



RING SYSTEM ENGINEERING HANDBOOK

REV. 2



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ENGINEERING HANDBOOK
 DSSENGHBK
 REV. 2
 6/25/2008

INTRODUCTION

The load capacities listed for the DSS Ring System scaffold system are based on the results of Engineering calculations, FEM analysis and extensive testing in Europe and in the United States by independent testing authorities.

All laboratory testing was carried out in consultation with resident engineers in order to that the results were obtained in accordance with the test procedures outlined in European Standards EN 12810 and 12811 and American OSHA regulations.

About Bodycote, Lancaster

Bodycote Materials Engineering Lancaster Laboratory is one of Europe's foremost fatigue and fracture toughness testing laboratories. The laboratory has a prestigious Europe-wide clientele within the forging sector, which supply aerospace, nuclear and power generation industries. Dealing with complex component sectioning in titanium and advanced aerospace alloys is a routine activity and the laboratory is widely approved by the major aerospace OEMs.

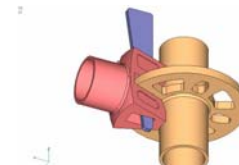
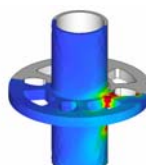
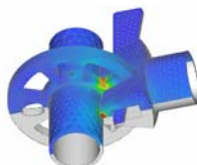
Bodycote Lancaster is a UKAS accredited testing laboratory

About UKAS

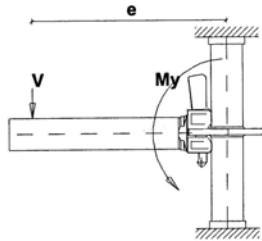
The United Kingdom Accreditation Service UKAS, is the sole accreditation body recognised by government to assess, against internationally recognised standards, organisations that provide certification, testing, inspection and calibration services.

Accreditation by UKAS demonstrates the competence, impartiality and sustainable performance of these evaluators.

Direct Scaffold Supply has implemented extensive quality control procedures at the factory to ensure that the results achieved and documented within this booklet remain reliable and consistant.

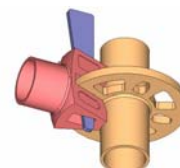
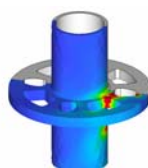
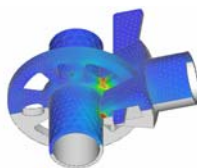


Maximum Bending Moment



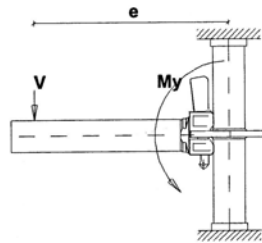
Max. My = 60 kNcm

See EN 12811 Pt 3 for Procedure



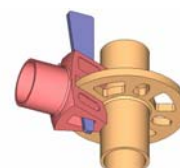
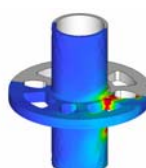
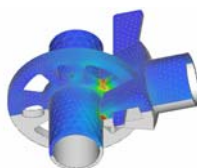
Ledger/Standard Connection

Maximum Bending Moment

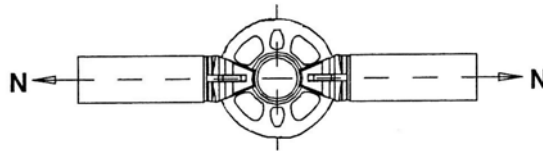


Max. My = 73 kNcm

See OSHA Testing Standards



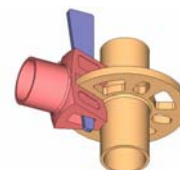
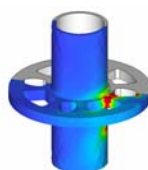
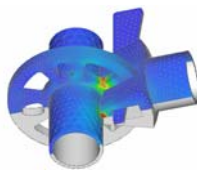
Maximum Normal Load



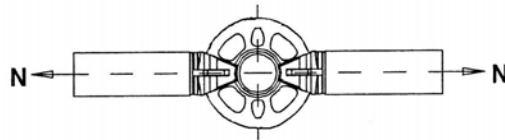
The normal load N is a tensile force or a compression force along the axis of a ledger/transom

Max. N = 19,4 kN

See EN 12811 Pt 3 for Procedure



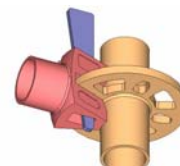
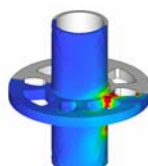
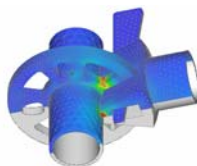
Maximum Normal Load



