

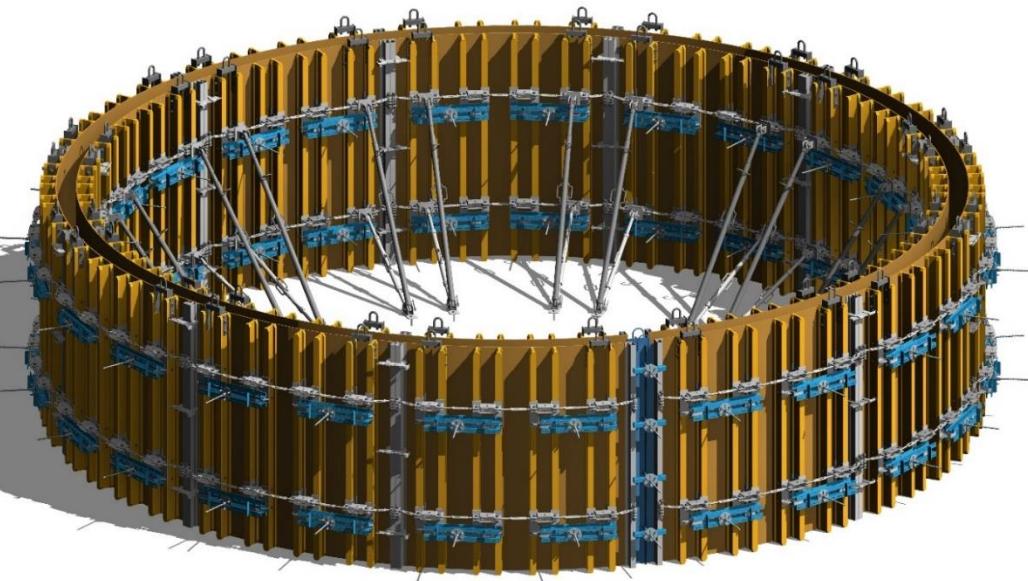


USER MANUAL

CIRCULAR WALL FORMWORK SYSTEM

L&T-COE-FW-UM-CWS-05

JUNE 2023



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INTRODUCTION

Elementary safety warnings

- This manual is aimed at all persons who will be working with the L&T product or system that it describes. It contains information on the standard design for setting up this system, and on correct, compliant utilisation of the system.
- All persons working with the product described herein must be familiar with the contents of this manual and with all the safety instructions it contains.
- Persons who are incapable of reading and understanding this booklet, or who can do so only with difficulty, must be instructed and trained by the site formwork engineer or competent foremen.
- The site engineer or foremen is to ensure that the information materials provided (User manual booklets, Instructions for Assembly and Use, Operating Instruction manuals, Assembly & Execution drawings etc.) are available to all users, and that they have been made aware of them and have easy access to them at the usage location.
- In this relevant technical documentation, the workplace safety precautions that are necessary in order to use this product safely in the usage situations is described.
- In all cases, users are obliged to ensure compliance with national laws, Standards and rules throughout the entire project and to take appropriate additional or alternative workplace safety precautions where ever necessary.

Hazard assessment

L&T's safety department is responsible for drawing up, documenting, implementing and continually updating a hazard assessment at every job-site. This document serves as the basis for the site specific hazard assessment, and for the instructions given to users on how to prepare and utilise the system. It does not substitute for overall site or project, safety plan or any specific hazard or safety related issues.

Usage of this document

This manual can also be used as a generic method statement or incorporated with a site specific method statement for using as circular shutter.

Many of the illustrations in this booklet show the situation during formwork assembly and are therefore not always complete from the safety point of view of L&T's safety department.

Any safety accessories not shown in these illustrations must still be used by the site engineer or foremen, in accordance with the applicable rules and regulations as derived from L&T's safety department.

System specific safety instructions, especially warnings, will be found in the individual sections of this document!

Planning

Provide safe workplaces for those using the formwork (e.g. for when it is being erected/dismantled, modified or repositioned etc.) It must be possible to get to and from these workplaces via safe access routes!

If you are considering any deviation from the details and instructions given in this booklet, or any application which goes beyond those described in the booklet, then structural calculations must be produced for checking, as well as supplementary assembly instructions can be made by IC specific formwork department.

L&T safety protocol

All laws, Standards, industrial safety regulations and other safety rules applying to the utilization of our products in the country and/or region in which L&T is operating must be observed at all times.

If a person or object falls against, or into, the side-guard component and/or any of its accessories, the component affected may only continue in use after it has been inspected and passed by an qualified L&T safety engineer.

Rules applying during all phases of Assembly the assignment

The site formwork engineer or formwork foremen must ensure that this product is erected and dismantled, reset and generally used for its intended purpose in accordance with this user manual, Standards and rules, under the direction and supervision of suitably skilled persons. These persons' mental and physical capacity must not in any way be impaired by alcohol, medicines or drugs.

The stability of all components against overturning and units must be ensured during all phases of the construction work!

The functional/technical instructions, safety warnings and loading data must all be strictly observed and complied with. Failure to do so can cause accidents and severe (even life-threatening) damage to health, as well as very great material equipment's damage can happen. Fire-sources are not permitted anywhere near the formwork. Heating appliances are only allowed if properly and expertly used and set up a safe distance away from the formwork.

The assembly work must be taken on account of the weather conditions (e.g., risk of slippage). In extreme weather, steps must be taken to safeguard the equipment.

All connections must be checked regularly to ensure that they still fit properly and are functioning correctly.

It is very important to check all screw-type connections and wedge-clamped joins whenever the construction operations require (particularly after exceptional events such as storms), and to tighten them if necessary.

No welding or heating

It is strictly forbidden to weld any steel parts in particular anchoring/tying components, suspension components, connector components and castings etc. or otherwise subject them to heating.

Welding causes serious change in the microstructure of the materials from which these components are made. This leads to a dramatic drop in the failure load, representing a very great risk to safety.

The only articles which are allowed to be welded are those for which the literature drawings exclusively points out that welding is permitted.

Assembly

The equipment/system must be inspected by the site engineer or foremen before use, to ensure that it is in suitable condition. Steps must be taken to rule out the use of any components that are damaged, deformed, or weakened due to wear, corrosion, mishandling.

Combining our L&T formwork systems with those of other manufacturers could be dangerous, risking damage to both health and property. If you intend to combine different systems, please contact formwork team HQ for advice first.

The equipment/system must be assembled and erected in accordance with the applicable laws, Standards and rules by suitably skilled personnel of the site engineer or foremen's, having regard to any and all required safety inspections.

It is not permitted to modify standard products; any such modifications constitute a safety risk.

Closing the formwork

Closing of formwork and ready for pouring of this system must be set up such a way that all loads acting upon them are safely transferred as per the design!

Pouring & concrete pressure

Do not exceed the permitted fresh-concrete pressures. Over-high pouring rates overload the form-work, cause greater deflection and risk breakage. In this circular formwork system, it is designed to load 60kN/m²

Stripping out the formwork

Do not strip out the formwork until the concrete has reached sufficient strength and the person in charge has given the order for the formwork to be stripped out!

When stripping out the formwork, never use the crane to break concrete cohesion. Use suitable tools such as timber wedges, special flat bars.

When stripping out the formwork, do not endanger the stability of any part of the structure, or of any scaffolding, platforms or formwork that is still in place!

Stripping time is based on the concrete mix design as well quality control engineer



Loosening of forms with Crow Bar



Transporting, stacking and storing

- Observe all regulations applying to the handling of formwork and scaffolding. In addition, the safe slinging means must be used - this is a mandatory requirement.
- Remove any loose parts or fix them in place so that they cannot be dislodged or fall free!
- All components must be stored safely, following all the special instructions given in the relevant sections of this manual!

Maintenance

Only original components may be used as spare parts. Repairs may only be carried out by the qualified person or at authorized facilities from Pondicherry factory.

Miscellaneous

CoE formwork team reserve the right to make alterations in the interests of technical detailing of the system if needed.

Symbols used

The following symbols are used in this booklet:



Important note:

Failure to observe this may lead to malfunction or damage

CAUTION / WARNING / DANGER

Failure to observe this may lead to material damage, and to injury to health which may range up to the severe or even life-threatening.



Instruction

This symbol indicates that actions need to be taken by the user.

Sight-check

Indicates that you need to do a sight-check to make sure that necessary actions have been carried out.



Tip

Points out useful practical tips.

Reference

Refers to other documents and materials as mentioned in the various sections of this book..

Product description

Circular formwork System H16 – Circular formwork for curved walls with varying diameter range.

Circular formwork H16 uses special spindles to curve the form-ply into a “**Exact**” Curved shape.

This adjusting system permits **continuous setting of the radii**. Circular formwork H16 is designed for **radii of 3.50 m to 40 m** (in special cases, a radius of 2.50 m is possible). We can also do different diameter with modification of the circular formwork elements.



Permitted fresh-concrete pressure: 60 kN/m²

Further product features:

- Continuous adaptation to different radii by means of spindles.
- Only 2 widths of element:
 - 2.33 m inside element
 - 2.44 m outside element
- Ideal height grid provided by the element heights of
 - 1.80 m
 - 2.40 m
 - Vertical Stacking above can form 4.20 m
- Only one type of connector needed:
 - Adjustable clamp 10cm
- Heavy-duty, flexible form-ply:
 - Plywood 12mm or 18mm
- Smooth, constant curvature ensured by uniform form-ply support.
- Extra-rigid connection between connecting profile and plywood ensures perfect curvature in the edge zone of the elements as well.
- Low form-tie ratio:
 - only 1 form-tie per 1.5 m² area to be formed

