Rolton Group

DSD
Davenport Scaffold Designs Ltd

CALCULATION SHEET

Title:	Access and vertical propping to the max loads specified for use at The Market Car Park, Peterborough.	**Job No:**	**1529-1-2-3-4-5-6-7**	Rev Date	
		Sheet No:	1	**Of**	20
Contractor:		**Prepd By:**	SMC	**Date:**	23.9.19
		Chkd By:		**Date:**	

Materials

Standard scaffold tube in accordance with TG20:13,
All tube will be galvanised therefore take as new.
Fittings in accordance with BS 1139.

Properties of tube.

Outside diameter	= 48.3 mm
Weight	= 4.37 kg/m
Z	= 5.70 cm3
I	= 13.8 cm4
r	= 1.57cm
Area	= 5.57 cm2
Allowable BM.	= 1.12kNm
Allowable shear	= 29.1kN

Scaffold boards

(225 x 38 mm)

Allowable BM.	= 0.48 kNm
Self weight	= 0.25 kN/m2

Allowable tube strut loads.

Length (mm)	Load (kN)	Length (mm)	Load (kN)
1000	58.6	1800	33.7
1200	51.9	2000	29.1
1400	45.3	2200	25.3
1600	39.2	2400	22.0

Allowable fitting loads.

Type of fitting	Type of load	S.W.L (kN)
Right Angle	Slip	6.1 (class A)
Right Angle	Slip	9.1 (class B)
SGB Mk3A	Slip	12.5
Swivel	Slip	6.1
Sleeve	Tension	3.6
Brace DH	Slip	5.0
Putlog Coupler	Slip	0.63
Adj. Base/FH	Axial	30.0

Allowable BM. & shear for scaffolding beams.

Type beam	Allowable BM.	Allowable reaction
Unit beam	27.7kNm (bolt shear)	20.0kN
Surebeam	13.5kNm	18.0kN
SGB Soldier Mk2	38.0kNm (10.0kNm at joint)	75.0kN
Haki 400 Aluminium Truss	15.7kNm	12.7kN
Haki 750 Aluminium Truss	41.3kNm	30.6kN

Note – Not all materials listed will be used in the following design

These calculations are for the access and vertical propping all as shown on DSD drawings 19-1529-1, 19-1529-2, 19-1529-3, 19-1529-4, 19-1529-5, 19-1529-6 and 19-1529-7.
Loads allowed for to the scaffold

Vertical loads to propping scaffold =
Self weight of slab = 6.72kN/m²
Live load on the slab = 1.5kN/m²
Therefore total vertical load allowed for per floor level = 8.22kN/m² all as specified by Rolton Group.

No additional vertical or horizontal loads have been accounted for on this scaffold!

Live load to the access scaffold
Live load to the access scaffold is allowed for at 2.0kN/m² at one level plus second level all at 0.75kN/m². One additional level all at 0.75kN/m² is allowed for as protection at first lift.

All loads must be checked to ensure they are adequate and not exceeded and the existing ground / structure must be checked to ensure they can safely support the imposed loads in all areas. All checks to be done by others.

Access Leg loads

Scaffold constructed in 2.0m lifts with a 2.7m pavement gantry, in accordance with TG20 the effective length of scaffold uprights = 2.7m therefore the permissible axial loads in uprights = 18.2kN

Inside Leg

Inside Standards	kg	**Fittings**
1 x 2.0m standard = 2.0m	2.0m x 4.4kg/m = 8.8kg	
1 x 2.0m ledger = 2.0m	2.0m x 4.4kg/m = 8.8kg	**1 x 1kg = 1kg**
4 x 0.8m transom = 3.2m	3.2m x 4.4kg/m = 14.08kg	**4 x 1kg = 4kg**
1 x 2.0m handrail = 2.0m	2.0m x 4.4kg/m = 8.8kg	**1 x 1kg = 1kg**
1 x 1.3m ledger brace = 1.3m	1.3m x 4.4kg/m = 5.72kg	**1 x 1kg = 1kg**
Total weight	46.2kg	**7kg**
Total self weight per node =	**46.2 + 7 = 53.2kg =**	**0.52kN**

Boards = 0.225 x 2.5 x 2.0 x 0.25kN/m² = 0.28kN
Live = 0.225 x 2.5 x 2.0 x (2.0kN/m² + 0.75kN/m² + 0.75kN/m²) = 3.94kN

Total leg load = 0.52kN x 8 + 0.28kN x 9 + 3.94kN = 10.62kN < 18.2kN permissible therefore OK

Outside Leg

Outside Standards	kg	**Fittings**
1 x 2.0m standard = 2.0m	2.0m x 4.4kg/m = 8.8kg	
1 x 2.0m ledger = 2.0m	2.0m x 4.4kg/m = 8.8kg	**1 x 1kg = 1kg**
4 x 0.8m transom = 3.2m	3.2m x 4.4kg/m = 14.08kg	**4 x 1kg = 4kg**
1 x 1.3m ledger brace = 1.3m	1.3m x 4.4kg/m = 5.72kg	**1 x 1kg = 1kg**
2 x 2.0m handrail = 4.0m	4.0m x 4.4kg/m = 17.6kg	**2 x 1kg = 2kg**
1 x 1.5m face brace = 1.5m	1.5m x 4.4kg/m = 6.6kg	**1 x 1kg = 1kg**
Total weight	61.6kg	**9kg**
Total weight per node =	**61.6 + 9 = 70.6kg =**	**0.69kN**

