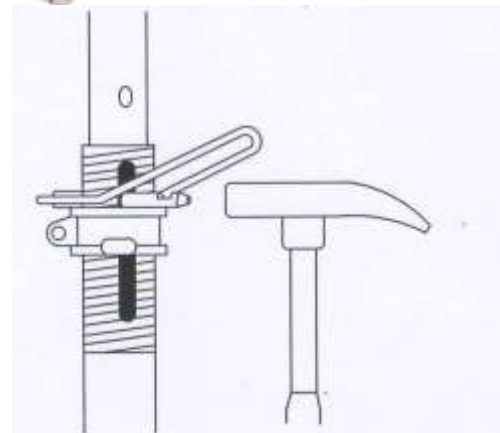
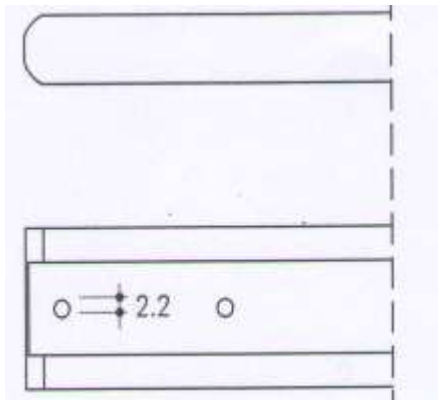
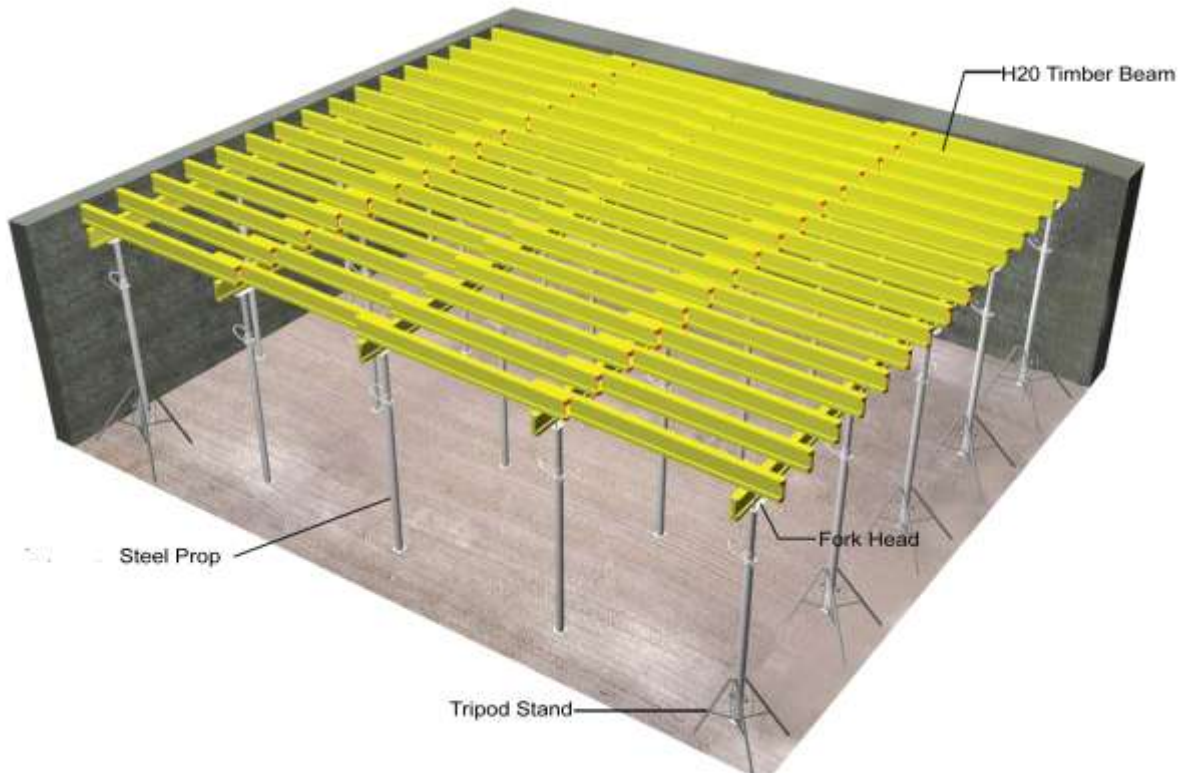


