1. Crane 81 K 3.5 m slewing radius, stationary and rail-going

1.1 Maximum corner pressures (in kN) during operation and when not in operation (EN14439:2009/FEM1.005-C25)

1.1.1 0° jib position (horizontal) (3.5 m slewing radius)

The corner pressures do not include any dead load factors or hoist load factors.

The specified torque M_D does not include any coefficient of impact!

Load-bearing capacity of the soil must be checked before commencing assembly of the crane!

The corner pressures of intermediate heights not yet executed can be ascertained by way of interpolation!

A reduced load curve applies for crane configuration with 6 tower sections!

All jib lengths

Number of tower sections	Hook height (m)	Corner*	Crane during operation (kN)			Crane not in operation (kN)		
			Position of jib in direction*					
			I	II	III	I	II	III
0	26.0	A	153	250	55	138	167	109
		B	**289**	250	248	**179**	167	167
		C	151	54	248	137	108	167
		D	14	54	55	96	108	109
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	18			46		

All jib lengths

Number of tower sections	Hook height (m)	Corner*	Crane during operation (kN)			Crane not in operation (kN)		
			Position of jib in direction*					
			I	II	III	I	II	III
5	38.0	A	139	284	35	145	236	53
		B	**357**	284	281	**273**	236	235
		C	136	32	281	143	52	235
		D	0	32	35	14	52	53
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	21			60		

* = see following page

0° jib position (horizontal) (3.5 m slewing radius)

The corner pressures do not include any dead load factors or hoist load factors.

The specified torque M_D does not include any coefficient of impact!

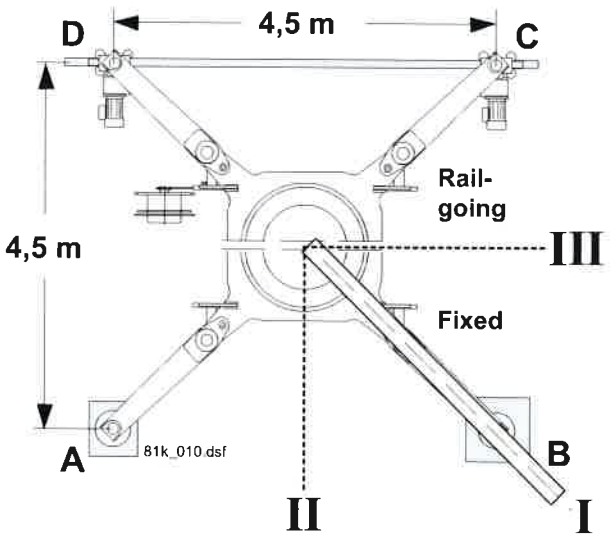
Load-bearing capacity of the soil must be checked before commencing assembly of the crane!

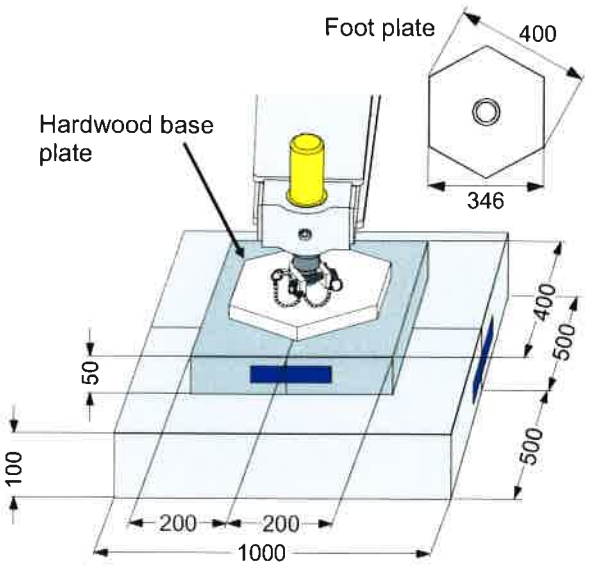
A reduced load curve applies for crane configuration with 6 tower sections!

All jib lengths

Number of tower sections	Hook height (m)	Corner	Crane during operation (kN)			Crane not in operation (kN)		
			Position of the jib in direction					
			I	II	III	I	II	III
6	40.4	A	135	268	37	140	252	40
		B	**332**	268	265	**302**	252	250
		C	132	34	265	138	38	250
		D	0	34	37	0	38	40
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	22			62		

Position of the jib





With **0** tower sections:
Ground pressure 28.9 N/cm² with E_{max} = 289 kN

With **5** tower sections:
Ground pressure 35.7 N/cm² with E_{max} = 357 kN

With **6** tower sections:
Ground pressure 33.2 N/cm² with E_{max} = 332 kN

1.1.2 45° jib position to avoid obstacles (3.5 m slewing radius)

The corner pressures do not include any dead load factors or hoist load factors.