Boards = 0.225 x 3.5 x 2.0 x 0.25kN/m² = 0.393kN
Live = 0.225 x 2.5 x 2.0 x (2.0kN/m² + 0.75kN/m² + 0.75kN/m²) = 3.94kN
Total leg load = 0.69kN x 8 + 0.393kN x 9 + 3.94kN = 12.99kN < 18.2kN permissible therefore OK

Tie loads from external access

Wind loads from BS EN 1991-1-4

Fundamental basic wind speed =
$V_f = V_m \times C_{alt}$

V_m = From figure NA.1 = 22
Altitude from Google Earth at 14m
$C_{alt} = 1 + 14 \div 1000$
$C_{alt} = 1.014$
$V_m = 22 \times 1.014$
$V_f = 22.308$

Basic wind speed =
$V_b = V_f \times C_{dir} \times C_{season} \times C_{prob}$
$V_b = 22.308 \times 1 \times 1 \times 1$
$V_b = 22.308$

Basic wind pressure =
$q_b = 0.613 \times V_b^2 \div 1000$
$q_b = 0.613 \times 22.308^2 \div 1000$
$q_b = 0.305$

Peak wind pressure =
$q_p = q_b \times C_e$
$q_b = 0.305$
C_e = Figure NA.7 at max 18m high at 40km to shoreline = 2.8
C_{eT} = Figure NA.8 at max 18m high 0.1km in town = 1.0
$q_p = 0.305 \times 2.8 \times 1$
$q_p = 0.854$

C_sC_d taken as 1.0
Therefore wind = 0.854 x 1.0 = 0.854kN/m²

Temporary structure factor taken from EN 12811 = 0.7 therefore wind = 0.854 x 0.7 = 0.598kN/m²

Car park considered with wind as for fully clad building due to full sheeting to perimeter (all sides to be clad at all times)

C_{pe} taken from BS EN 1991-1-4 table 7.1.
Wind considered to zone A, D & B

C_{pe} zone A = -1.2 x 0.598kN/m² = -0.7176kN/m²
C_{pe} zone D = 0.8 x 0.598kN/m² = 0.478kN/m²
C_{pe} zone B = -0.8 x 0.598kN/m² = -0.478kN/m²

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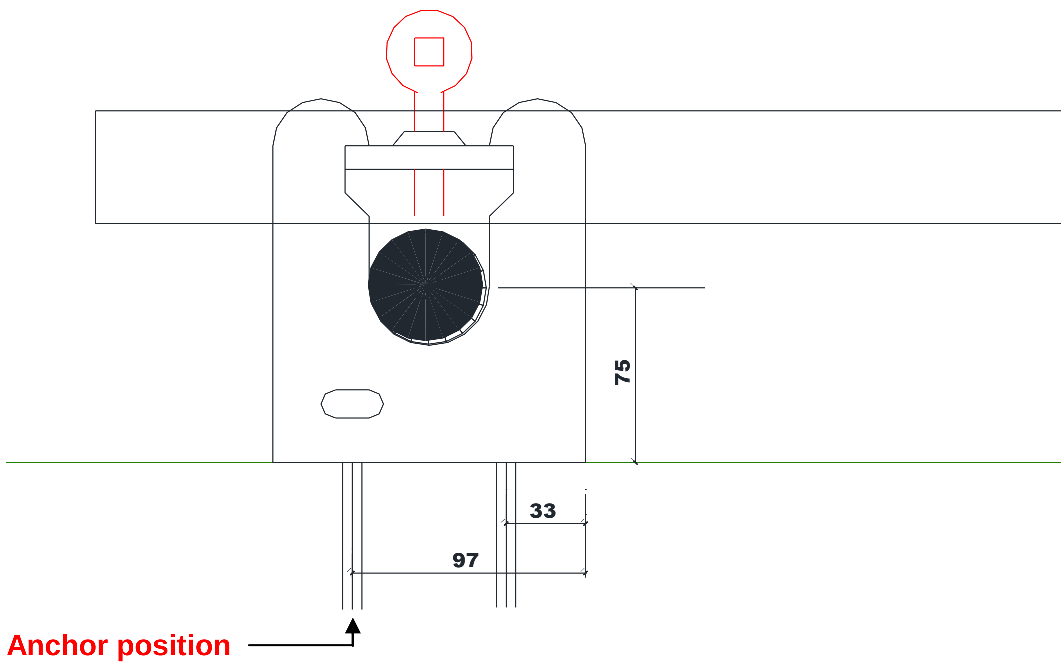
Scaffold to be tied to the existing structure with shear anchors to the underside of the slab or by box ties to the existing columns to every floor at every frame in zone A and at every other frame at Zone B therefore maximum area per tie =
Zone A = 2.0m x 2.55m vertical = 5.1m²
Zone B = 4.0m x 2.55m vertical = 10.2m²

Tie loads
Zone A = 5.1m² x -0.7176kN/m² = 3.66kN
Zone B = 10.2m² x -0.478kN/m² = 4.87kN

Increased tie area to top tie per frame = 2.0m x 4.1m vertical = 8.2m²
Fix ties to top lift at every frame therefore;
Zone A maximum tie load = 8.2m² x -0.7176kN/m² = 5.88kN
Zone B maximum tie load = 8.2m² x -0.478kN/m² = 3.92kN
Positive loads to zone D = 8.2m² x -0.478kN/m² = 3.92kN max in all areas

Note – during the demolition process each level becomes the top tied lift and therefore all ties to be taken top tie level case

Check moment though two hole band for pull out load, anchor fixed in one hole only, furthest away from external scaffold as shown on drawing.



