FlyForms International L.L.C.

Formwork Solutions

- *Supply*
- *Technical Consultation*
- *Design & Engineering*
- *Training & Supervision*

Alu Top Deck

Assembly and Application Guide

Product Information and Features

Contents

Product Features

The FFI Alu Top Deck slab formwork system is made of aluminum frame panels which consist of 2 fundamental components: panel and prop. The aluminum frame panels are light, durable, and easy to handle.

The multi-layer plywood sheet with a thickness of 10 mm is inserted into the aluminum profile, therefore all around edge is protected.

The FFI Alu Top Deck system can be used with all types of Euroform Plus steel props.

The easy handling slab formwork system has to be braced at the panel levels against existing structural parts such as walls, columns etc.

Safe erection and dismantling of the system is also one advantage in using FFI Alu Top Deck. For comfort and safety, a small movable scaffolding should be used for fixing the panels if height is above 3.50 m.

Due to simple use of the system, only a very short period of time is needed for getting familiarized with the system. Even workers unfamiliar with the system can easily reach shuttering times between 0.15 up to 0.25 man hours per square meter.

The Alu Top Deck Formwork System is designed and manufactured in accordance with BS EN 12812 : 2008, code of practice for Falsework

Important Remarks

The succeeding Assembly and Application Guide has to be carefully read as it contains detailed information on the proper application and handling of the FFI Alu Top Deck system. All instructions concerning technical operation and function have to be observed carefully. Please note that exceptional use of the FFI Alu Top Deck requires a separate design calculation.

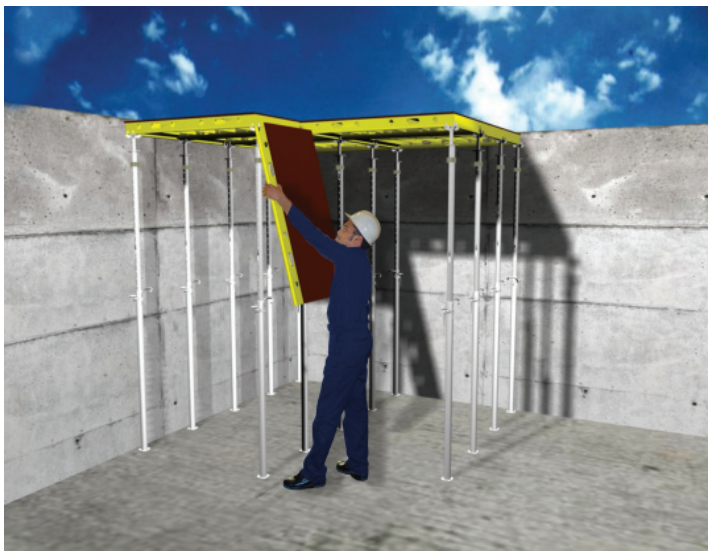
In order to ensure a technical and safe use of our product, all relevant national safety rules and regulations and safety instructions of national institutes and/or local authorities have to be observed. In general, only flawless material and components which are not in improper condition or without damages must be used.

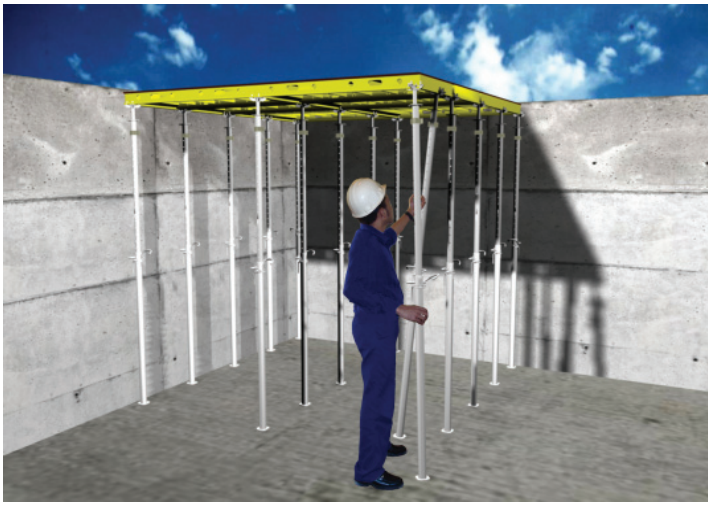
It is important that damaged components have to be sorted out and removed from the construction site. In case of repairs, only original parts of FFI may be used.

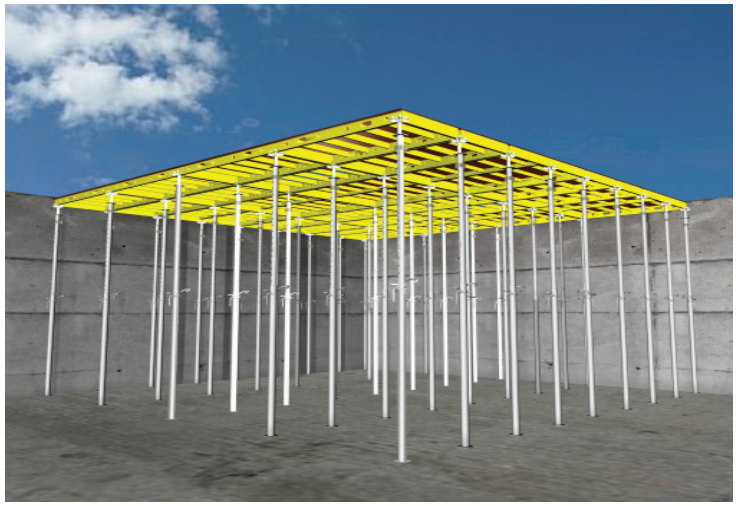
The use of FFI formwork systems combined with other suppliers may involve certain dangers and, therefore require an additional inspection and quality check by our specialist.

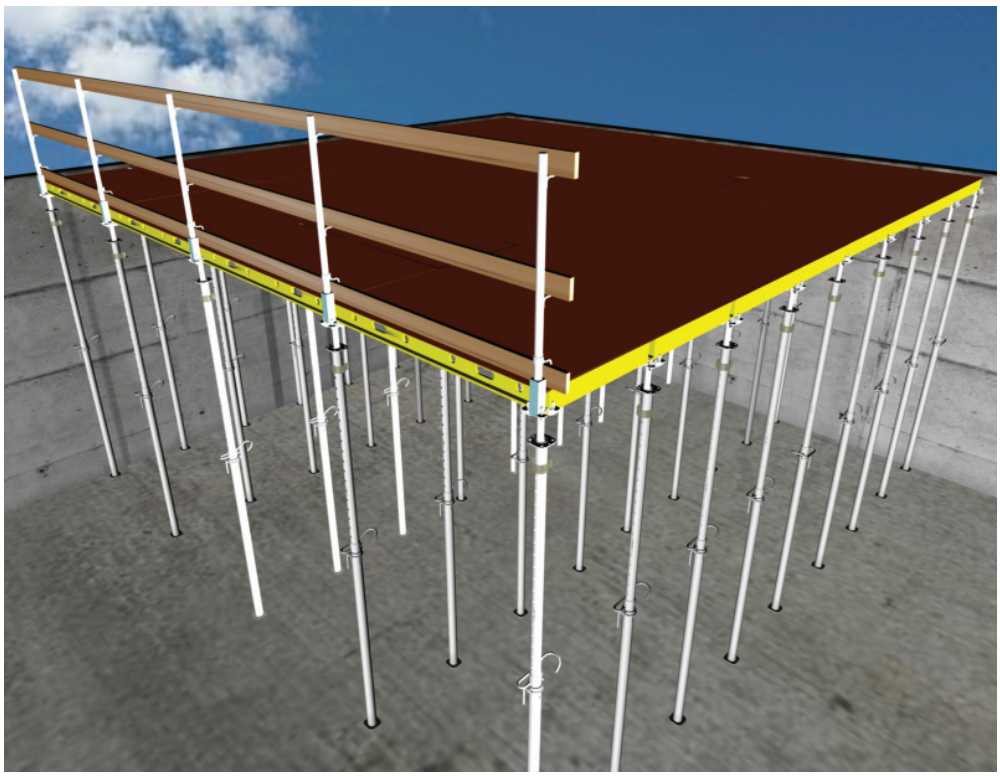
Due to technical development of our system, we would like to emphasize that FFI reserves the right to revise, change, or modify any of the product's components at any time without prior notice.

Product Overview



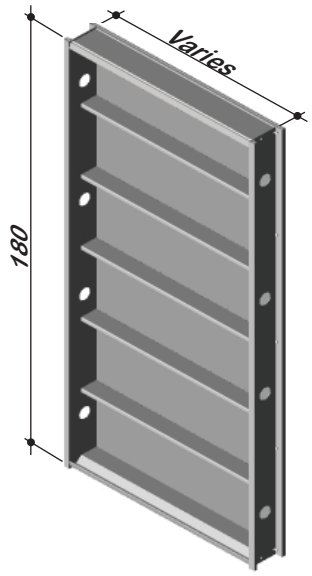






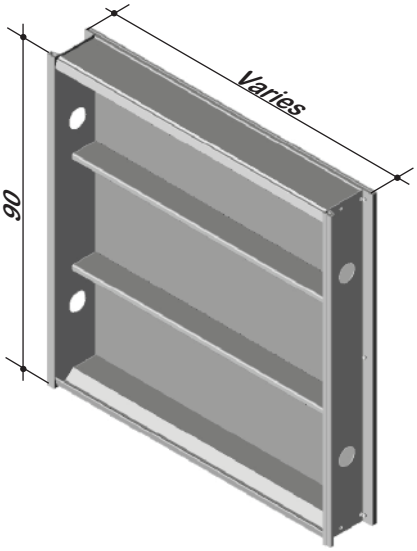
	Art. No	Weight Kg/pc.
Panel 180 x 90 powder coated	340012	20.9
Panel 180 x 75 powder coated	340013	18.6
Panel 180 x 60 powder coated	340014	16.2
Panel 180 x 45 powder coated	340015	14.5

All Alu Top Deck aluminum panels are equipped with an inserted 10 mm thick multi-layer plywood sheet.