The specified torque M_D does not include any coefficient of impact!

Load-bearing capacity of the soil must be checked before commencing assembly of the crane!

The corner pressures of intermediate heights not yet executed can be ascertained by way of interpolation!

A reduced load curve applies for crane configuration with 6 tower sections!

45° jib position to avoid obstacles is not possible :

- **for a jib length of 45 m for crane configuration with 6 tower sections**

All jib lengths

Number of tower sections	Hook height (m)	Corner*	Crane during operation (kN)			Crane not in operation (kN)		
			Position of jib in direction*					
			I	II	III	I	II	III
0	26.0	A	153	250	55	138	195	81
		B	**289**	250	248	**218**	195	194
		C	151	54	248	137	80	194
		D	14	54	55	57	80	81
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	20			54		

All jib lengths

Number of tower sections	Hook height (m)	Corner*	Crane during operation (kN)			Crane not in operation (kN)		
			Position of jib in direction*					
			I	II	III	I	II	III
5	38.0	A	139	284	35	117	289	20
		B	**357**	284	281	**384**	289	287
		C	136	32	281	114	18	287
		D	0	32	35	0	18	20
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	23			68		

* = see following page

45° jib position to avoid obstacles (3.5 m slewing radius)

The corner pressures do not include any dead load factors or hoist load factors.

The specified torque M_D does not include any coefficient of impact!

Load-bearing capacity of the soil must be checked before commencing assembly of the crane!

A reduced load curve applies for crane configuration with 6 tower sections!

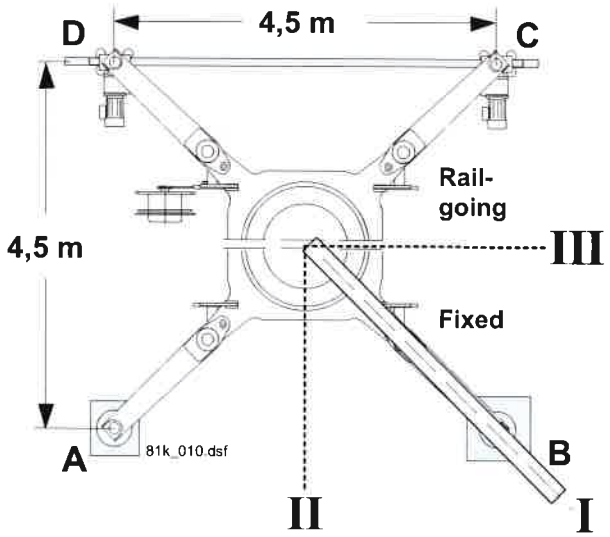
45° jib position to avoid obstacles is not possible :

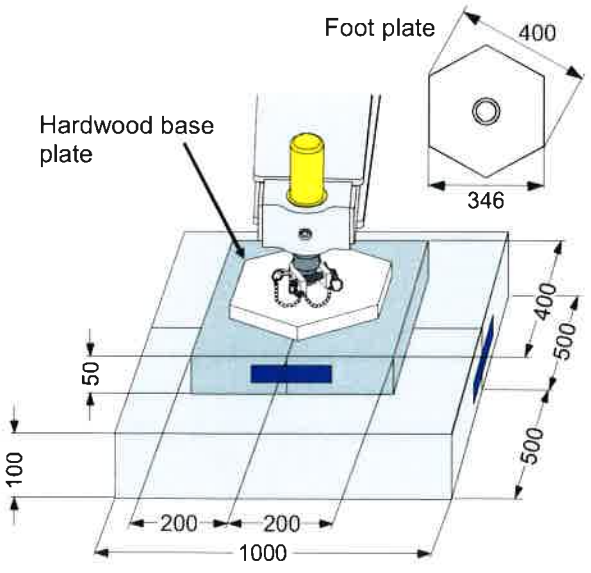
- **for a jib length of 45 m for crane configuration with 6 tower sections**

Jib lengths 42.0 m, 37.0 m and 31.0 m

Number of tower sections	Hook height (m)	Corner	Crane during operation (kN)			Crane not in operation (kN)		
			Position of the jib in direction					
			I	II	III	I	II	III
6	40.4	A	135	268	37	139	311	30
		B	**332**	268	265	**402**	311	309
		C	132	34	265	136	28	309
		D	0	34	37	0	28	30
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	23			70		

Position of the jib





With **0** tower sections:
Ground pressure 28.9 N/cm² with E_{max} = 289 kN

With **5** tower sections:
Ground pressure 38.4 N/cm² with E_{max} = 384 kN

With **6** tower sections:
Ground pressure 40.2 N/cm² with E_{max} = 402 kN

1.1.3 30° luffed jib position (3.5 m slewing radius)

The corner pressures do not include any dead load factors or hoist load factors.