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Zone A (negative loads) =
Moment = 5.88kN x 0.075m = 0.441kNm
Force = 0.441kNm ÷ 0.097m = **4.54kN**

Zone B (negative loads) =
Moment = 3.92kN x 0.075m = 0.294kNm
Force = 0.294kNm ÷ 0.097m = **3.03kN**

Zone D (positive loads) =
Moment = 3.92kN x 0.075m = 0.294kNm
Force = 0.294kNm ÷ 0.033m = **8.91kN**

Resulting worst case loads to anchor =
Zone A with 5.88kN shear and 4.54kN tension
Zone D with 3.92kN shear and 8.91kN tension

Anchors to be fixed as 130mm long 12mm ADI self-tapping concrete bolt through the back of a band and plate as shear tie each with permissible shear of 15kN per bolt and permissible tension load of 13kN

Check COMBINED anchor bolt loading:

Zone A =

Combined loading $= \frac{fs}{Fs} + \frac{ft}{Ft} < 1.2$ as TG4:11

$= \frac{5.88}{15} + \frac{4.54}{13} = 0.74\ (< 1.2)$ **OK**

Zone D =

Combined loading $= \frac{fs}{Fs} + \frac{ft}{Ft} < 1.2$ as TG4:11

$= \frac{3.92}{15} + \frac{8.91}{13} = 0.946\ (< 1.2)$ **OK**

Ties to be tested in accordance with TG4 at 1.25 x required load therefore increased proof test required = 8.91 x 1.25 = 11.14kN

Vertical propping

Total load allowed for per floor level = 8.22kN/m² all as specified by Rolton Group

All propping to be constructed in a maximum grid size of 2.0m x 2.0m with props at each level positioned directly above props below. Therefor maximum load per prop line per floor = 2.0m x 2.0m x 8.22kN/m² = 32.88kN

Self weight of the propping system at each level =

Tubular props on 5th floor =
Uprights = 2.0m x 2 = 4m
Ledgers / transoms = 2.0m x 4 = 8m
Ledger bracing / face bracing = 1.5m x 2 = 3m

Total = (4m + 8m + 3m) x 4.4kg/m + 8 fittings x 1kg = 74kg
74kg x 9.81 ÷ 1000 = 0.725kN

Soleboards = 0.225m x 0.7m x 4 x 0.25kN/m² = 0.15kN

Total self weight = 0.15kN + 0.725kN = 0.88kN

Single soldier props on 4th floor =
Threaded shoring adaptor = 12.7kg
Tubular shoring adaptor = 5.2kg
1.125m soldier = 25.43kg
Ledgers / transoms = 2.0m x 4 = 8m
Ledger bracing / face bracing = 1.5m x 2 = 3m

Total = (8m + 3m) x 4.4kg/m + 8 fittings x 1kg + 25.43kg + 5.2kg + 12.7kg = 99.73kg
99.73kg x 9.81 ÷ 1000 = 0.978kN

Soleboards = 0.225m x 0.7m x 4 x 0.25kN/m² = 0.15kN

Total self weight = 0.15kN + 0.978kN = 1.13kN

Single soldier prop with single tubular prop on 3rd floor =
Threaded shoring adaptor = 12.7kg
Tubular shoring adaptor = 5.2kg
1.125m soldier = 25.43kg
Upright = 2.0m

Ledgers / transoms = 2.0m x 4 = 8m
Ledger bracing / face bracing = 1.5m x 2 = 3m

Total = (2.0m +8m + 3m) x 4.4kg/m + 10 fittings x 1kg + 25.43kg + 5.2kg + 12.7kg = 110.53kg
110.53kg x 9.81 ÷ 1000 = 1.08kN

Soleboards = 0.225m x 0.7m x 4 x 0.25kN/m² x 2 = 0.3kN

Total self weight = 0.3kN + 1.08kN = 1.38kN

Double soldier props on 2nd and 1st floors =
Threaded shoring adaptor = 12.7kg x 2 = 25.4kg
Tubular shoring adaptor = 5.2kg x 2 = 10.4kg
1.125m soldier = 25.43kg x 2 = 50.86kg
Ledgers / transoms = 2.0m x 4 = 8m
Ledger bracing / face bracing = 1.5m x 2 = 3m

Total = (8m + 3m) x 4.4kg/m + 12 fittings x 1kg + 50.86kg + 10.4kg + 25.4kg = 147.06kg
147.06kg x 9.81 ÷ 1000 = 1.44kN

Soleboards = 0.225m x 0.7m x 4 x 0.25kN/m² x 2 = 0.3kN

Total self weight = 0.3kN + 1.44kN = 1.74kN

Double soldier props with tubular prop on ground floor =
Threaded shoring adaptor = 12.7kg x 2 = 25.4kg
Tubular shoring adaptor = 5.2kg x 2 = 10.4kg
1.8m soldier = 37.42kg x 2 = 74.84kg
Upright = 2.0m
Ledgers / transoms = 2.0m x 4 = 8m
Ledger bracing / face bracing = 1.5m x 2 = 3m

Total = (2m + 8m + 3m) x 4.4kg/m + 14 fittings x 1kg + 74.84kg + 10.4kg + 25.4kg = 181.84kg
181.84kg x 9.81 ÷ 1000 = 1.78kN

Soleboards = 0.225m x 0.7m x 4 x 0.25kN/m² x 2 = 0.3kN

Total self weight = 0.3kN + 1.78kN = 2.08kN

Therefore loads per level from structure and self weight of propping system =
Tubular scaffold props constructed on floor level 5 load = 32.88kN + 0.88kN = 33.76kN
Single soldier prop constructed on floor level 4 load = 33.76kN + 32.88kN = 66.64kN
Single soldier prop with tubular prop constructed on floor level 3 load = 66.64kN + 32.88kN = 98.64kN
Double soldier props constructed on floor level 2 load = 32.88kN x 4 = 131.52kN
Double soldier props constructed on floor level 1 load = 32.88kN x 5 = 164.44kN
Double soldier props with tubular prop constructed on floor level 1 load = 32.88kN x 6 = 197.28kN