SL300 Decking System



OVER VIEW

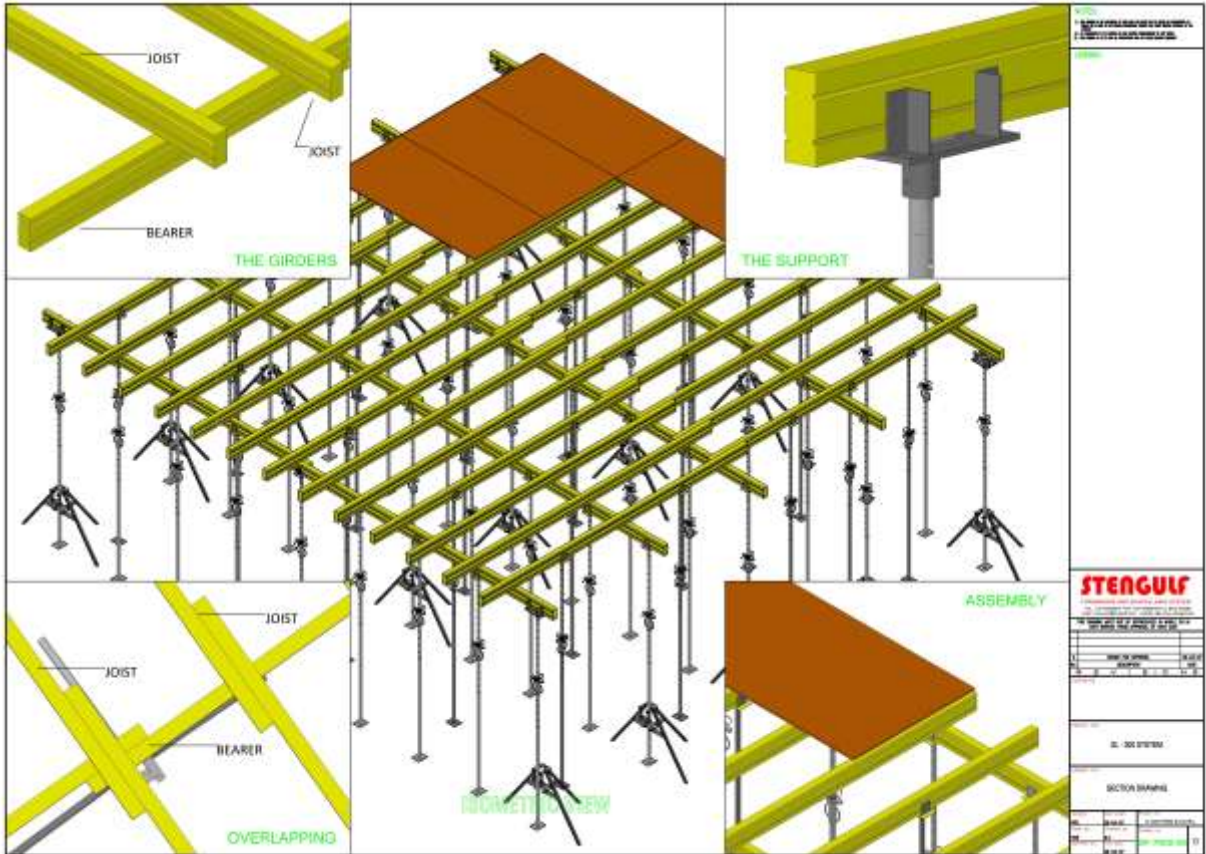


Quick lowering mechanism:

Another special feature is that all the props are equipped with the quick-release bolt, which, with a blow of the hammer, immediately releases the adjustment nut.

SL-300 DECKING SYSTEM

SL-300 system is a traditional system consisting of joist over main girder housed in a fork head supported by a prop. It is common system used in the formwork. Also the picture shows how to assembling the SL-300 decking system



SL-300 DECKING SYSTEM

Benefits

- Fast construction for large floor heights.
- High quality surface finishes can be achieved.
- Reduced long-term workforce requirement on site.
- Individual components of the formwork system can be precisely adjusted.
- Repetitive nature of the work makes it easier to plan construction activities.

Safety

- Decking with non-slip surfaces can be used to enhance safety.
- Interconnected truss members provide a stable working platform.
- Repetitive nature of work ensures quick familiarity of safety procedures.
- False work units can be assembled at ground level minimizing work at height.
- Table formwork systems can include standard health and safety features such as guard rails.

Other Considerations

- The supporting slab must be capable of carrying high loads at bearing locations; back propping may be needed underneath the slab.
- Safe access has to be provided

	150x77	1.6	1.4	1.3	1.2	1.2	1.1	1.9	1.5	1.4	1.3	1.2	1.1
1000	130x77	1.2	1.1	1.0	0.9	-	-	1.3	1.1	1.0	0.9	-	-
	150x77	1.4	1.2	1.1	1.0	1.0	0.9	1.5	1.3	1.1	1.0	1.0	0.9

Table 1

Notes for use with Table 1:

- Design for the bearer and joist tables presented includes a 4 kPa allowance for stacked materials. Where the stacked material load is reduced, then spans used may be larger than those given - refer formwork designer.
- In the preparation of the tables, deflections were limited to the greater of span/270 or 3 mm. Finish quality is however also dependent upon combinations of sheeting, joist, bearer and support deformations and upon the accuracy of alignment in set-up. The use of the tables should not therefore be interpreted to necessarily guarantee the achievement of a Class 3 finish.
- For multiple spans, the design has assumed,
 - the most conservative of two or three span use,
 - all spans equally loaded, and
 - All spans equal
- Truform 10.7E used in accordance with the tables need not be provided with intermediate lateral restraint.
- Span values may be interpolated for intermediate slab thicknesses.