The specified torque M_D does not include any coefficient of impact!

Load-bearing capacity of the soil must be checked before commencing assembly of the crane!

The corner pressures of intermediate heights not yet executed can be ascertained by way of interpolation!

30° luffed jib position is not possible:
- **for crane configuration with 6 tower sections**
- **for a jib length of 45 m for crane configuration with 5 tower sections**

All jib lengths

Number of tower sections	Hook height (m)	Corner*	Crane during operation (kN)			Crane not in operation (kN)		
			Position of jib in direction*					
			I	II	III	I	II	III
0	45.4	A	143	222	64	138	206	70
		B	**254**	222	221	**234**	206	205
		C	142	63	221	137	69	205
		D	31	63	64	42	69	70
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	21			60		

All jib lengths

Number of tower sections	Hook height (m)	Corner*	Crane during operation (kN)			Crane not in operation (kN)		
			Position of jib in direction*					
			I	II	III	I	II	III
4	55.0	A	173	272	74	146	301	35
		B	**312**	272	270	**379**	301	299
		C	173	72	270	144	33	299
		D	31	72	74	0	33	35
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	21			69		

* = see following pages

30° luffed jib position (3.5 m slewing radius)

The corner pressures do not include any dead load factors or hoist load factors.

The specified torque M_D does not include any coefficient of impact!

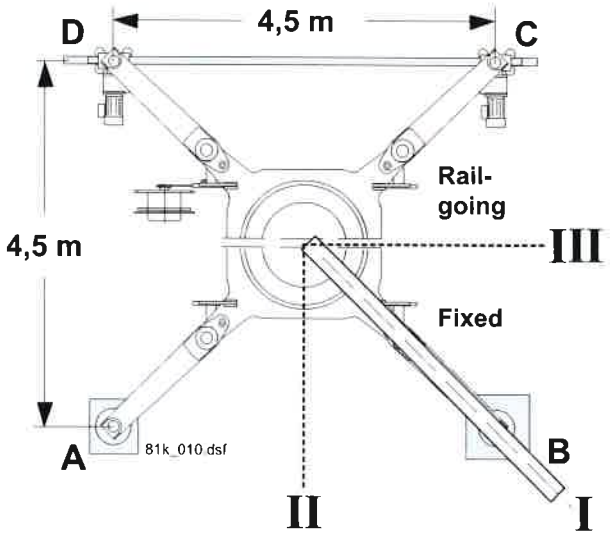
Load-bearing capacity of the soil must be checked before commencing assembly of the crane!

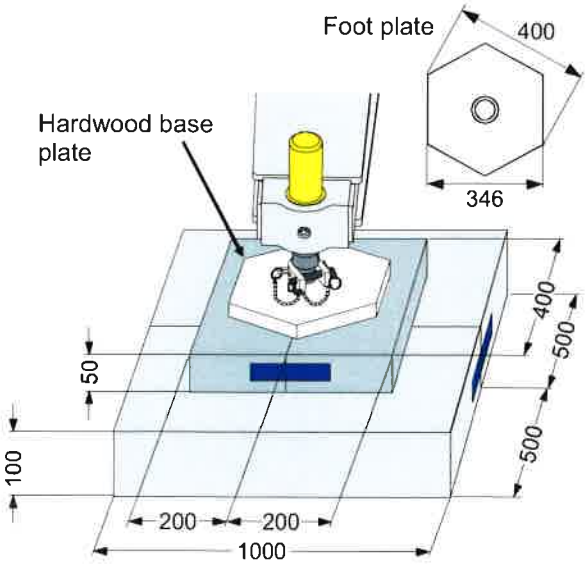
30° luffed jib position is not possible:
- **for crane configuration with 6 tower sections**
- **for a jib length of 45 m for crane configuration with 5 tower sections**

Jib lengths 42.0 m, 37.0 m and 31.0 m

Number of tower sections	Hook height (m)	Corner*	Crane during operation (kN)			Crane not in operation (kN)		
			Position of jib in direction*					
			I	II	III	I	II	III
5	55.9	A	175	279	69	135	311	28
		B	**321**	279	277	**405**	311	309
		C	172	67	277	132	25	309
		D	25	67	69	0	25	28
		Prescribed M_D (kNm)	85			0		
		Horizontal force (kN)	22			71		