Floor level	Cumulative loads from existing structure and props from floors above	Total load at floor level immediately above prop level	Self weight propping	Total load at floor level
6th Floor	-	-	-	
5th Floor	-	32.88kN	0.88kN	33.76kN
4th Floor	33.76kN	32.88kN	1.13kN	67.77kN
3rd Floor	67.77kN	32.88kN	1.38kN	102.03kN
2nd Floor	102.03kN	32.88kN	1.74kN	136.65kN
1st Floor	136.65kN	32.88kN	1.74kN	171.27kN
Ground	171.27kN	32.88kN	2.08kN	206.23kN

The existing structure must be checked to ensure that it is capable of safely transmitting the loads from one level to another and the existing ground level must be checked to ensure it is capable of safely supporting the loads specified, all by others. Some existing partition walls, toilets and toilet cubicles will need to be removed prior to the start of construction. All making good necessary of ground floor around toilet waste pipes etc to be designed supplied and fixed by other and must be capable of supporting the loads specified.

Props fixed per level

5th Floor

Prop load = 33.76kN
Props to be fixed as pairs of tubular uprights each fixed with adjustable base plates with a minimum safe working load of 30kN.
The scaffold is to be fully braced with 1.8m maximum lift heights, in accordance with TG20 the effective length of the uprights including a k factor of 1.1 = 1.8m x 1.1 = 1.98m taken as 2.0m resulting in a permissible axial load of 29.1kN.
Therefore capacity of props = 29.1kN x 2 = 58.2kN > 33.79kN therefore OK

4th Floor

Prop load = 67.77kN
Props to be fixed as single lines of soldier props with a minimum safe working load of 100kN > 67.77kN therefore OK

3rd Floor

Prop load = 102.03kN
Props to be fixed as single lines of soldier props with an adjacent tubular prop.

Tubular props to be fixed with adjustable base plate with a minimum safe working load of 30kN.
The scaffold is to be fully braced with 1.0m maximum lift heights, in accordance with TG20 the effective length of the uprights including a k factor of 1.1 = 1.0m x 1.1 = 1.1m resulting in a permissible axial load of 51.9kN. The top un braced lift of the tubular uprights is taken with an effective length of l x 2 = 0.8m x 2 = 1.6m resulting in a permissible axial load of 39.2kN.
Therefore item limiting capacity of tubular upright is adjustable base at 30kN

Soldier props to be fixed as single lines of soldier props with a minimum safe working load of 100kN

Therefore capacity of props = 100kN + 30kN = 130kN > 102.03kN therefore OK

2nd Floor

Prop load = 136.65kN
Props to be fixed as double lines of soldier props each with a minimum safe working load of 100kN therefore capacity of props = 100kN x 2 = 200kN > 136.65kN therefore OK

1st Floor

Prop load = 171.27kN
Props to be fixed as double lines of soldier props each with a minimum safe working load of 100kN therefore capacity of props = 100kN x 2 = 200kN > 171.27kN therefore OK

Ground Floor

Prop load = 206.23kN
Props to be fixed as double lines of soldier props with an adjacent tubular prop.

Tubular props to be fixed with adjustable base plate with a minimum safe working load of 30kN. The scaffold is to be fully braced with 1.6m maximum lift heights, in accordance with TG20 the effective length of the uprights including a k factor of 1.1 = 1.6m x 1.1 = 1.76m taken as 1.8m resulting in a permissible axial load of 33.7kN. The top un braced lift of the tubular uprights is taken with an effective length of l x 2 = 0.8m x 2 = 1.6m resulting in a permissible axial load of 39.2kN. Therefore item limiting capacity of tubular upright is adjustable base at 30kN

Soldier props to be fixed as double lines of soldier props with a minimum safe working load of 100kN x 2 = 200kN

Therefore capacity of props = 200kN + 30kN = 230kN > 206.23kN therefore OK

Props to car park ramps

Props to car park ramps to be fixed with swivel shoring base with 90kN capacity.

Therefore props fixed per level

5th Floor

Prop load = 33.76kN
Props to be fixed as single lines of soldier props with a minimum safe working load of 90kN > 33.76kN therefore OK

4th Floor

Prop load = 67.77kN
Props to be fixed as single lines of soldier props with a minimum safe working load of 90kN > 67.77kN therefore OK

3rd Floor

Prop load = 102.03kN
Props to be fixed as double lines of soldier props each with a minimum safe working load of 90kN therefore capacity of props = 90kN x 2 = 180kN > 102.03kN therefore OK

2nd Floor

Prop load = 136.65kN
Props to be fixed as double lines of soldier props each with a minimum safe working load of 90kN therefore capacity of props = 90kN x 2 = 180kN > 136.65kN therefore OK

1st Floor

Prop load = 171.27kN
Props to be fixed as double lines of soldier props each with a minimum safe working load of 100kN therefore capacity of props = 90kN x 2 = 180kN > 171.27kN therefore OK

Ground Floor

Prop load = 206.23kN
Props to be fixed as triple cluster of soldier props each with a minimum safe working load of 90kN therefore capacity of props = 90kN x 3 = 270kN > 206.23kN therefore OK

