

Revision C: Supporting Calculations



BDS | SCAFFOLD
DESIGN
SPECIALISTS

Drawn By: Adam McCann		
Date: 01/11/2023		
Calculations By: Jonny Hollingworth	Client: Connolly Scaffolding Ltd	Drawing Status: CONSTRUCTION
Date: 01/11/2023	Project: Ryland Building, Manchester	Drawing Ref: BDS - 10312 - 01 to 05
Checked By: Mike Brown	Drawing Title: External Independent Access With Stair Access to Tib St	Revision: C 31/07/2024
Date: 31/07/2024		Pages: All

Components & Material Properties

Items listed below are for information purposes only, & are not necessarily used in this design.

All tubes used in this design are based on type 4, unless otherwise stated.

All couplers used in this design are based on class "B", unless otherwise stated.

NASC TG20:21 - Page 119 - Table 5.9Steel Tube (Type 4)

Area	=	5.57cm ²
Wall Thickness	=	4mm
Self Weight	=	4.37kg/m (0.043kN/m)
Diameter	=	48.3mm
Radius of Gyration	=	1.57cm
Plastic Modulus	=	7.87cm ³
Design Strength	=	235N/mm ²
Modulus of Elasticity	=	210000N/mm ²
Moment of Inertia	=	13.8cm ⁴
Moment Capacity	=	1.12kNm
Shear Capacity	=	29.1kN

NASC TG20:21 - Page 121 - Table 5.10

<u>Effective Length (L_E)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load - P_c</u>
1.0m	63.50	58.60kN
1.1m	70.00	55.25kN
1.2m	76.50	51.90kN
1.3m	82.70	48.60kN
1.4m	88.90	45.30kN
1.5m	95.30	42.25kN
1.6m	101.70	39.20kN
1.7m	108.05	36.45kN
1.8m	114.40	33.70kN
1.9m	120.75	31.40kN
2.0m	127.10	29.10kN
2.1m	133.45	27.20kN
2.2m	139.80	25.30kN
2.3m	146.15	23.65kN
2.4m	152.50	22.00kN
2.5m	158.85	20.65kN
2.6m	165.20	19.30kN
2.7m	171.55	18.20kN
2.8m	177.90	17.10kN
2.9m	184.25	16.15kN
3.0m	190.60	15.20kN
3.1m	196.95	14.40kN
3.2m	203.30	13.60kN
3.3m	209.65	12.90kN
3.4m	216.00	12.20kN

<u>Effective Length (L_F)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load - P_c</u>
3.5m	222.35	11.60kN
3.6m	228.70	11.00kN
3.7m	235.05	10.50kN
3.8m	241.40	10.00kN
3.9m	247.75	9.55kN
4.0m	254.10	9.10kN

NASC TG20:21 - Page 129 - Table 5.14

Effective lengths, L_F of standards in ledger braced tied independent scaffolds with 2m lifts with effective façade bracing

Vertical intervals betw Bay lengths

lines of ties	1.2m	1.5m	1.8m	2.0m	2.1m	2.4m	2.7m
2m with 2m 1st lift	2.5	2.5	2.5	2.5	2.55	2.75	2.9
2m with 2.7m 1st lift	2.7	2.7	2.7	2.7	2.7	2.9	3
4m	3.2	3.2	3.2	3.2	3.2	3.2	3.2
6m	4	4	4	4	4	4	4

NASC TG20:21 - Page 166 - Table C1

Aluminium Tube

Area	=	6.15cm ²
Wall Thickness	=	4.47mm
Self Weight	=	1.65kg/m
Diameter	=	48.3mm
Radius of Gyration	=	1.56cm
Plastic Modulus	=	8.61cm ³
Design Strength	=	255N/mm ²
Modulus of Elasticity	=	70000N/mm ²
Moment of Inertia	=	14.9cm ⁴
Moment Capacity	=	1.33kNm

NASC TG20:21 - Page 167 - Table C.2

<u>Effective Length (L_F)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load - P_c</u>
1.0m	64.2	48.90kN
1.2m	77	36.60kN
1.4m	89.9	27.90kN
1.6m	102.7	21.80kN
1.8m	115.5	17.50kN
2.0m	128.4	14.40kN
2.2m	141.2	12.00kN
2.4m	154	10.10kN
2.6m	166.9	8.70kN
2.8m	179.7	7.50kN

NASC TG20:21 - Page 135 - Table 5.15**Couplers**

Right Angle Coupler (Double) Class "A"	SWL =	6.10kN	Slip
Right Angle Coupler (Double) Class "B"	SWL =	9.10kN	Slip
Band & plate (Double) coupler	SWL =	6.10kN	Slip
Right Angle Coupler (Double) Self Weight	SW =	1.25kg	
Swivel Coupler Class "A"	SWL =	6.10kN	Slip
Swivel Coupler Class "B"	SWL =	9.10kN	Slip
Swivel Coupler Self Weight	SW =	1.33kg	
Sleeve Coupler Class "A"	SWL =	3.60kN	Tension
Adjustable Screw Jack (200mm extension)	SWL =	35.00kN	Compression
Girder Coupler (must be used in pairs)	SWL =	10.00kN	"X" Axis
	SWL =	30.00kN	"Y" Axis
	SWL =	12.50kN	"Z" Axis
Girder Coupler Self Weight (each)	SW =	1.50kg	