Panel 90 x 90 powder coated	340016	12.4
Panel 90 x 75 powder coated	340017	11.6
Panel 90 x 60 powder coated	340018	9.8
Panel 90 x 45 powder coated	340019	8.2

These small sized aluminum panels can be used for optimum application and adjustment to the ground plan of the structure. All Alu Top Deck aluminum panels are equipped with an inserted 10 mm thick multi-layer plywood sheet.



Top Deck Bearing 340155 2.6

The Alu Top Deck panel is supported by the Top Deck Bearing which is placed into the inner tube of the steel prop and fixed by means of the integrated T-Bolt or T-Bolt L.

Top Deck Edge Support

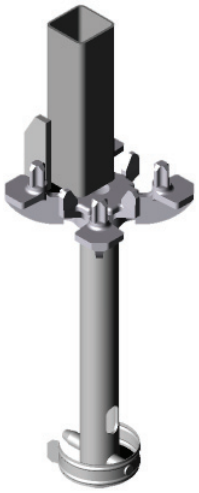
In order to provide a tight connection to wall or columns, the Alu Top Deck panels have to be supported by the Top Deck Edge support. It is also inserted into the inner tube of the props and fixed by means of T-Bolt & T-Bolt L.

Art. No	Weight Kg/pc.
340156	2.1

Top Deck Bearing for Railing

This special Top Deck Bearing is used at the edge of the slab shuttering area and serves as a bearing device for the Safety Railing Post SQ & WB Railing Post.

340157	3.9



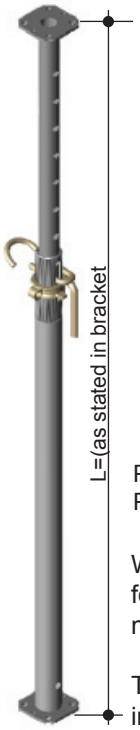
Euroform Plus Steel Props

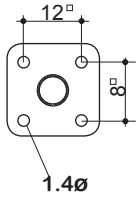
Euroform Plus 20 KN

260	(L=1.54 - 2.60m)	310031	12.70
300	(L=1.72 - 3.00m)	310032	15.80
350	(L=1.98 - 3.50m)	310033	19.20
400	(L=2.24 - 4.00m)	310034	22.70
500	(L=3.00 - 5.00m)	310036	28.70
550	(L=3.05 - 5.50m)	310035	32.30

Euroform Plus 30 KN

260	(L=1.54 - 2.60m)	310037	16.03
300	(L=1.72 - 3.00m)	310038	18.50
350	(L=1.98 - 3.50m)	310039	22.70
400	(L=2.24 - 4.00m)	310040	26.00



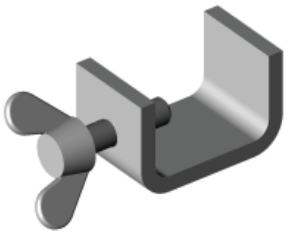


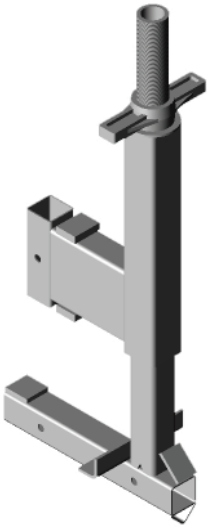
Prop plate of Euroform Plus Props

With quick - release bolts for rapid lowering by 2 mm.

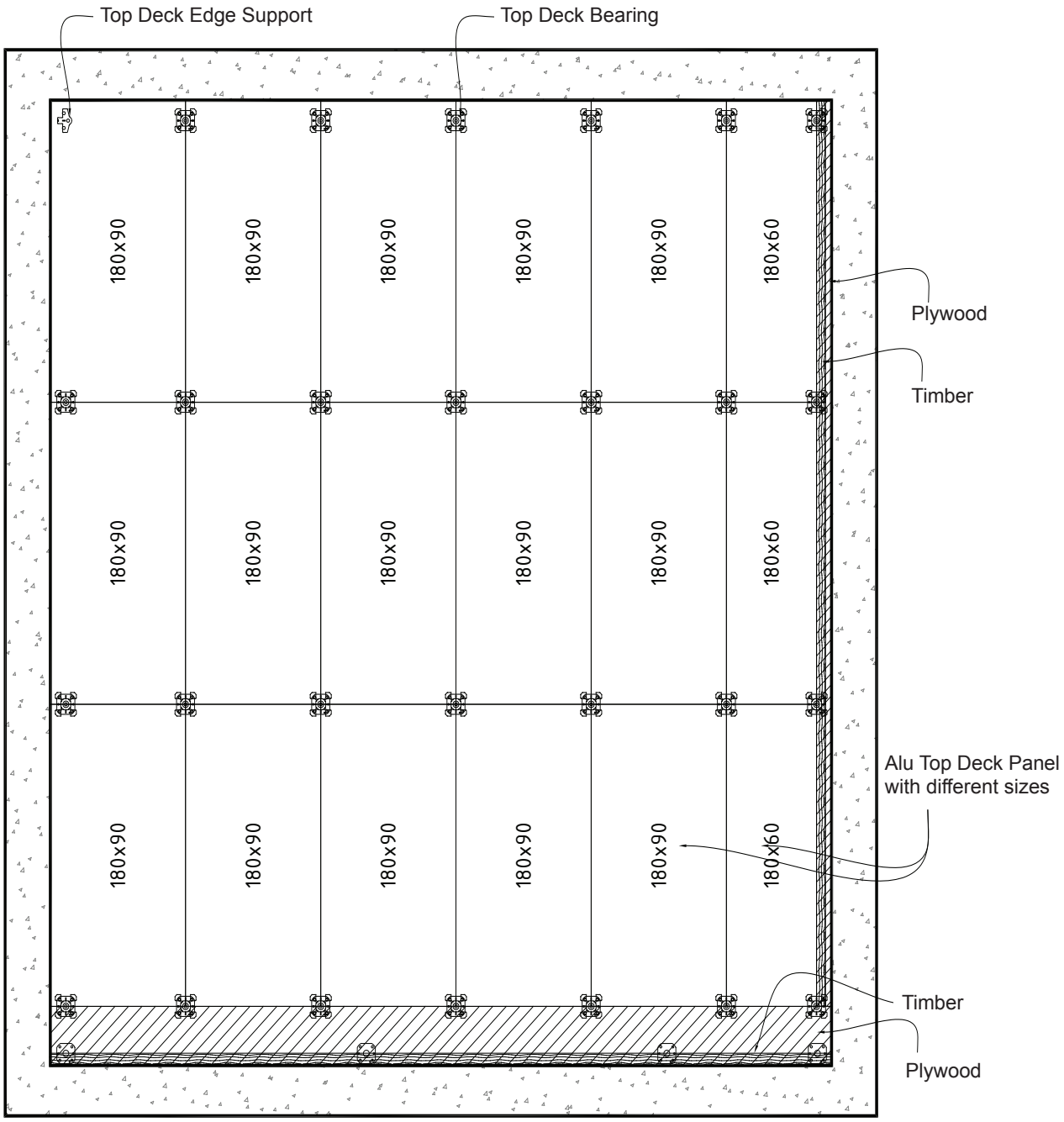
The inner and outer tubes, including the threads, are hot-dip galvanized steel which ensures the quality and high durability of tubular steel props from FFI.

Components

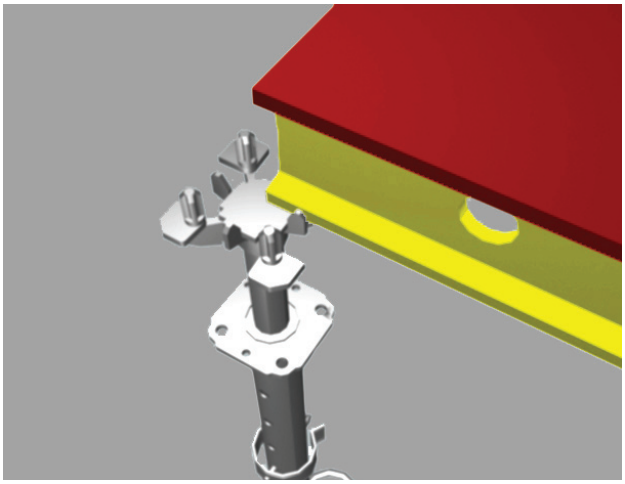
	Art. No	Weight Kg/pc.	
Toe Board Security The sleeve is slid over the circular railing post and serves as a holder for the toe board.	340183	0.5	
Prop Retainer The Prop Retainer is always required when the Top Deck Bearing is not positioned at the very corner of the Top Deck panels and to avoid the props from moving off its designated position when panels are arranged as cantilever.	340184	0.2	
Head Support Device This serves as support for the square timber in adjustment areas and is simply placed on top of the Top Deck Bearing.	340154	0.5	
WB Railing Post To be placed into the general railing device.	110212	4.5	

	Art. No	Weight Kg/pc.	
FFI Safety Multiple Clamp SQ Used as a common holding device for the FFI Safety Railing Post SQ. It can be fixed to various structural parts made of steel or timber, slab edges, roof parapets or parapets. The whole range of the multiple clamp is 1 to 47cm and by simply turning its movable jaw, the grip of the clamp can be adjusted.	310160	7.5	
FFI Safety Railing Post SQ The FFI Railing Post SQ which is equipped with built-in board railing holders is the main item of the FFI Safety System and can be used with either railing plank or FFI Safety Mesh. The FFI Safety Railing Post SQ is automatically fixed by the built-in locking mechanism when inserted into one of various holding devices. The FFI Safety Railing Post SQ is hot-dip galvanized which protects it against corrosion.	310159	3.7	
T-Bolt The T-Bolt is used for fixing and securing the Top Deck Bearing to the inner tube of the Euroform Plus Props 260, 300 and 350.	340172	0.1	
T-Bolt L Used for fixing and securing the Top Deck Bearing to the inner tube of the Euroform Plus Props 400, 500 and 550.	310126	0.2	