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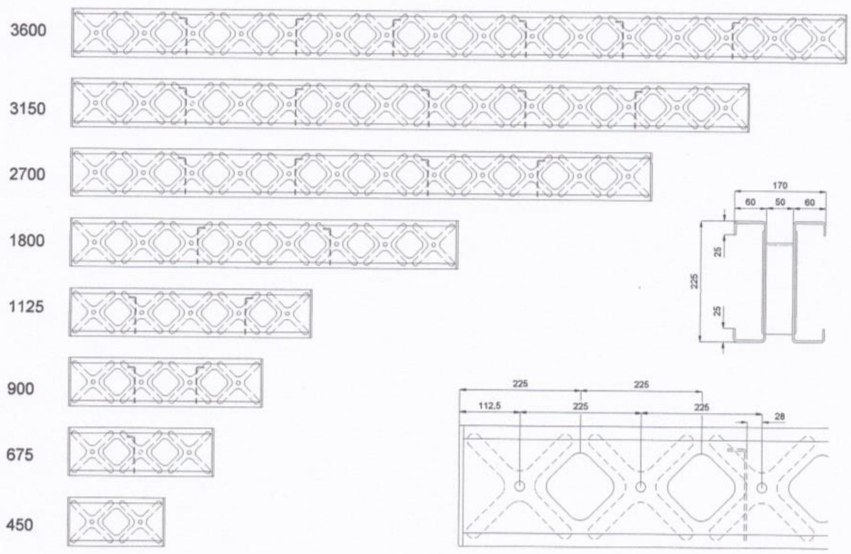
MKII SOLDIER – System - Soldiers



Soldier Length	Code No. (Painted)	Code No. (Galv))	Weight kg
3600	**443006**	**443096**	70.97
3150	**443005**	**443095**	62.58
2700	**443004**	**443094**	54.20
1800	**443003**	**443093**	37.42
1125	**443002**	**443092**	25.43
900	**443001**	**443091**	21.43
675	**443008**	**443098**	19.48
450	**443007**	**443097**	11.65

Specification / Properties

Material	BSC Tenform XF450		Axial Comp. (Facade)	300 kN
Finish	As specified		Axial Comp. (Shore)	100 kN
Weight	-	kg	Axial Tension	120 kN
Weight/m	20.8	kg/m	End Reaction (see note 2)	115 kN
C.S. Area (Gross)	25.73	cm2	Centre Reac. (see note 2)	115 kN
C.S. Area (Avge)	22.52	cm2	B. Mo. (Hog) Max *	38 kNm
E	206000	N/mm2	B. Mo. (Sag) Max *	38 kNm
Ixx	1578	cm4	B. Mo. (at joint)	10 kNm
Iyy	534.6	cm4	B. Mo. (Reinf. joint)	15 kN
rx	7.83	cm	Tie Load (443020 Washer)	115 kN
ry	4.55	cm	Shear Max *	100 kN
Minimum F.O.S.	2.1		*See page 25	

Guidance Notes
1) Comp/Tension loads may be limited by end attachment/strut length. See relevant sheets.
2) Minimum bearing length 155 mm (as Tie washer 443020)
3) Weight excludes timber insert. (Additional weight approx, 1. 1 kg/m)
4) For detail dimensions see page 2
5) See also (limited availability) Soldier 343 mm page 5, packer 150 mm page 4 & 75 mm page 3

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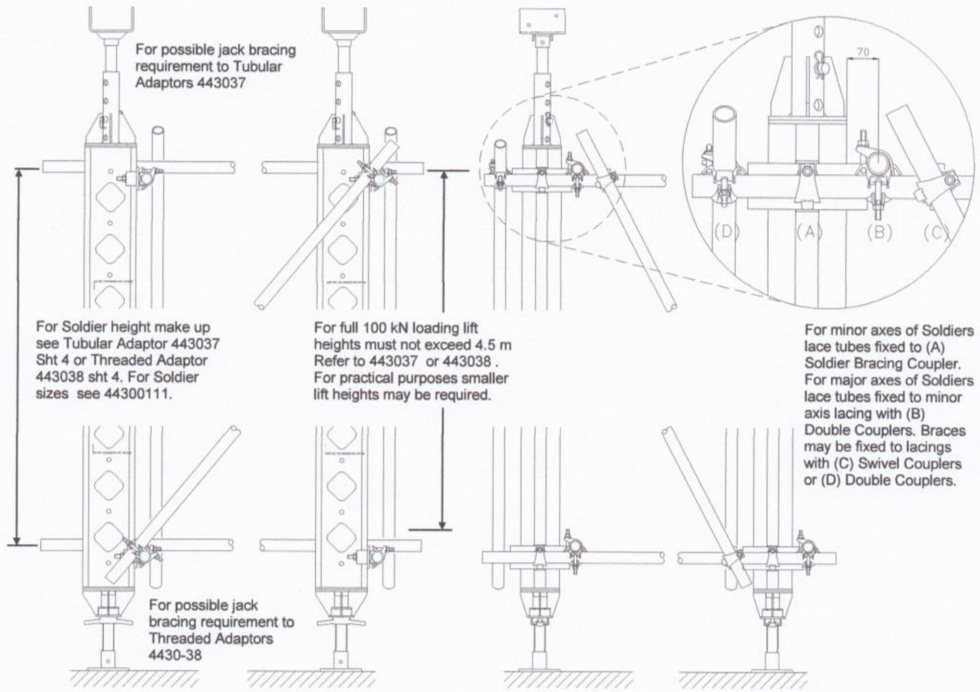
MKII SOLDIER - Bracing Coupler Assembly