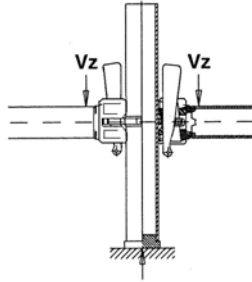
The normal load N is a tensile force or a compression force along the axis of a ledger/transom

Max. N = 22 kN

See OSHA ANSI Test Standard



Maximum Vertical Load



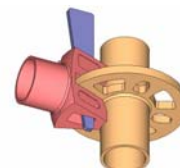
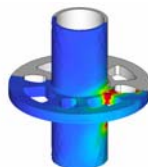
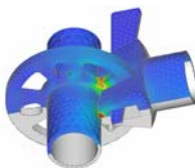
*The vertical load V_z is the supporting load for the transoms.
The maximum load for a single Ledger or transom was given to be*

$$\text{Max. } V_z = 19,5 \text{ kN}$$

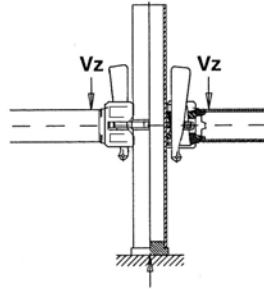
*The maximum allowable load on the complete
rosette was given as:*

$$\Sigma V_z = 54,90 \text{ kN}$$

See EN 12811 Pt 3 for Procedure



Maximum Vertical Load



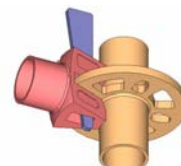
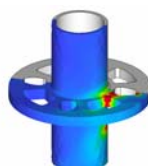
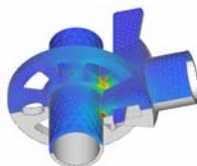
*The vertical load V_z is the supporting load for the transoms.
The maximum load for a single Ledger or transom was given to be*

$$\text{Max. } V_z = 21 \text{ kN}$$

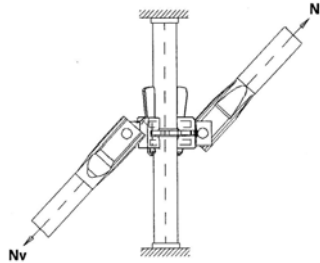
*The maximum allowable load on the complete
rosette was given as:*

$$\Sigma V_z = 64.00 \text{ kN}$$

See OSHA Test Standards



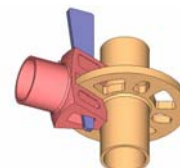
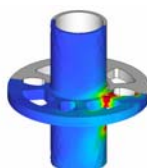
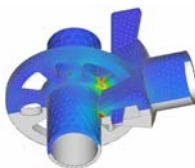
Maximum Load in Diagonals



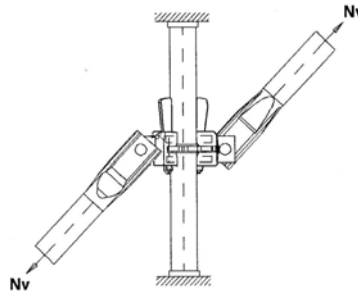
*The maximum tensile load in the diagonals N_v
Was found to be:-*

Max. N_v = 14,20 kN

See EN 12811 Pt 3 for Procedure



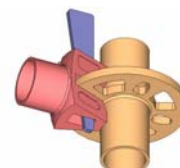
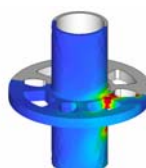
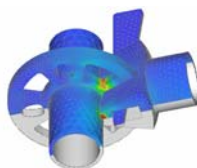
Maximum Load in Diagonals



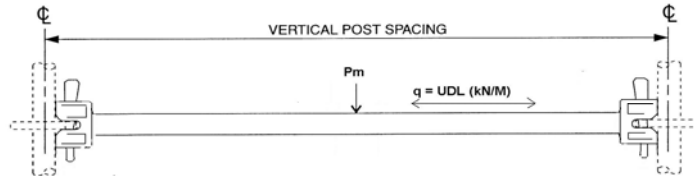
*The maximum tensile load in the diagonals N_v
Was found to be:-*

Max. N_v = 14,20 kN

See OSHA Test Standards



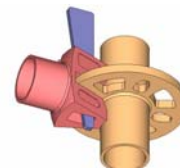
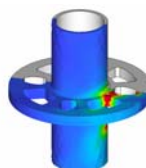
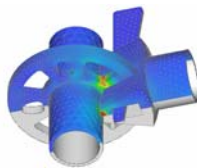
Load capacity of Ledgers