Timber Scaffold Boards

Self Weight	=	25kg/m ²
Width	=	225mm
Thickness	=	38mm
Section Modulus	=	47.5cm ³
Moment Capacity	=	0.48kNm

300mm Ladder Beams* (Steel) Laced at 1m c/c

Self Weight	=	0.30kN	(laced & braced)
Moment Capacity	=	10.40kNm	
Shear Capacity	=	18.00kN	

*For further information refer to manufacturer

RMD Superslim Soldiers

Moment Capacity	=	38.0kNm
Shear Capacity	=	75.0kN

*For further information refer to manufacturer

450mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.14kN	(laced & braced)
Moment Capacity	=	15.70kNm	
Shear Capacity	=	13.90kN	

*For further information refer to manufacturer

750mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.28kN	(laced & braced)
Moment Capacity	=	42.90kNm	
Shear Capacity	=	45.50kN	

*For further information refer to manufacturer

1300mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	Varies TBC	(laced & braced)
Moment Capacity	=	98.52kNm	
Shear Capacity	=	44.25kN	

*For further information refer to manufacturer

1500mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	Varies TBC (laced & braced)
Moment Capacity	=	255.00kNm
Shear Capacity	=	60.00kN

*For further information refer to manufacturer

1300mm Asterix Beams* (Aluminium)

Self Weight	=	Varies TBC (laced & braced)
Moment Capacity	=	102.20kNm Laced at 1m c/c
Moment Capacity	=	77.70kNm Laced at 1.5m c/c
Shear Capacity	=	42.10kN (Top & Bottom chords connected)
Shear Capacity	=	32.60kN (Bottom chord connected)

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	13.94kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 1.5m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	8.06kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 2m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	5.14kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

780mm Dessa Beams* (Aluminium) Laced at 1m c/c. (6no. bolts 3 each side of spigot)

Self Weight	=	0.28kN (laced & braced)
Moment Capacity	=	38.84kNm
Shear Capacity	=	23.71kN

*For further information refer to manufacturer

Relevant Design Standards/guidance (only a selection of the below standards are applicable for this design)

BS EN 39	:2001	Specification for steel scaffold tube.
BS EN 74-1	:2005	Couplers, spigot pins & baseplates for use in falsework & scaffolds.
BS EN 12811-1	:2003	Temporary works equipment: Scaffolds - Performance requirements & general design.☐
BS EN 12812-1	:2008	Falsework: Performance requirements & general design.
BS EN 1139-1-2	:1990	Metal scaffolding - part 1: Tubes - Specification for aluminium tube.
BS EN 1139-2-2	:2009	Metal scaffolding - part 2: Couplers - Specification for aluminium couplers.
BS EN 1991-1-1	:2002	Eurocode 1: Actions on structures - Densities, self-weight & imposed loads.
BS EN 1991-1-3	:2003	Eurocode 1: Actions on structures - Snow loads.
BS EN 1991-1-4	:2005	Eurocode 1: Actions on structures - Wind loads.
BS EN 1991-2	:2003	Eurocode 1: Actions on structures - Part2: Traffic load and bridges
BS EN 13374	:2013	Temporary edge protection systems - Product specification, test methods.
BS 5975	:2019	Code of practise for temporary work procedures & the pæ design of false work.
BS 2482	:2009	Specification for timber scaffold boards.
TG3:19		Erection, use & dismantling of temporary rubbish chutes on scaffold.
TG4:19		Anchorage systems.
TG9:18		Guide to the design & construction of temporary roofs & buildings.
TG12:17		Tying down of scaffold boards.
TG13:16		Non-standard boarded platforms.
TG16:21		Anchoring to the ground.
TG20:21		Technical guidance on the use of BS EN 12811-1.
SG4:15		Preventing falls in scaffolding.
SG5:18		Overhead power sources.
SG25:20		Access & egress from scaffolds.
SG27:09		Temporary edge protection on open steelwork.
SG28:17		Safe system of work for scaffolding associated with timber frame building construction.
SG29:17		Internal edge protection on scaffold platforms.
SG32:17		Provision of extended & telescopic transoms & board brackets.
SG34:17		Guidance on protection of the public

Job Description: External Independent Access With Stair Access to Tib St

Safe Working Loads: Independent with 1no. Lift at: 2 kN/m²
All inside decks at: 0.75 kN/m²
Bolt on Stair Tower: 1.5 kN/m²

