



DOUBLE WALL
LIFTING ANCHORS

07

CONTENTS

Double Wall Anchors	07-03
Installation	07-05
Hoisting, Transportation and Relocation	07-06
Rules for using Flexi-X Lifters	07-07
General rules for Flexi-X Lifters	07-08

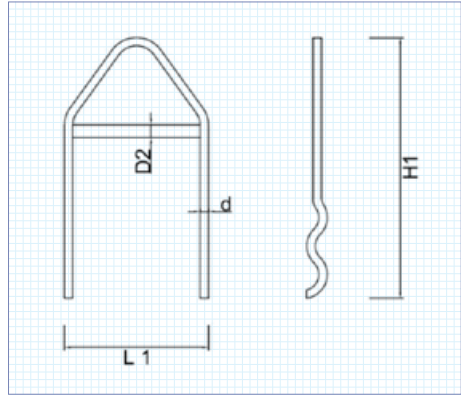


DOUBLE WALL ANCHORS

Double Wall anchors are used for transporting and relocating precast concrete sandwich panels.

About Double Walls

Double walls consist of two thin precast concrete formwork layers which are joined by lattice girders. These form permanent shuttering and after installation on site, the core is concrete-filled.



Dimensions of Double Wall Anchors

Anchor width	Leg bar diameter		Crossbar diameter	Length
	Smooth steel S235			
L1	d		D2	H1
mm				
≤ 200	14		20	450
200 - 310	14		22	450
310 - 360	14		25	500

Maximum Wall Weights

Concrete Strength	Min concrete			Allowable loads				Maximum wall weights							
	thickness	cover	Edge distance	Axial		Angled	Shear	Loadcase 1		Loadcase 2		Loadcase 3		Loadcase 4	
	h	ci	c	F _v	F _{vs}	F _o	2 anchors	4 anchors	2 anchors	4 anchors	2 anchors	4 anchors	2 anchors	4 anchors	
	N/mm ²	mm			kN			tonnes							
15	50	10	300	25.2	23.1	7.9	4	7.9	2.5	5	-	-	-	-	
20	50	10	300	29.1	26.7	9.1	4.6	9.1	2.9	5.7	4.2	8.4	2.9	5.7	
25	50	10	300	32.5	29.8	10.2	5.1	10.2	3.2	6.4	4.7	9.3	3.2	6.4	
30	50	10	300	35.6	32.6	11.2	-	-	-	-	5.1	10.2	3.5	7.0	
35	50	10	300	36.5	35.3	12.1	-	-	-	-	5.5	11.1	3.8	7.6	
15	65	15	300	35.5	35.5	11	5.6	11.1	3.5	6.9	-	-	-	-	
20	65	15	300	36.5	36.5	12.7	5.7	11.4	4	8	5.7	11.4	4	8	
25	65	15	300	36.5	36.5	14.2	5.7	11.4	4.5	8.9	5.7	11.4	4.5	8.9	
30	65	15	300	36.5	36.5	15.6	-	-	-	-	5.7	11.4	4.9	9.8	
35	65	15	300	36.5	36.5	16.8	-	-	-	-	5.7	11.4	5.3	10.5	

The minimum edge distances given in this table are for the loadings given here. Please contact CFS if you have different conditions and we can provide a bespoke calculation.

DOUBLE WALL ANCHORS



Loadcase 1 - Factory - Axial loading only

- Rotate to vertical using tilting table and then axial lifting with a lifting beam
- Concrete strength 15 to 25 N/mm²
- Dynamic factor = 1.3 (tower crane, mobile crane)
- No demoulding
- All axial load, no angled and no shear lifting

Loadcase 2 - Factory - Axial, angled and shear loading

- Stripping without tilting table. Tilting the walls in shear from the horizontal to the vertical using the anchors
- Concrete strength 15 to 25 N/mm²
- Dynamic factor = 1.3 (tower crane, mobile crane)
- Lifting chains at an angle $\leq 45^\circ$