System overview

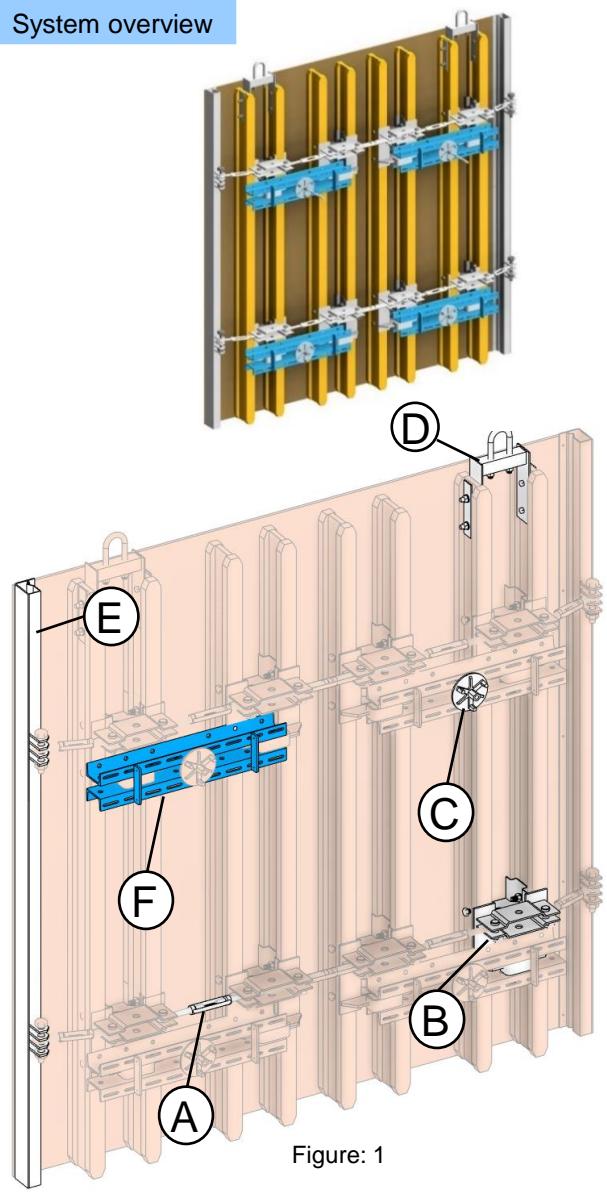
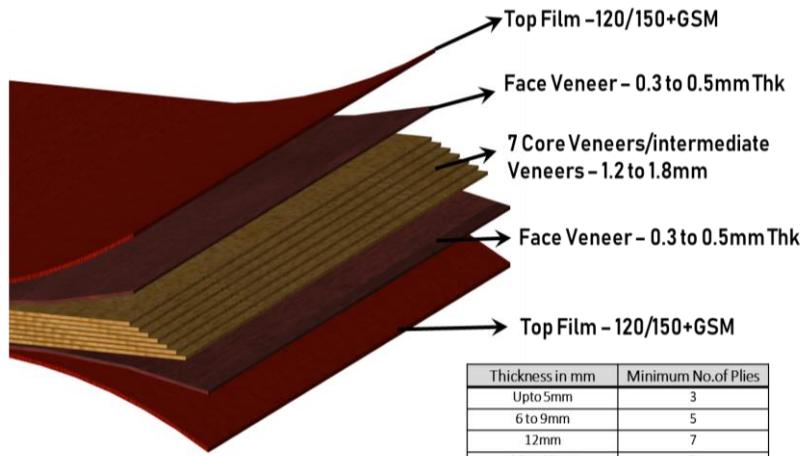


Figure: 1

A	Turn buckle: Adjusting and setting the Circular shutter for required Radius.
B	Holder Unit H16: Used to Hold Two H-beams in Position and to hold the Turn Buckle.
C	L&T Super plate: Tighten and align with steel waler
D	Lifting hook: For lifting and resetting the element
E	End profile: Used to connect Two shutters to extend the circular wall for required length and Radius.
F	Multipurpose steel waler: For distributing the form-tie forces

Shuttering Plywood



For 12mm thick Plywood :- The Layers should be 7+2+2

For 18mm thick Plywood :- The Layers should be 9+2+2

Item Code for RC vendors

[Kg]

Item #

12mm Film Faced Plywood(densified) using core composer; Size:- 2440mm x 1220mm;120 GSM 30Kg IS 4990-2011. Guaranteed 8 Repetition	30kg	6CD2M000J000002
12mm Film Faced Plywood(densified) using core composer; Size:- 2440mm x 1220mm ;150 GSM 30Kg IS 4990-2011 . Guaranteed 12 Repetition	30kg	6CD2M000K000001
12mm Film Faced Plywood(densified) using core composer; Size :- 2440mm x 1220mm ; 150 GSM 34Kg IS 3513 . Guaranteed 20 Repetition	34kg	6CD2M000L000001
18mm Film Faced Plywood(densified) using core composer; Size:- 2440mm x 1220mm ,150 GSM 46Kg IS 4990-2011. Guaranteed 15 Repetition	46kg	6CD2M000M000001
18mm Film Faced Plywood(densified) using core composer; Size :-2440mm x 1220mm ; 120 GSM 46Kg IS 4990-2011. Guaranteed 16 Repetition	46kg	6CD2M000000001



Note:

* - For further details
please refer TNL #15

NEW ! - FILM FACED PLYWOOD SPECIFICATION

Shuttering Plywood :
Ply wood is a compressed or laminated wood made up of plies or veneers which are very thin layers of wood prepared separately.

Note that the grains of one layer are at right angle to the grains of other layer.

For 12mm thick Plywood :- The Layers should be 7+2+2
For 18mm thick Plywood :- The Layers should be 9+2+2

Item Code for RC Vender	Weight	Item #
12mm Film Faced Plywood(densified) using core composer; Size:- 2440mm x 1220mm;120 GSM 30Kg IS 4990-2011. Guaranteed 8 Repetition	30kg	6CD2M000J000002
12mm Film Faced Plywood(densified) using core composer; Size:- 2440mm x 1220mm ;150 GSM 30Kg IS 4990-2011 . Guaranteed 12 Repetition	30kg	6CD2M000K000001
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18mm Film Faced Plywood(densified) using core composer; Size :-2440mm x 1220mm ; 120 GSM 46Kg IS 4990-2011. Guaranteed 16 Repetition	46kg	6CD2M000000001

Density of Plywood

S.No	Weight of Plywood (kg)	Thickness (in mm)	Density per cu.m (kg/m ³)
1	30	12	850 Kg/Cum
2	34	12	950 Kg/Cum
3	46	18	850 Kg/Cum

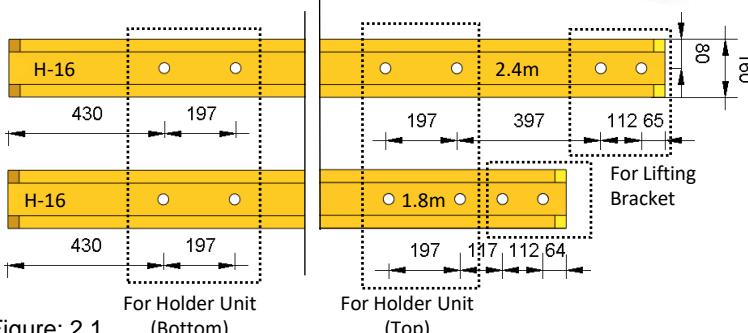
Making of Panel

1. Drilling of holes in H-beam



Ø of hole 18mm

Drilling machine required



2. Fixing of Holder unit

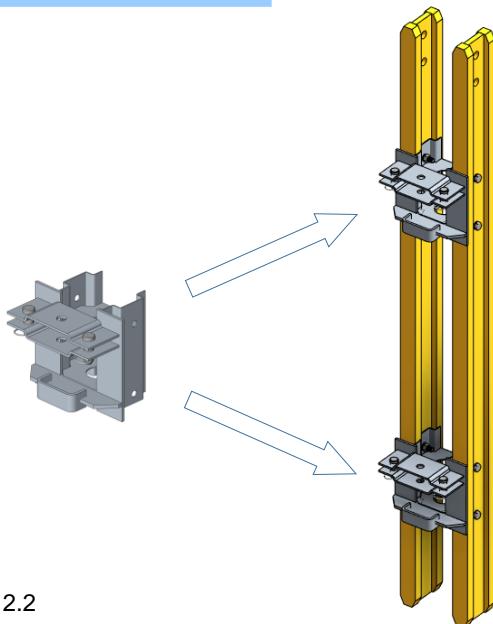


Figure: 2.2

3. Fixing of Lifting bracket

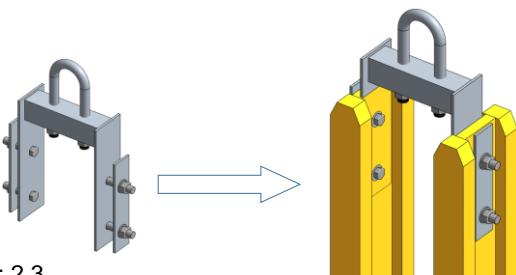
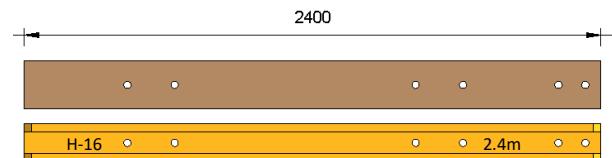


Figure: 2.3



Tip

Use a plywood cut piece of 90mm width and make it a drilling template for many hole drilling.



- It is advised to make all holder units fixed with H16 beams at the very beginning of the work
- One 2.4m panel always have 2 lifting units. So, its also can be pre fitted counting total number of panels x 2times = total number of lifting bracket.