Item: Independent

Max Bay Length: 2.50m
Max Bay Width: 1.00m (3 decks)
Max Transom Centres: N/A
Max Standard Load: Refer to DWG's

Item: Loading Bay

Max Bay Length: N/A
Max Bay Width: N/A
Max Transom Centres: N/A
Max Standard Load: N/A

Item: Birdcage

Max Bay Length: N/A
Max Bay Width: N/A
Max Transom Centres: N/A
Max Standard Load: N/A

Item: Buttress

Max Bay Length: N/A
Max Bay Width: N/A
Max Transom Centres: N/A
Max Standard Load: N/A

Item: Ties (Tension)

Max Tie Load: 4.28kN
Preliminary Test: 8.56kN
Proof Test: 5.35kN

Item: Ties (Shear)

Max Tie Load: 7.28kN
Preliminary Test: 14.56kN
Proof Test: 9.10kN

Additional Comments (if required)

- System scaffold to be built in accordance with manufacturers guidelines & recommendations

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	0.70m							
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam						kN/m		0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied									
								Total Number of Lifts:	11
								Number of Boarded Lifts:	11

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	7.24kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.66kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	7.89kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
7.89kN	2.0m	26.10kN	

Ground Bearing Pressure (GBP)

		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	0.40m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.20m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.50
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.10m
Façade Bracing								0	3.15m
Plan Bracing								0	2.35m
Fittings								2	N/A
Live Loads Applied								3	
								3	
								3	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.45kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	1.70kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.38kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	2.07kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
2.07kN	2.0m	#N/A	

Ground Bearing Pressure (GBP)

		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

CENTRE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								2	1.13
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied								Total Number of Lifts:	17
								Number of Boarded Lifts:	16

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.23kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	9.01kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.34kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	12.35kN

No. Support Stds/Puncheons	1	
Axial Load	Buckling Length	Allowable
21.95kN	2.0m	26.10kN

Ground Bearing Pressure (GBP)

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.750	0.450	0.3375

Imposed Load:	21.95 kN
GBP:	65.03 kN/m ²

Total Standard Load

Load	+	Load	+	Load	
7.89kN	+	1.70kN	+	12.35kN	= 21.95kN

OUTSIDE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								2	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								1	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied									
								Total Number of Lifts:	17
								Number of Boarded Lifts:	16

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	14.80kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.94kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	15.74kN

No. Support Stds/Puncheons	1	
Axial Load	Buckling Length	Allowable
15.74kN	2.0m	26.10kN

Ground Bearing Pressure (GBP)

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.750	0.450	0.3375

Imposed Load:	15.74 kN
GBP:	46.63 kN/m ²

Additional Comments If Required

Consider Stair Load

Item	Length (m)	Weight (kg)	*	no.	Total Weight(kg)
Staircase	2.50m	27.20kg	*	15	204.00kg
Hop-up Bracket	0.70m	4.91kg	*	8	19.64kg
				Total	223.64kg

<u>Total Dead Load</u>				
223.64kg	*	0.00981	=	2.19kN

<u>Total Leg Load</u>				
2.19kN	+	15.74kN	=	17.93kN

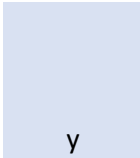
No. Support Stds/Puncheons 1

Axial Load	Effective Length (L _E)	Safe Axial Load (P _c)
17.93kN	2.0 m	26.10kN

Result

PASSES

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other		0.750	0.450	0.3375

Imposed Load:	17.93 kN
GBP:	53.14 kN/m²

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	0.70m							
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam						kN/m		0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied								10	
								10	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	6.58kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.66kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	7.23kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
7.23kN	2.0m	26.10kN	

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	0.40m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.20m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.50
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.10m
Façade Bracing								0	3.15m
Plan Bracing								0	2.35m
Fittings								2	N/A
Live Loads Applied								3	
								3	
								3	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.45kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	1.70kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.38kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	2.07kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
2.07kN	2.0m	#N/A	

Ground Bearing Pressure (GBP)

		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

CENTRE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								2	1.13
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied								Total Number of Lifts:	16
								Number of Boarded Lifts:	15

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.23kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	8.49kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.34kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	11.84kN

No. Support Stds/Puncheons	1	
Axial Load	Buckling Length	Allowable
20.77kN	2.0m	26.10kN

Ground Bearing Pressure (GBP)

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.750	0.450	0.3375

Imposed Load: 20.77 kN
GBP: 61.55 kN/m²

Total Standard Load

Load	+	Load	+	Load	
7.23kN	+	1.70kN	+	11.84kN	= 20.77kN

OUTSIDE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								2	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								1	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied									
								Total Number of Lifts:	16
								Number of Boarded Lifts:	15

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	13.91kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.94kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	14.85kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
14.85kN	2.0m	26.10kN	

Ground Bearing Pressure (GBP)