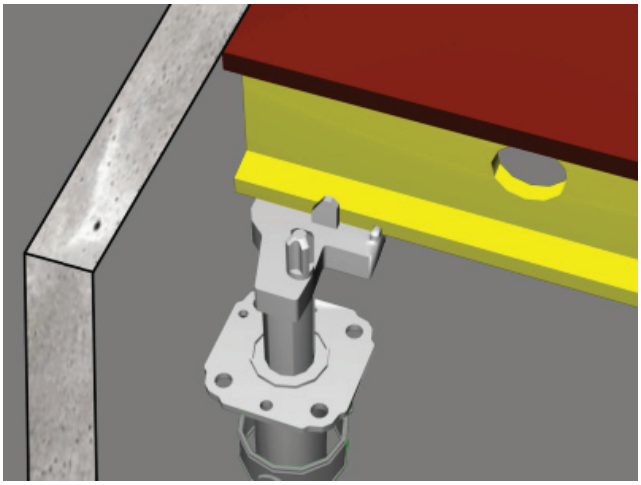
	Art. No	Weight Kg/pc.	
Tripod Stand Used for easy and quick erection of the Euroform Plus steel prop for slab formwork assembly. To be used as an erection aid since it has no statical relevance. This does not replace the stiffening necessary for the supporting structure.	310121	11.2	
Bracing Clamp Provides stiffening by means of shutter boards to any tubular steel prop. (for maximum board thickness of 3 x 12 cm)	310129	1.6	
Alu Erection Rod **Alu Extension Rod** The Alu Erection Rod with an extension rate from 2.00 m up to 3.65 m is used as an erection aid and also for dismantling the Alu Top Deck panels for clear heights up to 3.65 m. For easy adaptation, the Alu Erection Rod can be extended in steps of 5 cm. For the erection of the panel system with clear heights of up to 5.40 m, the Alu Erection Rod can be extended by means of a Rod Extension 1.80 m. In this case, the Alu Erection Rod can be extended from 3.60 m up to 5.40 m.	340179 340180	3.1 1.5	
Top Deck Storage Angle Used for assembling a practical storage unit for easy transport by crane or forklift.	340181	8.7	



Top Deck Bearing



Top Deck Edge Support



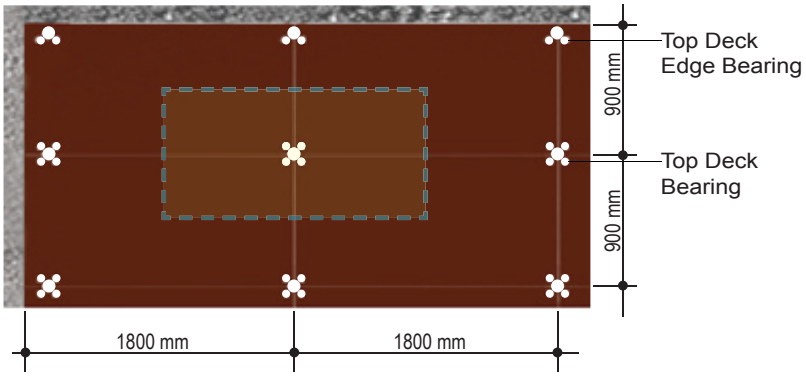
Design and Erection Criteria

The corresponding load capacity of the individual steel props shown in the table below is based on a stable and rigid Alu Top Deck Panel system which is properly braced against horizontal forces in the panel levels against existing structural concrete parts such as walls and columns.

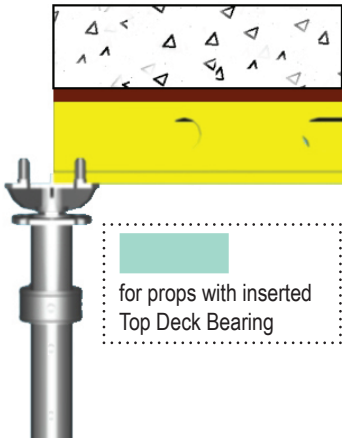
Using the standard panel 180 x 90, the maximum support area per prop is: A = 1.80 x 0.90 = 1.62m².

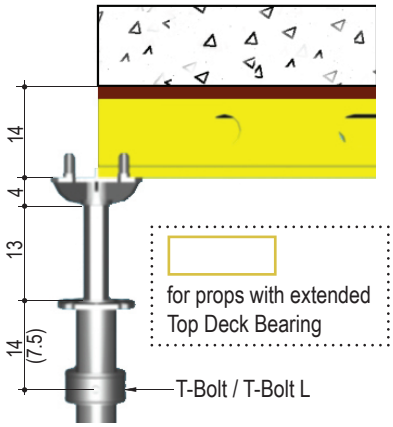
Total Load Assumption

w_f dead load for formwork = 0.25 kN/m²
w_c load of concrete = **t** [m] x 25.0 kN/m³
weight density of concrete = 25 kN/m³
p live load $p = 0.75+(0.75 \leq 0.1 \times W_C \geq 1.75)$ kN/m²
Total load $q = w_f + w_c + p$ [kN/m²]



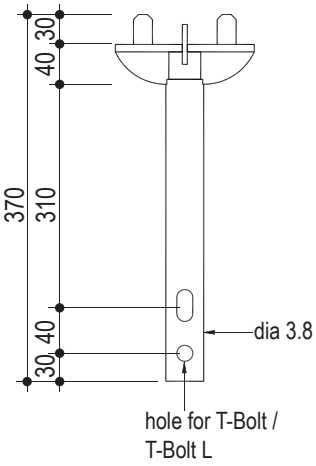
Maximum clear room height





Types of Euroform Plus Steel Prop	Max. clear room height h[m] in accordance with perm. deflections stated							
Slab Thickness [cm]	15	20	25	30	35	40	45	50
Load per Prop [kN]	8.50	10.05	12.55	14.58	16.80	19.03	21.26	23.50
Euroform Plus Prop 260	2.95	2.95	2.95	2.95	2.95	2.95	2.75	2.75
Euroform Plus Prop 300	3.30	3.30	3.30	3.30	3.30	3.20	3.08	2.93
Euroform Plus Prop 350	3.80	3.80	3.80	3.80	3.80	3.80	3.65	3.55
Euroform Plus Prop 400	4.15	4.15	4.15	4.15	4.15	4.15	4.15	4.15
Euroform Plus Prop 500	5.65	5.65	5.65	5.65	5.65	5.55	5.35	5.15
Euroform Plus Prop 550	5.15	5.15	5.15	5.15	5.15	5.06	4.63	4.85

Top Deck Bearing



The following tables are based on the structural design criteria of the steel props irrespective from the load to be transmitted.

Clear room height [m] at extended Top Deck Bearing		
Euroform Plus	min	max
260	1.95	2.95
300	2.12	3.30
350	2.37	3.80
400	2.48	4.15

Clear room height [m] at inserted Top Deck Bearing		
Euroform Plus	min	max
260	1.85	2.75
300	2.10	3.15
350	2.35	3.65
400	2.42	4.15
500	3.18	5.15
550	3.23	5.65

Erection and Dismantling of Alu Top Deck Panel System

Below topics will provide guidelines on how to use the system in the safest, most practical, and economical way.

Using Standard Panel 180 x 90

1. The standard panel 180 x 90 is designed for nearly all types of ground plans and can be used for slab thickness of up to 50 cm without additional systematical support.

2. The extreme light panel weight of only 20.9 kg makes the handling of the system simple and easy.

3. Only one worker is enough to erect the panel system but for practical reasons, it is advisable that panels are always fixed by two workers.

4. The erection of the system is supported by an Alu Erection Rod which serves as an erection aid. In general, 3 to 4 workers are sufficient to erect the Alu Top Deck panel system of a normal ground plan of up to 3.8 m height.

5. The efficiency of the system allows shuttering times (erection and dismantling) of less than 0.3 man hour/m^2, even with unskilled labour.

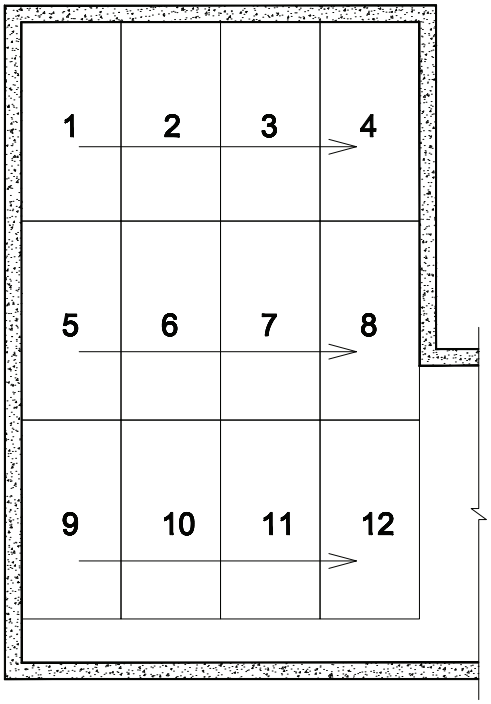


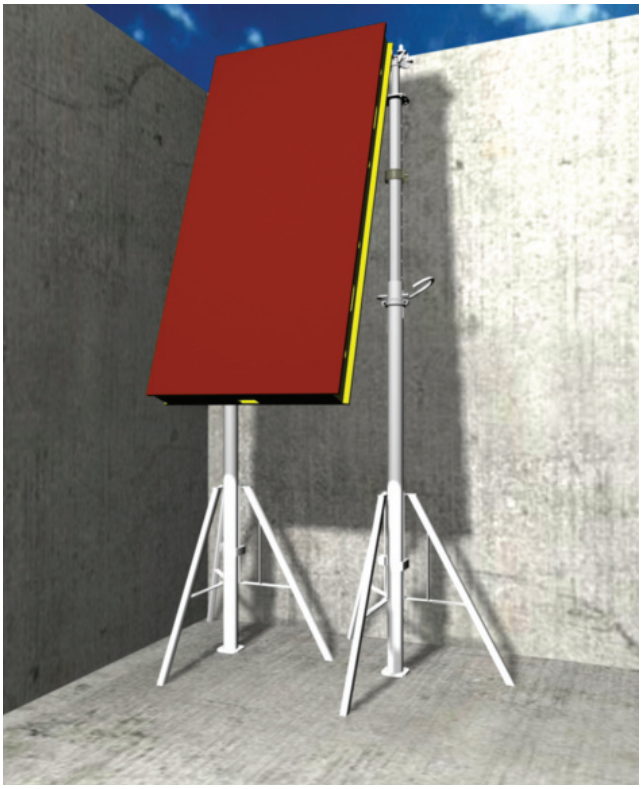
Figure 1

Arrangement of Standard Panel 180 x 90

The first panel is always set up in the corner of a room or against an existing structural part such as walls or columns. The sequence of the arrangement can be done according to the pattern shown on fig-1. Due to it .