Assemble

4. Fixing of H-beam units in plywood

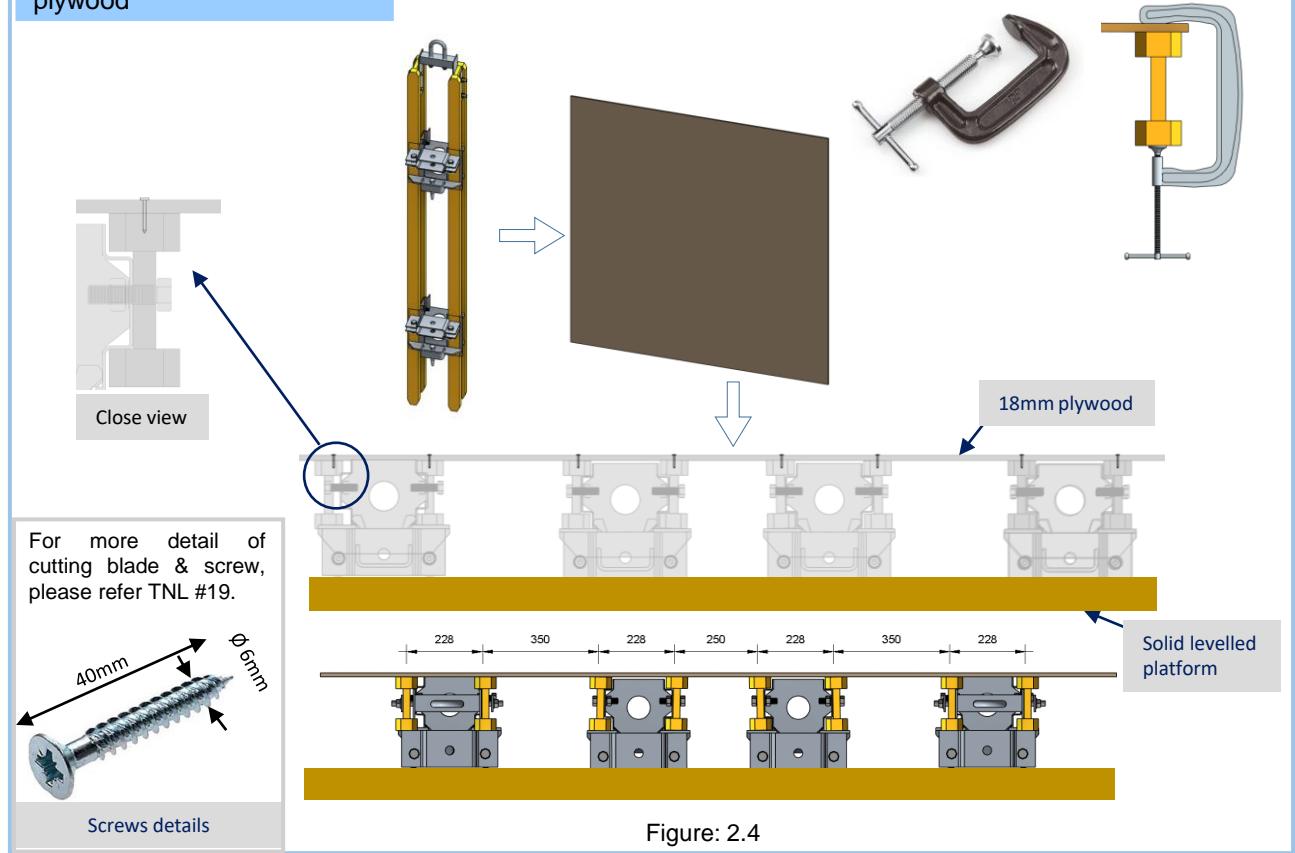


Figure: 2.4

5. Fixing of End profile

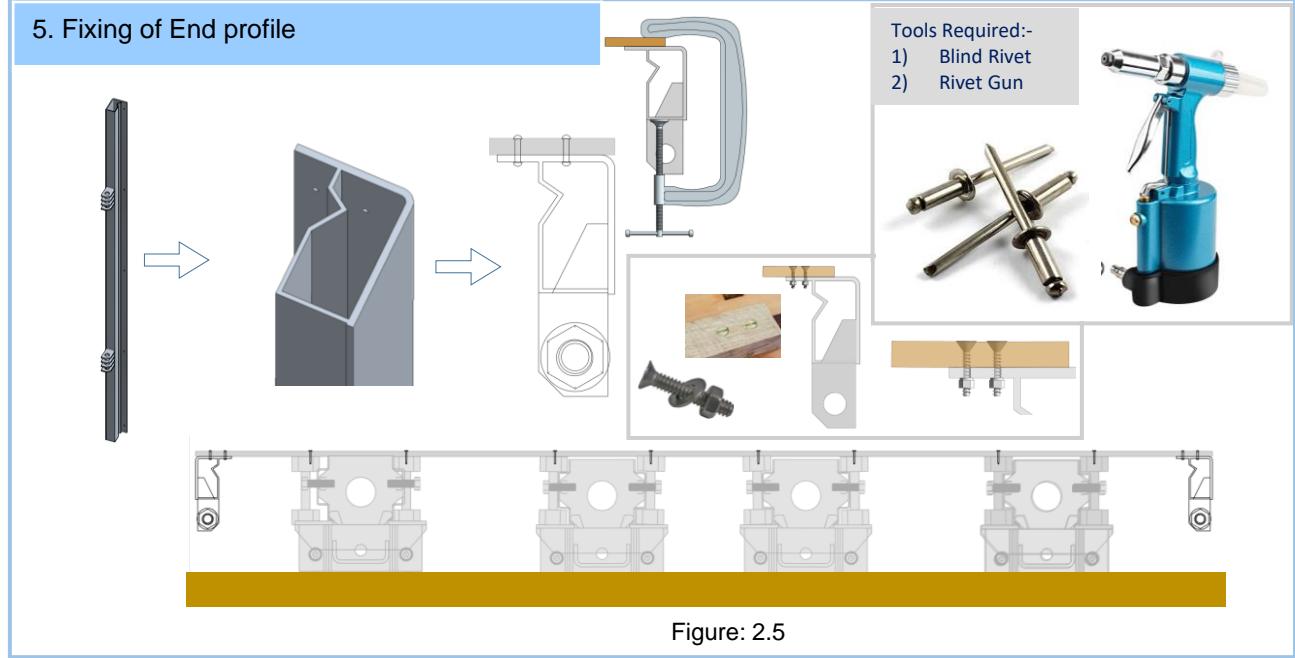


Figure: 2.5

6. Fixing of Multipurpose steel waler 0.8m

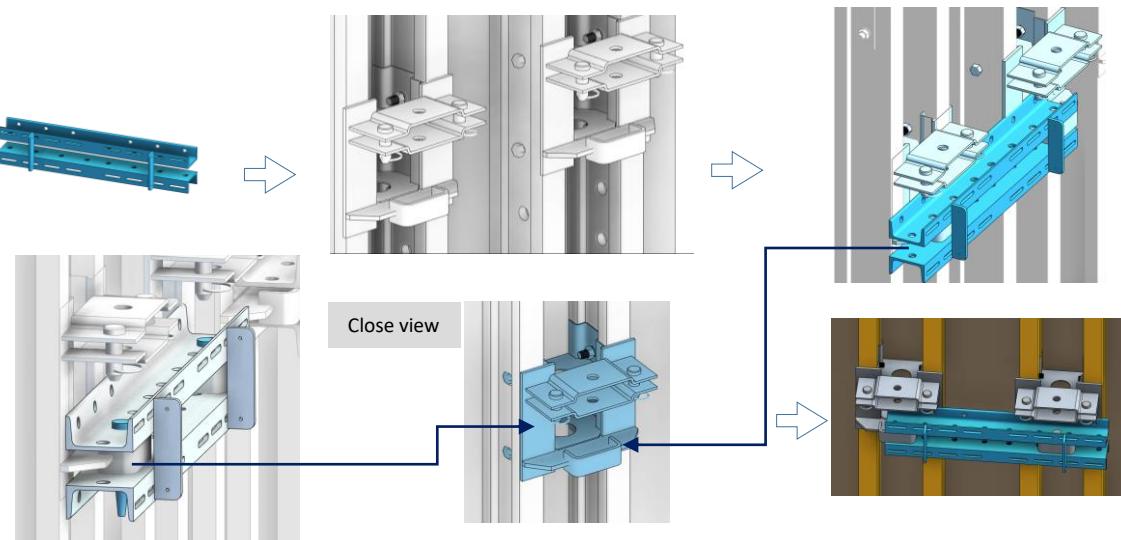
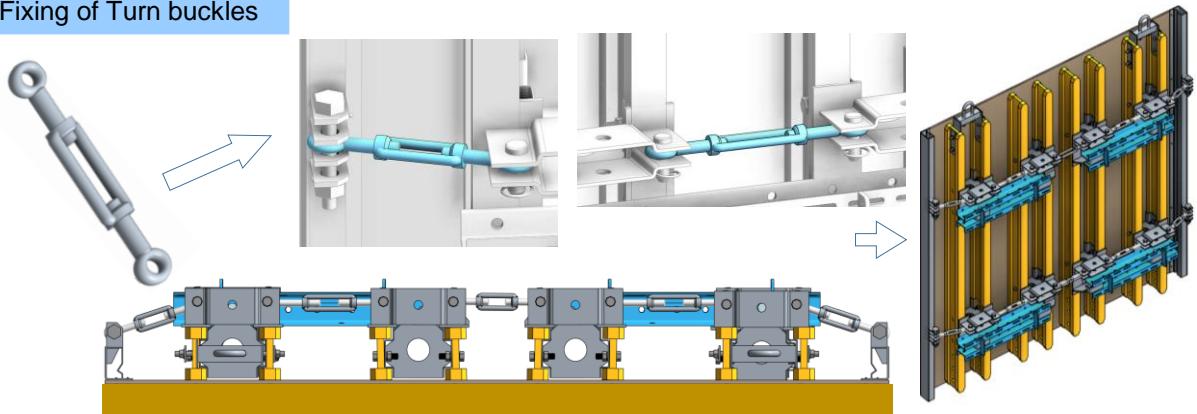
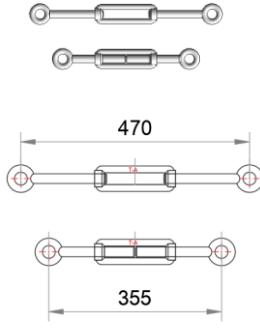


Figure: 2.6

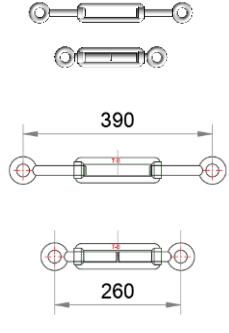
7. Fixing of Turn buckles



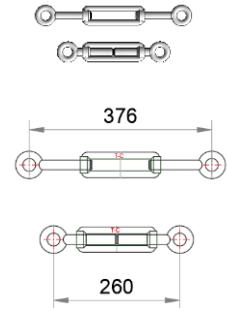
TURNBUCKLE - A



TURNBUCKLE - B



TURNBUCKLE - C



TURNBUCKLE - D

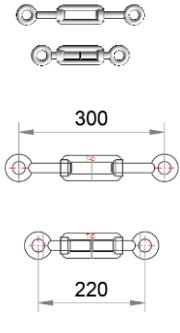


Figure: 2.7

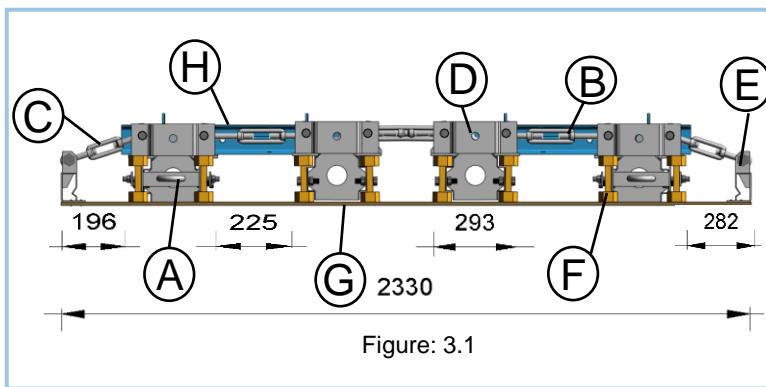
System Grid

Panel widths

The 2.33m wide elements are used for the inside formwork, and the 2.44m wide ones for the outside formwork. This speeds up work by making it easy to identify which element belongs where.