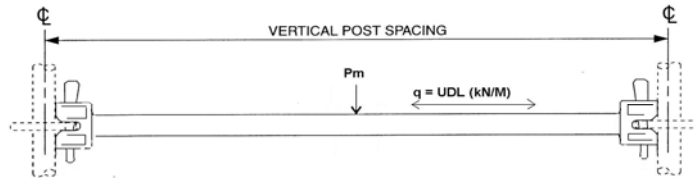
1 length	2 Perm q (kN/m)	3 Perm P _m kN	4 Deck Length	5 Perm. P (kN/m ²)	6 Scaffold class
0.75	24.20	9.10	3.00	7.80	5*
			2.50	9.40	6
			2.00	11.80	6
			1.50	15.80	6
1.00	14.90	7.40	3.00	4.70	5
			2.50	5.70	5
			2.00	7.20	5
			1.50	9.60	5
1.06	12.00	6.40	3.00	3.70	4
			2.50	4.50	5
			2.00	5.70	5
			1.50	7.70	5
1.50	6.10	4.50	3.00	1.70	2
			2.50	2.10	3
			2.00	2.70	3
			1.50	3.80	4
2.00	3.40	3.40	3.00	0.80	1**
			2.50	1.10	1**
			2.00	1.50	2
			1.50	2.00	3
2.50	2.20	2.70	2.00	0.80	1**
			1.50	1.20	1**
3.00	1.50	2.30	1.50	0.80	1**

*Table relates to GSD ringlock ledgers with GSD specified decks. Check capacity of decks of length 2.50 and over when not GSD specified.

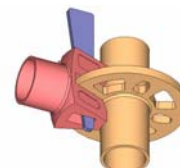
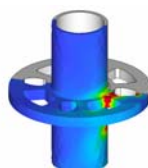
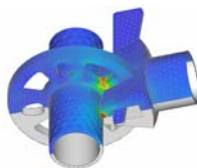
According to HD 1000, Section 5 Para 5.2.1, "No scaffold shall have a load bearing capacity lower than that specified for a class 2 scaffold."



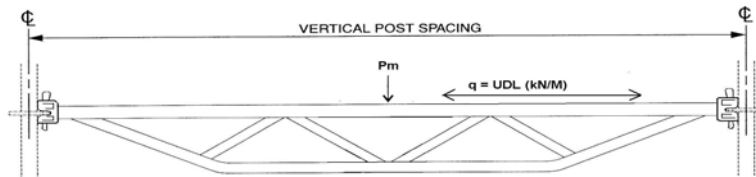
Load capacity of Ledgers



Part Number	LENGTH (In)	Point Load (Pm) PSI	Uniformly Distributed Load Lbs/Ft
RH20	24	1500	1400
RH22	26	1480	1380
RH24	28	1477	1320
RH211	35	1250	850
RH30	36	1220	800
RH33	39	1180	700
RH36	42	967	565
RH39	45	940	550
RH40	48	900	480
RH43	51	840	425
RH410	58	744	336
RH50	60	700	320
RH52	62	660	265
RH60	72	600	225
RH69	81	497	150
RH70	84	475	130
RH80	96	425	120
RH86	102	398	97
RH100	120	333	67
RH101	121	250	50



Load Capacity Double Ledgers

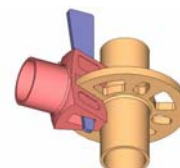
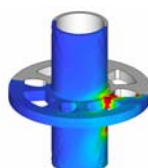
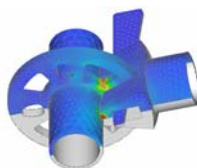


1 length	2 Perm q (kN/m)	3 Perm P_m (kN)	4 Perm P_3 (kN)	5 Deck Length	6 Perm. P (kN/m ²)	7 Scaffold class
1.50	19.90	11.20	11.20	3.00	6.30	5
				2.50	7.70	6*
				2.00	9.60	6
				1.50	13.00	6
2.00	14.50	17.00	7.40	3.00	4.50	5
				2.50	5.50	5
				2.00	7.00	6
				1.50	9.40	6
2.50	9.50	9.80	7.20	3.00	2.90	3
				2.50	3.50	4
				2.00	4.50	5
				1.50	9.40	6
3.00	4.90	6.90	5.40	3.00	1.30	1**
				2.50	1.70	1**
				2.00	2.20	3
				1.50	3.00	4

* Table relates to GSD Ringlock with GSD specified steel decks.
Check the capacity of steel decks over 2.50 m when other than GSD specified.