Arranging Panels from the Ground

A. Position two steel props including Top Deck Bearing in the corner of the room with a distance of 90 cm and align vertically by means of Tripod Stand.



B. Hang the Alu Top Deck panel onto the Top Deck Bearing as illustrated. If the panel is properly placed, the cams of the bearing devices will hold the panel.

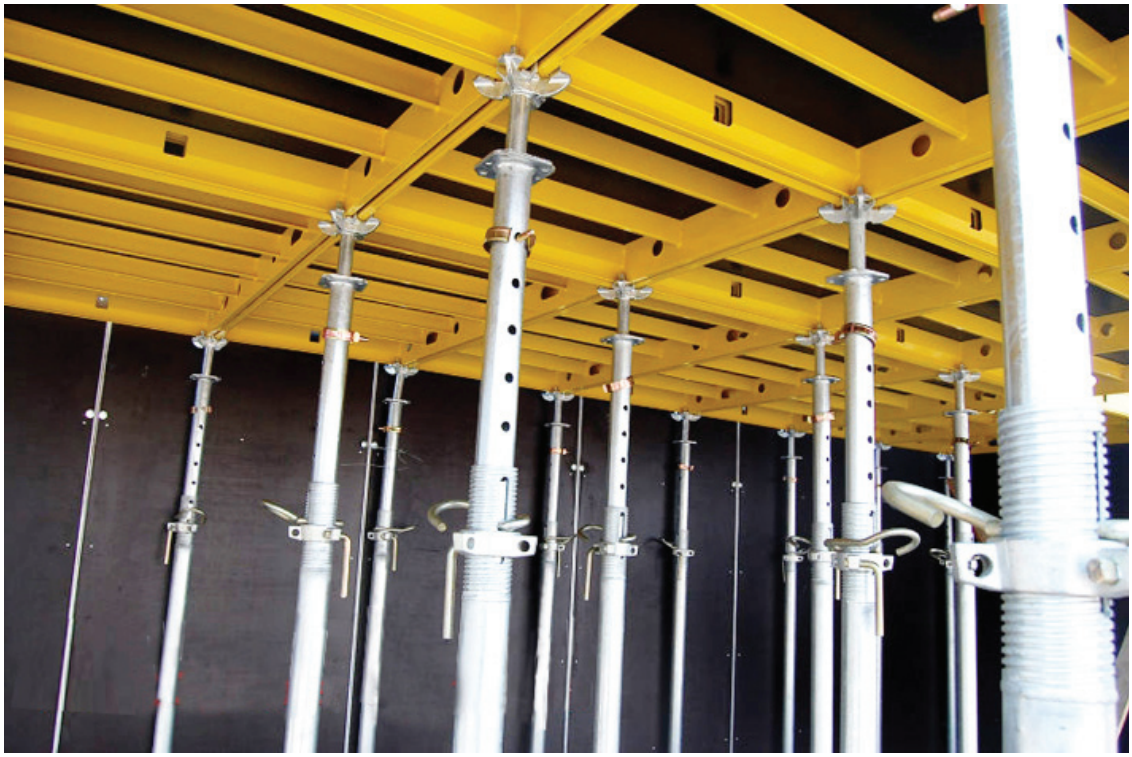
C. Using the Alu Erection Rod, swing up the panel and push it onto the Top Deck Bearing until it is secured properly against the wall.

D. Position the Top Deck Bearing at the corners of the panel and align vertically.

E. Raise the panel as explained in no. 3 and let it rest on another Alu Erection Rod.

F. Continue putting the Top Deck Bearing in place at the panel corners and align vertically.

G. Dismantling of the Alu Top Deck panels is performed in a reverse order.



Arranging Panels from Above

A. Place the Alu Top Deck panels onto the Top Deck Bearing from above.

B. Support the panel in the corner using the Top Deck Bearing as illustrated.

C. Final arrangement of the Alu Top Deck panels with clear positioning of the support in the corner of the panels.

D. Final safety check to see that the panels are properly resting and fixed on the Top Deck Bearing.

Slab Adjustment Areas

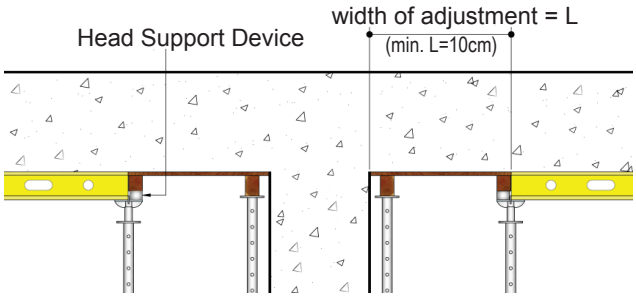
Using Head Support Device

The arrangement of the slab formwork system can be adapted to the dimensions of the ground plan in steps of 15 cm. Remaining areas which are not covered by the standard panels 180 x 90 can be easily completed by means of the Head Support Device in connection with a square timber and an 18 mm plywood sheet which has to be cut to size at the job site.

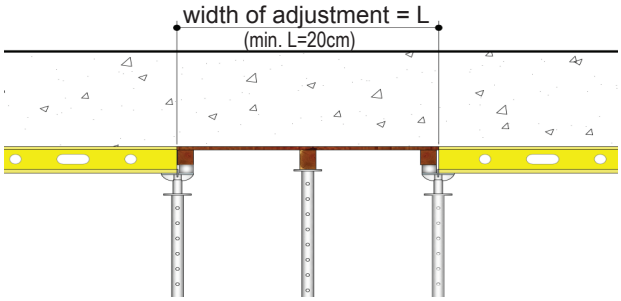
The adjustment area is adapted on site by means of Head Support Device which is positioned on top of the Top Deck Bearing which provides support for the squared timber 8 cm high and the plywood sheet for the infill area (provided by site).

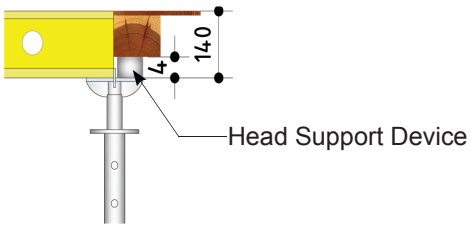
Slab Thickness **t** (cm)	max. L (cm) line 5	max. L (cm) line 6
14	80	65
16	75	65
18	75	60
20	70	60
22	70	55
24	65	55
26	65	50
28	65	50
30	60	50
35	60	45
40	55	40
45	50	40
50	50	35

Adjustments at the Edge



Adjustments between Alu Top Deck Panels

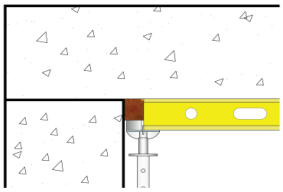




For adjustments between the Alu Top Deck panels, the Head Support Device with a squared timber and a corresponding plywood infill strip can be used. Even larger adjustment widths can be arranged in consideration of additional intermediate support shown in the table of maximum adjustment widths.

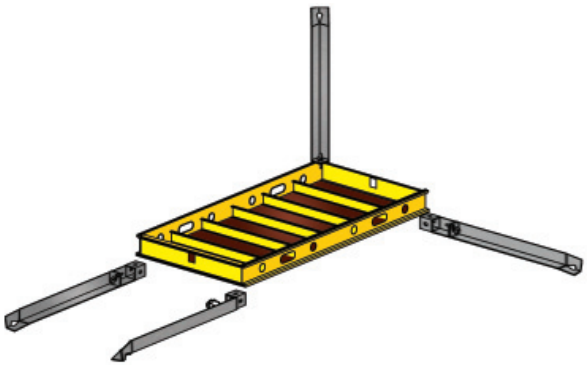
Adjustments at the Edge

It is quite common that the required clear height of a room shows a gap of 1 up to 3 cm. In order to close this gap we recommend the use of Head Support Device in combination with a squared timber 8 x 10 cm to be placed on top of the Top Deck Bearing. The inserted strip of the edge timber serves as shuttering and prevents concrete from pouring out.

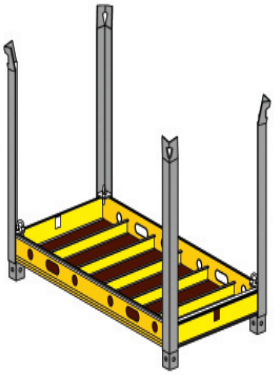


Top Deck Storage Angle

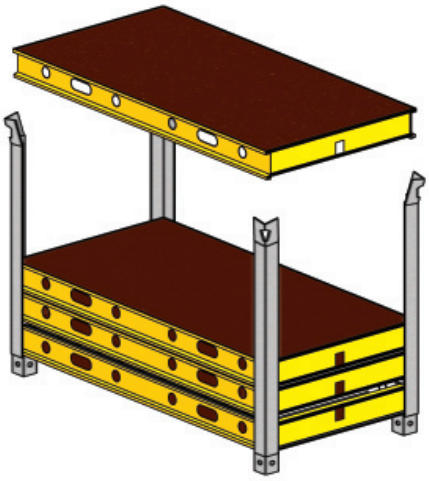
Top Deck Storage Angles have to be fixed to the four corners of the standard panel 180 x 90. Please note that the first panel has to rest with the plywood face down at the bottom part of the Top Deck Storage Angle. The panel is immediately fixed and locked by the built-in gravity bolt.



A complete Top Deck storage unit is assembled using 5 single components only.

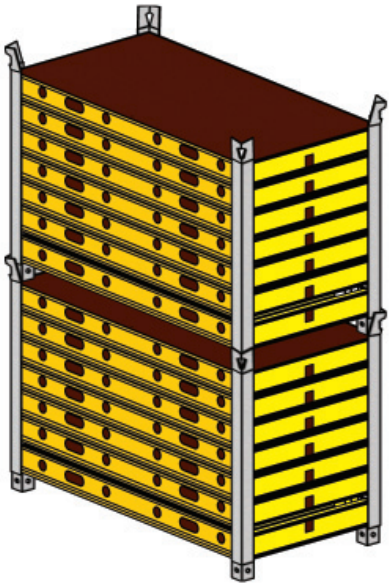


After the arrangement above, additional Top Deck Panels can be placed on top of each other with plywood face up.