		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other	y	0.750	0.450	0.3375

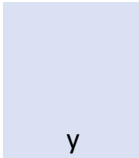
Imposed Load:	14.85 kN
GBP:	44.00 kN/m ²

Additional Comments If Required

Consider Imposed Load From Protection Fan

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m²)	+	Decks DL (kN/m²)	)	+	Tube Dead Load(kN)	
1.5	*	2.5	*	(	0.75	+	0.25	)	+	0.45	
										=	4.20kN
Load	*	No. Lifts	=	Result							
4.20kN	*	1	=	4.20kN							
Load	+	Load	=	Result							
14.85kN	+	4.20kN	=	19.05kN							
No. Support Stds/Puncheons			1								
Axial Load	Buckling Length			Allowable	Length of Thread				Allowable	Result	
19.05kN	2.0m			26.10kN	0.4m				32.50kN	PASSES	
No. Support Stds/Puncheons			1								
Axial Load	Buckling Length			Allowable							
19.05kN	2.0m			26.10kN							

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other		0.750	0.450	0.3375
Imposed Load:	19.05 kN			
GBP:	56.45 kN/m ²			

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	0.70m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam								0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied						Total Number of Lifts:		10	
						Number of Boarded Lifts:		10	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	6.58kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.66kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	7.23kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
7.23kN	2.0m	26.10kN	

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Treda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	0.40m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.20m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.50
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.10m
Façade Bracing								0	3.15m
Plan Bracing								0	2.35m
Fittings								2	N/A
Live Loads Applied								3	
								3	
								3	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.45kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	1.70kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.38kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	2.07kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
2.07kN	2.0m	#N/A	

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

CENTRE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								2	1.13
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied								Total Number of Lifts:	14
								Number of Boarded Lifts:	13.5

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.23kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	7.60kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.34kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	10.95kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
19.88kN	2.0m	26.10kN	

Ground Bearing Pressure (GBP)

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Treda Plate	0.210	0.210	0.0441
Other	0.750	0.450	0.3375

Imposed Load: 19.88 kN
 GBP: 58.91 kN/m²

Total Standard Load

Load	+	Load	+	Load	
7.23kN	+	1.70kN	+	10.95kN	= 19.88kN

OUTSIDE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								2	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								1	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied								Total Number of Lifts:	14
								Number of Boarded Lifts:	13.5

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	12.28kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.94kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	13.22kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
13.22kN	2.0m	26.10kN	

Ground Bearing Pressure (GBP)

Sole Pad Arrangements			
	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.750	0.450	0.3375

Imposed Load:	13.22 kN
GBP:	39.17 kN/m ²

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	0.70m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam								0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied						Total Number of Lifts:		10	
						Number of Boarded Lifts:		10	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	6.58kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.66kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	7.23kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
7.23kN	2.0m	26.10kN	

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	0.40m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.20m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.50
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.10m
Façade Bracing								0	3.15m
Plan Bracing								0	2.35m
Fittings								2	N/A
Live Loads Applied								3	
								3	
								3	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.45kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	1.70kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.38kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	2.07kN

No. Support Stds/Puncheons	1		
Axial Load	Buckling Length	Allowable	
2.07kN	2.0m	#N/A	

Ground Bearing Pressure (GBP)

		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

CENTRE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								2	1.13
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied								Total Number of Lifts:	13
								Number of Boarded Lifts:	13

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.23kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	7.23kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.34kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	10.58kN

No. Support Stds/Puncheons	1	
Axial Load	Buckling Length	Allowable
19.51kN	2.0m	26.10kN

Ground Bearing Pressure (GBP)

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.750	0.450	0.3375

Imposed Load: N/A

GBP: N/A

Total Standard Load

Load	+	Load	+	Load	
7.23kN	+	1.70kN	+	10.58kN	= 19.51kN

OUTSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								2	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								1	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied								Total Number of Lifts:	13
								Number of Boarded Lifts:	14.5

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	11.97kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.94kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	12.91kN

No. Support Stds/Puncheons	1	
Axial Load	Buckling Length	Allowable
12.91kN	2.0m	26.10kN

Ground Bearing Pressure (GBP)

		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other	y	0.750	0.450	0.3375

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

Consider Load Through Spur/Pull back (Inside)

Load	/	Sin (°degrees)	=	30.04kN	>	10.60kN	FAILS
19.51kN	/	40.5					

Load	/	No. Pull backs	=	7.51kN	<	10.60kN	PASSES
30.04kN	/	4					

TABLE 1 – Capacity of Vertical Diagonal Brace

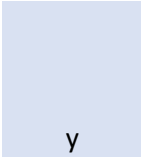
Bay Length (m)	α (°)	Loading by Tension			Loading by Compression		
		All. Nv (kN)	All. Q (kN)	All. V (kN)	All. Nv (kN)	All. Q (kN)	All. V (kN)
Bay Height H = 2.0m							
3.0	35.1	+16.30	13.3	9.4	-5.12	4.2	2.9
2.5	40.5		12.4	10.6	-6.17	4.7	4.0
2.0	47.3		11.1	12.0	-7.62	5.2	5.6
1.5	56.1		9.1	13.5	-9.59	5.4	8.0
1.0	67.1		6.3	15.0	-12.32	4.8	11.4
0.7	74.8		4.3	15.8	-13.81	3.6	13.3