INSIDE ELEMENT

Circular formwork element H16, 2.33m



A	Lifting Hook
B	Turnbuckle A
C	Turnbuckle D
D	Holder unit
E	End profile
F	H-Beam H16
G	Plywood
H	Steel waler

Panel heights

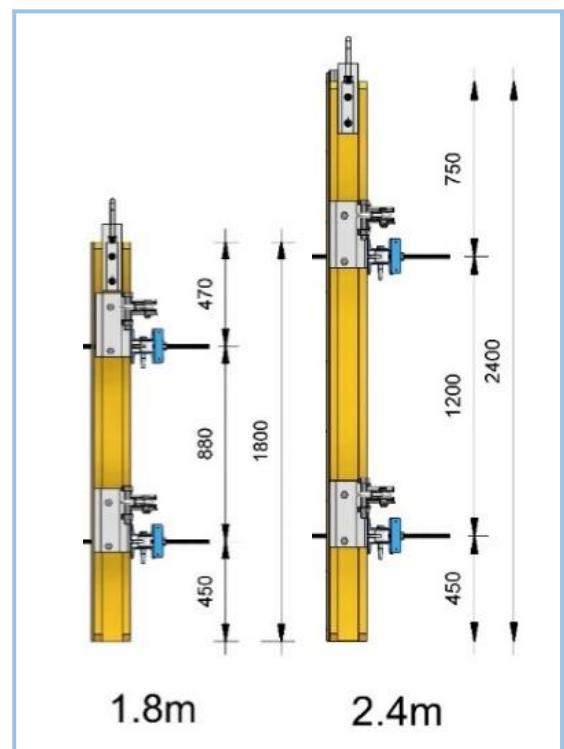
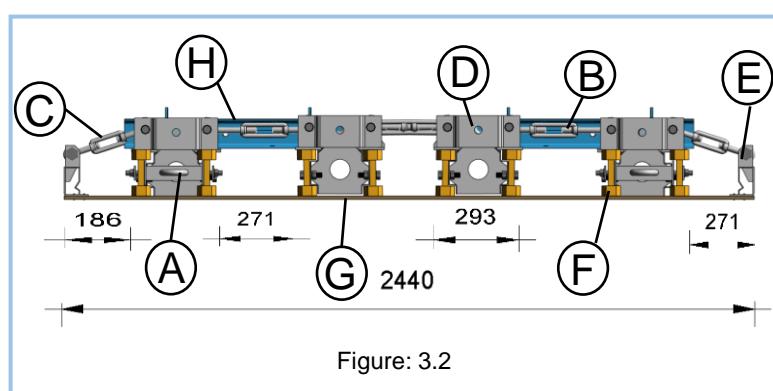


Figure: 3

1. Two sizes of panels 1800mm and 2400mm
2. Vertical stacking of panels possible.

OUTSIDE ELEMENT

Circular formwork element H16, 2.44m



Vertical stacking using Beam connection splice plate for circular formwork H16

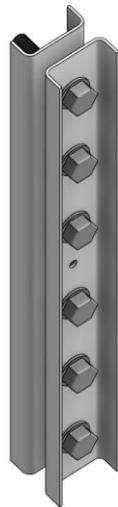


Figure: 4

Practical example

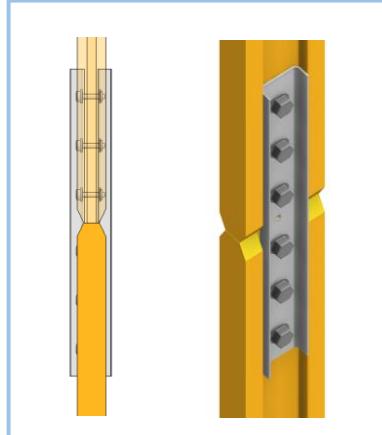


Figure: 5

Circular formwork element H16 1.80x2.40m



Perm. moment: 2.0 kNm

Rules for vertical stacking of panels

- Always position 0.70m high elements at the top.
- In stacking configurations, 1.8m high elements are only allowed to have other elements placed beneath them, never on top of them! In other words, these elements must always be on top.

The ideal height-grid of the elements, and the systematic spacing of the form-ties, make it possible to arrange many different height-combinations opposite one another.



Note:

A 1.8 m high element may only be placed opposite another 1.8 m high element.

Dismount the **Lifting-bracket for Circular formwork H16** from the element joint before vertically stacking the elements.

Mounting the splice plate



- Before vertically stacking elements, always turn their spindles to make them straight again.
- Attach one stacking plate for every beam join.

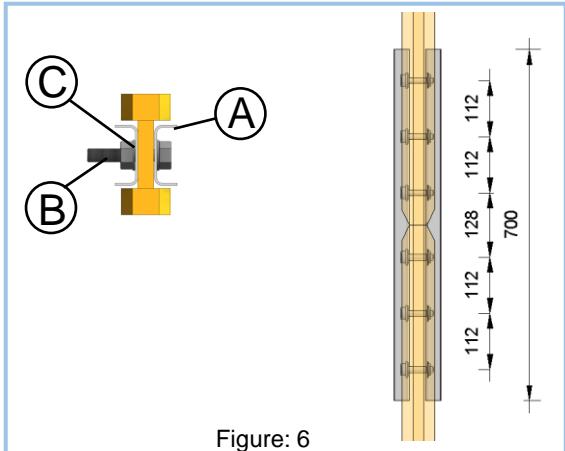


Figure: 6

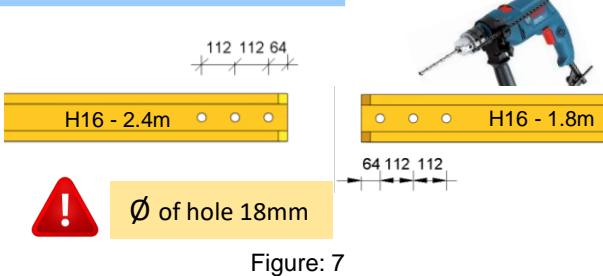
The necessary nuts & bolts etc. are included with the stacking plate.

A	Beam Splice plate
B	Hexagon screw M16x70 (width across 24mm)
C	Spring washer

Vertical stacking

Possible height gradations

H16 Beam drill hole details



Plywood template for drilling holes

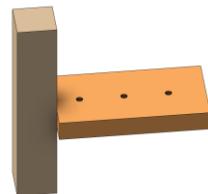


Figure: 10

Removing lifting hook from 2.4m panel

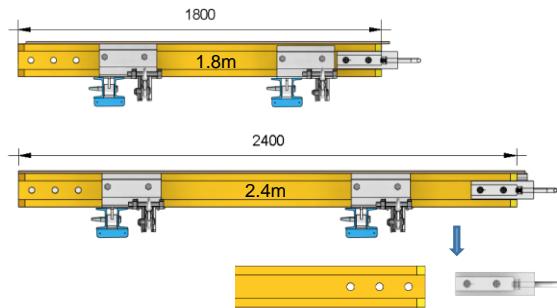


Figure: 8

Assembling H16 1.8m and 2.4m

Vertically arranging two panels(1.8m & 2.4m) to make 4.2m height for stacking one above the other. So, removing the lifting hook from 2.4m height of the panel and placing 1.8m combining these two panels with **H16 Beam Splice Plate**

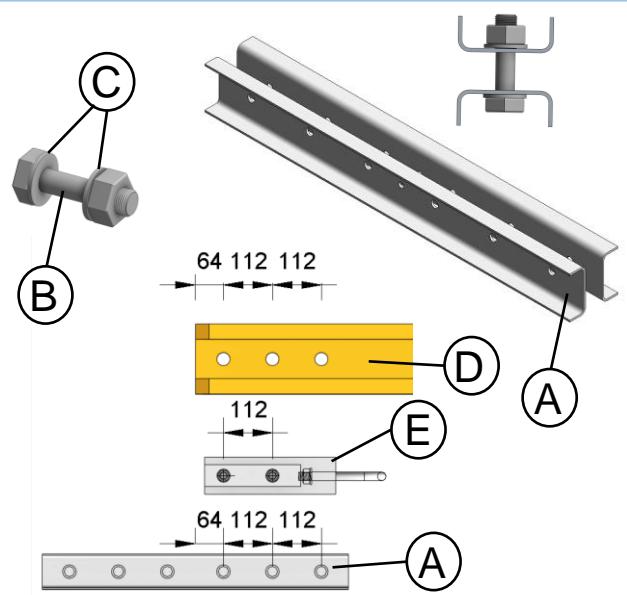


Figure: 11

Drill 18mm diameter hole in H Beam for fixing the lifting hook & Beam Splice Plate. The spacing of lifting hook matched with the beam splice plate.

A	Beam Splice plate
B	Hexagon screw M16x70 (width across 24mm)
C	Spring washer
D	H16 Beam
E	Lifting Hook for circular wall panel

Figure: 9

Vertical stacking

Combination of circular panels 1.8m and 2.4m

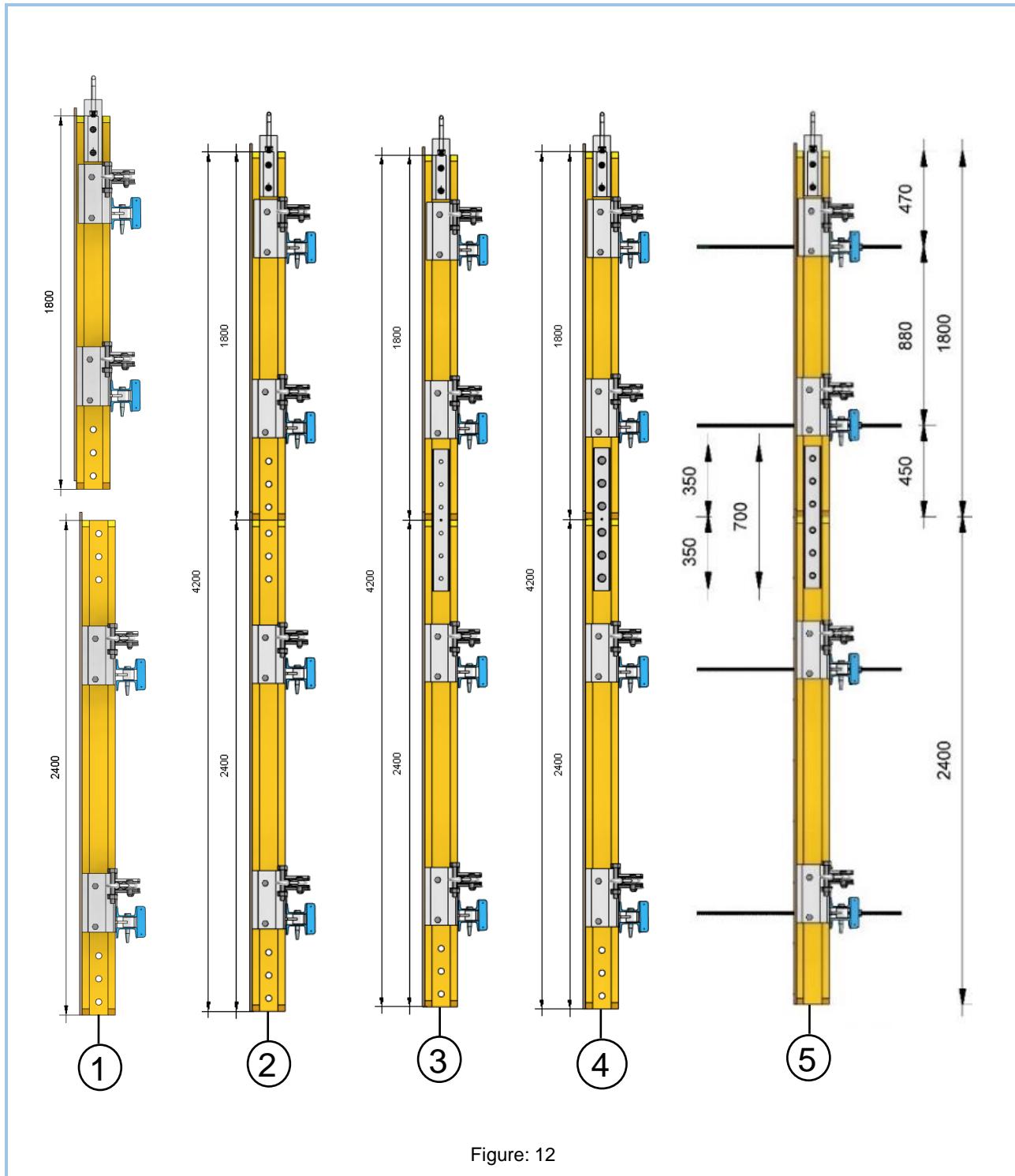


Figure: 12

Inter-Element Connections

- As a rule, 2.44 m wide elements are used for the out-side formwork.
- For the inside formwork, 2.33 m wide elements are used.
- The inter-element connections are made using **Adjustable clamps 10cm**. Attach at least one clamp for every meter that the element is high!
 - Do not oil or grease wedge-clamped joints.
- Place the inside and outside formworks opposite one another.
- Bridge any closure gaps between the elements using fitting-timbers ($a=122$ mm), e.g. fitting timbers 2.70m or 3.30m. See the closure diagram!
- Tie using a Tie-rod 15.0 and a Super-plate 15.0. Minimum length of the tie-rods: Wall thickness + 1.00m

Practical example

Inside radius of the structure: 10.00 m Wall thickness: 0.30 m.