A complete Top Deck storage unit is comprised of 7 Alu Top Deck panels. Please note that only panels with the same size are allowed to be stored in one Top Deck storage unit.

For transport purposes, a maximum of 1 storage unit can be placed on top of another Top Deck storage unit. The individual Top Deck storage units can be comfortably and safely moved by either crane or forklift. Please note that when shifting the Alu Top Deck storage unit by crane, the Crane Hook have to be fixed at the 4 corners of the storage unit. The permissible weight per storage unit is maximum of 400 kg.

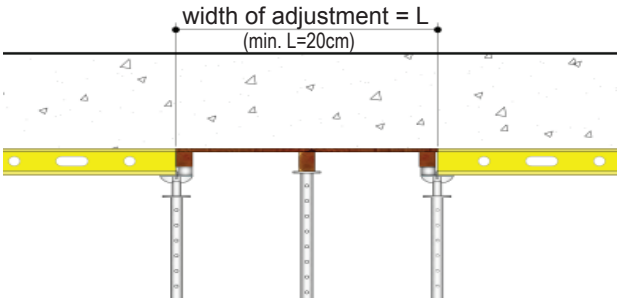


Arrangement of Re-Propping as Secondary Support

According to German Standards DIN 1045, secondary props must be placed immediately after dismantling the slab formwork system.

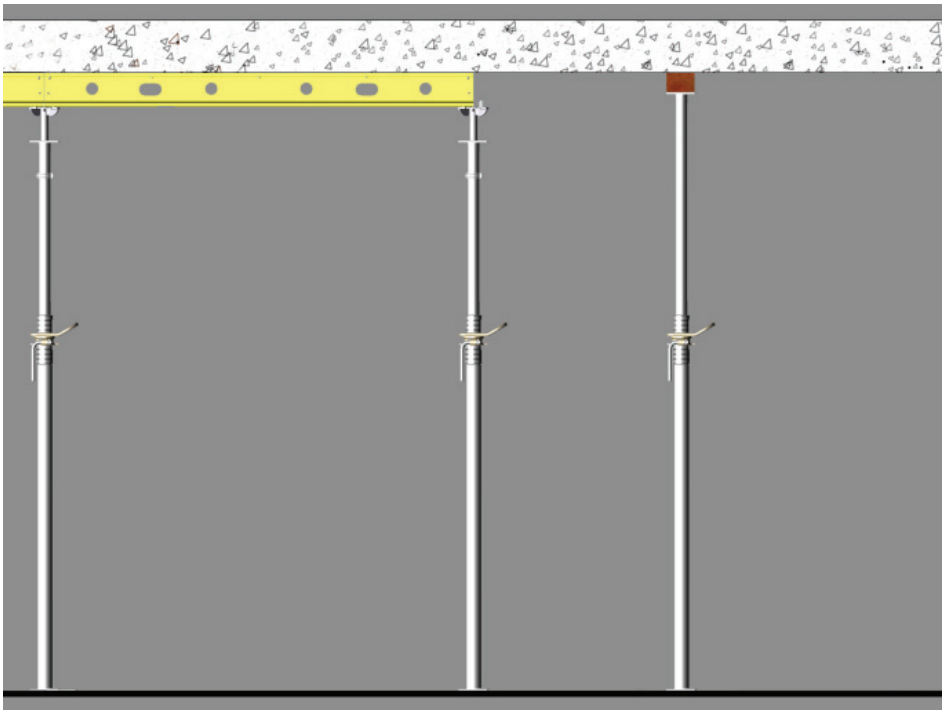
The reasons for this are as follows:

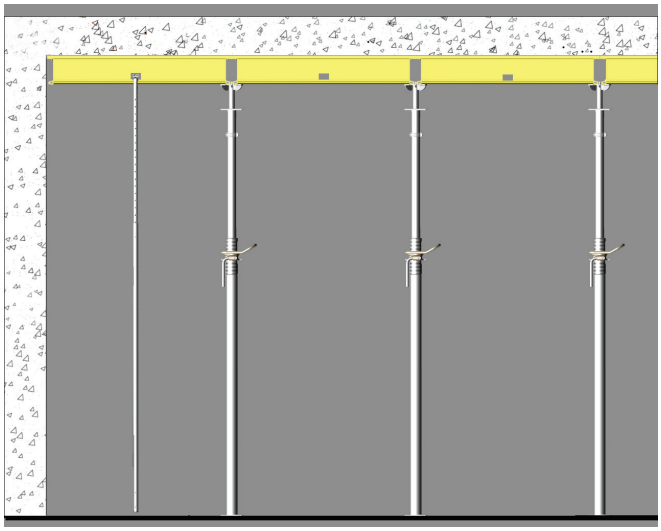
1. Due to removal of the Alu Top Deck panels in partial slab areas, the own load-bearing capability of the poured slab will be activated. The props for re-propping after removing the panels should be positioned in the mid-span area of the slab and in the same location in various floors below if required. In case of arranging the Alu Top Deck panels in connection with an infill section in the middle span of the room, the secondary props can be placed there. This type of panel arrangement allows the removal of the whole decking system where only the infill section remains in position.



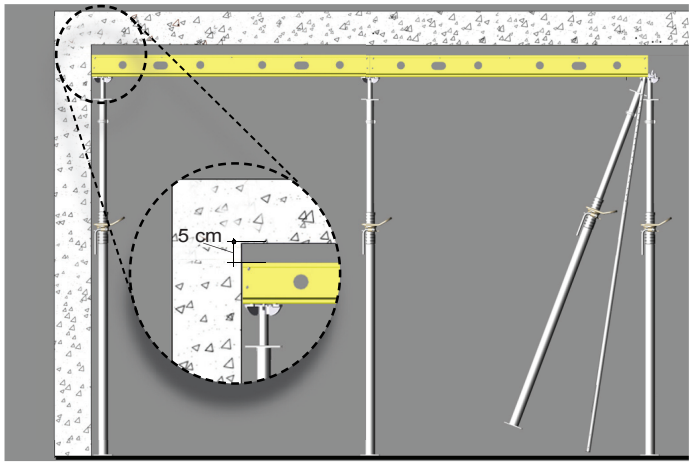
Arrangement of an independent support infill section in the middle of a room recommended by German Standard DIN 1045.

Illustrated below are secondary props as re-propping directly positioned after removing the Alu Top Deck panels. In general, a poured slab with an outer temperature of +20 degrees Celsius can be dismantled after a period of approximately 3 to 5 days in order to activate its own load-bearing capability.
However, prior to dismantling the slab formwork system within this period, consultation with the construction engineer or design office is required in order to obtain detailed information about the re-propping procedure. Aside from outside temperature, other important parameters such as type and quantity of cement, aggregates, reinforcement, as well as type of additives, have to be taken into consideration and requires consultant's advice and approval.

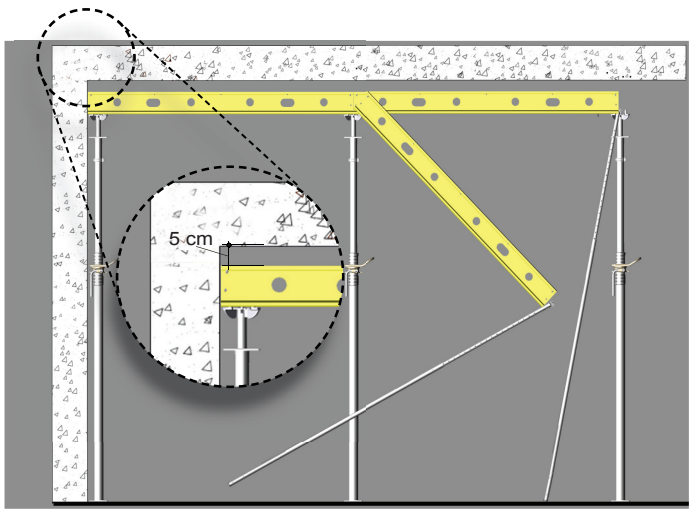




Prior to removing two Top Deck Bearing support, two Alu Top Deck panels have to be temporarily supported by Alu Erection Rod.



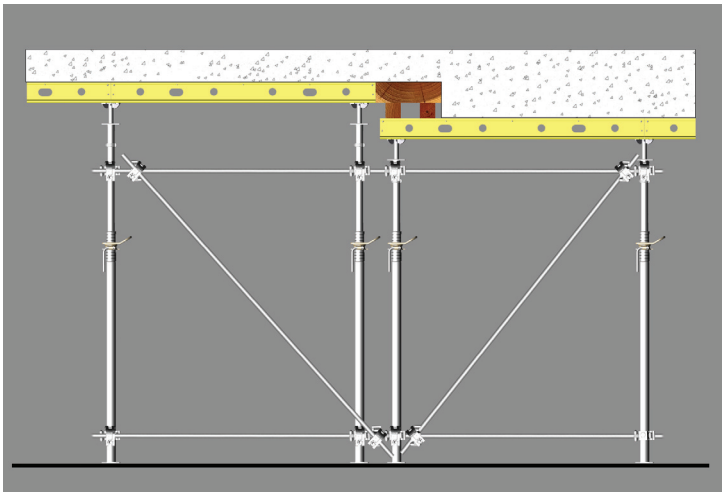
The Top Deck Bearing support of the first panel has to be released from the load and lowered by at least 5 cm. After this, the Top Deck Bearing support has to be removed from the panel which is now supported by the Alu Erection Rod.

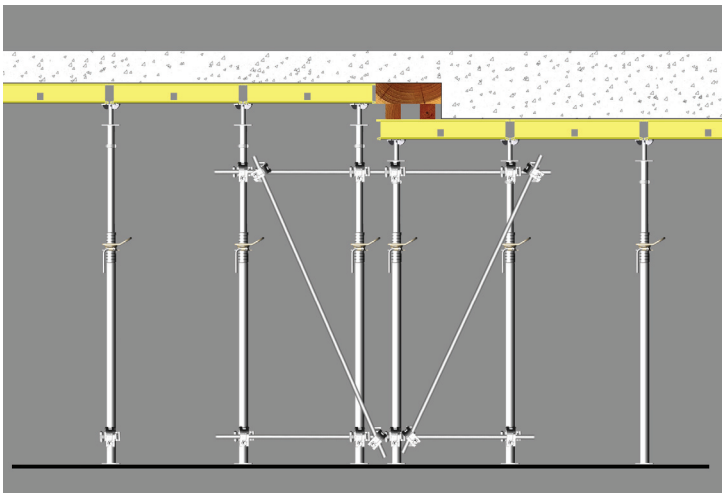


In the next step, the lowered Alu Top Deck panel has to be swung down by means of the Alu Erection Rod and then taken out. Please note, in case the clear height is more than 3.20 m, dismantling should be done from a movable scaffolding. Also, in order to avoid damages and incidents, dropping of the Alu Top Deck panels must be avoided.