Loads Imposed on to Ground

Support	Reaction		Additional Leg/Loads		Additional Leg/Loads		Total Load
1	19.51kN	+	19.88kN	+		=	39.39kN

No. Support Stds/Puncheons	2	
Axial Load	Buckling Length	Allowable
39.39kN	2.0m	52.20kN

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Treda Plate		0.210	0.210	0.0441
Other		0.675	0.900	0.6075

Imposed Load:	39.39 kN
GBP:	64.84 kN/m ²

Additional Comments If Required

Consider Load Through Spur/Pull back (Outside)

Load	/	Sin (°degrees)	=	19.87kN	>	10.60kN	FAILS
12.91kN	/	40.5					

Load	/	No. Pull backs	=	4.97kN	<	10.60kN	PASSES
19.87kN	/	4					

TABLE 1 – Capacity of Vertical Diagonal Brace							
Bay Length (m)	α (°)	Loading by Tension			Loading by Compression		
		All. Nv (kN)	All. Q (kN)	All. V (kN)	All. Nv (kN)	All. Q (kN)	All. V (kN)
Bay Height H = 2.0m							
3.0	35.1	+16.30	13.3	9.4	-5.12	4.2	2.9
2.5	40.5		12.4	10.6	-6.17	4.7	4.0
2.0	47.3		11.1	12.0	-7.62	5.2	5.6
1.5	56.1		9.1	13.5	-9.59	5.4	8.0
1.0	67.1		6.3	15.0	-12.32	4.8	11.4
0.7	74.8		4.3	15.8	-13.81	3.6	13.3

Loads Imposed on to Ground

Support	Reaction		Additional Leg/Loads		Additional Leg/Loads	=	Total Load
1	12.91kN	+	13.22kN	+			26.13kN

No. Support Stds/Puncheons	2	
Axial Load	Buckling Length	Allowable
26.13kN	2.0m	52.20kN

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other		0.675	0.900	0.6075

Imposed Load:	26.13 kN
GBP:	43.01 kN/m ²

Additional Comments If Required

Consider Wind Loads On Scaffold

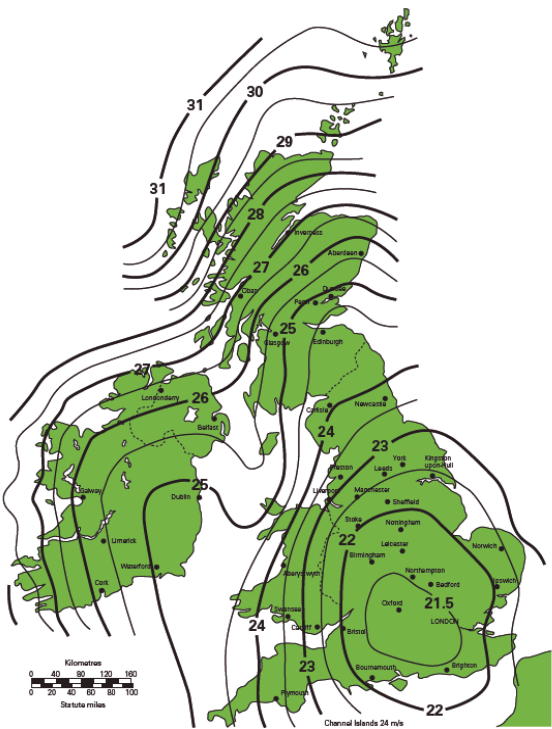


Figure E.1 – Wind speed, V_{map} (m/s)

Table E1: Combined exposure factor, C_c

Height $Z - h_{eff}$ (m)	Site in country or adjacent to sea				Site in town, more than 2 km from the edge of the town		
	Closest distance to the shoreline (km)				Distance to shoreline (km)		
	≤ 0.1	2	10	≥ 100	≥ 2	10	≥ 100
≤ 2	1.90	1.60	1.50	1.40	1.07	1.01	0.94
3	2.15	1.84	1.73	1.62	1.32	1.25	1.17
4	2.31	2.03	1.90	1.78	1.54	1.44	1.35
5	2.43	2.18	2.05	1.90	1.72	1.62	1.50
10	2.82	2.65	2.50	2.32	2.33	2.20	2.04
15	3.07	3.02	2.85	2.67	2.81	2.65	2.48
20	3.20	3.05	2.98	2.78	2.90	2.83	2.64
30	3.42	3.43	3.27	3.04	3.40	3.24	3.01
50	3.68	3.68	3.62	3.39	3.68	3.62	3.39
100	3.98	3.98	3.98	3.80	3.98	3.98	3.80