Closer view

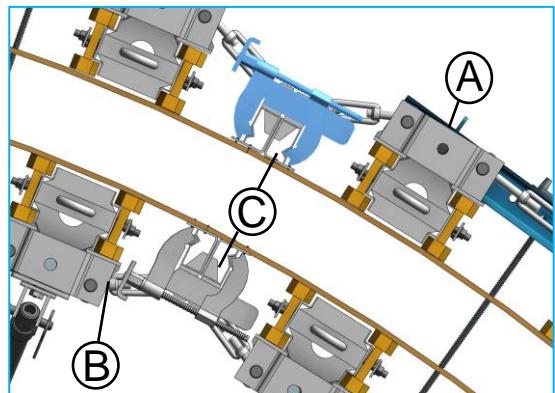


Figure: 13.1

A	Outside formwork
B	Inside formwork
C	Adjustable clamp 10cm

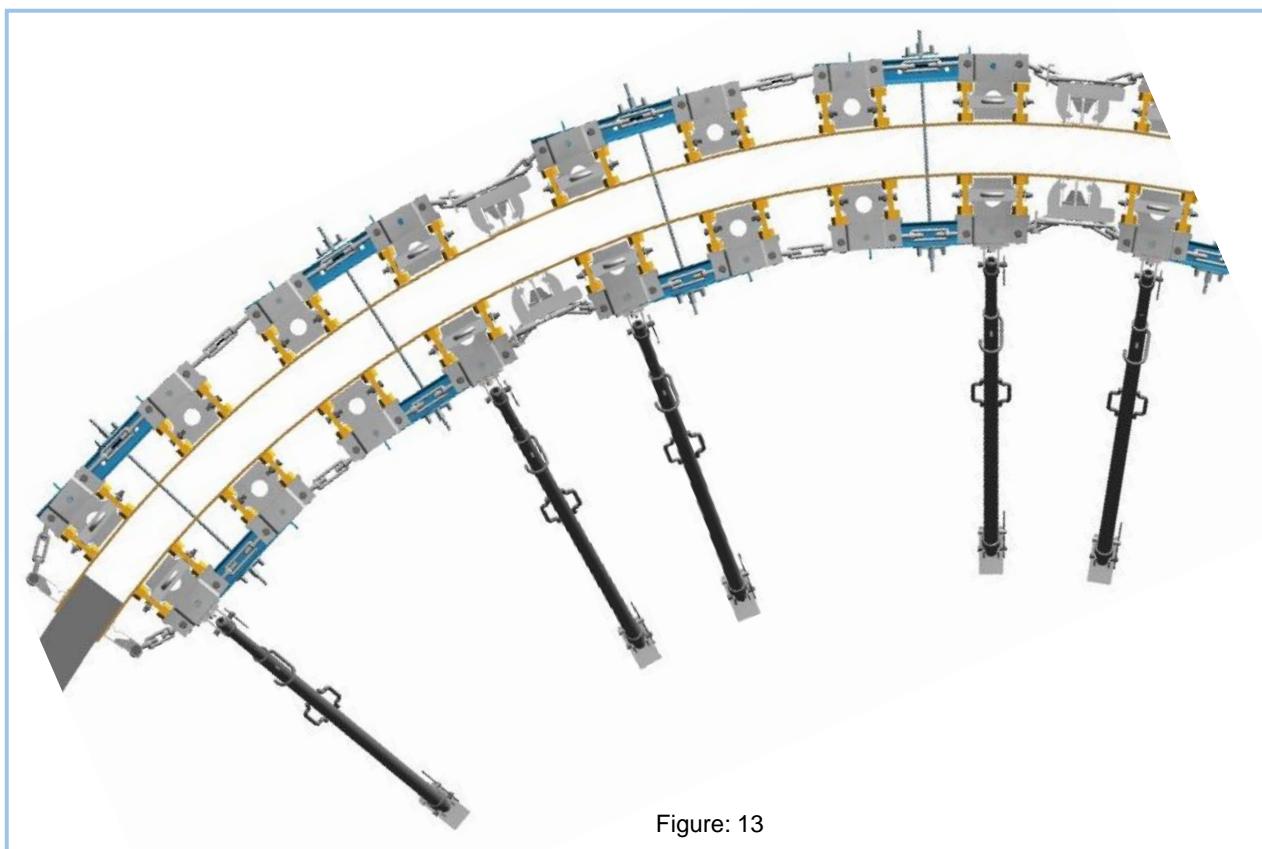


Figure: 13

End Closures, End Shuttering

There are 3 ways of making up stop ends (for wall thicknesses up to 60 cm):

- Adjustable clamp 10cm
- Stop-end tie
- Multi function clamp

Adjustable clamp 10cm:

Perm. tensile force: 10.0 kN

Stop – end tie:

Perm. tensile force: 15.0 kN

Multi function clamp:

Perm. tensile force: 15.0 kN

Example: Stop end with stop end tie

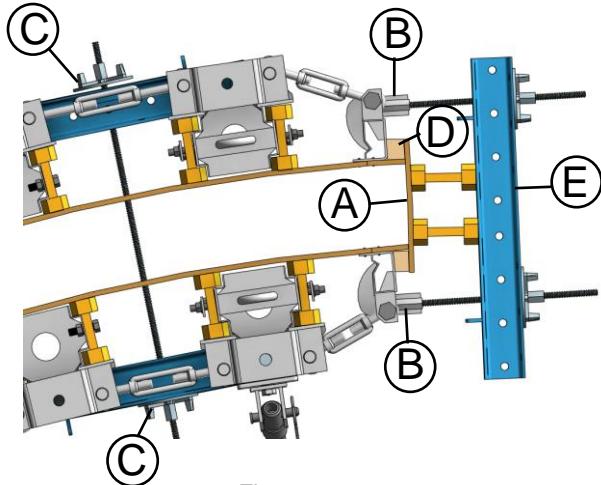


Figure: 14

Number of connectors required

Wall Thickness	Adjustable clamp 10cm		Stop-end tie / multi function clamp (inner & outer side)	
Height	1.8m	2.4m	1.8m	2.4m
250mm	2	3	4	6
340mm	2	3	4	6
400mm	2	4	6	8
500mm	2	4	6	8
600mm	3	4	6	8

Example:

- Wall thickness: 40 cm
- Panel height: 2.40 m
- Adjustable clamp 10cm

A Formwork sheet

B Stop-end tie

C L&T Super plate 15.0

D Spacer

E Multi purpose steel waler (length depends on wall thickness)



Attention !

Number of connectors: 6 pcs./stop end



- Permissible load of stop end: max. 18.0 kN/m at the profiles of the circular formwork elements.
- If wall thickness is greater than 60 cm provide additional support for the stop end.

Bending instructions



As-delivered condition: Element = straight

Smallest bending radius: 3.50 m

- Put up the circular formwork element and secure it so that it cannot topple over.
- Place tall elements on their sides, as shown in the illustration, so that the spindle-levels are in the vertical. In this way, all the spindles are within easy reach.

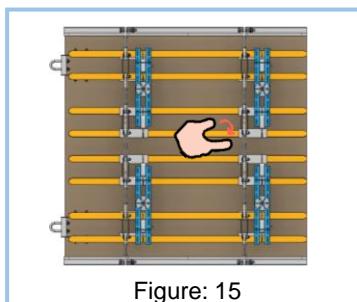


Figure: 15

Uniformly pre-tension all the spindles by hand

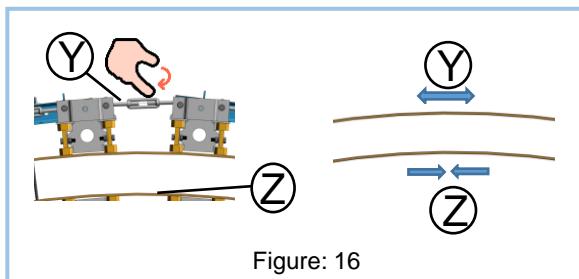


Figure: 16

Y Outside element pushed apart

Z Inside element pulled together



There is an indicator on the spindles to show you which way to turn them (**(Z)** for pulling together, **(D)** for pushing apart).

Prepare the template:



Figure: 17

The formwork is easier to set up if there is an in line connection to an existing wall.

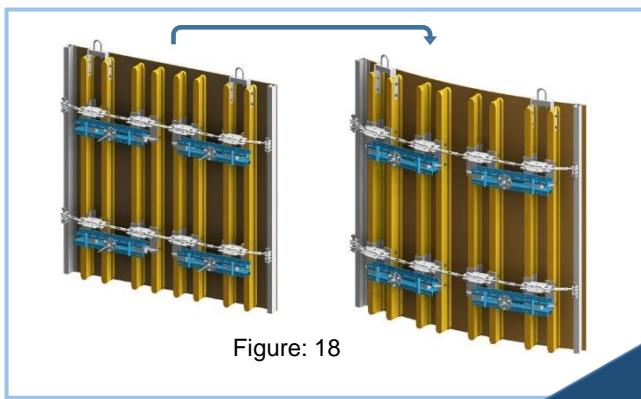


Figure: 18

Adjusting:

- Only adjust the element by means of the template.
- Make sure that you turn each spindle exactly as much as the ones above and below it.
- Check the radius with the template before every pour.
- Adjust the spindles using the Wrench for Circular formwork H20 (**E**) .