** According to HD 1000, Section 5 Para 5.2.1
“no scaffold shall have a load bearing capacity lower than that specified for a class 2 scaffold.”

P_3 is the maximum load at two points spaced at equal distances along the length of the horizontal



Capacity of Steel decks

Heavy Duty Steel Decks

Part Nr.	Length cm	Weight kg	Capacity per m ²	20 x 20 cm Capacity	Scaffold Class
HSB 075	75	8.00	600 kg	100 kg	6
HSB 100	100	10.00	600 kg	100 kg	6
HSB 150	150	13.20	600 kg	100 kg	6
HSB 200	200	16.80	600 kg	100 kg	6
HSB 250	250	20.00	600 kg	100 kg	6
HSB 300	300	23.30	450 kg	100 kg	5

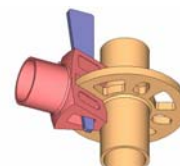
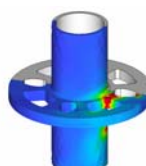
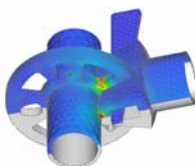
Lightweight Steel Decks

Part Nr.	Length cm	Weight kg	Capacity per m ²	20 x 20 cm Capacity	Scaffold Class
LSB 075	75	6.60	600 kg	100 kg	6
LSB 100	100	8.10	600 kg	100 kg	6
LSB 150	150	10.80	600 kg	100 kg	6
LSB 200	200	13.80	600 kg	100 kg	6
LSB 250	250	16.40	450 kg	100 kg	5
LSB 300	300	19.00	300 kg	100 kg	4

Summary of Scaffold Classifications in Accordance with HD 1000 (see also BS 1139 :Part 5/DIN 4420 : Part 4)

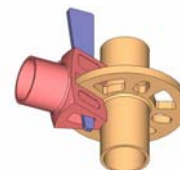
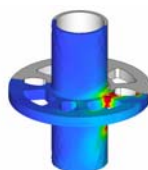
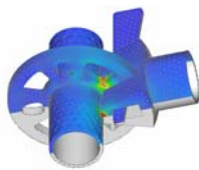
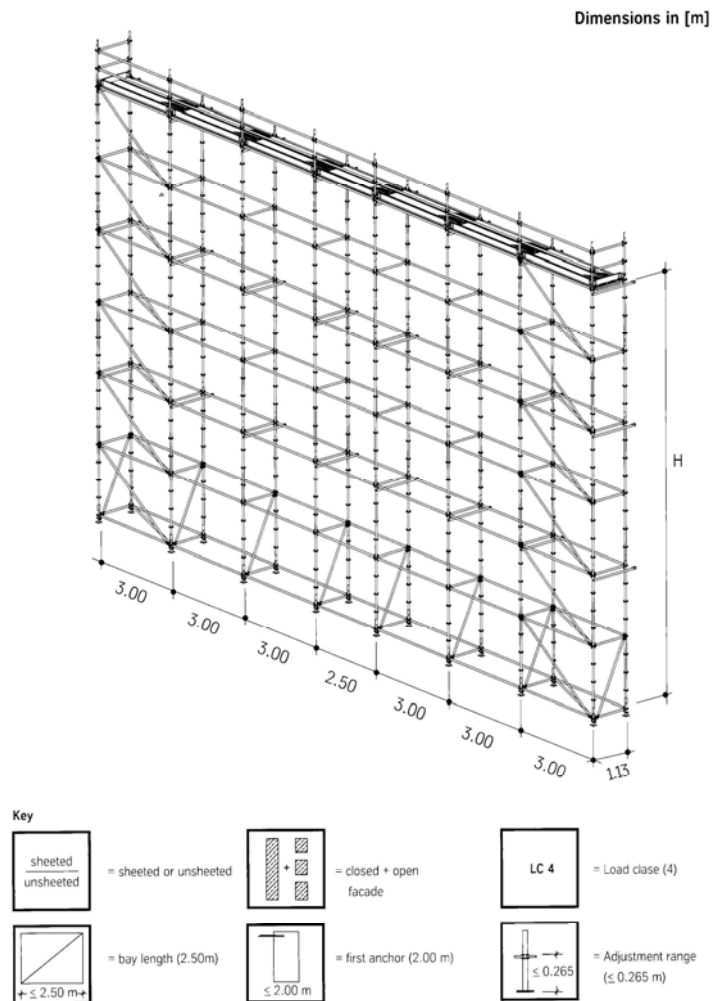
Scaffold Class2	UDL	Concentrated Load on 50 x 50 cm area	Concentrated Load on 20 x 20 cm area
2	150 kg/m ²	150 kg	100 kg
3	200 kg/m ²	150 kg	100 kg
4	300 kg/m ²	300 kg	100 kg
5	450 kg/m ²	300 kg	100 kg
6	600 kg/m ²	300 kg	100 kg