Height Adaptation

The flexibility and height adaptation of the Alu Top Deck panel system in case of two different slab levels is shown below. Due to the interruption of the arranged Alu Top Deck panels in the area of the two different slab levels, horizontal forces resulting from this arrangement have to be transferred either into existing structural parts such as walls, columns or braced by tubes and couplers.

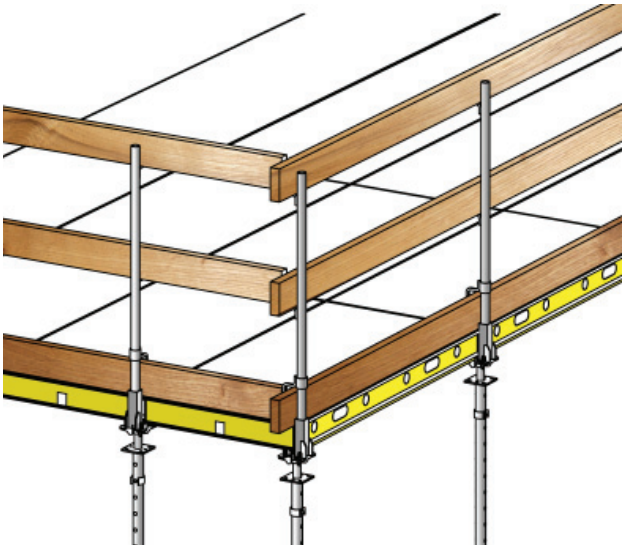


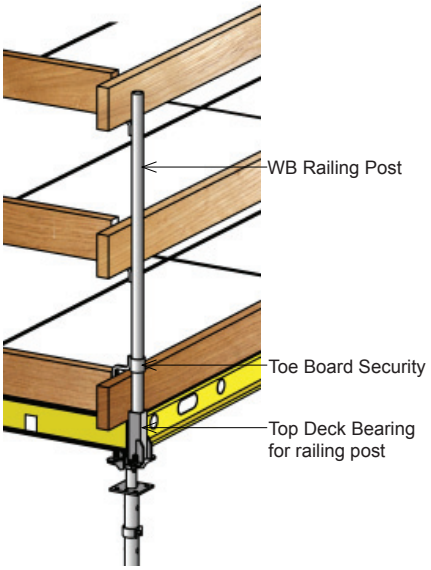


Use of Top Deck Bearing for Railing and WB Railing Post

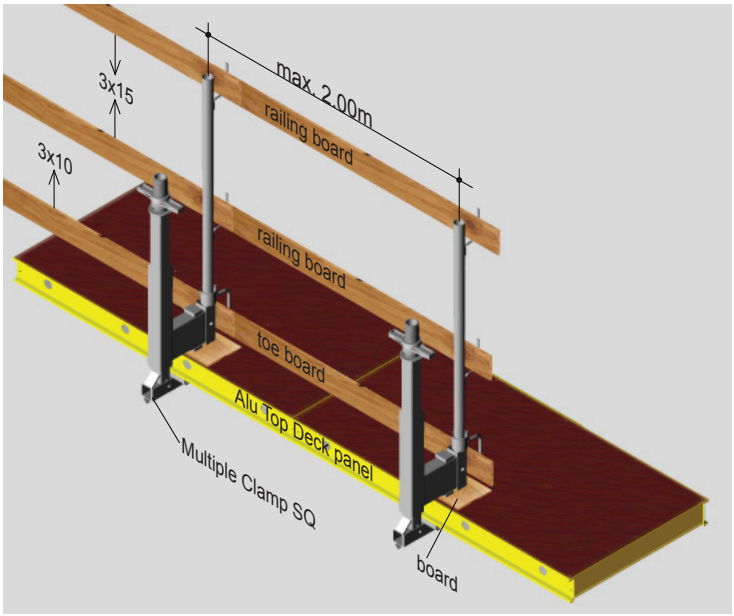
The WB Railing Post is inserted in the post holder of the Top Deck Bearing for railing which is fixed to the steel props. The two bolt holders at the WB Railing Post plus the Toe Board Security provides a 3-part side protection with a height of 1 m.

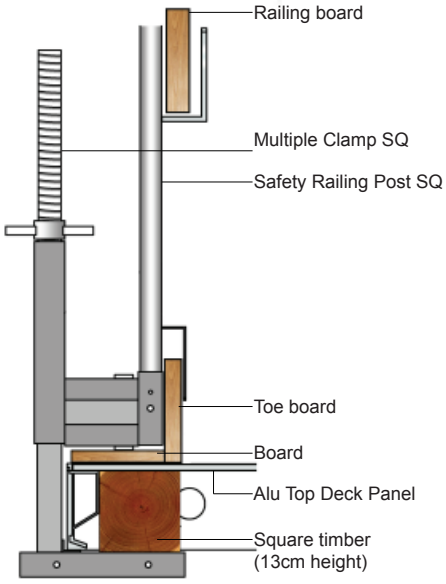
The illustration below shows a completed arrangement of guard railing fixed in longitudinal and cross direction of the Alu Top Deck panel system.





Alternatively, as described above, guard railing for the Alu Top Deck Panel System can also be arranged with the FFI Safety Multiple Clamp SQ in combination with the FFI Safety Railing Post SQ. Also, this solution provides a 3-part 1 m high side protection provided by boards 3 x 15 cm respectively 3 x 10 cm as toe board. Please note that the arrangement of the FFI Safety Multiple Clamp SQ has to be arranged with a 2 m maximum distance. The advantage of using this alternative protection system is that the multiple clamps and railing post can be fixed to the Alu Top Deck panels at any position.





Cantilever Arrangement of Panels

The Alu Top Deck panel system also allows arrangement of standard panels 180 x 90 with a cantilever of up to 90 cm with the full permissible load capacity, under the condition that below mentioned information and instructions are strictly followed.

Guidelines and Instructions

In order to avoid any movement of the prop arranged in intermediate positions together with the Top Deck Bearing, a Prop Retainer has to be fixed on both sides supporting the cantilever part.

For any arrangement of a cantilever exceeding 10 cm, a vertical spanning downwards to existing structural parts such as slab, beam, column or wall is required.

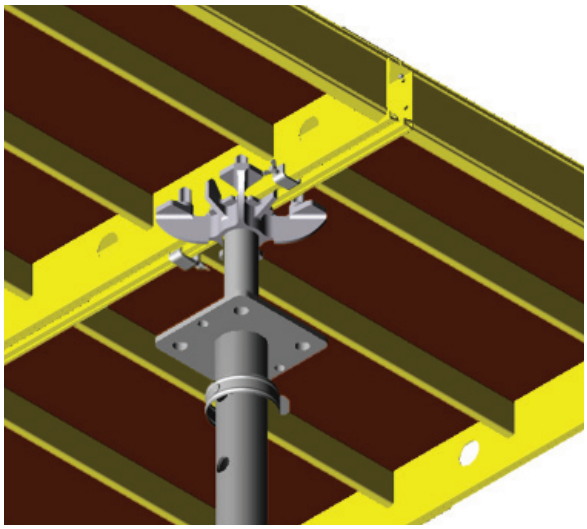
Please note that the concreting sequence for the slab must always be executed from the supported area of the slab to the cantilever area.

Uplifting forces which may come up because of wind have to be taken into consideration and appropriate measures such as spanning downwards by means of chains or wires have to be done on site.

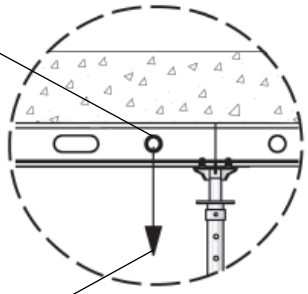
In order to take the maximum deflection of the Alu Top Deck panel, the following design criteria have to be taken into consideration:

The design values of the panel 180/90 are:

moment of inertia	J= 359 cm^4
modulus of elasticity	E=7,000 kN/cm^2

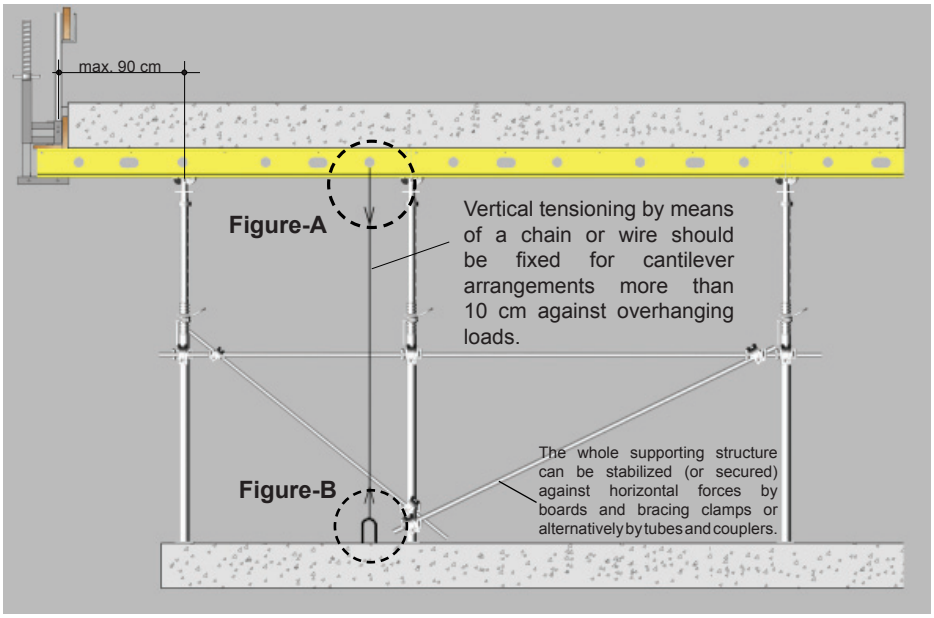


For the arrangement of vertical spanning by means of a chain or a wire, a scaffold tube with 48 mm dia. has to be inserted into the holes of the Alu Top Deck profile.