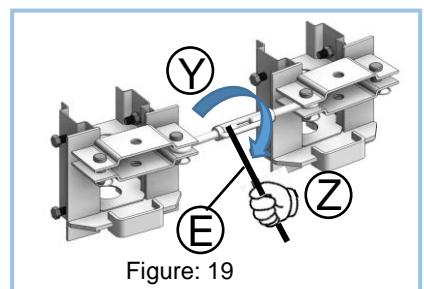


Figure: 19

Y Outside element pushed apart

Z Inside element pulled together

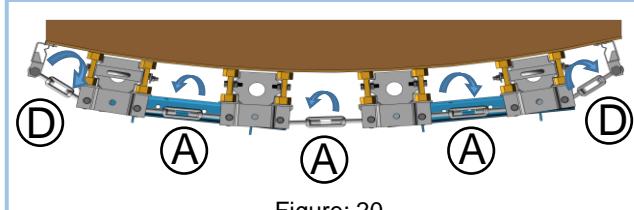


Figure: 20

N° of turns of the spindle

	(D)	(A)	(A)	(A)	(D)
1	—	—	1½	—	—
2	—	1½	—	1½	—
3	½	—	—	—	½

Repeat this procedure until the form-ply sits closely and evenly against the template. To return the elements to the "straight" position, simply repeat the spindling procedure in reverse.



If spindling has gone badly wrong:

Straighten out the element and start all over again!

- Once you have adjusted the circular formwork elements to the desired radius, set them up next to one another in the same way as straight elements, link them with Adjustable clamps 10cm, and then place the form-ties.

Storage

- Straighten out the elements again before storing them for any length of time.

Inner panel

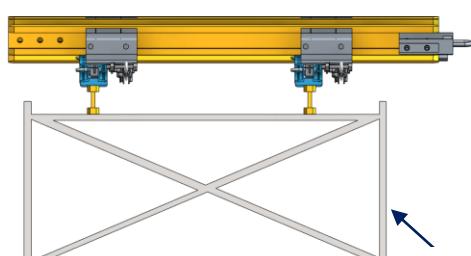


Figure: 21

view

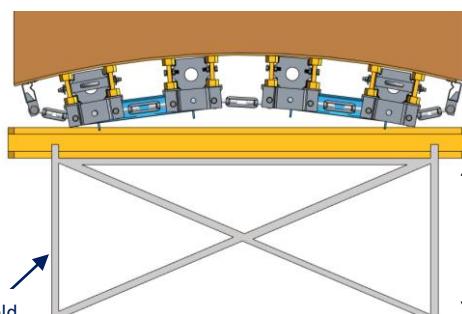


Figure: 22

1.0/1.2m
high

Outer panel

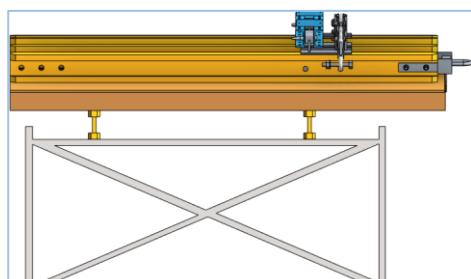


Figure: 23

view

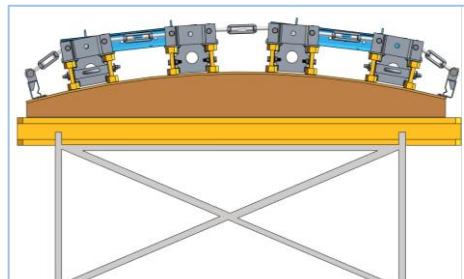


Figure: 24

Closer view of plywood template



Outer template



Inner template

Figure: 25

Plumbing accessories

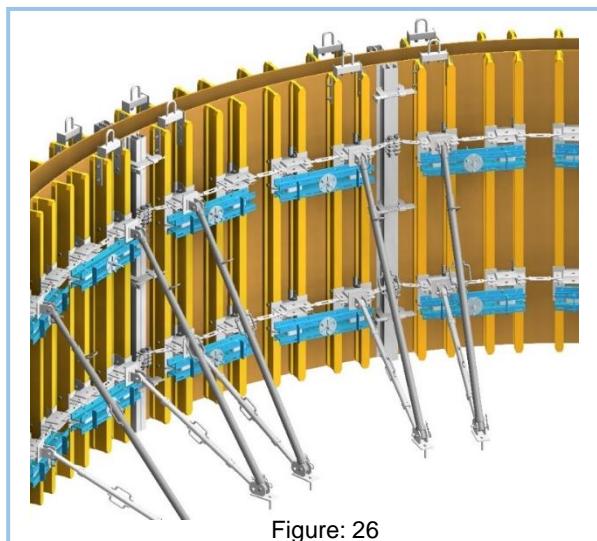


Figure: 26

Alignment strut brace the formwork against wind loads and make it easier to plumb and align.



Important note:

- The formwork panels must be held stable in **every** phase of the construction work!
- Please observe all applicable safety regulations for walkway & erection.

For more information (wind loads etc.) see the section headed 'Vertical and horizontal loads' in the Calculation Guide 'formwork engineering'.

Permitted spacing's [m] of the plumbing accessories: * - Refer Figure: 30

FORMWORK HEIGHT (M)	PANEL STRUT SPACING (M) IN WALL		
	TYPE A & B	TYPE A & C	TYPE B & C
1.8	2.4	-	-
2.4	2.4	2.4	-
4.2	-	-	2.4

The values apply where the wind pressure $w_e=0.65\text{kN/m}^2$. This results in a dynamic pressure $q_p=0.5\text{kN/m}^2$ (102 km/h) where $c_{p,\text{net}} = 1.3$. The greater wind loads encountered at exposed formwork ends must be supported properly by additional plumbing accessories (e.g. struts or pipe-braces). In cases where higher wind pressure is encountered, the number of struts must be determined by structural calculation

Note:

Every gang-form must be supported by **at least 2 plumbing accessories**.

Example: For a formwork height of 4.20 m, the following items are required for each element:

- 2 Panel strut A&C

Fixing the struts to the formwork

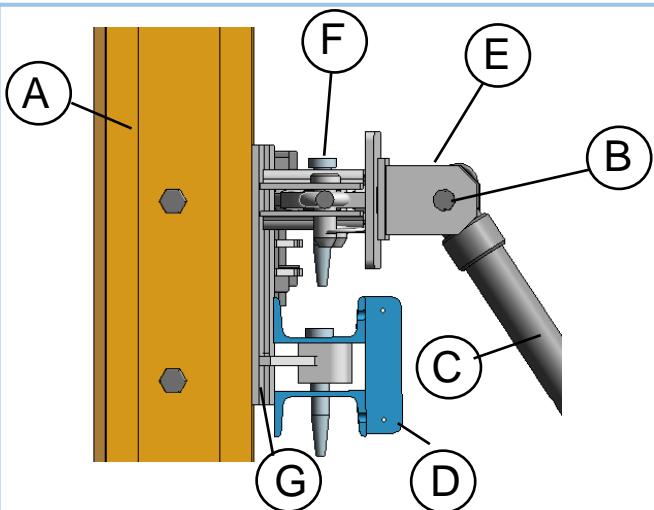


Figure: 27

A	H16 Beam
B	Non-removable 20Ø Pin & spring cotter Alignment Struts (A, B & C).
C	Alignment Strut A, B or C
D	Steel Waler
E	Multipurpose Strut Head
F	Connecting Pin 19X130
G	Holder unit H16

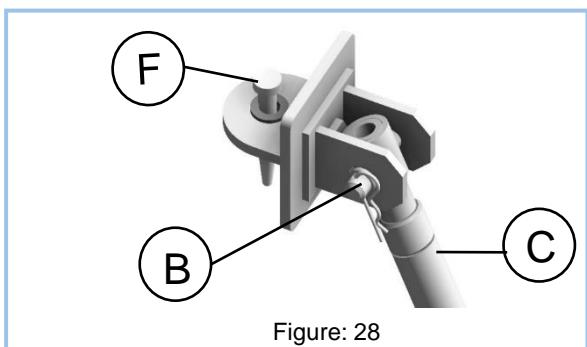


Figure: 28

Fixing to the ground

Anchor the plumbing accessories in such a way as to resist tensile and compressive forces!

Drilled holes in the footplates

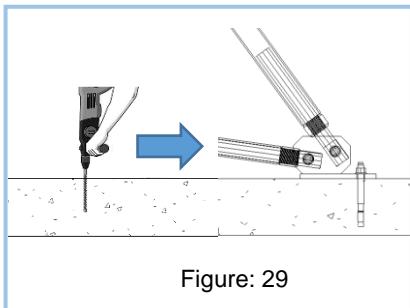


Figure: 29

Base plate



Adjustable Panel Strut

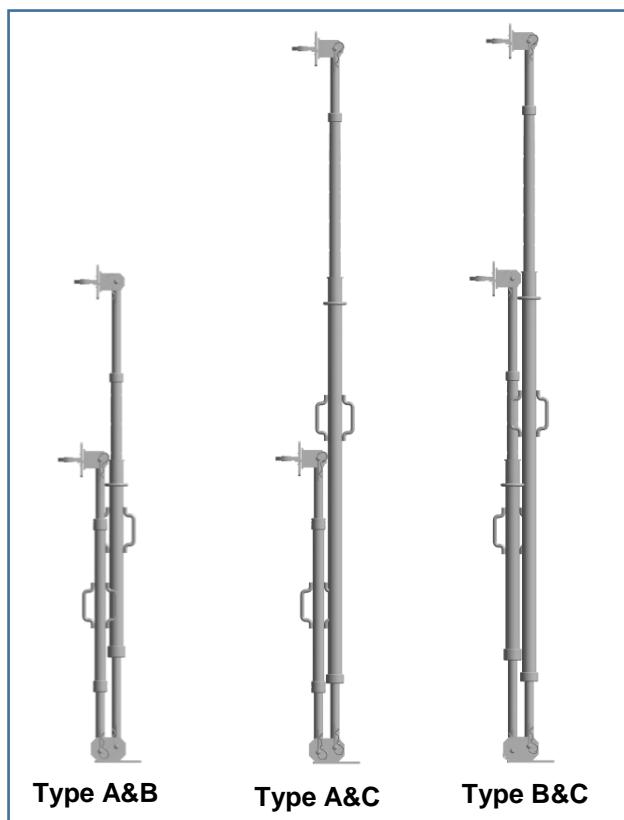


Figure: 30

Load Carrying Capacity (Based on the Full Extended Length)



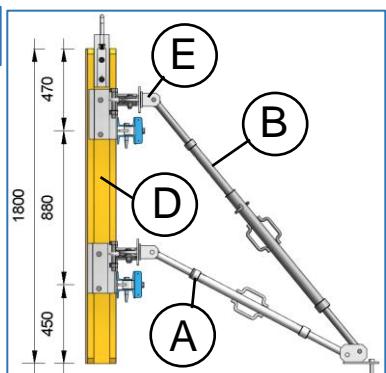
Tip

- For ease of handling U-clip is helpful to connect two struts together
- **For more details, please refer TNL #8 R-03.**

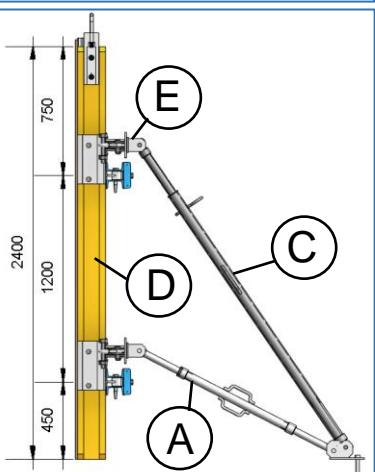


Panel Struts

Strut A & B



Strut A & C



Strut B & C

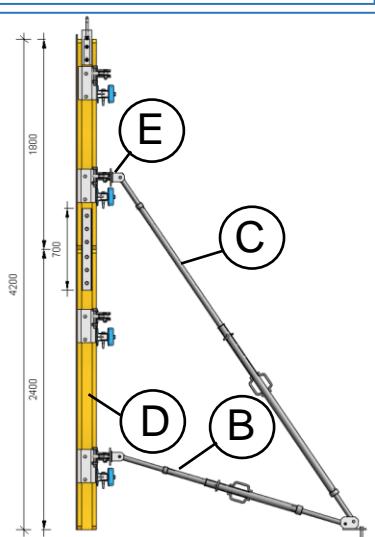


Figure: 31

A Alignment strut type A

B Alignment strut type B

C Alignment strut type C

D H16 Beam

E Multipurpose Strut Head

Resetting

The slinging chains are hooked into the ready mounted lifting-brackets of the Circular formwork element H16.

