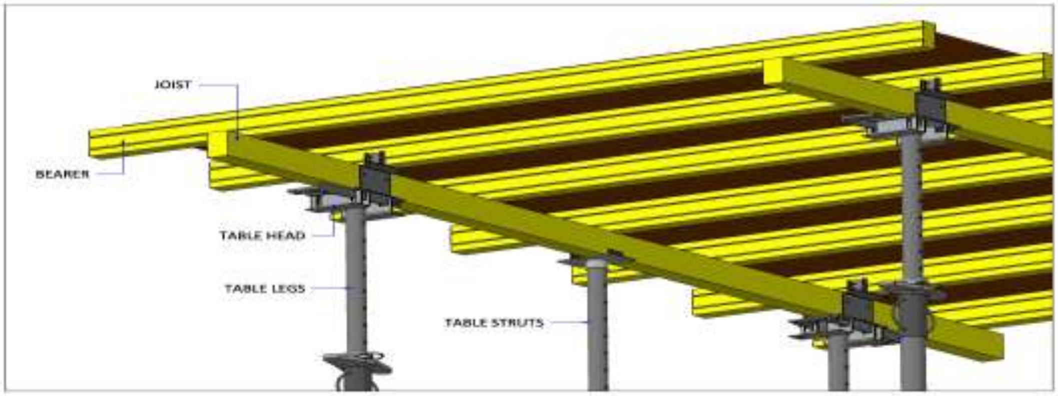
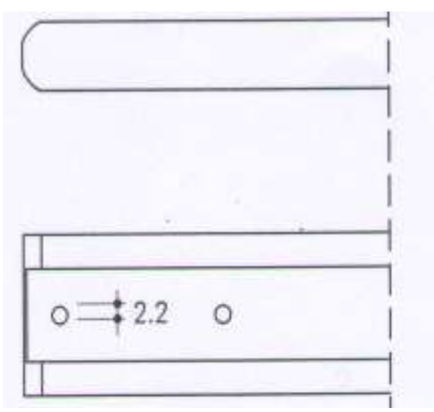
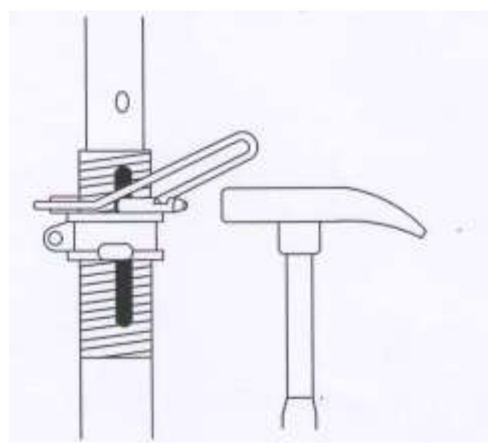
SFX Table Formwork System

STENGULF FORMWORK&SCAFFOLDING

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.

INTRODUCTION

SFX Table formwork system is a kind of formwork specialising in floor slab concreting and it is widely used in high rise building, skyscraper, multi-storey industrial factory building, underground structure, etc. SFX table formwork system can be set up to meet the requirements of slabs in different shapes and dimensions; these consist of slab formwork tables which are reusable. These tables do not have to be dismantled and can be use in high buildings where cranes or elevators are used to lift the tables. Once the tables are positioned, the space between the wall and table is filled, tables vary in size. Advantages of the formwork are simple assembly and disassembly, flexible allocation, and multiple usages for number of times. By the specially designed lifting fork, the whole table formwork unit can be lifted and repositioned, thus speeding up the construction cycle and saving much labour cost and it is the favourite for construction engineers and architects.

TYPICAL ARRANGEMENT OF SFX TABLE SYSTEM

Because the system is easily dismantled into single parts, it is transportable. Joists and stringers are screwed, bolted or welded to become a deck.SFX table Formwork should be placed at the correct height so that there is sufficient space to remove them once the concrete has set or cured. Due to this reason, the support systems of tables' formwork need to be height adjustable. Adjustable metal props can be used to support the systems; it is standing on four legs only. The legs consist of 50KN props. For fast repositioning and reduction in the labour costs.