Guidance Notes

1) For specification & properties of Soldier Bracing Coupler refer to page 40
2) Allowable load on a Soldier shore is limited by its unrestrained length.
3) For Shores up to 10 m high and 100 kN load, lacing & bracing may be required.
4) Lift heights of not greater than 4.5 m will allow full 100 kN loading, however for practical purposes, (e.g. erection or lace / brace load) smaller lift heights may be required.
5) Lacing should resist 2½ % of applied load in shore via bracing or physical ties to permanent works. (Ref : BS 5975)
6) Laced / braced Shores may also require bracing to Tubular & Threaded Adaptors. Refer to page 35 (Tubular Adaptor) or page 36 (Threaded Adaptor).
7) For minor axes of Soldiers lace tubes are fixed using the Soldier Bracing Couplers. For major axes of Soldiers lace tubes are fixed to minor axis lacing using Double Couplers. Brace tubes may be fixed to lace tubes with Swivel Couplers (lace & brace parallel) or to lace tubes with Double Couplers (lace & brace at right angles).
S.W.L SGB Double & Swivel Couplers 6.25 kN, SGB Mk3A Double Coupler 12.5 kN

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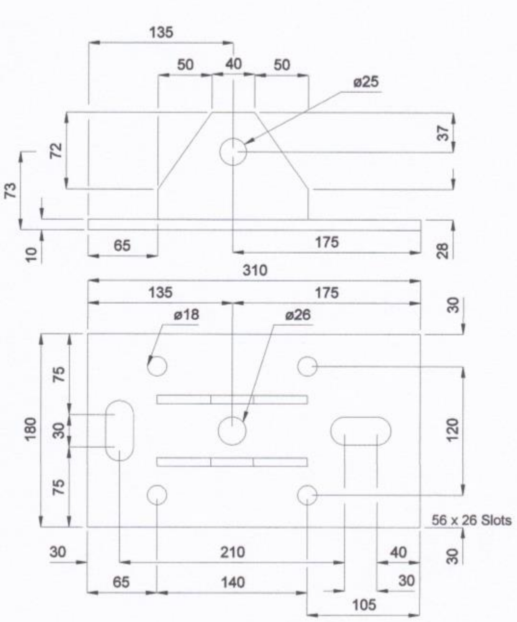
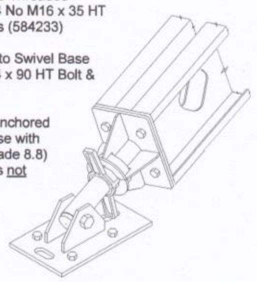
MKII SOLDIER - Swivel Shoring Base



Soldier fixed to Threaded Adaptor with 4 No M16 x 35 HT Screws & Nuts (584233)

Adaptor fixed to Swivel Base with 1 No M24 x 90 HT Bolt & Nut (584235)

Swivel Base anchored to suitable Base with 4 No M16 (Grade 8.8) Bolts (Anchors <u>not</u> supplied)



Specification / Properties

		Safe Working Loads:	
Material:	Steel	Swivel Shoring Base:	±90 kN
Finish:	As Specified	..Connected to Tubular Shoring Adaptor:	±90 kN
Minimum F.O.S:	2.1	..Connected to Threaded Shoring Adaptor: (Solid stem)	±90 kN
Code No.	**443024 (Painted)** **443087 (Galvanised)**	..Connected to Threaded Shoring Adaptor: (Hollow Stem)	-50 kN (Tension) +90kN (Compression)

Guidance Notes

1) Comp/Tension loads may be limited by attached components. See relevant sheets.
2) Comp/Tension loads may be limited by anchorage or foundations. Anchors are not supplied by SGB. For guidance on anchor tensile/shear loads see page 62.
3) Tubular Shoring Adaptor (443037) or Threaded Shoring Adaptor (443090) connected to Swivel Shoring Base with 1 No M24 x 90 HT Bolt & Nut (584235).

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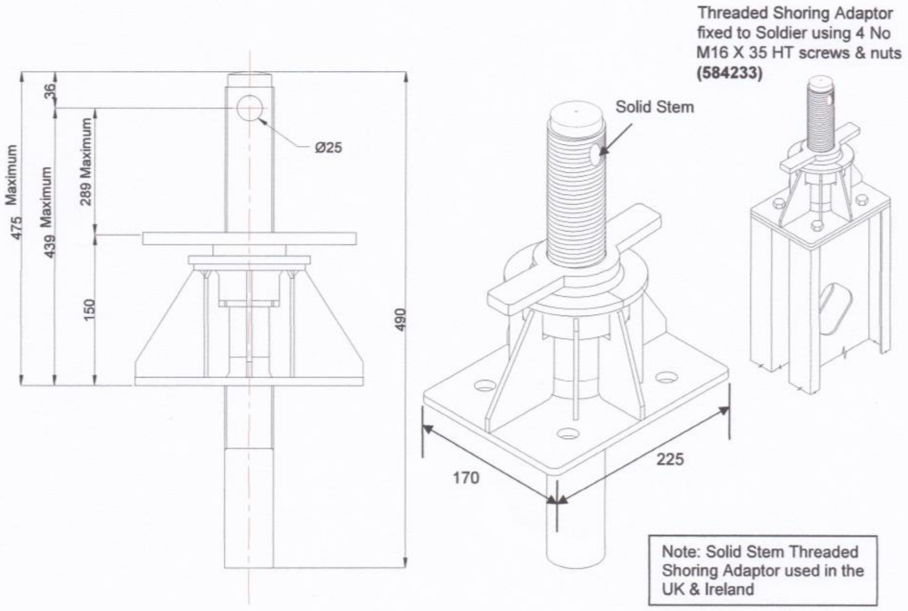
Contractor:		**Prepd By:**	SMC	**Date:**	23.9.19
		Chkd By:		**Date:**	