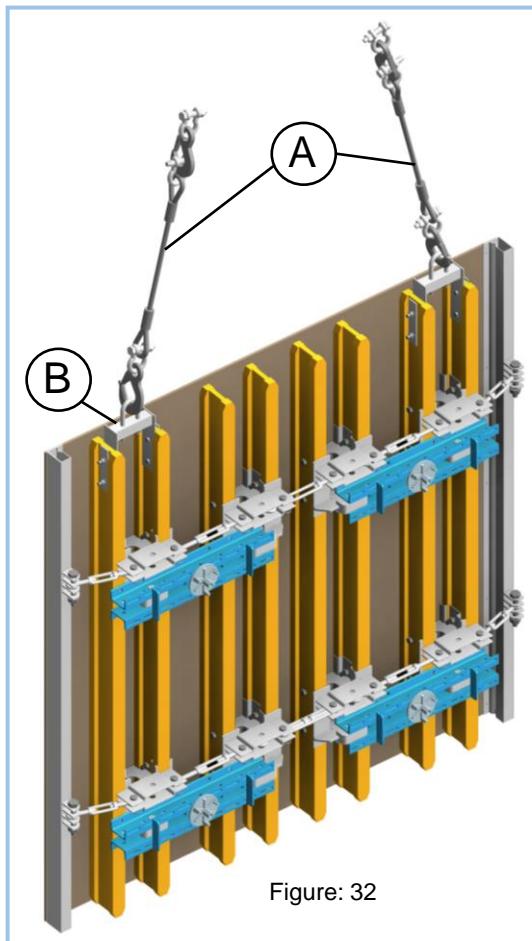


Figure: 32

Close-up of lifting-bracket:

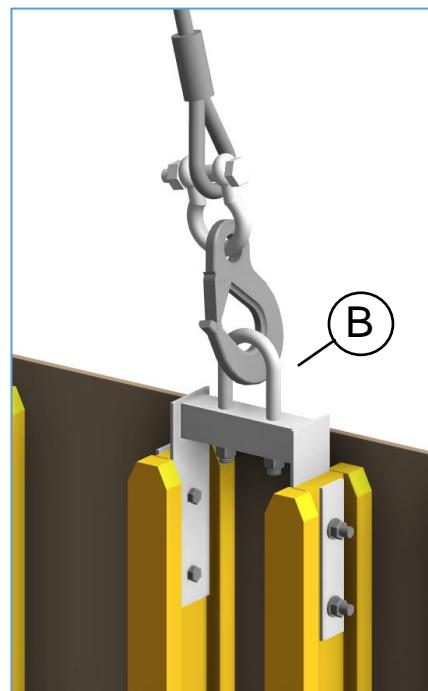


Figure: 33

Max. load per lifting-bracket: 1000 kg

A Lifting Chain hooks

B Lifting Hook for H16

Transporting, stacking and storing

1FWNM004H000000	WAREHOUSE STACKING RACK	44 kg
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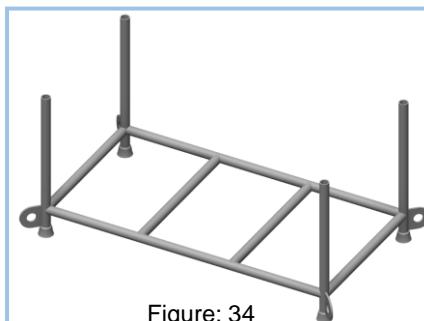


Figure: 34



Tip

- For more details, please refer TNL # 27.

1FWNM005Q000000	STACKING PALLET WITH WIRE MESH & DOOR	133 kg
-----------------	---------------------------------------	--------

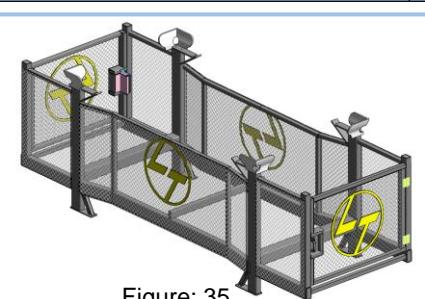


Figure: 35

1FWNM004G000000	STACKING PALLET 1.5m	67 kg
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Figure: 36

1FWNM005R000000	STACKING PALLET BOX WITH MESH	87 kg
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Bolt-on castor set B

The Bolt-on castor set B turns the stacking pallet into a fast and manoeuvrable transport trolley

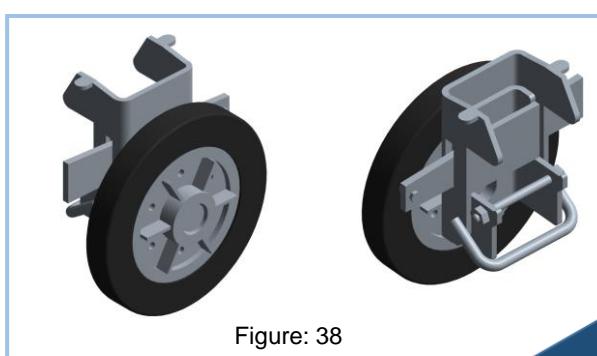


Figure: 38

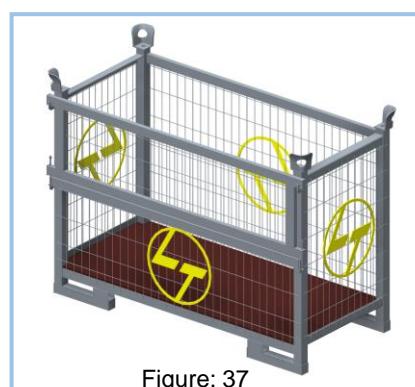


Figure: 37

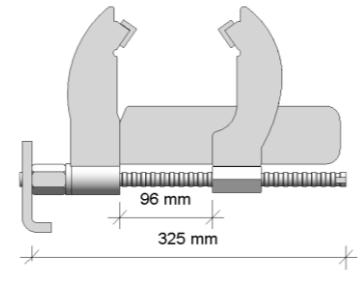
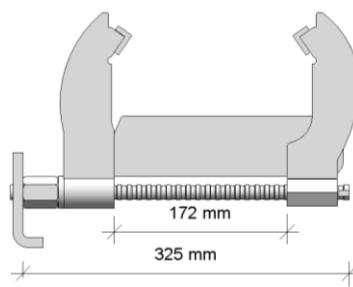
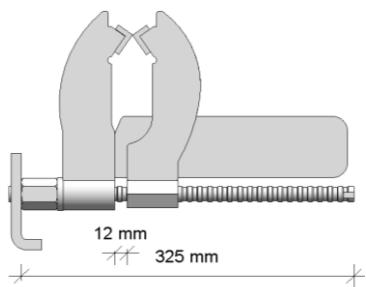
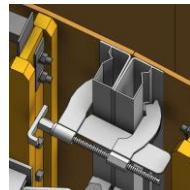
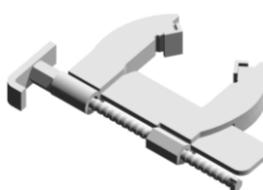
L&T Circular System components

S.no	Components	Finish	Unit Weight (Kg)	Appx. Unit Cost @ 90/-per kg
1	ADJUSTABLE CLAMP	GALVANISED	4.6	414
2	H16 HOLDER UNIT	GALVANISED	12.64	1138
3	STOP END TIE	GALVANISED	0.96	86.
4	LIFTING HOOK	GALVANISED	5.09	458
5	TURNBUCKLE	GALVANISED		
	A		1.86	167
	B		1.42	1278
	C		1.6	144
	D		1.38	124
6	STEEL FILLER PANEL 300 X 2400 250 X 2400	GALVANISED	34.24 29.53	3082 2658
7	END PROFILE	GALVANISED	27.55	2480

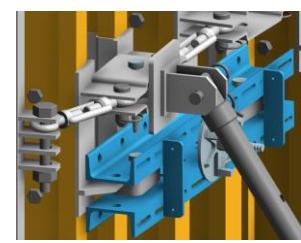
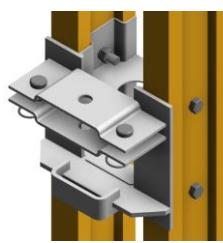
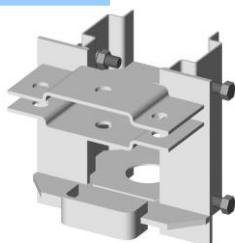
The new creation of circular system is very useful for large area projects

1. ADJUSTABLE CLAMP

while placing the end profile in between the clamp, distance should be 96mm. Minimum and Maximum length can extend for fixing and removing the adjustable clamp



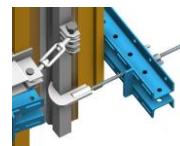
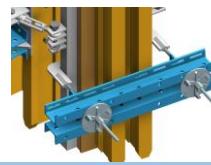
2. H16 HOLDER UNIT



USER MANUAL
CIRCULAR WALL FORMWORK



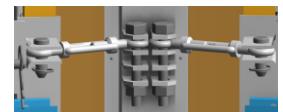
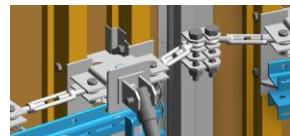
3. STOP END TIE