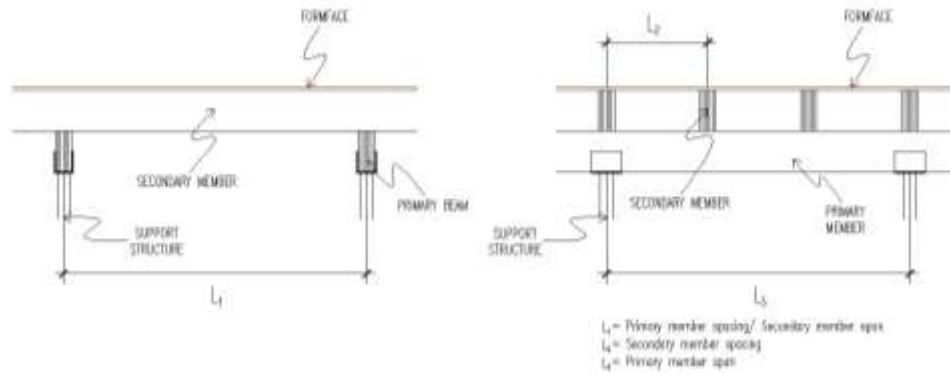
Truform section Size (mm)	Span (L) (m)	Single span use				Multiple span use			
		Safe ³ Load (kN/m)	Deflection for unit load (mm/(kN/m))	Loads for Deflection limits		Safe ³ Load (kN/m)	Deflection for unit load (mm/(kN/m))	Loads for Deflection limits	
				$\delta=L/270$ (kN/m)	$\delta=3\text{mm}$ (kN/m)			$\delta=L/270$ (kN/m)	$\delta=3\text{mm}$ (kN/m)
95x47	1.2	12.6	0.78	5.7	3.8	12.6	0.42	10.7	7.2
	1.8	5.0 5.6	3.97	1.7	0.8	5.6	2.11	3.2	1.4
95x65	1.2	17.7	0.56	7.9	5.4	17.7	0.30	15.0	10.1
	1.8	7.9	2.83	2.4	1.1	7.9	1.50	4.4	2.0
130x77	1.2	39.4	0.18	24.2	16.4	39.4	0.10	45.6	30.8
	1.8	17.5	0.93	7.2	3.2	17.5	0.49	13.5	6.1
150x77	1.8	23.3	0.60	11.0	5.0	23.3	0.32	20.8	9.3

Table 2

Notes for use with Table 2:

- Loads corresponding to deflection limits may exceed the maximum design load for the strength limit state.
- The shaded values for maximum design load apply where the section is laterally restrained by overlying form ply, or joists at maximum 1200 mm spacing. The alternative values apply where intermediate lateral restraint is not provided.
- The maximum design load, based on capacity, is calculated using $\phi = 0.85$ and $k_1 = 0.94$ - refer NZS 3603. To satisfy the strength limit state the design load calculated using factored load combinations must be less than the maximum design load given in the table.
- For multiple spans the maximum design load, deflections and deflection for unit load values correspond to,
 - The most conservative of two or three span use,
 - All spans equally loaded, and

(c) All spans equal.