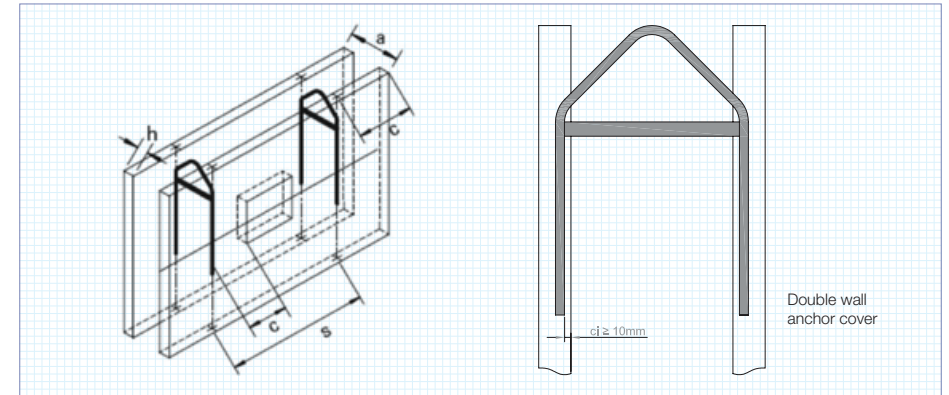
Loadcase 3 - Site - Axial and angled loading

- Delivery of double wall standing vertically
- Concrete strength 20 to 35 N/mm²
- Dynamic factor = 1.3 (tower crane, mobile crane)
- Lifting chains at an angle $\leq 45^\circ$

Loadcase 4 - Site - Axial, angled and shear loading

- Delivery of double wall lying flat on the bed of the truck
- Concrete strength 20 to 35 N/mm²
- Tilting of the walls in shear to the vertical using the anchors
- Dynamic factor = 1.3 (tower crane, mobile crane)
- Lifting chains at an angle $\leq 45^\circ$

INSTALLATION



Edge Distances and Spacing

To use the load tables shown here, the minimum distance from the edge of a panel and from any recesses is 300mm and the minimum distance between anchors is 600mm. If you have a different situation contact CFS for a bespoke calculation.

Concrete Cover

The concrete cover towards the outside of the panel must be determined by the engineer according to the durability requirements of the wall. To the inside, the concrete cover should be as stated in the table. If the contours of the stirrup are visible on the inside surface of the wall, the capacity of the anchor is not guaranteed and the anchor should not be used.

Reinforcement

Minimum reinforcement should be determined by the engineer. The manufacturer's data has been generated from tests with 1 layer of A252 mesh, please provide at least this level of reinforcement.

Insert Depth

The anchors should be installed so that the upper end of the stirrup does not project out of the end of the wall.

Anchor Arrangement

If using more than two double wall anchors, suspension will be structurally indeterminate unless a compensation equaliser or similar is used. This is due to possible uneven rope lengths or different heights of the installed double wall anchors. Without this aid it is impossible to calculate the load on each anchor.

Allowable Load Under Angle

In the load table our load values F_{vs} is the vertical component of the load, no angled load reduction necessary.

HOISTING, TRANSPORTATION AND RELOCATION

Visual Check

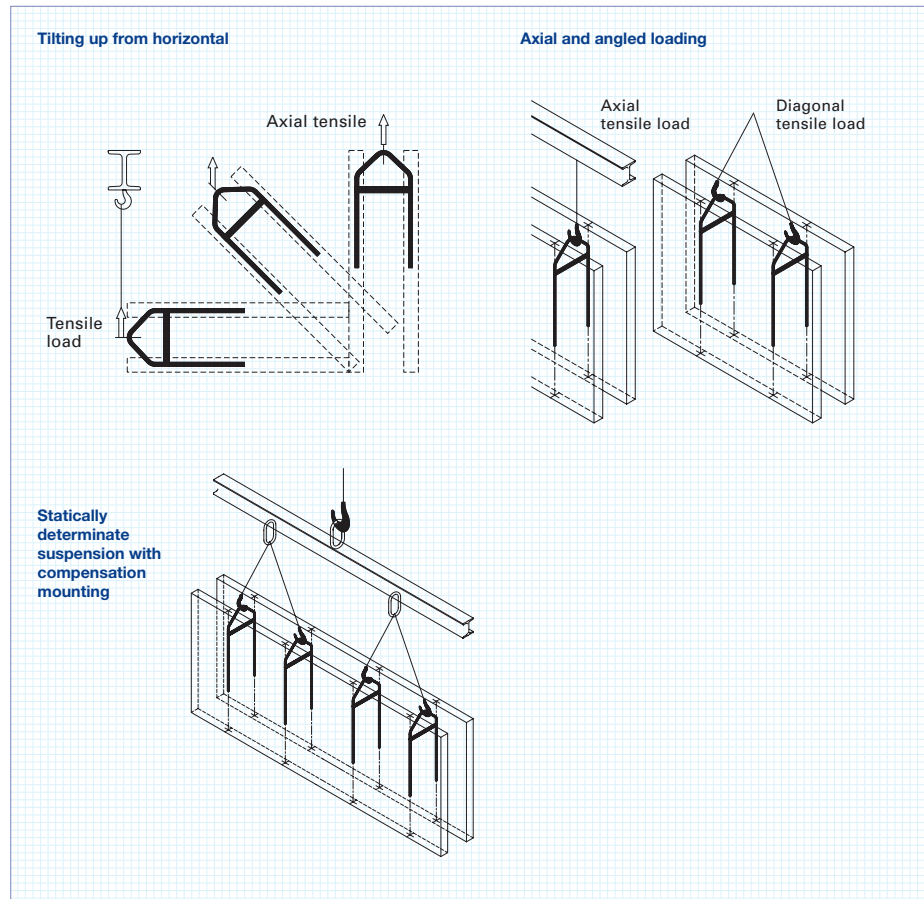
A visual check on the anchors should be carried out for obvious damage before installation. Do not use damaged anchors.