The SFX table formwork system has simple structure, it is easy to assemble and disassemble and can be re-used. Practical shifting trolley makes for virtually fatigue-free operations.

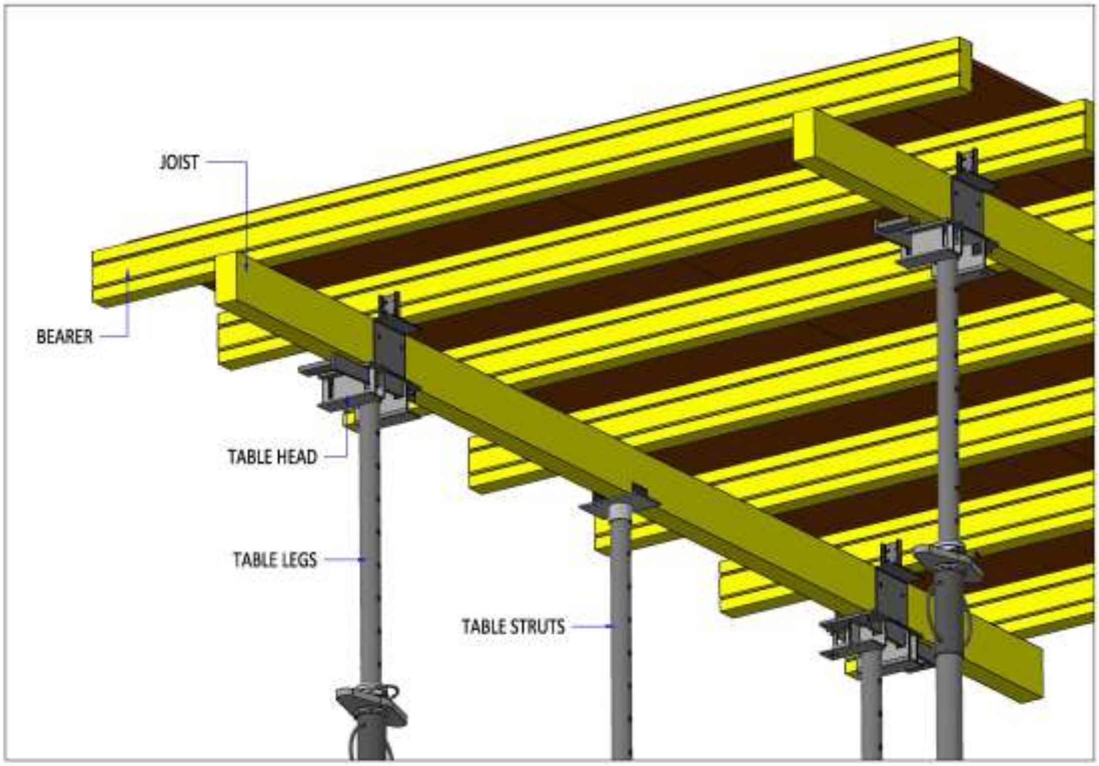
Fully assembled units are maneuvered quickly into place.
Easier to handle and safer than hand-operated formwork, particularly as room heights increase.

Lifting fork can reposition SFX table formwork easily and reliably on the construction site, for its effortless removal from underneath the cast slab and transportation to the next storey and to the trucks for loading and unloading.

FLYING SFX TABLE

SFX table size varies from 6000mmx4000mm (the largest) to 2000mmx1500mm (the smallest).

Special sizes for special applications can be supplied at any time. Standard functional components can be installed for straightforward, speedy adaptation to changing requirement on the construction site.