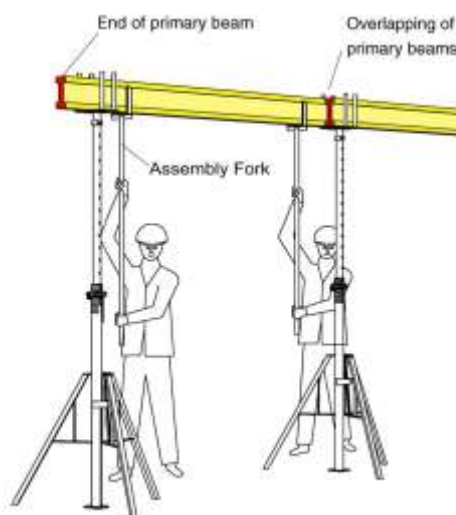


CONCRETE SLAB THICKNESS (mm)	truFORM SECTION (mm)	PRIMARY MEMBERS SPACING (MM)											
		(MAXIMUM SPAN OF SECONDARIES BETWEEN CENTRIES OF PRIMARIES, L_1)											
		915	1220	1525	1830	2135	2440	915	1220	1525	1830	2135	2440
MAXIMUM SINGLE SPAN, L_3 (m)						MAXIMUM MULTIPLE SPAN, L_3 (m)							
100	200x80	3.9	3.5	3.3	3.1	2.9	2.8	4.8	4.3	4.0	3.7	3.4	3.2
	2/200x80	4.9	4.4	4.1	3.9	3.7	3.5	6.0	5.5	5.1	4.8	4.5	4.3
150	200x80	3.4	3.1	2.9	2.7	2.6	2.5	4.3	3.9	3.5	3.2	3.0	2.8
	2/200x80	4.3	3.9	3.7	3.4	3.3	3.1	5.4	4.9	4.5	4.3	4.0	3.9
200	200x80	3.2	2.9	2.7	2.5	2.4	2.3	3.9	3.5	3.2	2.9	2.7	2.5
	2/200x80	4.0	3.6	3.4	3.2	3.0	2.9	4.9	4.5	4.2	3.9	3.7	3.5
300	200x80	2.8	2.5	2.4	2.2	2.1	2.0	3.4	3.1	2.8	2.5 ⁷	2.3 ⁷	2.2 ⁷
	2/200x80	3.5	3.2	3.0	2.8	2.7	2.5	4.3	3.9	3.7	3.4	3.3	3.1
350	200x80	2.7	2.4	2.2	2.1	2.0	1.9	3.3	2.9	2.6	2.4 ⁷	2.2 ⁷	2 ⁷
	2/200x80	3.3	3.0	2.8	2.7	2.5	2.4	4.1	3.8	3.5	3.3	3.1	2.9
400	200x80	2.5	2.3	2.2	2.0	1.9	1.9	3.1	2.7	2.4 ⁷	2.2 ⁷	2.1 ⁷	1.9 ⁷
	2/200x80	3.2	2.9	2.7	2.5	2.4	2.3	4.0	3.6	3.3	3.1	2.9	2.7
450	200x80	2.5	2.2	2.1	2.0	1.9	1.8	3.0	2.6	2.3 ⁷	2.1 ⁷	2 ⁷	1.8 ⁷
	2/200x80	3.1	2.8	2.6	2.5	2.3	2.2	3.8	3.5	3.2	3.0	2.8	2.6
500	200x80	2.4	2.2	2.0	1.9	1.8	1.7 ⁶	2.9	2.5	2.2 ⁷	2 ⁷	1.9 ⁷	1.8 ⁷
	2/200x80	3.0	2.7	2.5	2.4	2.3	2.2	3.7	3.4	3.1	2.9	2.7	2.5
600	200x80	2.2	2.0	1.9	1.8	1.7 ⁶	1.6 ⁶	2.7	2.3	2.1 ⁷	1.9 ⁷	1.7 ⁷	1.6 ⁷
	2/200x80	2.8	2.6	2.4	2.2	2.1	2.0	3.5	3.2	2.9	2.7	2.5	2.3
1000	200x80	1.9	1.7	1.6 ⁶	1.5 ⁶	1.4 ⁶	1.3 ⁶	2.1	1.8 ⁷	1.6 ⁷	1.5 ⁷	1.3 ⁷	1.2 ⁷
	2/200x80	2.4	2.2	2.0	1.9	1.8	1.7	3.0	2.6	2.3 ⁷	2.1 ⁷	2 ⁷	1.8 ⁷

Table 3

Notes:

1. Design includes a live load allowance of 150 kg/m² for men and materials. No allowance for stacked materials has been made – contact a formwork designer.
2. In the preparation of the above tables, deflections were limited to span/270.
3. For multiple spans, the design has assumed, (a) the most conservative of two or three spans, (b) all spans equally loaded, and (c) all spans equal.
4. TruFORM used in accordance with these span tables need not be provided with intermediate lateral restraint.
5. Span values may be interpolated for intermediate slab thicknesses.
6. Minimum end bearing 80mm.
7. Minimum intermediate bearing 150mm.



Erecting the primary beams

Erection of the SL-300 formwork begins with setting up the primary beams.

For this, the props are set at roughly the required extension length on the ground. The fork-heads are mounted to them, and then they are set up under the ends of the primary beams (in the case of jointed beams, under the joints as well). To keep them steady, tripod stands are attached to these props. Then the remaining props should be set up, taking into account the static requirements (room height, slab thickness, and maximum permitted loading capacity of the tubular steel props which are being used). The steel prop hangers which are attached to the props immediately safeguard them from falling over. The prop is then swung into place under the primary beam.