Transport cases

Shear loading is not generally permitted during transport. A shear lift may only be used when lifting the slabs from horizontal to upright from the formwork platform or from the transport truck on site. Please refer to the engineer's instructions for correct transportation position.

Modes of transport, hoisting and use of equalisers

There are different hoisting load factors to take into account in the calculations depending on the transport and lifting device. Each loadcase in the table covers a different lifting situation.



FLEXI-X LIFTERS

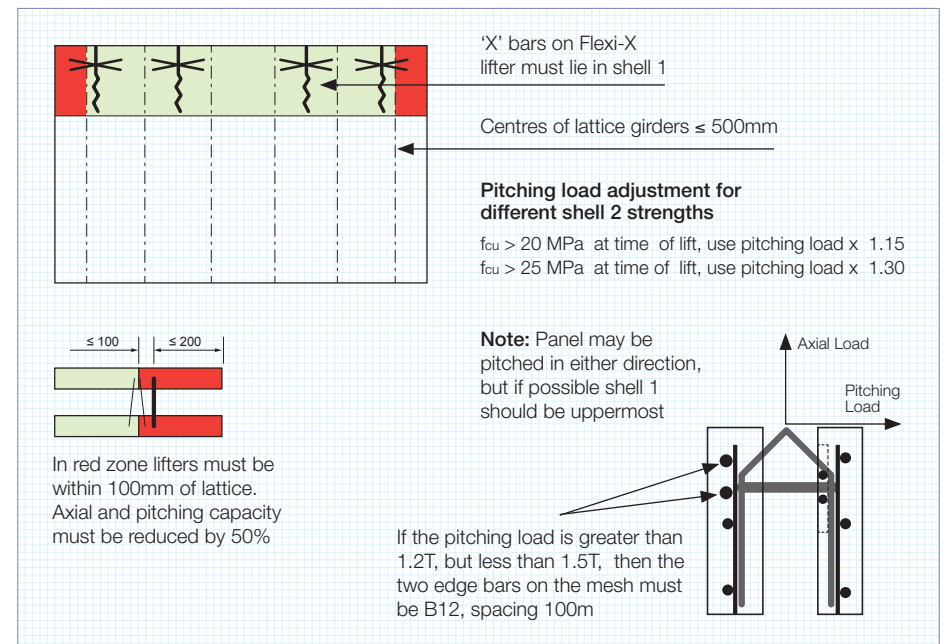
- Increase load capacity for tilting
- Easier to fix in the mould via the X cross bar

Rules for Flexi-X lifter positioning

- 1) Flexi-X must be positioned between two lattice girders
- 2) Only one Flexi-X may be located between two girders
- 3) Minimum spacing of adjacent Flexi-X's = 500mm

Axial Load (Tonnes)	Pitching shear Load (Tonnes)	Special Shell 2 requirements
≤ 3.3	≤ 1.2	None
≤ 3.4	1.2 < PL < 1.5	2B12 bars @ 100crs

Twinwall Thickness	Steel Cover	Girder & Lifter Height
mm		
200	25	120
250	25	170
300	25	220
300	25	220
300	35	200
350	35	250
400	35	300



GENERAL USAGE INSTRUCTIONS

- 1) Nominal lifter size to be same as nominal girder height.
- 2) Concrete strength of shell 2 at time of lifting ≥ 15 MPa
- 3) Minimum cover to lifter is 10mm. The 'X' bars in shell 1 should just be completely covered with concrete.
- 4) 'X' bars to be wired to mesh bars. Wire in 3 places only and avoid distortion of mesh through over-tightening.
- 5) Shell 1 thickness ≥ 65 mm.
- 6) Combined thickness of shell 1 and shell 2 ≥ 145 mm
- 7) Axial load may be inclined at 30 degrees to vertical without any down rating of capacity.