Notes: (1) Interpolation may be used in this table
(2) Based on Figure NA.7 and Figure NA.8 in the NA to BS EN 1991-1-4

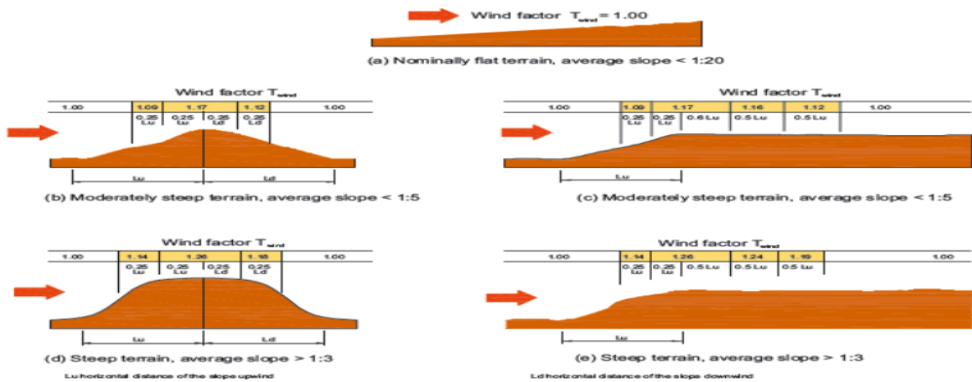


Figure E.2 – Topography factor, T_{wind}



Figure E.3 – Displacement height

Table NA.1 Directional factor c_{dir}

Direction	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
c_{dir}	0,78	0,73	0,73	0,74	0,73	0,80	0,85	0,93	1,00	0,99	0,91	0,82

NOTE 1 Interpolation may be used within Table NA.1.

NOTE 2 The directions are defined by angles from due North in a clockwise direction.

NOTE 3 Where the wind loading on a building is assessed only for orthogonal load cases, the maximum value of the factor for the directions that lie $\pm 45^\circ$ either side of the normal to the face of the building is to be used

NOTE 4 Conservatively, c_{dir} may be taken as 1,0 for all directions.

Consider Wind Loads On Scaffold**TG20:21 - 5.15. 1.3 Scaffolds Clad With Sheeting****Windward**

$$F_c = q_p * C_{fT} * H_c * L_c * K_s \text{ kN}$$

q_p	*	C_{fT}	*	H_c	*	L_c	*	K_s	Result
0.61kN/m ²	*	1.3	*	4.0m	*	4.0m	*	1.35	=
									17.13kN
Max Tie Load (windward):		17.13kN				<	18.20kN		PASSES

Coupler Capacities

Coupler Type Used - Class A: 6.1kN

Coupler Type Used - Class B: **Y** 9.1kN

Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **2**No. of Supplementary Connections: **0**Strength of Connection: **18.20kN****Leeward**

$$F_{tc} = q_p * C_s * C_{fT} * H_c * L_c * K_s \text{ kN}$$

q_p	*	C_s	*	C_{fT}	*	H_c	*	L_c	*
0.61kN/m ²	*	0.25	*	1.3	*	4.0m	*	4.0m	*
K_s	=	Result							
1.35	=	4.28kN							

Max Tie Load (leeward):	4.28kN	<	9.10kN	PASSES
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Preliminary Load Test: 8.56kN

Proof Test Load: 5.35kN

Coupler Capacities

Coupler Type Used - Class A: 6.1kN

Coupler Type Used - Class B: **Y** 9.1kN

Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **1**No. of Supplementary Connections: **0**Strength of Connection: **9.10kN****Consider Load Through Bracing**

Load	/	Sin (°degrees)					
4.28kN	/	32	=	8.08kN	<	9.10kN	PASSES

12mm ADI SCE Restraint Eye & 100mm Nylon Insert**Technical Data Sheet****Temporary Works Loads**

Product Designation	: SCE restraint eye
Type	: Eye type screw with 12mm diameter shaft & 23 or 50mm id
Material	: Carbon Steel Bar
Finish	: Bright Zinc Plated (Thickness 5~7 Microns)

SAFETY FACTORS:

Temporary works requires a safety factor of 2

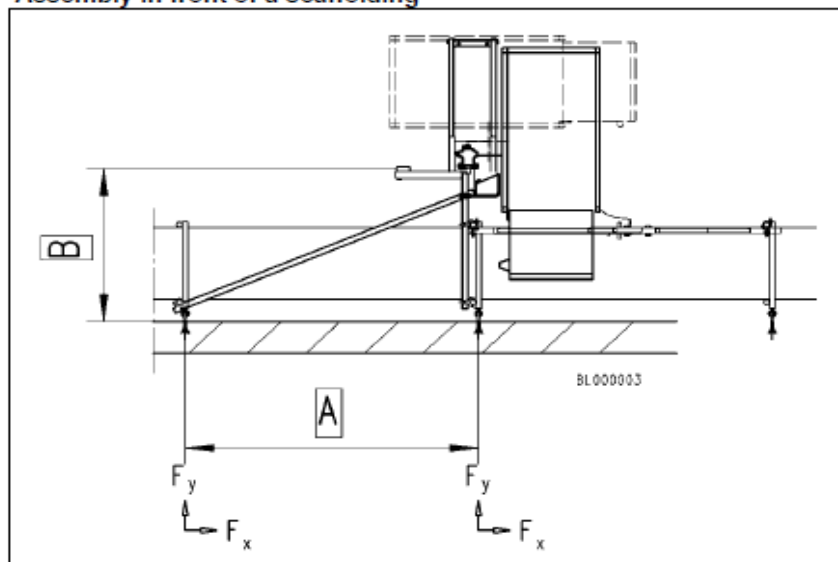
**Technical Data Sheet**

Product Designation	: NP14 xxx
Type	: Nylon Plug (Rimmed or Rimless)
Material	: PA6 Polyamide (Nylon)
Finish	: Grey (RAL 7035)
Load Class	: Light duty fixing

NP14 is a nylon fixing, normally used in conjunction with the SCE restraint eye or a 12mm diameter screw in a variety of base materials. The short (75mm) version comes with or without rim as required. There are longer lengths available, 100/ 135 & 160mm long designed for render faced or insulated surfaces.

Substrate	Mean Ultimate TENSILE Action kN	
	75mm plug	100mm plug
Concrete C10/15	12	18
Concrete C20/25	15	24
Solid Brick	12	18
Granite	15	24
Hollow Brick	9	15

Assembly in front of a scaffolding



A = approx. 2.5 m, B = approx. 1.38 m (with a scaffold field depth of approx. 0.7 m)

$$A \geq B \times 1.7$$

		Anchoring forces [kN] with maximum mast projection				Anchoring forces [kN] without projecting mast			
		Top anchor point		Other anchor points		Top anchor point		Other anchor points	
	Assembly height	F_x	F_y	F_x	F_y	F_x	F_y	F_x	F_y
Wind region A/B	$0 < H \leq 10$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
	$10 < H \leq 20$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
	$20 < H \leq 50$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
	$50 < H \leq 100$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
Wind region C	$0 < H \leq 10$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
	$10 < H \leq 20$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
	$20 < H \leq 50$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.9	± 1.9
	$50 < H \leq 100$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 2.4	± 2.0
Wind region D	$0 < H \leq 10$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
	$10 < H \leq 20$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
	$20 < H \leq 50$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.3	± 2.1	± 2.3	± 2.0
	$50 < H \leq 100$ m	± 3.9	± 3.4	± 2.9	± 2.5	± 2.9	± 2.5	± 2.9	± 2.5
Wind region E	$0 < H \leq 10$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 1.8	± 1.9
	$10 < H \leq 20$ m	± 3.2	± 3.0	± 2.2	± 2.1	± 2.2	± 2.1	± 2.0	± 1.9
	$20 < H \leq 50$ m	± 3.6	± 3.1	± 2.6	± 2.3	± 2.6	± 2.3	± 2.6	± 2.3
	$50 < H \leq 100$ m	± 4.5	± 3.9	± 3.3	± 2.9	± 3.3	± 2.9	± 3.3	± 2.9

Fx Worst Case Laterally

Coupler Capacities

Coupler Type Used - Class A: 6.1kN
Coupler Type Used - Class B: **Y** 9.1kN
Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **1**
No. of Supplementary Connections: **1**
Strength of Connection: **15.20kN**

Load	*	FOS	=	Total Load		Capacity	Result
3.20kN	*	1.5	=	4.80kN	>	15.20kN	PASSES

Consider Load Through Spur/Pull back

Load	/	Sin (°degrees)					
4.80kN	/	53	=	6.01kN	<	15.20kN	PASSES

Consider Axial Load Capacities

Axial Load	Effective Length (Le)	Safe Axial Load (Pc)	Slenderness Ratio (λ)	Slenderness Max (λ)	Result
6.01kN	3.0 m	15.20kN	190.6	271	PASSES

FY Worst Case Laterally

Coupler Capacities

Coupler Type Used - Class A: 6.1kN
Coupler Type Used - Class B: **Y** 9.1kN
Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **2**
No. of Supplementary Connections: **1**
Strength of Connection: **24.30kN**

Load	*	FOS	=	Total Load		Capacity	Result
3.00kN	*	1.5	=	4.50kN	<	24.30kN	PASSES

Worst Case Tie Load @ Hoist Location

Fy		Wind Load (Windward)		
3.00kN	+	17.13kN	=	20.13kN

Fy		Wind Load (Leeward)		
3.00kN	+	4.28kN	=	7.28kN

Max Tie Load (windward):	20.13kN	<	24.30kN	PASSES
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Max Tie Load (leeward):	7.28kN	<	24.30kN	PASSES
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Preliminary Load Test: 14.56kN