Alu Top Deck panels with cantilever arrangement have to be tensioned and secured to the floor slab or other structural parts.

Figure A



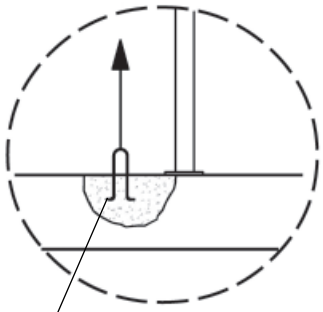
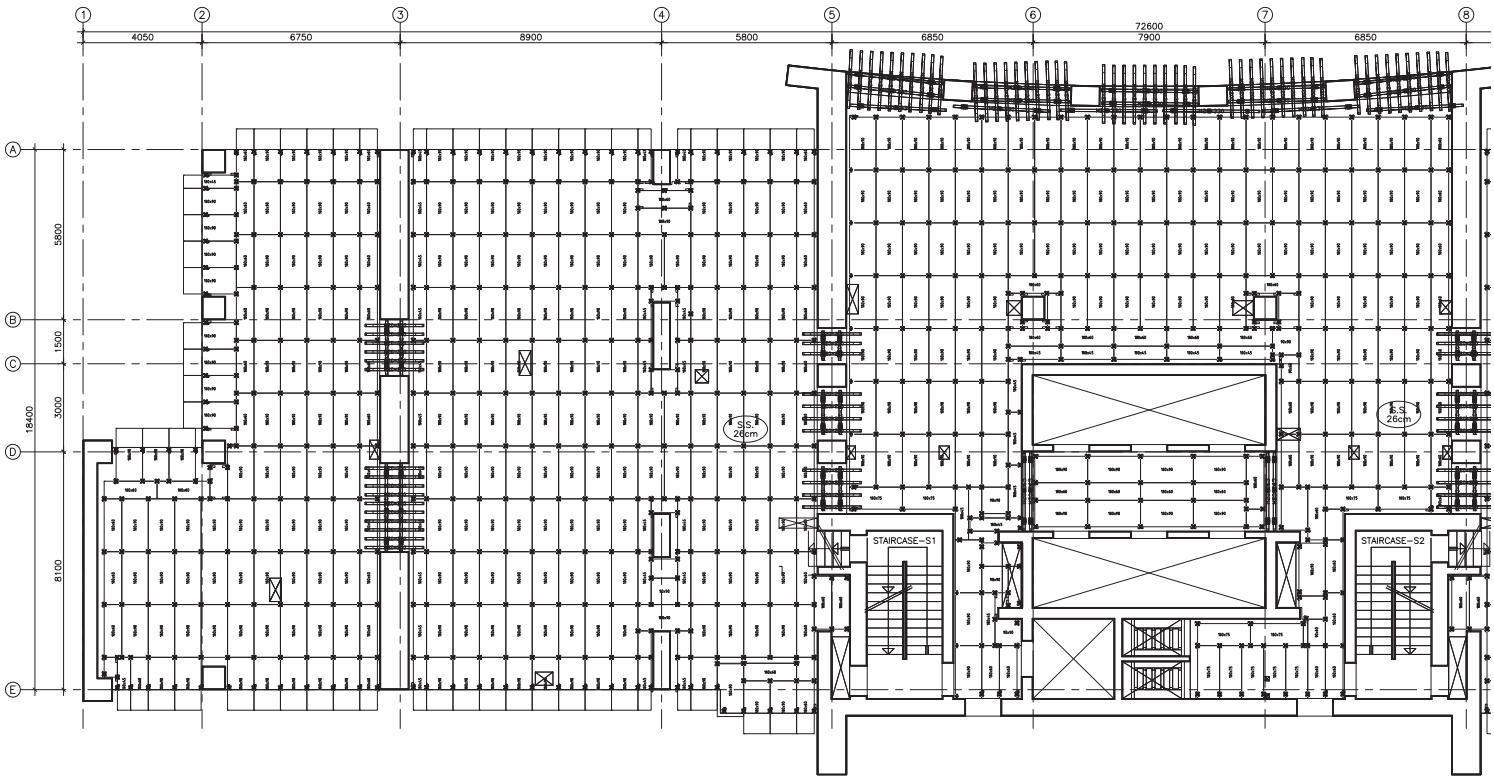


Figure B

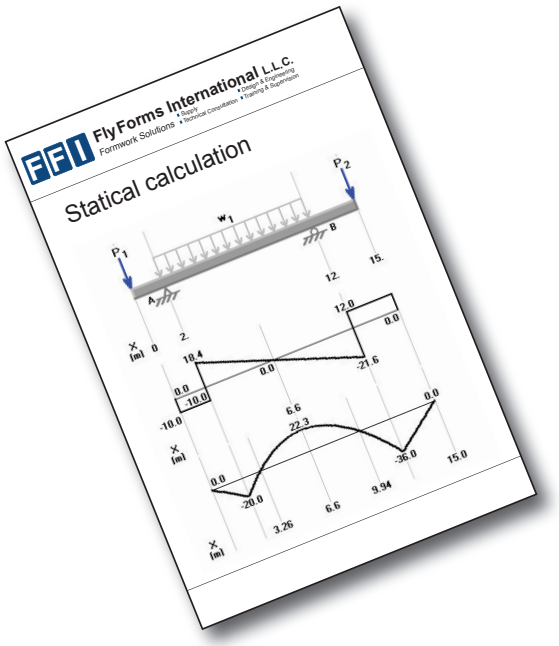
Alu Top Deck panels with cantilever arrangement have to be tensioned and secured to the floor slab or other structural parts.

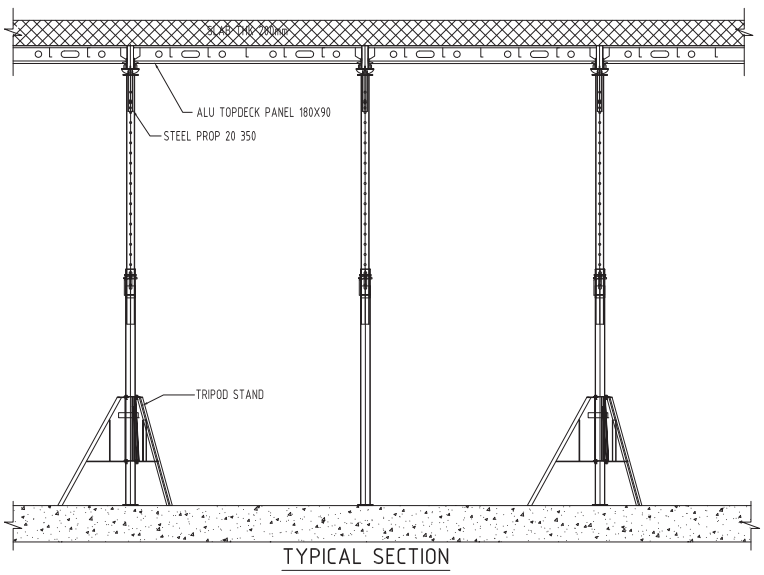
Engineering, Design & Drawing

A. All the Shop drawing, Technical data & the Statical calculation will be Submitted by FFI in accordance with the structural drawing project requirement
B. The site erection should be done as per FFI's shop drawing and shall be supervised and inspected by FFI's formwork specialist
C. The spacing and positioning of the Formwork material are arranged based on the statical requirements and as shown in the FFI's execution drawing & Calculation