Position of the jib





With **0** tower sections:
Ground pressure 25.4 N/cm² with E_{max} = 254 kN

With **4** tower sections:
Ground pressure 37.9 N/cm² with E_{max} = 379 kN

With **5** tower sections:
Ground pressure 40.5 N/cm² with E_{max} = 405 kN

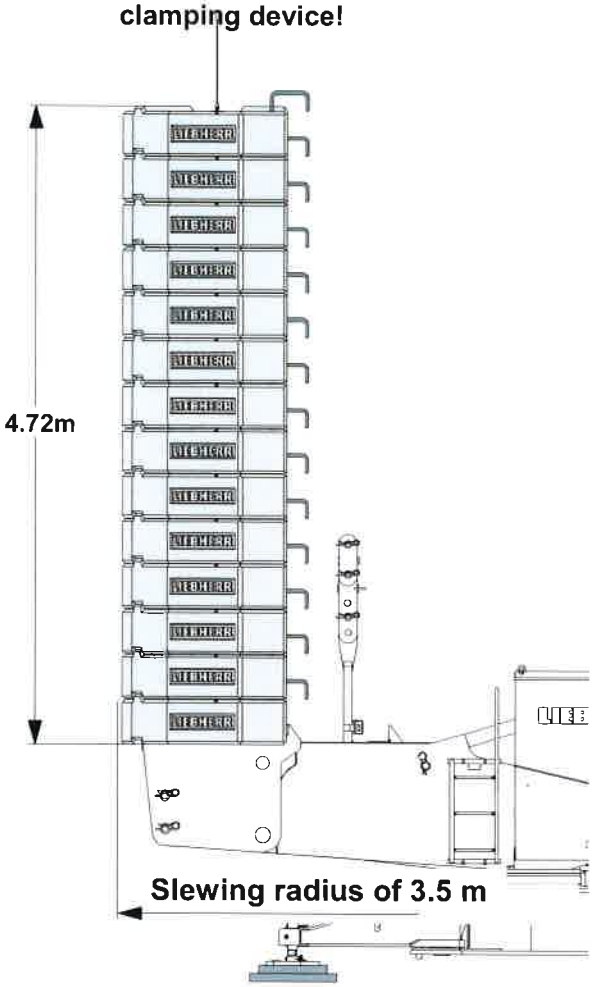
1.2 Ballasting with a 3.5 m slewing radius

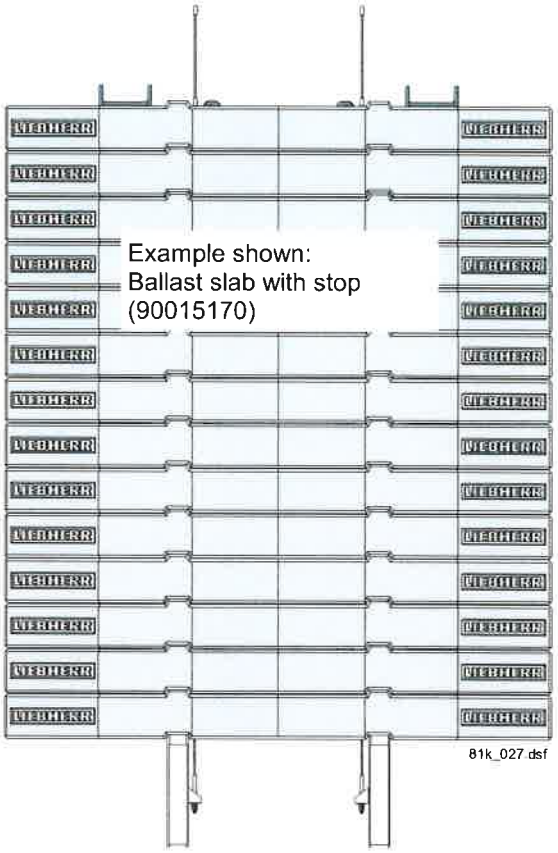
1.2.1 Variant 1: Normal concrete with stop (ballast slab 90015170)

1.2.2 Variant 2: Normal concrete without stop (ballast slab 90015227)

Number	Ballast slab	Weight
14	Ballast slab normal concrete (with stop 90015170) (without stop 90015227)	2 500 kg
	Complete counter-ballast	35 000 kg

On both sides:
Secure the ballast slabs with a ballast clamping device!





For a 45° jib position to avoid obstacles and a 30° luffed jib position, an additional cenral ballast is required for „Crane not in operation", depending on the respective crane configuration! For further information, see page 2-14 and page 2-15.