SFX TABLE FORMWORK UNITS

SFX TABLE TROLLY

50 KN PROPS

Benefits

- Fast construction for large floor heights.
- Fully assembled units can be maneuvered quickly into place.
- High quality surface finishes can be achieved.
- Reduced long-term workforce requirement on site.
- The need for infill areas and decking joints is minimized.
- 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 system requires enough space around the new construction to fly the table unit beyond the building line on everyday use.
- 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

Concrete slab thickness (mm)	Truform section (mm)	Joist spacings (mm)											
		225	300	400	450	480	600	225	300	400	450	480	600
		Maximum single span (m)						Maximum multiple span (m)					
100	95x47	1.9	1.7	1.5	1.5	1.4	1.3	2.3	2.1	1.9	1.8	1.8	1.7
	95x65	2.1	1.9	1.7	1.7	1.6	1.5	2.6	2.3	2.1	2.0	2	1.9
	130x77	3.0	2.7	2.5	2.4	2.3	2.2	3.7	3.4	3.1	3.0	2.9	2.7
	150x77	3.5	3.2	2.9	2.8	2.7	2.5	4.3	3.9	3.5	3.4	3.3	3.1
150	95x47	1.8	1.6	1.5	1.4	1.4	1.3	2.2	2.0	1.8	1.7	1.7	1.6
	95x65	2.0	1.8	1.6	1.6	1.5	1.4	2.4	2.2	2.0	1.9	1.9	1.8
	130x77	2.9	2.6	2.4	2.3	2.2	2.1	3.5	3.2	2.9	2.8	2.7	2.6
	150x77	3.3	3.0	2.7	2.6	2.6	2.4	4.1	3.7	3.4	3.2	3.2	2.9
200	95x47	1.7	1.5	1.4	1.3	1.3	1.2	2.1	1.9	1.7	1.6	1.6	1.5
	95x65	1.9.	1.7	1.5	1.5	1.5	1.4	2.3	2.1	1.9	1.8	1.8	1.7
	130x77	2.7	2.5	2.2	2.2	2.1	2.0	3.4	3.0	2.8	2.7	2.6	2.4
	150x77	3.1	2.8	2.6	2.5	2.4	2.3	3.9	3.5	3.2	3.1	3.0	2.8
300	95x47	1.5	1.4	1.3	1.2	1.2	1.1	1.9	1.7	1.6	1.5	1.5	1.3
	95x65	1.7	1.6	1.4	1.4	1.3	1.3	2.1	1.9	1.8	1.7	1.7	1.5
	130x77	2.5	2.3	2.1	2.0	2.0	1.8	3.1	2.8	2.6	2.5	2.4	2.2
	150x77	2.9	2.6	2.4	2.3	2.3	2.1	3.6	3.2	3.0	2.8	2.8	2.6
400	95x47	1.5	1.3	1.2	1.2	1.1	1.0	1.9	1.6	1.5	1.4	1.4	1.2
	95x65	1.6	1.5	1.3	1.3	1.3	1.2	2.0	1.8	1.7	1.6	1.6	1.4
	130x77	2.4	2.1	2.0	1.9	1.8	1.7	2.9	2.6	2.4	2.3	2.3	2.1
	150x77	2.7	2.5	2.2	2.2	2.1	2.0	3.4	3.0	2.8	2.7	2.6	2.4
600	95x47	1.3	1.2	1.1	1.0	1.0	1.0	1.6	1.5	1.3	1.2	1.2	1.1
	95x65	1.5	1.3	1.2	1.2	1.1	1.1	1.8	1.7	1.5	1.4	1.4	1.3
	130x77	2.1	1.9	1.8	1.7	1.7	1.5	2.6	2.4	2.2	2.1	2.0	1.9
	150x77	2.5	2.2	2.0	2.0	1.9	1.8	3.0	2.8	2.5	2.4	2.4	2.2
1000	95x47	1.1	1.0	0.9	0.9	0.9	-	1.4	1.2	1.1	1.0	1.0	0.9
	95x65	1.3	1.2	1.1	1.0	1.0	0.9	1.6	1.4	1.3	1.2	1.2	1.0
	130x77	1.9	1.7	11.5	1.5	1.4	1.3	2.3	2.1	1.9	1.8	1.7	1.6
	150x77	2.1	1.9	1.8	1.7	1.7	1.5	2.6	2.4	2.2	2.1	2.0	1.8