Placing the Secondary Beams

The correct distance between the secondary beams must be calculated, in line with the static requirements, by using the loading table on page 5, 6 and 7. A beam must be placed under each shuttering panel joint. Here, too, the work is facilitated by the assembly fork.

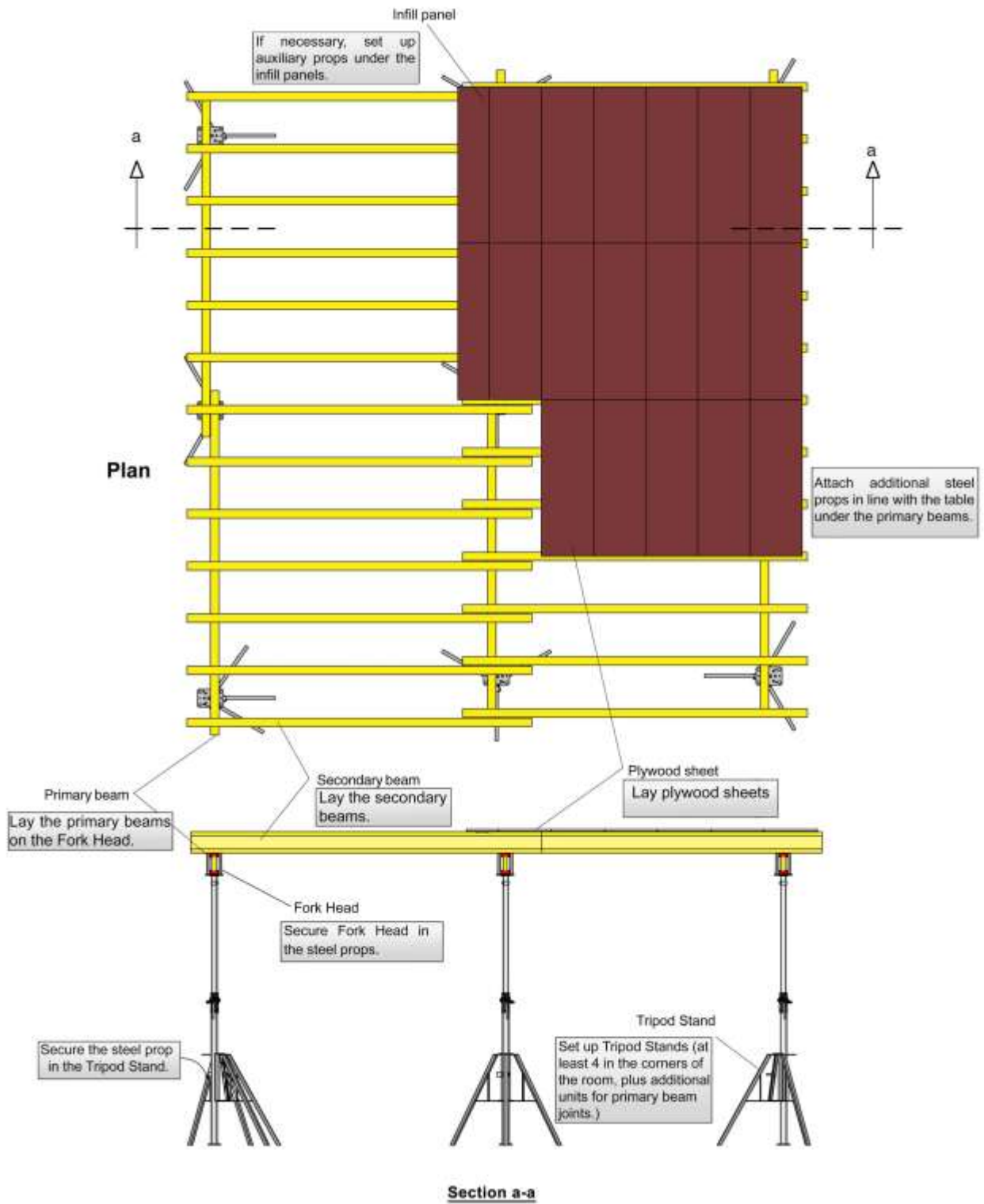


Adding the shuttering panels

The shuttering panels are placed on top of the secondary beams and tacked in place. The rigid shuttering structure must be braced against the building.