Proof Test Load: 9.10kN

TABLE 2 – Capacity of Standards					
Buckling Length (m)	1.0	1.5	2.0	2.5	3.0
Allowable Compression Load (kN)	60.0	39.5	26.1	18.0	13.1
Allowable Tension Load (kN)	54.0*				

Standard Capacity: 26.1kN > **20.77kN** therefore **Passes**

TABLE 3 – Capacity of Base Jacks / Swivel Base Jacks / U-Heads						
Length of Thread Visible (m)	0.1	0.2	0.3	0.4	0.5	0.6
Allowable Compression Load* (kN)	60.0	50.0	40.0	32.5	22.5	15.0

Screw Jack Capacity: 32.5kN > **20.77kN** therefore **Passes**

TABLE 7 – Capacity of Decks					
Type	Steel, 0.30m Wide	Steel, 0.20m Wide	Aluminium, 0.30m Wide	Aluminium, 0.60m Wide	Aluminium / Timber, 0.60m Wide
Length (m)	kN/m ²	kN/m ²	kN/m ²	kN/m ²	kN/m ²
3.0	6.0	6.0	3.0	2.0	2.0
2.5	6.0	6.0	3.0	4.5	4.5
2.0	6.0	6.0	3.0	-	4.5
1.5	6.0	6.0	-	-	4.5
1.3	6.0	6.0	-	-	-
1.0	6.0	6.0	-	-	-
0.7	6.0	6.0	-	-	-

Deck Capacity: 6kN/m² > **2kN/m²** therefore **Passes**

TABLE 4 – Capacity of Single Transoms and Ledgers; Tubular Support					
Transom Length (m)	allow. q (kN/m)	Deck Length (m)	allow. p ⁺ central transom (kN/m ²)	allow. p ⁺ perimeter transom (kN/m ²)	allow. P (kN)
0.7	24.4	3.0	7.9	16.0	7.4
		2.5	9.5	19.3	
		2.0	12.0	24.2	
		1.5	16.0	32.3	
1.0	13.5	3.0	4.3	8.8	6.1
		2.5	5.2	10.6	
		2.0	6.5	13.3	
		1.5	8.8	17.8	

UDL (Independent)

$$2.5\text{m} * (2\text{kN/m}^2 + 0.5\text{kN/m}^2) + 0.45\text{kN/m} = \mathbf{6.7\text{kN/m}}$$

Transom Capacity: 13.5kN/m > **6.7kN/m** therefore **Passes**

TABLE 9 – Capacity of Console Hop-Up Brackets			
Type	Uniformly Distributed Load	Point Load to Outer Wedge Head	Centre Point Load
	kN	kN	kN
0.22m Coupler	7.2	3.6	7.2
0.4m Lite	7.7	3.4	3.4
0.4m Reinforced	11.2	5.5	10.6
0.7m Reinforced	8.1	3.6	8.3
1.0m Reinforced	8.3	8.3	6.6

UDL (Independent)

$$2.5\text{m} * (0.75\text{kN/m}^2 + 0.5\text{kN/m}^2) + 0.45\text{kN/m} = \mathbf{2.95\text{kN/m}}$$

Transom Capacity: 8.1kN/m > **2.95kN/m** therefore **Passes**

Project:	Ryland Building, Manchester
Drawing Number:	BDS - 10312 - 01 to 05
Item:	External Independent Access With Stair Access to Tib St
Revision (if applicable):	C 31/07/2024
Category of Check (1, 2, or 3):	2

Description of Temporary Works:

External Independent Access With Stair Access to Tib St

I certify for and on behalf of BDS Ltd, that in my opinion, the erection proposals and proposed temporary works details, specified in the schedule attached hereto relating to the construction of the above contract, are satisfactory for the proper discharge of responsibilities for the safe temporary works design elements of the works, and for their safe execution and removal (if applicable) in accordance with the drawings and specification, and without detriment to the related permanent Works.

Schedule of Drawings and Other Documents:

10312 - 01	Plan A-A	Plan B-B
10312 - 02	Plan C-C	
10312 - 03	Elevation D-D	
10312 - 04	Section E-E	Section F-F
10312 - 05	Typical Hoist Plan	Typical Hoist Elevation

Supporting Calculations: Page 1 to 34

Check Certificate: Page 35 of Calculations Document

Drawn By: Adam McCann
Company: Buckley Design Solutions

Signature:



Drawing Status:
CONSTRUCTION

Calculations By: Jonny Hollingworth
Company: Buckley Design Solutions

Signature:



Checked By: Mike Brown
Company: Buckley Design Solutions

Signature:



Date:
31/07/2024