MKII SOLDIER - Threaded Shoring Adaptor (Solid Stem)



Specification / Properties:

Description	Material	Finish	Weight	Code No
Threaded Shoring Adaptor (Solid Stem)	Steel	Stem: Zinc Plated. Body: Galv + Powder coat Yellow	12.7kg	443090

		Comp	Tension	
Safe Working Loads	Prop / Strut	100kN*	100kN	Bending-See Page 63
	..To H.D. Push-Pull Adaptor	90kN	90kN	
	..To Push-Pull Bracket	80kN	80kN	Minimum F.O.S. 2:1
	..To Web Bearing Plates	70kN	70kN	
	..To Swivel Shoring Base	90kN	90kN	

Guidance Notes

1) Comp/Tension loads may be limited by attached components. See relevant sheets.
2) Adaptor fixes to Soldier using 4 No M16 x 35 HT Screws & Nuts **(584233)**
3a) Head/Base Plate **(443022)** or Forkhead **(443018)** fix to jack using 1 No M12 x 80 Bolt & Nut **(584207)** (No tensile value).
3b) Swivel Base **(443024)**, Heavy Duty Push-Pull Adaptor **(443025**, Push-Pull Bracket **(443027)** or Web Bearing Plates **(443026)** fix to Jack using 1 No M24 x 90 HT Bolt & Nut **(584235)**
4) For adjustment lengths see page 58.
5) * In Special cases the allowable compression may be 200kN. Contact the Formwork design office for more information.

Rolton Group

DSD
Davenport Scaffold Designs Ltd
CALCULATION SHEET

Title:	Access and vertical propping to the max loads specified for use at The Market Car Park, Peterborough.	**Job No:**	**1529-1-2-3-4-5-6-7**	Rev Date	
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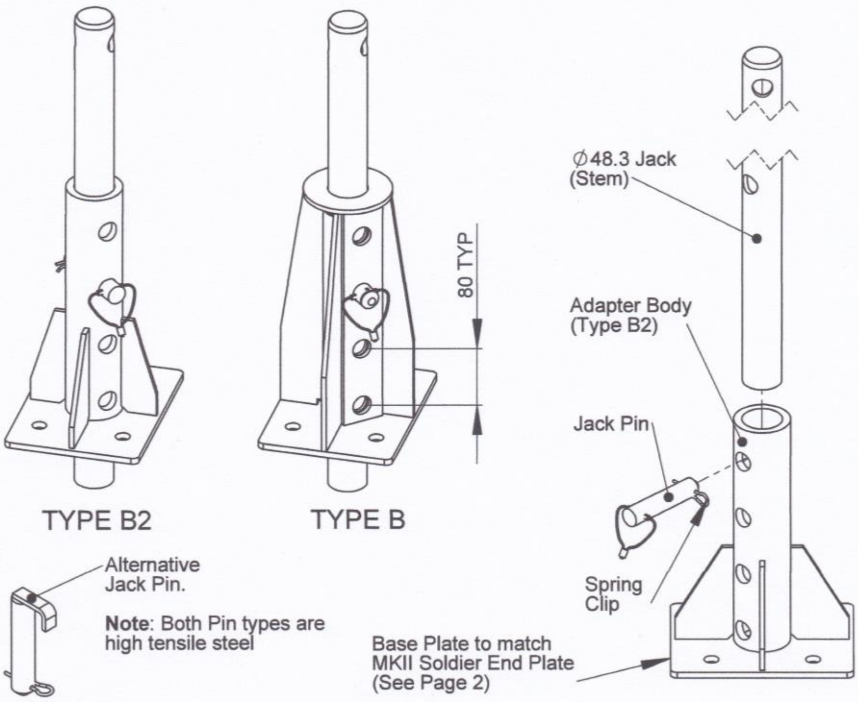
Contractor:		**Prepd By:**	SMC	**Date:**	23.9.19
		Chkd By:		**Date:**	

MKII SOLDIER		SGB
Component	**Tubular Shoring Adaptor**	



Specification/Properties:

Description	Material	Finish	Weight	Code No
Tubular Shoring Adapter Type B and Type B2	Steel	As specified	12kg	**443037 (Painted)** **443079 (Galvanised)**

Safe Working Loads	Axial Load (Jack)	± 100kN	Bending - See Page 64
	To H.D. Push-Pull Adapter	± 90kN	
	To Push-Pull Bracket	± 80kN	
	To Web Bearing Plates	± 70kN	Minimum F.O.S. 2:1
	To Swivel Shoring Base	± 90kN	

Guidance Notes:

1) Comp/Tension loads may be limited by attached components. See relevant sheets.
2) Adaptor fixes to soldier using 4 No M16 x 35 HT Screws & Nuts (584233)
3a) Head/Base Plate (443022) and Forkhead (443018) fix to Jack using 1 No M12 x 80 Bolt & Nut. (584207) (No tensile value).
3b) Swivel Base (443024), Heavy Duty Push-Pull Adaptor (443025), Push-Pull Bracket (443027) and Web Bearing Plates (443026) fix to Jack using 1 No M24 x 90 HT Bolt & Nut (584235)
4) For adjustment lengths see page 59.