No platform shall have a capacity lower than that specified for class 2

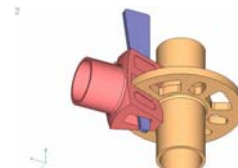
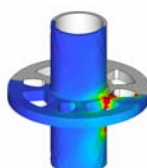
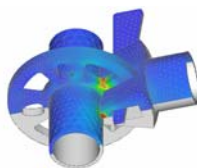
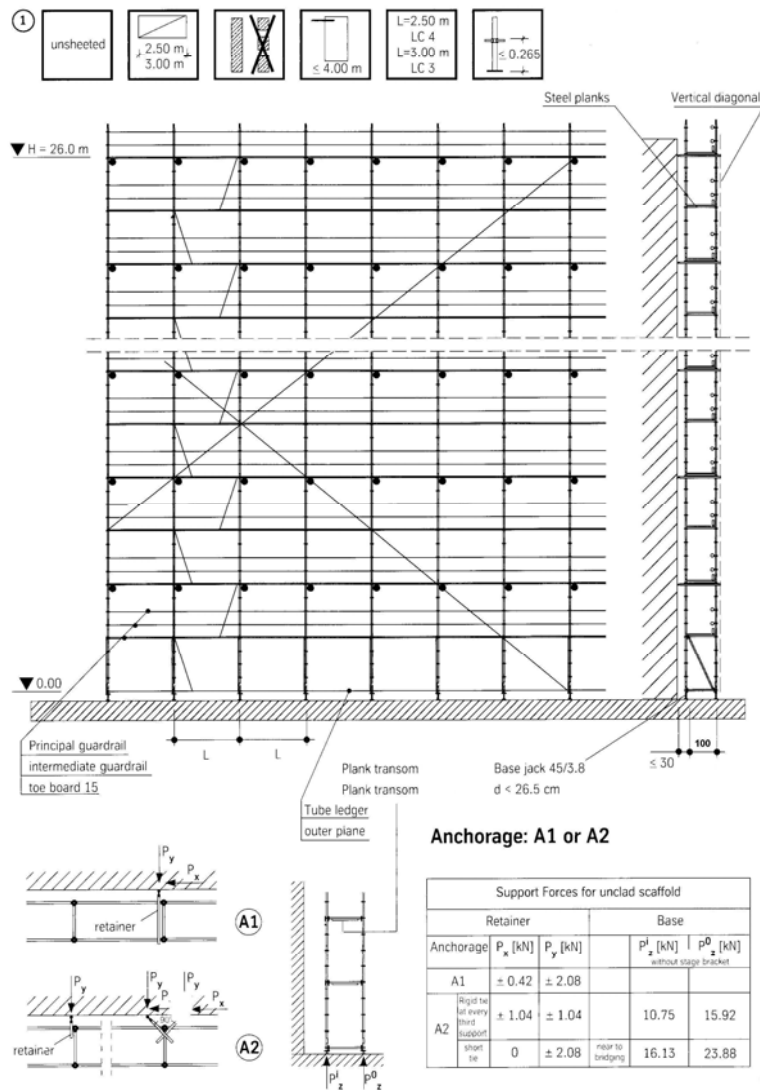