Concrete slab thickness (mm)	Truform section (mm)	Bearer spacings (mm)											
		900	1200	1500	1800	2100	2400	900	1200	1500	1800	2100	2400
		Maximum single span (m)						Maximum multiple span (m)					
100	95x65	1.3	1.2	1.1	1.0	1.0	0.9	1.6	1.4	1.2	1.1	1.1	1.0
	130x77	1.9	1.7	1.6	1.5	1.4	1.4	2.3	2.1	1.9	1.7	1.6	1.5
	150x77	2.2	2.0	1.9	1.7	1.7	1.6	2.7	2.4	2.1	2.0	1.8	1.7
150	95x65	1.2	1.1	1.0	1.0	0.9	0.9	1.5	1.3	1.2	1.1	1.0	0.9
	130x77	1.8	1.6	1.5	1.4	1.4	1.3	2.2	1.9	1.7	1.6	1.5	1.4
	150x77	2.1	1.9	1.8	1.6	1.6	1.5	2.6	2.2	2.0	1.8	1.7	1.6
200	130x77	1.7	1.6	1.4	1.4	1.3	1.2	2.1	1.8	1.6	1.5	1.4	1.3
	150x77	2.0	1.8	1.7	1.6	1.5	1.4	2.4	2.1	1.9	1.7	1.6	1.5
300	130x77	1.6	1.4	1.3	1.3	1.2	1.1	1.9	1.7	1.5	1.4	1.3	1.2
	150x77	1.8	1.7	1.5	1.5	1.4	1.3	2.2	1.9	1.7	1.6	1.4	1.4
400	130x77	1.5	1.4	1.3	1.2	1.1	1.1	1.9	1.5	1.4	1.2	1.2	1.1
	150x77	1.7	1.6	1.4	1.4	1.3	1.2	2.0	1.8	1.6	1.4	1.3	1.2
600	130x77	1.3	1.2	1.1	1.1	1.0	0.9	1.5	1.3	1.2	1.1	1.0	0.9
	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

Notes for use with Table 1:

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.
2. 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.
3. For multiple spans, the design has assumed,
   a) the most conservative of two or three span use,
   b) all spans equally loaded, and
   c) all spans equal
4. Truform 10.7E used in accordance with the tables need not be provided with intermediate lateral restraint.
5. Span values may be interpolated for intermediate slab thicknesses.

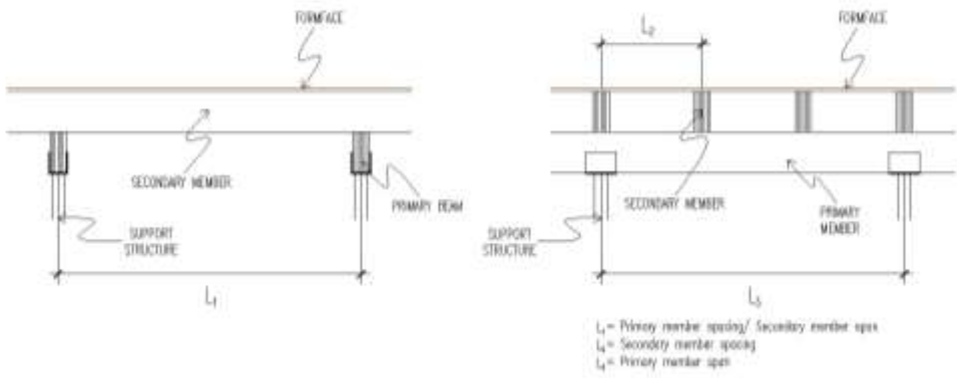
Truform section Size (mm)	Span (L) (m)	Single span use: Safe[3] Load kN/m	Single span use: Deflection for unit load mm/(kN/m)	Single span use: Loads for Deflection limits δ=L/270 kN/m	Single span use: Loads for Deflection limits δ=3mm kN/m	Multiple span use: Safe[3] Load kN/m	Multiple span use: Deflection for unit load mm/(kN/m)	Multiple span use: Loads for Deflection limits δ=L/270 kN/m	Multiple span use: Loads for Deflection limits δ=3mm 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:

