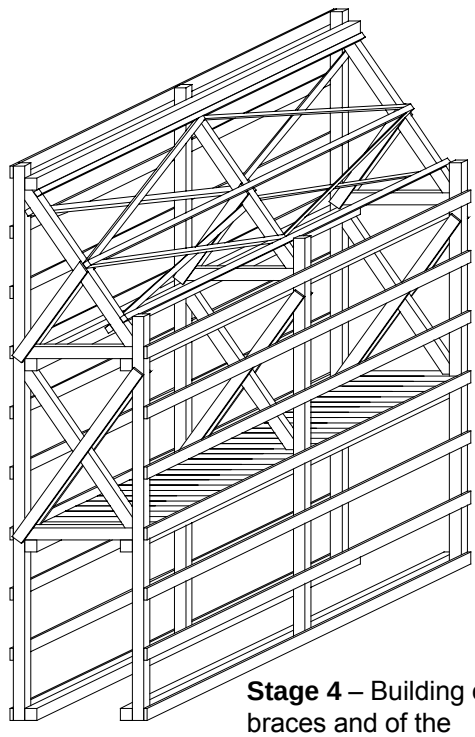
Stage 1 – Building of the trellises



Stage 2 – Joining of the trellises



Stage 3 – Biulding of the support elements



Stage 4 – Building of the braces and of the protective tables

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TIMBER WALL TO WALL SHORES

Field of application

The use of this procedure is allowed only with 9 m high masonry structures and only for wall thickness of 1 m. The maximum free height of the wall is 8 m.
The maximum distance between the wall to support and the supporting wall is 2 times the distance between two consecutive floors (h).
The supporting structure should be made of wood.

General assumptions

The intervention is allowed only under the permission of local Authorities because of the possibility of damage to the supporting building due to aftershocks. Check the solutions to the critical considerations shown on page 6/14.

Instructions for the use of the procedure

After the check of the site to be shored, define the type of the shore (P or S) on pages 1/14, 2/14 and 3/14.
On page 4/14 the table to size the parallel shape shore (P) is shown.
On page 5/14 the table to size the slope shape shore (S) is shown.
The sizing of the shore's elements is dependent on: the type of the shore (P o S), the total height of the wall to support (H_{tot}), the thickness of the wall to support (s_m) and of the seismic classification (see the Annex 1).
On the pages 6-7/14 the main critical considerations are shown.
On the pages 8-12/14 the details of the shore structure are shown.

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K14 removed "s"
Bellamy; 22/06/2012