Scaffold Bracing patterns

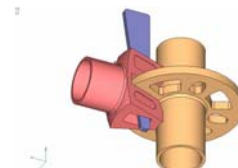
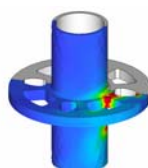
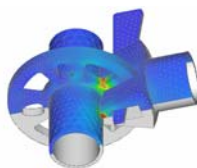
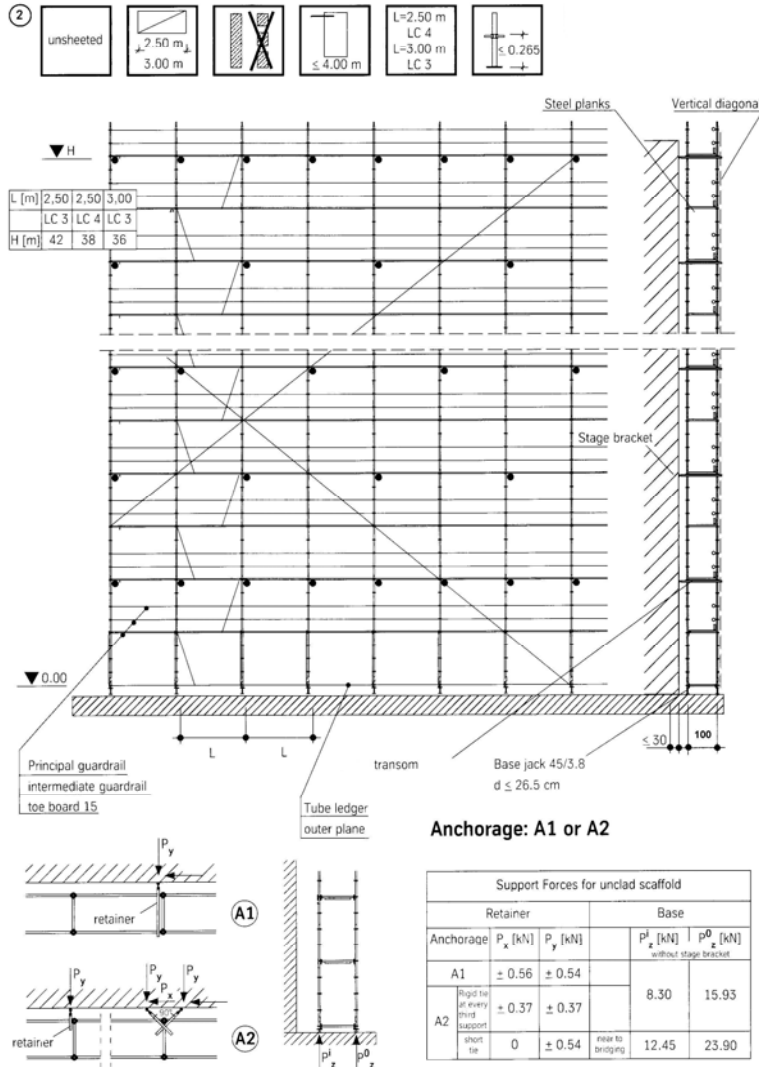
1. General Arrangement and Legend



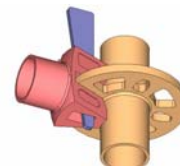
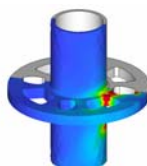
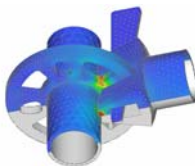
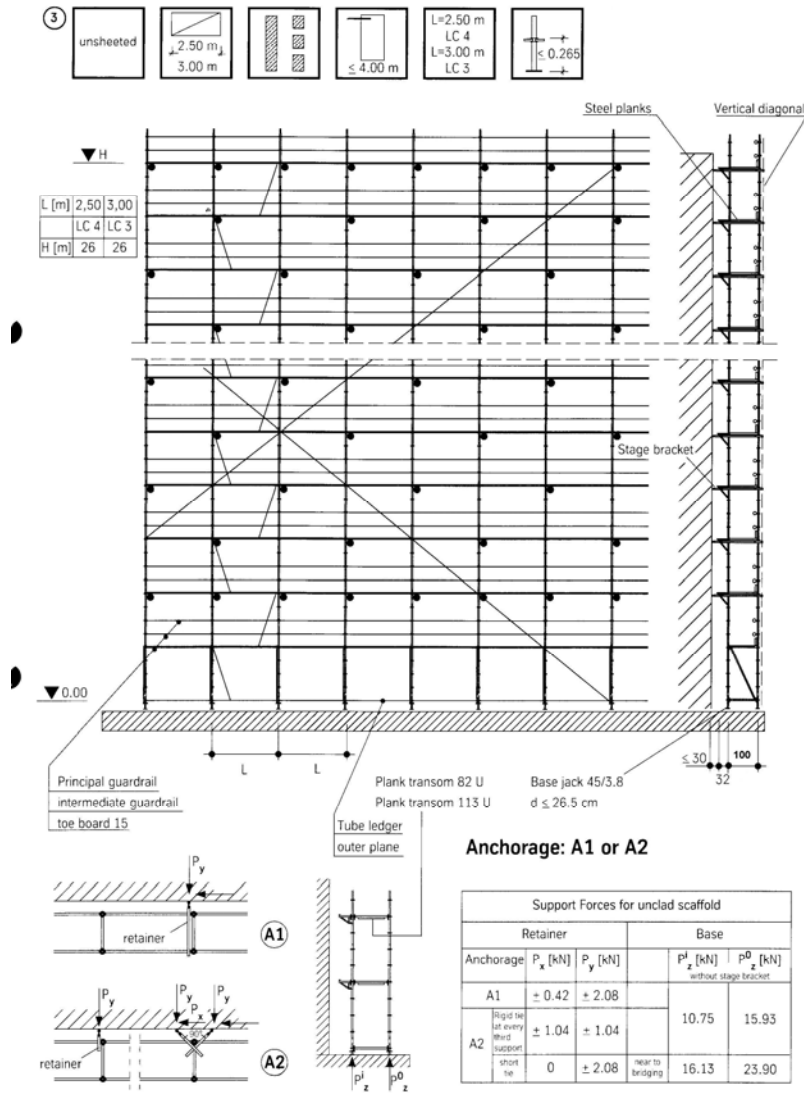
Example 1 – Unsheeted, 2,50 or 3,00 bay length, closed facade, Scaffold Rating 4 (3 for 3,00m bay length), first anchor at 4,00 m, spindle length 26 cm.