1. Loads corresponding to deflection limits may exceed the maximum design load for the strength limit state.
2. 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.
3. The maximum design load, based on capacity, is calculated using $\phi = 0.85$ and k1 = 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

4. For multiple spans the maximum design load, deflections and deflection for unit load values correspond to,
   (a) The most conservative of two or three span use,
   (b) 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. Tru-Form 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.

EXAMPLE OF DESIGN CALCULATION

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 for 3900x3900 tables is governed by 18 mm thick plywood strength.

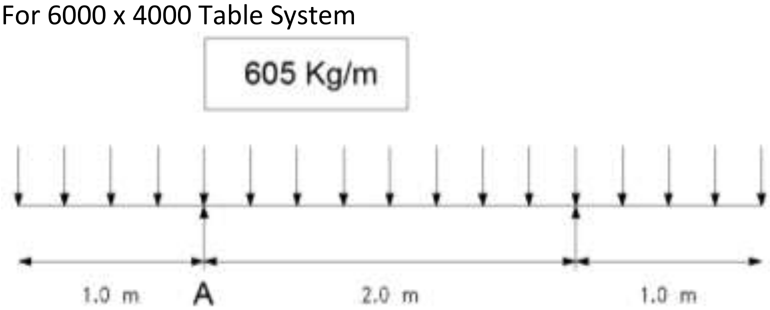
Table System	Adequate spacing
6000x4000	600mm
4500x4500	400 mm
3900x3900	700 mm