	Date:	Issue:	Page:
These data sheets show the extent of the MKII Product. Not all products are available for hire/sale in all countries. Check with your nearest SGB branch. Unless otherwise stated, the data contained in this data sheet is expressed in terms of safe working loads	17.11.06	C	35

MKI041C.SLDDRW

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Technical Data Sheet

Product Designation : CSB
Type : Self Tapping Concrete/ Masonry Bolt
Material : Hardened Steel
Finish : Zinc & Yellow Passivated (thickness 3~5 Microns

CS Bolts are a single fixing solution for the majority of construction materials which are very easy to install and have high pull out and shear values. They can also be used close to an edge without breaking the substrate. Suitable for brick, wood, marble, block & stone.

Anchor Sizes & Setting Details

Setting Details		5x30	5x50	5x75	5x100	6x50	6x75	6x100	6x130	6x150
d0	Drill Diameter	5				6				
l	Anchor Length	30	50	75	100	50	75	100	130	150
tfix	Maximum Fixing Thickness	5	25	50	63	20	45	55	85	105
hmin	Minimum Embedment	25			37	30		45		
h1	Minimum Hole Depth	35			47	40		55		
tinst	Installation Torque (Nm)	15				25				
Num	Mean Ultimate Tensile Action (kN)	4.2			9.6	8		16		
Vum	Mean Ultimate Shear Action (kN)	9			11	10		14		
Nrec	Maximum Allowable Tensile Action (kN)	2.1			4.8	2		4		
Vrec	Maximum Allowable Shear Action (kN)	4.5			5.5	2.5		3.5		
AF	A/F Size	8				10				
H2	Washer Diameter	N/A				N/A				
	Normal Edge Distance (Tensile)	N/A				60				
	Normal Edge Distance (Shear)	N/A				80				
	Normal Spacing Distance (Tensile)	N/A				100				

Setting Details		8x60	8x75	8x100	8x130	8x150	10x60	10x75	10x100	10x130	10x150
d0	Drill Diameter	8					10				
l	Anchor Length	60	75	100	130	150	60	75	100	130	150
tfix	Maximum Fixing Thickness	20	35	60	90	110	10	25	50	80	100
hmin	Minimum Embedment	40		60			50		75		
h1	Minimum Hole Depth	55		75			70		95		
tinst	Installation Torque (Nm)	40					60				
Num	Mean Ultimate Tensile Action (kN)	12		24			18		36		
Vum	Mean Ultimate Shear Action (kN)	24		30			40		50		
Nrec	Maximum Allowable Tensile Action (kN)	3		6			4.5		9		
Vrec	Maximum Allowable Shear Action (kN)	6		7.5			10		12.5		
AF	A/F Size	15					17				
H2	Washer Diameter	10					12				
	Normal Edge Distance (Tensile)	60					80				
	Normal Edge Distance (Shear)	90					120				
	Normal Spacing Distance (Tensile)	120					170				

Setting Details		12x75	12x100	12x130	12x150	12x200	16x100	16x150	16x200
d0	Drill Diameter	12					16		
l	Anchor Length	75	100	130	150	200	100	150	200
tfix	Maximum Fixing Thickness	15	40	70	90	140	20	70	120
hmin	Minimum Embedment	60		90			80	120	
h1	Minimum Hole Depth	85		115			115	155	
tinst	Installation Torque (Nm)	80					100		
Num	Mean Ultimate Tensile Action (kN)	26		52			40	72	
Vum	Mean Ultimate Shear Action (kN)	54		60			N/A	N/A	
Nrec	Maximum Allowable Tensile Action (kN)	6.5		13			8	18	
Vrec	Maximum Allowable Shear Action (kN)	13.5		15			N/A	N/A	
AF	A/F Size	19					27		
H2	Washer Diameter	14					18		
	Normal Edge Distance (Tensile)	90					100		
	Normal Edge Distance (Shear)	140					N/A		
	Normal Spacing Distance (Tensile)	200					220		

All dimensions in mm unless otherwise shown
Data applies to hex and hex flange head styles only
Loads in C20/25 Concrete

Registered in the UK
05002500

CONSTRUCTION FIXINGS APPROVED DISTRIBUTOR

CONSTRUCTION FIXINGS APPROVED TESTER

FSB MEMBER

Title:	Access and vertical propping to the max loads specified for use at The Market Car Park, Peterborough.	**Job No:**	**1529-1-2-3-4-5-6-7**	Rev Date	
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		Chkd By:		**Date:**	

ADI

Spacing Reduction Factors

Size mm	Edge mm	20	30	40	50	60	70	80	90	100	120	140	170	200
6	Tensile		0.52	0.59	0.66	0.73	0.80	0.86	0.93	1.00				
8	Tensile			0.78	0.81	0.84	0.87	0.89	0.92	0.95	1.00			
10	Tensile					0.69	0.70	0.70	0.71	0.72	0.73	0.84	1.00	
12	Tensile					0.76	0.77	0.77	0.78	0.78	0.79	0.85	0.92	1.00

Edge Reduction Factors

Size mm	Edge mm	20	30	40	50	60	70	80	90	100	110	120	130	140
6	Tensile	0.70	0.80	0.86	0.95	1.00								
8	Tensile	0.61	0.72	0.84	0.93	1.00								
10	Tensile		0.43	0.63	0.80	0.92	1.00							
12	Tensile			0.57	0.62	0.70	0.77	0.85	0.90	1.00				
6	Shear	0.35	0.52	0.70	0.78	0.85	0.92	1.00						
8	Shear			0.32	0.40	0.48	0.65	0.83	1.00					
10	Shear					0.33	0.39	0.51	0.63	0.76	0.88	1.00		
12	Shear							0.32	0.36	0.48	0.61	0.74	0.87	1.00

Edge & spacing reduction factors are based on minimum embedments only
In Concrete C20/25
Data for 5mm & 16mm are currently not available