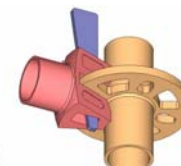
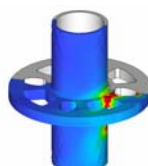
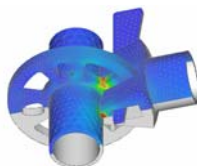
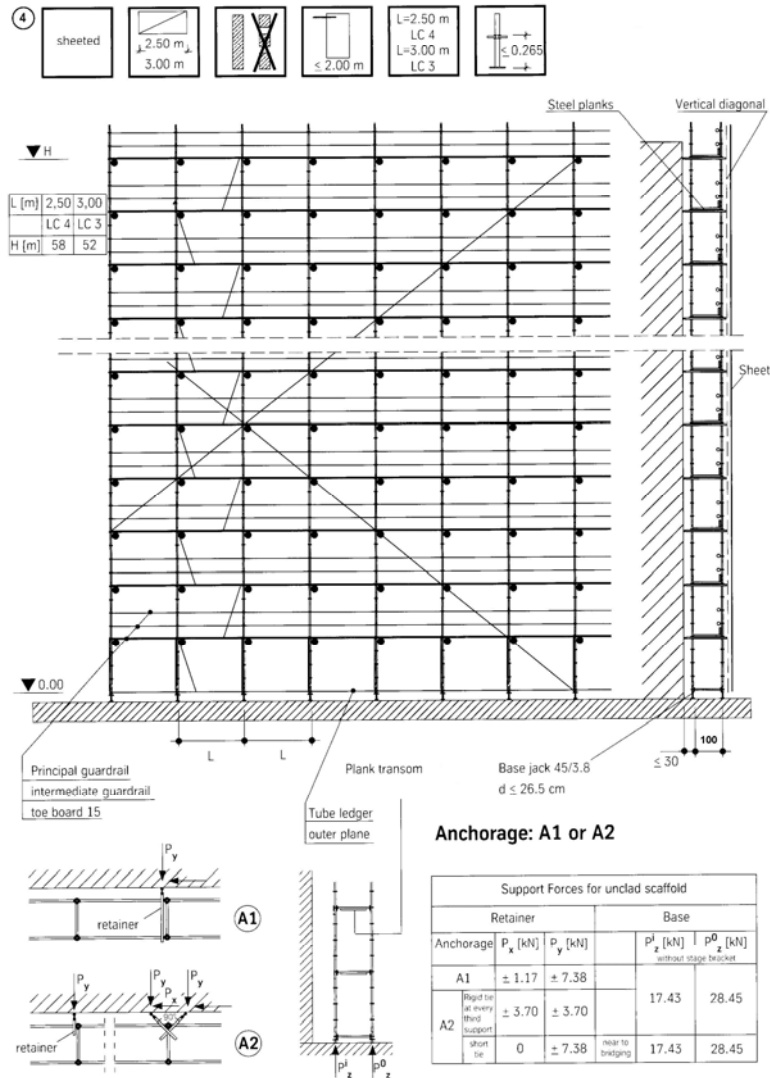
Example 2 – Unsheeted, 2,50 or 3,00 bay length, closed facade, Scaffold Rating 4 (3 for 3,00m bay length), first anchor at 4,00 m, spindle length 26 cm *with side bracket*.



Example 3 – Unsheeted, 2,50 or 3,00 bay length, open or closed facade, Scaffold Rating 4 (3 for 3,00m bay length), first anchor at 4,00 m, spindle length 26 cm.