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
Future build Data sheet	

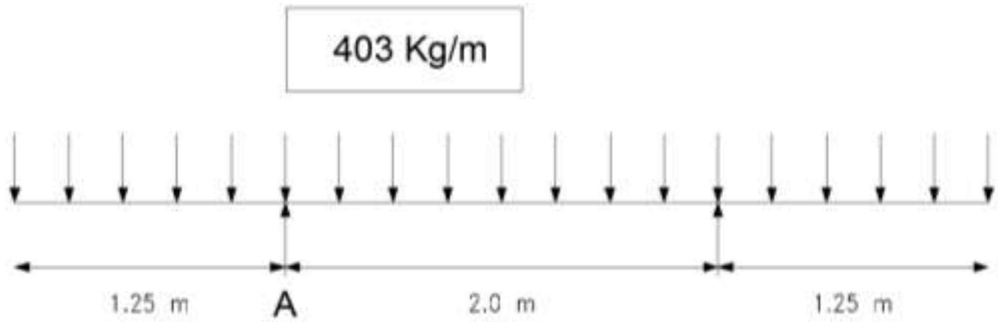
Load Built up

For 6000 x 4000 Table System



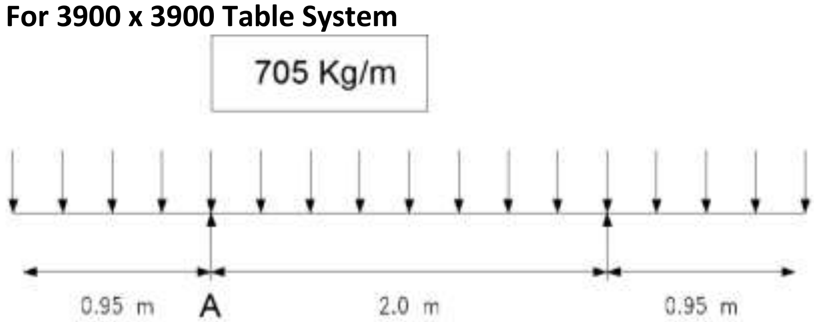
Span (between supports)	2.0m
Span (cantilever)	1.0 m
Beam spacing	0.6 m
Density of Concrete	2450 Kg/m^3
Thickness of Concrete slab	0.35 m
Construction load	150 Kg/m^2
UDL load on beam	(2450 x 0.35 + 150) x 0.6 = 605 Kg/m
Maximum Moment at support A	605 x 1.0^2 / 2 = 303 Kgm i.e.3.03 KNm
Maximum Shear at support A	605 x 1.0 = 605 Kg i.e.6.05 KN

For 4500 x 4500 Table System



Span (between supports)	2.0 m
Span (cantilever)	1.25 m
Beam spacing	0.40 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 x 0.35 + 150) x 0.40 = 403 Kg/m
Maximum Moment at support A	403 x 1.25^2 / 2 = 315 Kgm i.e.3.15 KNm
Maximum Shear at support A	403 x 1.25 = 504 Kg i.e.5.04 KN

For 3900 x 3900 Table System



Span (between supports)	2.0 m
Span (cantilever)	0.95 m
Beam spacing	0.7 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 x 0.35 + 150) x 0.7 = 705 kg/m
Maximum Moment at support A	705 x 0.95^2 / 2 = 318 Kgm i.e.3.18 kNm
Maximum Shear at support A	705 x 0.95 = 670 Kg i.e.6.70 Kn

Sectional Properties of the Wooden Beam 65 x 150 mm

Cross sectional area 65 x 150 = 9750 mm^2
Section Modulus 65 x 150^2 / 6 = 243750 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 x 1.04 = 10140 mm^2
Modified Section Modulus 243750 x 1.06 = 258375 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 x 1.4 = 11.2 N/ mm^2
Modified Shear Stress of the wooden beam for wet condition 0.801 x 1.4 = 1.12 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 x 1.1 = 12.32 N/ mm^2
Modified Shear Stress of the wooden beam for wet condition 1.12 x 1.1 = 1.232 N/ mm^2

Stresses in the Beam due to load

For 6000 x 4000 Table System

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

= 3.03×10^6 / 258375 = 11.73 N/ mm^2 < 12.32 N/ mm^2 SAFE

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

= 6.05×10^3 / 10140 = 0.60 N/ mm^2 < 1.232 N/ mm^2 SAFE

For 4500 x 4500 Table System

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

= 3.15×10^6 / 258375 = 12.19 N/ mm^2 < 12.32 N/ mm^2 SAFE

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

= 5.04×10^3 / 10140 = 0.50 N/ mm^2 < 1.232 N/ mm^2 SAFE

For 3900 x 3900 Table System

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

= 3.18×10^6 / 258375 = 12.31 N/ mm^2 < 12.32 N/ mm^2 SAFE

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

=6.70×10^3 / 10140 = 0.66 N/ mm^2 < 1.232 N/ mm^2 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 x 0.6 x 0.6 / 10 = 0.363 KNm per metre width
Max. Shear due to load SH = 10.1 x 0.6 / 2 = 3.023 KN per metre width
Max. Bending stress $\sigma = M / Z$ = $0.363 \times 10^6 / (1000 \times 18^2 / 6)$
σ = 6.72 N/mm^2
Max. Shear stress $\tau = SH / A$ = 3.023 x 1000 / (1000 x 18) =
τ = 0.17 N/mm^2

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

Bending stress = 11.87 N/mm^2 > 6.717 N/mm^2 SAFE
Shear stress = 1.75 N/mm^2 > 0.168 N/mm^2 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/mm^2

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

δ = 1.86mm < 2.5 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	Nmm2	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	Nmm2	kNm	kN
typical 200mm deep formwork I beam			5.9	429.0	5.0	11.0