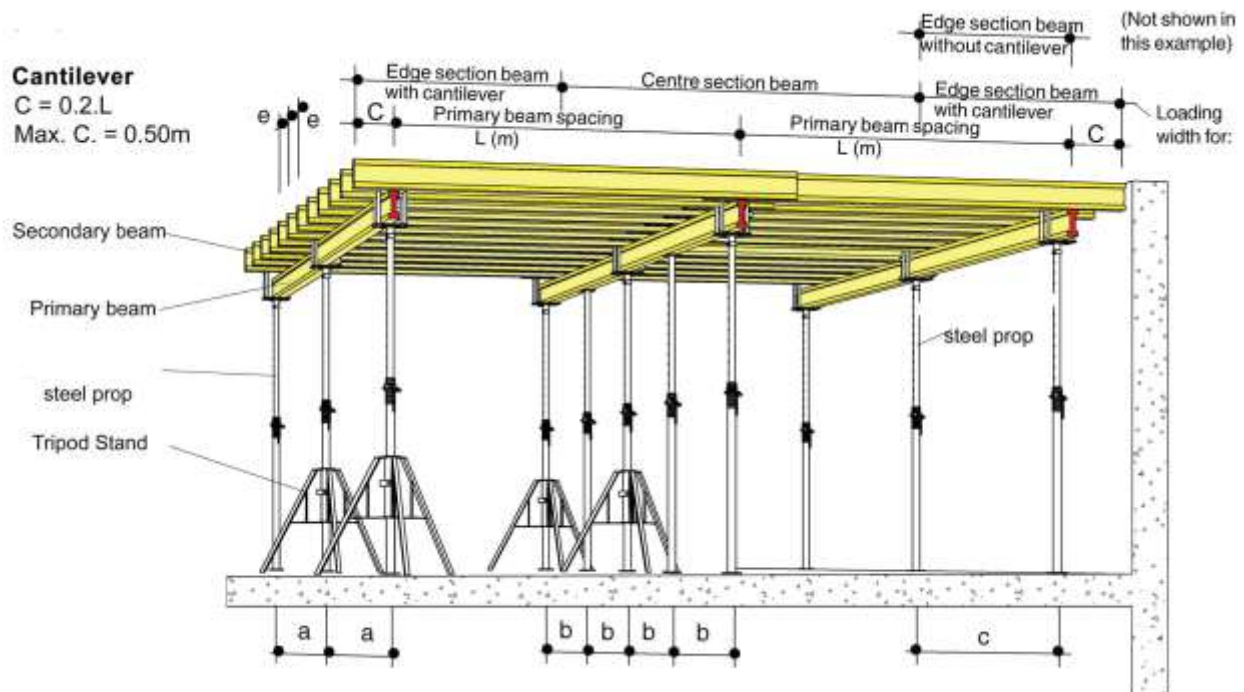
Note:

Safety rails must be erected on the edges of the structure, in line with the regulations for safety and health protection in shuttering and scaffolding.



The maximum permitted distance between primary and steel props is determined based on slab thickness. The thicker the slab, the less distance of primary beams and steel prop is required.

Demonstration



EXAMPLE OF DESIGN CALCULATION FOR ADEQUACY OF GTX BEAM.

This note deals with the design check of wooden beam of size 65x150 mm used for the support of formwork of concrete slab of thickness 350 mm. An advice for the adequate spacing of the beam is provided in the event member does not meet the Code specification. The capacity of the beam is checked as per the BS code BS 5975 1982.

DESIGN STANDARD

Design code BS 5975 1982

DESIGN SUMMARY

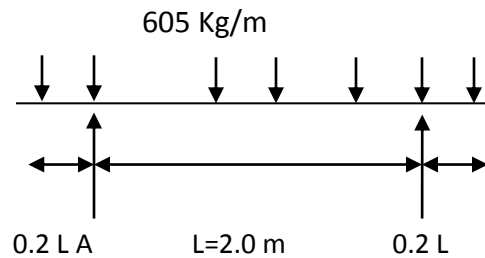
The beam size is safe and adequate for the slab thickness of 350 mm and for following spacing. The spacing of the beam is governed by 18 mm thick plywood strength.

REFERENCE DOCUMENT

8F-7004-07 Rev 0 Grip form details 65x150mm

SF-7015-30 Rev 0 Detail for 4500 x 4500 Table System
 SF-7015-20 Rev 0 Detail for 6000 x 4000 Table System
 Futures Build Data

Load Built up



Distance between main beams	2.0m
Distance between supports	2.0 m
Beam spacing	0.6 m
Density of Concrete	2,450 Kg/m ³
Thickness of Concrete slab	0.35 m
Construction load	150 Kg/m ²

UDL load on beam $(2450 \times 0.35 + 150) \times 0.6 = 605 \text{ Kg/m}$

Maximum Moment at support A $WL/8 = 605 \times 2/8 = 151.25 \text{ Kg.m i.e. } 1.5125 \text{ KN.m}$

Maximum Shear at support A $WL/2 = 605 \times 2/2 = 605 \text{ Kg i.e. } 6.05 \text{ KN}$

SECTIONAL PROPERTIES OF THE WOODEN BEAM 65 X 150 MM

Cross sectional area	$65 \times 150 = 9750 \text{ mm}^2$
Section Modulus	$65 \times 150^2 / 6 = 243750 \text{ mm}^3$