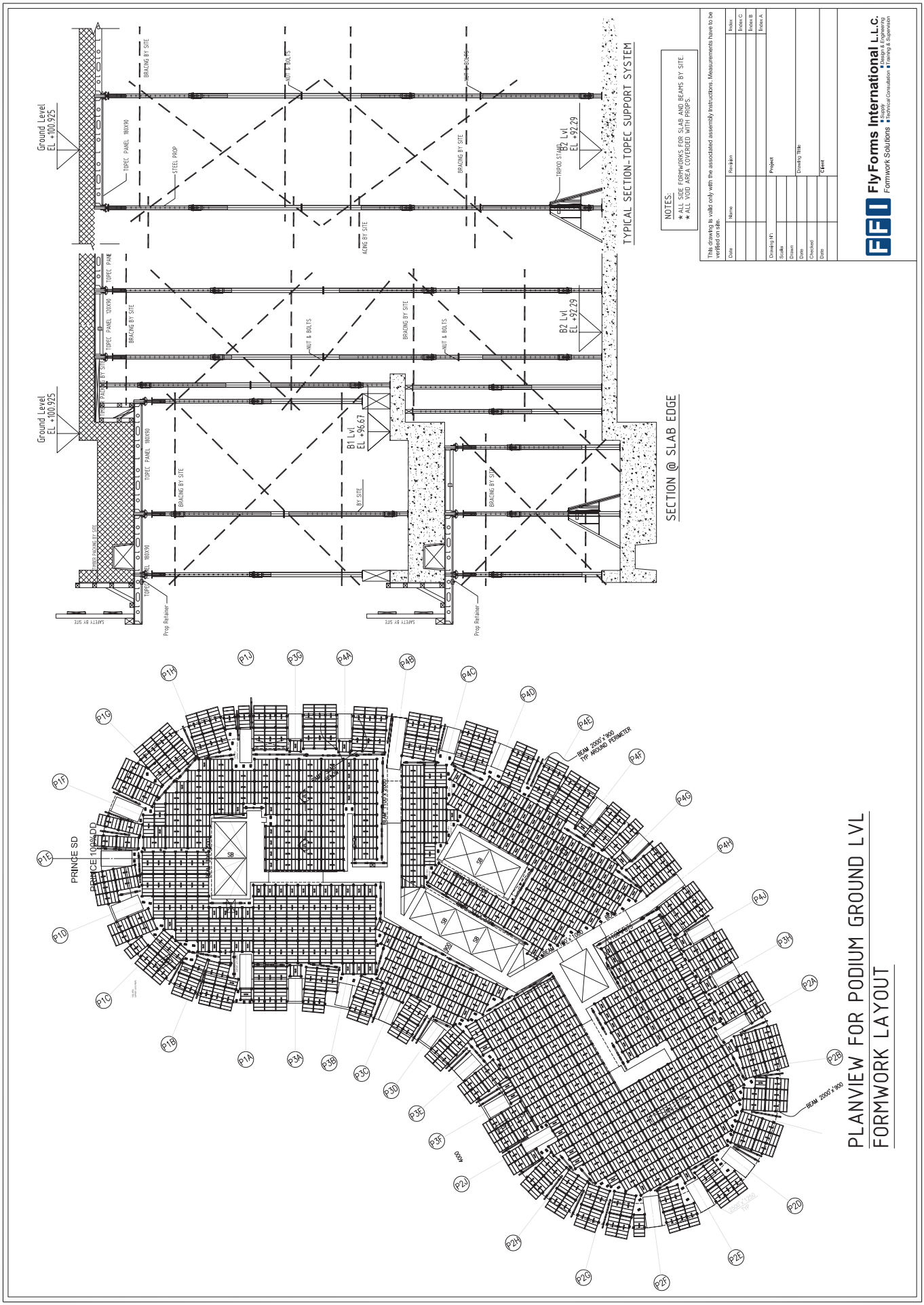


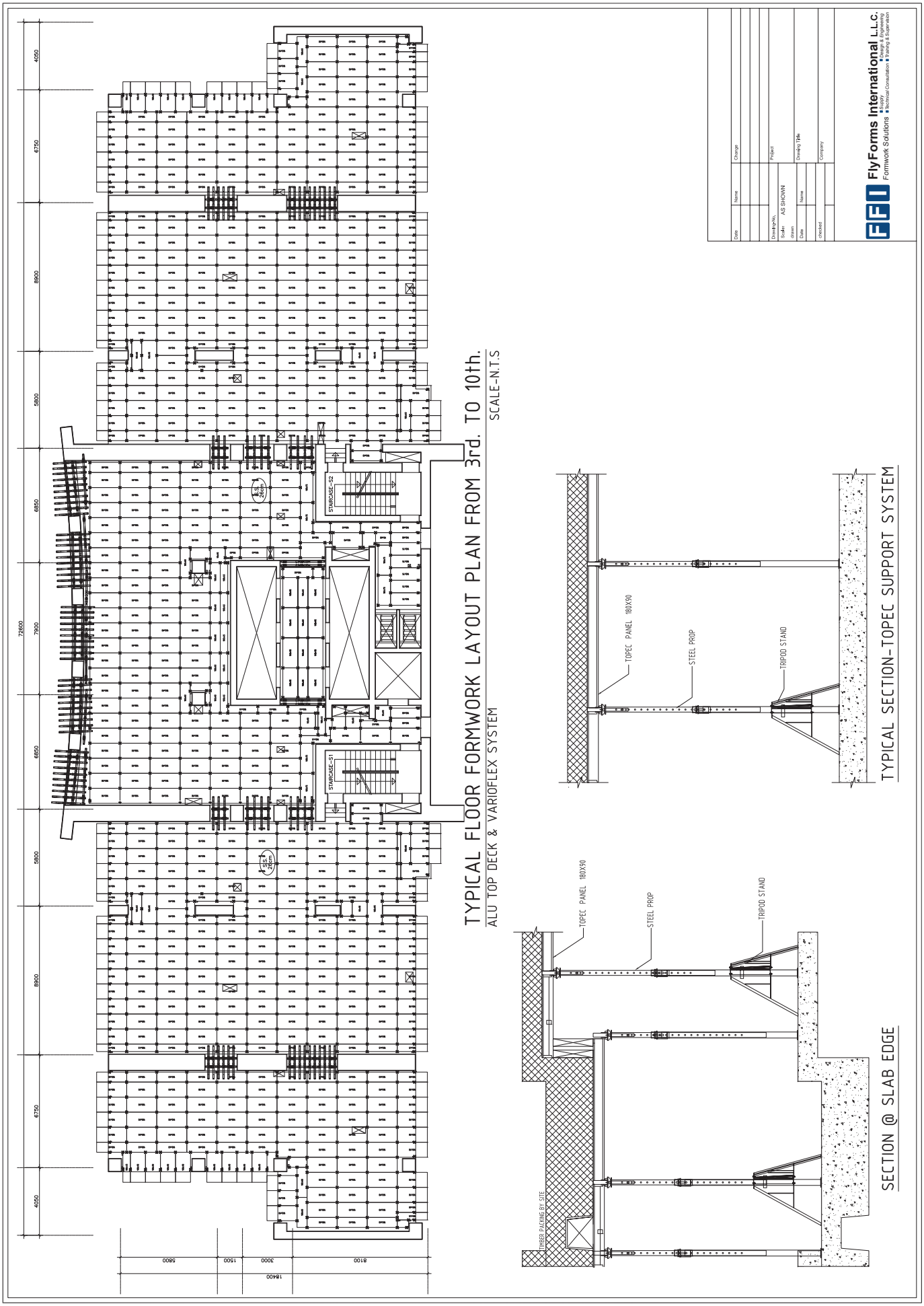
TYPICAL FLOOR FORMWORK LAYOUT PLAN FROM 3rd. TO 10th.

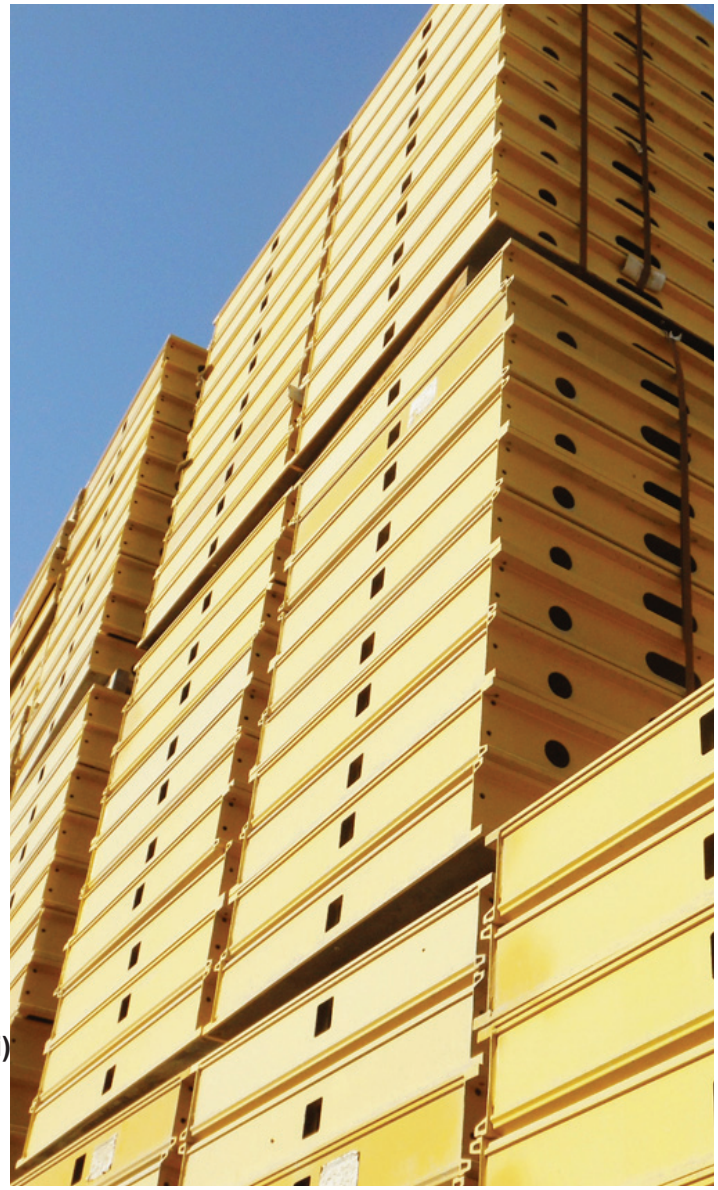




TYPICAL SECTION


TYPICAL SECTION-TOPEC SUPPORT SYSTEM
SECTION @ SLAB EDGE
PLANVIEW FOR PODIUM GROUND LVL
FORMWORK LAYOUT
NOTES:
★ALL SIDE FORMWORKS FOR SLAB AND BEAMS BY SITE.
★ALL FOR AREA COVERED WITH PROPS.
Ground Level EL +100.925
B1 Lvl EL +96.67
B2 Lvl EL +92.29
TOPEC PANEL 180X90
TOPEC PANEL 120X90
TOPEC PANEL 180X60
STEEL PROP
TRIPOD STAND
NUT & BOLTS
BRACING BY SITE
Prop Retainer
SAFETY BY SITE
PRINCE (100)RD
BEAM 2000 X 900
TYP AROUND PERIMETER
FlyForms International L.L.C.
Formwork Solutions
This drawing is valid only with the associated assembly instructions. Measurements have to be verified on site.
Index A
Index B
Index C
Index
Revision
Name
Date
Project
Drawing Title:
Client
Drawing №:
Scale:
Drawn
Checked


TYPICAL FLOOR FORMWORK LAYOUT PLAN FROM 3rd. TO 10th.
ALU TOP DECK & VARIOFLEX SYSTEM
SCALE-N.T.S
TYPICAL SECTION-TOPEC SUPPORT SYSTEM
TOPEC PANEL 180X90
STEEL PROP
TRIPOD STAND
SECTION @ SLAB EDGE
TOPEC PANEL 180X90
STEEL PROP
TRIPOD STAND
TIMBER PADDING BY SITE
STAIRCASE-S2
STAIRCASE-S1
FlyForms International L.L.C.
Formwork Solutions



Fly Forms International L.L.C. (Dubai)
Al Quoz – Industrial Area 4
P.O.Box 283565, Dubai, U.A.E
Tel. No. : +971 (4) 32 36 682
Fax. No. : +971 (4) 32 36 683
E-mail : Info@flyforms.net
Web : www.flyforms.net

Fly Forms International L.L.C. (Qatar)
Aziziya Commercial Complex
Aziziya Commercial Street - 424
P.O. Box : 16502 Doha, Qatar
Tel. No. : +974 - 4465 9766
Fax. No. : +974 - 4456 7250
E-mail : Info@flyforms.net
Web : www.flyforms.net