4. LIFTING HOOK

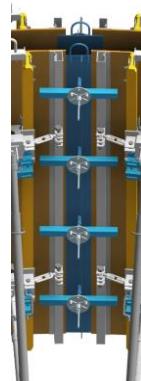


5. TURNBUCKLE

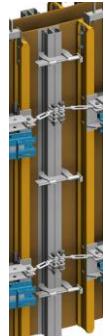


6. STEEL FILLER PANEL

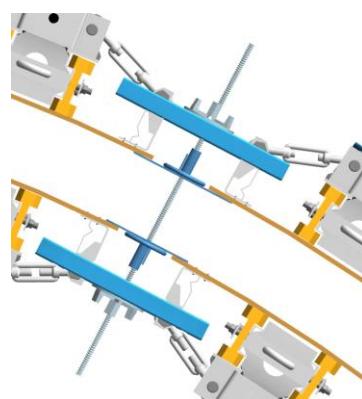
300 X 2400
250 X 2400



7. END PROFILE



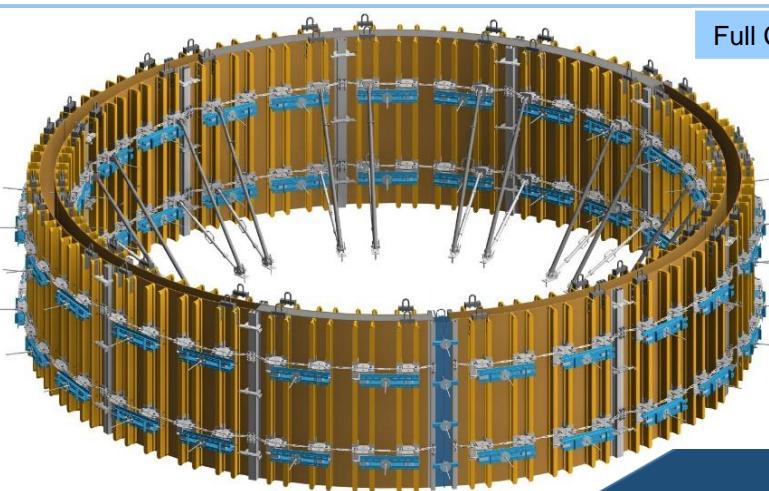
CLOSER VIEW – FILLER PANEL



BOQ - CIRCULAR WALL SHUTTER FOR 9.4m OD 9mID - 200 mm wall

L&T SYSTEM	L&T ITEM DESCRIPTION	QUANTITY In Nos	UNIT WEIGHT in kg	TOTAL WEIGHT in kg
CIRCULAR WALL	ADJUSTABLE CLAMP	66	4.6	303.6
WALL COLUMN	ADJUSTABLE PANEL STRUT A GI	24	12.67	304.08
WALL COLUMN	ADJUSTABLE PANEL STRUT C GI	24	25.48	611.52
WALL COLUMN	BASE PLATE FOR PANEL STRUT GI	24	3.45	82.8
WALL COLUMN	CONNECTING PIN	240	0.32	76.80
CIRCULAR WALL	END PROFILE	48	27.55	1178.4
CIRCULAR WALL	H16 HOLDER UNIT	192	12.64	2426.88
CIRCULAR WALL	LIFTING HOOK	48	5.09	244.32
WALL COLUMN	MULTIPURPOSE STEEL WALER 800mm	96	13.57	1302.72
WALL COLUMN	MULTIPURPOSE STRUT HEAD	48	5.41	259.68
ACCESSORIES	SQUARE TUBE	8	3.36	26.88
CIRCULAR WALL	STEEL FILLER PANEL 250x2400 mm	1	29.53	29.53
CIRCULAR WALL	STEEL FILLER PANEL 300 x 2400	1	34.24	34.24
ACCESSORIES	TIE ROD 1m	52	1.4	72.8
CIRCULAR WALL	TURNBUCKLE - A	72	1.86	133.92
CIRCULAR WALL	TURNBUCKLE - C	72	1.6	115.2
CIRCULAR WALL	TURNBUCKLE - D	96	1.38	132.48
ACCESSORIES	WINGNUT BRACKET 15	104	0.95	98.8
TOTAL				7330.97
L&T SYSTEM	L&T ITEM DESCRIPTION		AREA in m²	TOTAL AREA in m²
ACCESSORIES	PLYWOOD	11	5.71	62.81
ACCESSORIES	PLYWOOD	11	5.99	65.89
ACCESSORIES	PLYWOOD	1	5.85	5.85
ACCESSORIES	PLYWOOD	1	6.13	6.13
TOTAL		24		140.54
L&T SYSTEM	L&T ITEM DESCRIPTION			
H BEAM	H BEAM - 2450	192		
TOTAL		192		

Full Circular Shutter

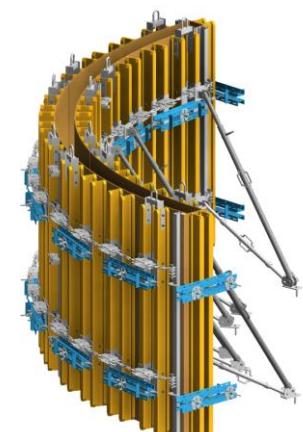
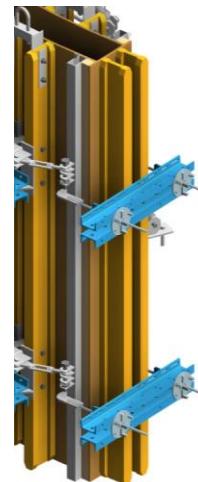


BOQ - CIRCULAR WALL SHUTTER FOR 3 SETS WITH STOP END

L&T SYSTEM	L&T ITEM DESCRIPTION	QUANTITY	UNIT WEIGHT in KG	TOTAL WEIGHT in KG
CIRCULAR WALL	ADJUSTABLE CLAMP	12	4.6	55.2
WALL COLUMN	ADJUSTABLE PANEL STRUT A GI	6	12.67	76.02
WALL COLUMN	ADJUSTABLE PANEL STRUT C GI	6	25.48	152.88
WALL COLUMN	BASE PLATE FOR PANEL STRUT GI	6	3.45	20.7
WALL COLUMN	CONNECTING PIN	60	0.32	19.2
CIRCULAR WALL	END PROFILE	12	27.55	330.6
CIRCULAR WALL	H16 HOLDER UNIT	48	12.64	606.72
H BEAM	H BEAM - 2450	52	8.83	
CIRCULAR WALL	LIFTING HOOK	12	5.09	61.08
	MULTIPURPOSE STEEL WALER			
WALL COLUMN	800mm	28	13.57	379.96
WALL COLUMN	MULTIPURPOSE STRUT HEAD	12	5.41	64.92
CIRCULAR WALL	STOP END	8	0.96	7.68
ACCESSORIES	TIE ROD 0.5m	8	0.69	5.52
ACCESSORIES	TIE ROD 1m	12	1.4	16.8
CIRCULAR WALL	TURNBUCKLE - A	18	1.86	33.48
CIRCULAR WALL	TURNBUCKLE - C	18	1.6	28.8
CIRCULAR WALL	TURNBUCKLE - D	24	1.38	33.12
ACCESSORIES	WINGNUT BRACKET 15	32	0.95	30.4
TOTAL				1903.88

L&T SYSTEM	L&T ITEM DESCRIPTION	QUANTITY	AREA in m ²	TOTAL AREA in m ²
ACCESSORIES	PLYWOOD	3	5.71	17.13
ACCESSORIES	PLYWOOD	3	5.98	17.94
ACCESSORIES	PLYWOOD	1	0.23	0.23
ACCESSORIES	PLYWOOD	1	0.22	0.22
ACCESSORIES	PLYWOOD	2	0.8	1.6
TOTAL		10		37.12

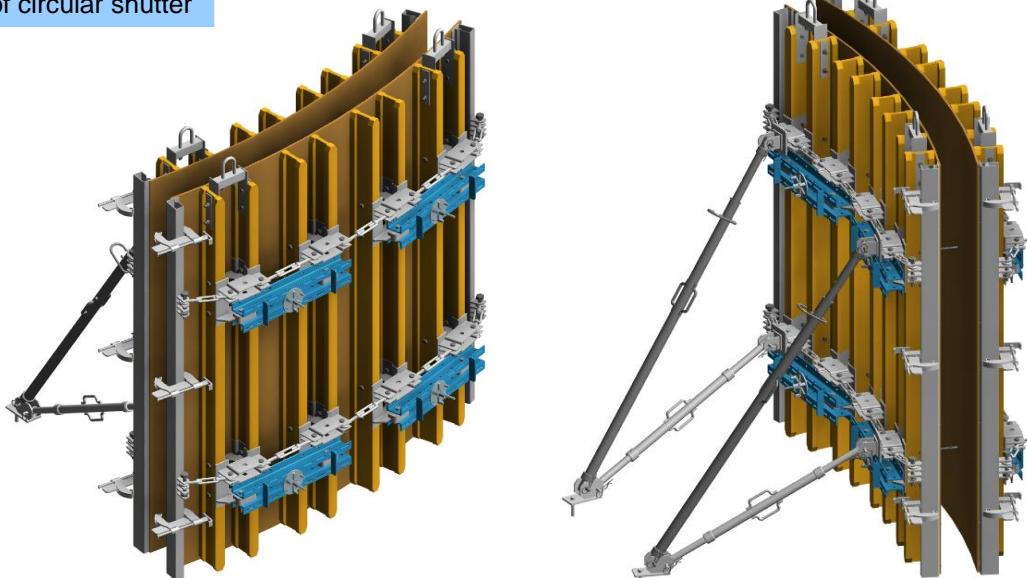
Stop End closer view



BOQ - CIRCULAR WALL SHUTTER FOR 1 SET

L&T SYSTEM	L&T ITEM DESCRIPTION	QUANTITY	UNIT WEIGHT in KG	TOTAL WEIGHT in KG
CIRCULAR WALL	ADJUSTABLE CLAMP	6	4.6	27.6
WALL COLUMN	ADJUSTABLE PANEL STRUT A GI	2	12.67	25.34
WALL COLUMN	ADJUSTABLE PANEL STRUT C GI	2	25.48	50.96
WALL COLUMN	BASE PLATE FOR PANEL STRUT GI	2	3.45	6.9
WALL COLUMN	CONNECTING PIN	20	0.32	6.4
CIRCULAR WALL	END PROFILE	4	27.55	110.2
CIRCULAR WALL	H16 HOLDER UNIT	16	12.64	202.24
H BEAM	H BEAM - 2450	16	8.83	141.28
CIRCULAR WALL	LIFTING HOOK	4	5.09	20.36
	MULTIPURPOSE STEEL WALER			
WALL COLUMN	800mm	8	13.57	108.56
WALL COLUMN	MULTIPURPOSE STRUT HEAD	4	5.41	21.64
ACCESSORIES	PLYWOOD	2	0	0
ACCESSORIES	TIE ROD 1m	4	1.4	5.6
CIRCULAR WALL	TURNBUCKLE - A	6	1.86	11.16
CIRCULAR WALL	TURNBUCKLE - C	6	1.6	9.6
CIRCULAR WALL	TURNBUCKLE - D	8	1.38	11.04
ACCESSORIES	WINGNUT BRACKET 15	8	0.95	7.6

Single set of circular shutter



Note :- Water Barrier, PVC tubes and cones are not included in BOQ