Capacity of the Wooden Beam as per the BS 5975 1982

Strength Class	SC5	
Bending Stress of the wooden beam for wet condition	8 N/ mm ²	Refer to Table 1
Shear Stress of the wooden beam for wet condition	0.801 N/ mm ²	Refer to Table 1
Modification factor to values in Table 1 as per condition		

]

a) Moisture content

Wood swells when moisture is present. The size to be considered in the calculation of the stresses is to be actual size and not the dry size. Since the wooden beam are seldom dry at site, the geometrical properties to be increased by factor K1 as per Table 4

For cross sectional area	1.04
For Section Modulus	1.06
Modified cross sectional area	$9750 \times 1.04 = 10140 \text{ mm}^2$
Modified Section Modulus	$243750 \times 1.06 = 258375 \text{ mm}^3$

b) Duration of load on Falsework

The permissible stress evaluated is for load on timber for 50 years. Since the loading on the formworks for short duration of one week, the stresses could be increased by factor K3 as in table 5.

Factor for 1 week load duration	1.4
Modified Bending Stress of the wooden beam for wet condition	$8 \times 1.4 = 11.2 \text{ N/ mm}^2$
Modified Shear Stress of the wooden beam for wet condition	$0.801 \times 1.4 = 1.12 \text{ N/ mm}^2$

c) Load Sharing

The beam being spaced closely not more than 600 mm a part redistribution of load takes place and code allows the stresses could be increased by factor 1.1

Modified Bending Stress of the wooden beam for wet condition	$11.2 \times 1.1 = 12.32 \text{ N/ mm}^2$
Modified Shear Stress of the wooden beam for wet condition	$1.12 \times 1.1 = 1.232 \text{ N/ mm}^2$

STRESSES IN THE BEAM DUE TO LOAD

Bending stress due to load = Max. Moment / modified section modulus

$$= 1.5125 \times 10^6 / 258375 = 5.854 \text{ N/ mm}^2 < 12.32 \text{ N/ mm}^2 \text{ SAFE}$$

Shear stress due to load = Max. Shear / modified cross sectional

$$= 6.05 \times 10^3 / 10140 = 0.597 \text{ N/ mm}^2 < 1.232 \text{ N/ mm}^2 \text{ SAFE}$$

EXAMPLE OF DESIGN CALCULATION FOR ADEQUACY OF H2O BEAM.

This note deals with the design check of H2O beam of size 80 x 200 mm used for the support of formwork of concrete slab of thickness 350 mm. An advice for the adequate spacing of the beam is provided in the event member does not meet the Code specification. The capacity of the beam is checked as per the BS code BS 5975 1982.

DESIGN STANDARD

Design code BS 5975 1982

DESIGN SUMMARY

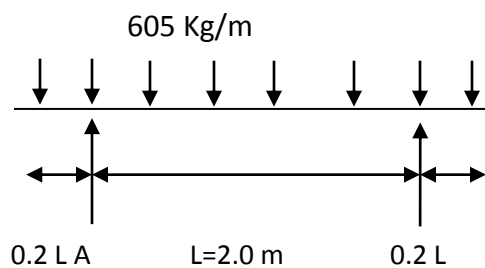
The beam size is safe and adequate for the slab thickness of 350 mm and for following spacing. The spacing of the beam is governed by 18 mm thick plywood strength.

REFERENCE DOCUMENT

SF-7015-30 Rev 0 Detail for 4500 x 4500 Table System

SF-7015-20 Rev 0 Detail for 6000 x 4000 Table System

Futures build Data

Load Built up

Distance between main beams	2.0m
Distance between supports	2.0 m
Beam spacing	0.6 m
Density of Concrete	2450 Kg/m ³
Thickness of Concrete slab	0.35 m
Construction load	150 Kg/m ²

UDL load on beam $(2450 \times 0.35 + 150) \times 0.6 = 605 \text{ Kg/m}$

Maximum Moment at support A $WL/8 = 605 \times 2/8 = 151.25 \text{ Kg.m}$ i.e. 1.5125 KN.m

Maximum Shear at support A $WL/2 = 605 \times 2/2 = 605 \text{ Kg i.e. } 6.05 \text{ KN}$

SECTIONAL PROPERTIES OF THE H2O BEAM 80 X 200 MM

Cross sectional area $80 \times 200 = 16000 \text{ mm}^2$
 Section Modulus $80 \times 200^2 / 6 = 533333 \text{ mm}^3$