Example 4 – Sheeted, 2,50 or 3,00 bay length, closed facade, Scaffold Rating 4 (3 for 3,00m bay length), first anchor at 4,00 m, spindle length 26 cm.



Technical drawing of a stage scaffolding system, showing plan, elevation, and detail views.

Plan View Dimensions:

- Horizontal dimensions: $L = 2.50\text{ m}$, $LC\ 4$, $L = 3.00\text{ m}$, $LC\ 3$
- Vertical dimension: $H = 42$

Elevation View Labels:

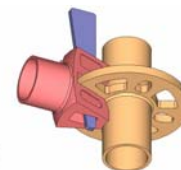
- Steel planks
- Vertical diagonal
- Stage bracket
- Plank transom
- Base jack 45/3.8 $d \leq 26.5\text{ cm}$
- Tube ledger outer plane

Detail View Labels:

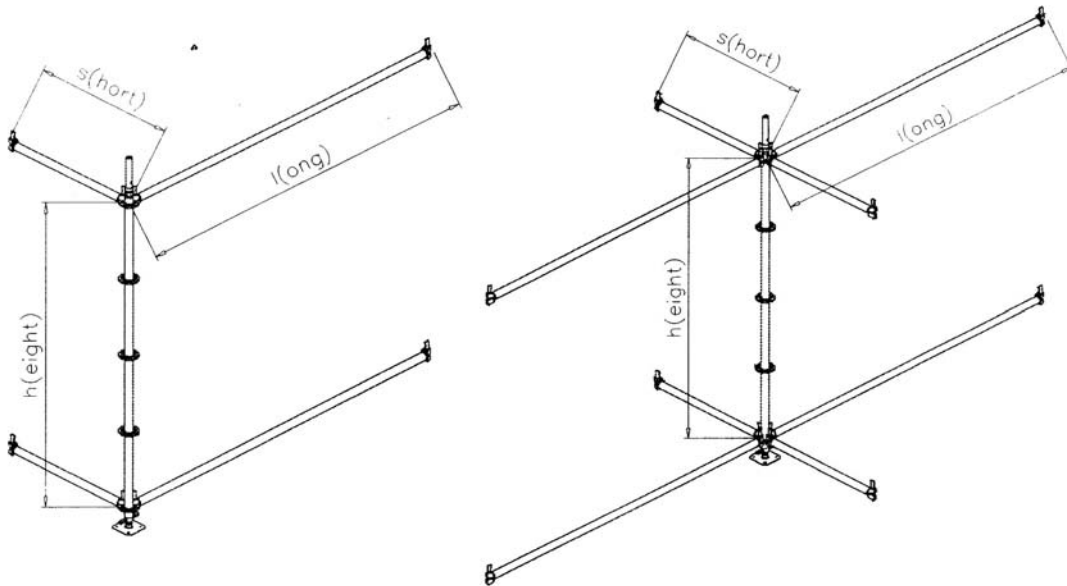
- Principal guardrail
- intermediate guardrail
- toe board 15
- retainer

Support Forces for unclad scaffolding

Support Forces for unclad scaffolding					
Retainer			Base		
Anchorage	P_x [kN]	P_y [kN]	P_z^1 [kN]	P_z^0 [kN]	
A1	± 1.17	± 7.38	26.90	23.42	
A2	± 3.70	± 3.70			
Rigid tie at every third support short tie	0	± 7.38	near to bridging	26.90	23.42



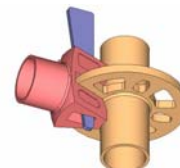
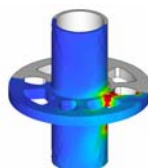
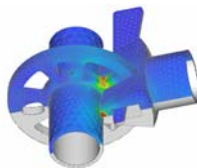
DSS Ring System Leg Loading



a) Standard at perimeter of structure

b) Standard within perimeter of structure

Length of the longer ledger l [m]	Compression capacity for standards at the perimeter of the scaffold h = 2.0 m [kN]			Compression capacity for standards in the centre of the scaffold h = 2.0 m [kN]		
	Vertical braces in every...			Vertical braces in every...		
	bay	2 nd bay	3 rd bay	bay	2 nd bay	3 rd bay
0.74	40.7	20.4	13.6	40.8	20.4	13.6
1.0	39.8	38.1	25.4	48.5	38.1	25.4
1.06	39.6	39.6	28.4	48.1	42.6	28.4
1.39	38.7			46.9	46.9	42.6
1.5	38.5			46.9		
2.0	38.2			44.9		
2.5	36.5			43.3		
3.0	35.8			42.2		





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Notes