Capacity of the Wooden Beam as per the BS 5975 1982

Strength Class	SC5	
Bending Stress of the wooden beam for wet condition	8 N/ mm ²	Refer to Table 1
Shear Stress of the wooden beam for wet condition	0.801 N/ mm ²	Refer to Table 1
Modification factor to values in Table 1 as per condition		

a) Moisture content

Wood swells when moisture is present. The size to be considered in the calculation of the stresses is to be actual size and not the dry size. Since the wooden beam are seldom dry at site, the geometrical properties to be increased by factor K1 as per Table 4

For cross sectional area	1.04
For Section Modulus	1.06
Modified cross sectional area	$16000 \times 1.04 = 16640 \text{ mm}^2$
Modified Section Modulus	$533333 \times 1.06 = 565333 \text{ mm}^3$

b) Duration of load on Falsework

The permissible stress evaluated is for load on timber for 50 years. Since the loading on the formworks for short duration of one week, the stresses could be increased by factor K3 as in table 5.

Factor for 1 week load duration	1.4
Modified Bending Stress of the wooden beam for wet condition	$8 \times 1.4 = 11.2 \text{ N/ mm}^2$
Modified Shear Stress of the wooden beam for wet condition	$0.801 \times 1.4 = 1.12 \text{ N/ mm}^2$

c) Load Sharing

The beam being spaced closely not more than 600 mm a part redistribution of load takes place and code allows the stresses could be increased by factor 1.1

Modified Bending Stress of the wooden beam for wet condition	$11.2 \times 1.1 = 12.32 \text{ N/ mm}^2$
Modified Shear Stress of the wooden beam for wet condition	$1.12 \times 1.1 = 1.232 \text{ N/ mm}^2$

STRESSES IN THE BEAM DUE TO LOAD

Bending stress due to load = Max. Moment / modified section modulus

$$= 1.5125 \times 10^6 / 565333 = 2.675 \text{ N/mm}^2 < 12.32 \text{ N/mm}^2 \text{ SAFE}$$

Shear stress due to load = Max. Shear / modified cross sectional

$$= 6.05 \times 10^3 / 16640 = 0.364 \text{ N/mm}^2 < 1.232 \text{ N/mm}^2 \text{ SAFE}$$

DESIGN CHECK FOR SLAB SHUTTERING 18 MM PLYWOOD

Dead Load & Live Load

Self weight (0.35 x 24.5)	8.6 KN/m ²
Live Load	1.5 KN/ m ²
Total	10.1 KN/ m ²

Spacing of Support 600 mm

Max. Moment due to load $M = 10.1 \times 0.6 \times 0.6 / 10 = 0.363 \text{ KNm per metre width}$

Max. Shear due to load $SH = 10.1 \times 0.6 / 2 = 3.023 \text{ KN per metre width}$

Max. Bending stress $\sigma = M / Z = 0.363 \times 10^6 / (1000 \times 18^2 / 6)$

$$\sigma = 6.72 \text{ N/mm}^2$$

Max. Shear stress $\tau = SH / A = 3.023 \times 1000 / (1000 \times 18) =$

$$\tau = 0.17 \text{ N/mm}^2$$

The permissible stresses in the timber as per British code BS 5975 are

Bending stress = 11.87 N/mm² > 6.717 N/mm² SAFE

Shear stress = 1.75 N/mm² > 0.168 N/mm² SAFE

Check for Deflection

$$\delta = 2.5 \times \omega \times l^4 / (384 \times EI)$$

The permissible value of E for plywood as per BS 5975 is 9418 N/mm²

$$\delta = 2.5 \times 0.0106 \times 700^4 / (384 \times 9418 \times 1000 \times 18^3 / 12)$$

$$\delta = 1.86\text{mm} < 2.5 \text{ mm (600/240)}$$

Truform Permissible stresses

The following design properties have been determined in accordance with AS/NZS 4063 for structural design in accordance with AS 3610 and AS 1720.1-1988. Safe capacities are for direct comparison with actions resulting from unfactored loads or combinations of load applicable for formwork design.

Truform section properties

d	x	b	mass	EI x 10 ⁹	Msafe	Vsafe	
	mm		kg/m	Nmm ²	kNm	kN	
150		65	5.7	186	6.1	25.8	gripFORM
150		77	6.5	225	7.5	31.0	truFORM
200		63	7.2	442	10.9	33.9	truFORM

1. Strength values apply for permissible stress design and are therefore appropriate for use with unfactored loads refer AS 3610.\
2. The strength values given include an allowance, k1+1.65 for duration of load effect refer AS 3610 & AS 1720.
3. Bending strength values apply for lateral stability applications, k12+1.0-refer AS 1720

The following values have been taken from manufacturers literature and should be used as a comparison only - not as a basis for specification.

Typical 200mm deep formwork I beam section properties

d	x	b	mass	EI x 10 ⁹	Msafe	Vsafe
	mm		kg/m	Nmm ²	kNm	kN
typical 200mm deep formwork I beam			5.9	429.0	5.0	11.0