When producing the ballast slabs, **ensure absolute precision as regards their weight!**

Check the ballast weight!

Tolerance of the weight: 0% to 4%

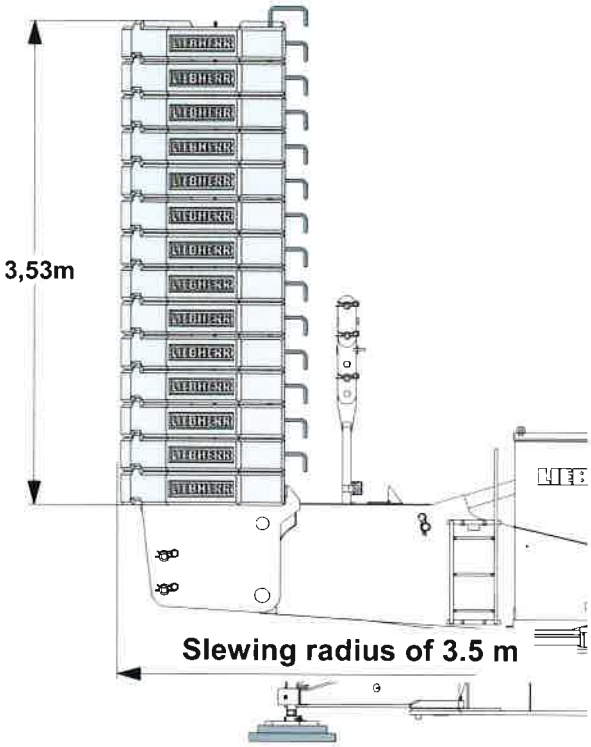
Ensure that the ballast slabs are laid precisely one on top of the other!

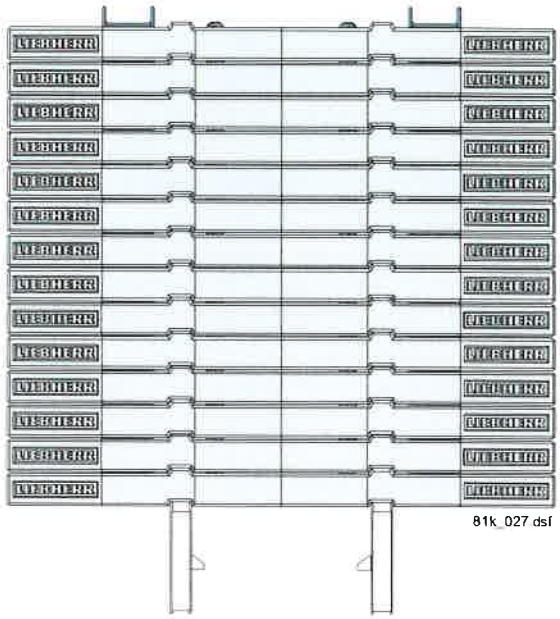
The production drawings, with in-house production of the ballast blocks, can be requested from **Liebherr-Werk Biberach, TB-Krantechnik.**

1.2.3 Variant 3: Heavy concrete with stop (ballast slab 90013014)

Number	Ballast slab	Weight
14	Ballast slab heavy concrete (with stop 90013014)	2 500 kg
	Complete counter-ballast	35 000 kg

The ballast slabs are not secured with a ballast clamping device!





For a 45° jib position to avoid obstacles and a 30° luffed jib position, an additional cenral ballast is required for „Crane not in operation", depending on the respective crane configuration! For further information, see page 2-14 and page 2-15.

When producing the ballast slabs, **ensure absolute precision as regards their weight!**

Check the ballast weight!

Tolerance of the weight: 0% to 4%

Ensure that the ballast slabs are laid precisely one on top of the other!

The production drawings, with in-house production of the ballast blocks, can be requested from **Liebherr-Werk Biberach, TB-Krantechnik**.

1.3 Required central ballast for 3.5 m slewing radius (EN14439:2009/FEM1.005-C25)

- **No central ballast is required for 0° jib position (horizontal)!**
- **For the 45° and 30° jib positions, the central ball ast is only required for „Crane not in operation"!**

1.3.1 0° jib position (horizontal) (3.5 m slewing radius)

Jib length (m)	Necessary central ballast with respective number of tower sections						
	0	**1**	**2**	**3**	**4**	**5**	**6**
31	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0

Position of trolley for „Crane not in operation"

Jib length (m)	Position of trolley for „Crane not in operation"						
	0	**1**	**2**	**3**	**4**	**5**	**6**
31	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius
37	"	"	"	"	"	"	"
42	"	"	"	"	"	"	"
45	"	"	"	"	"	"	"

1.3.2 45° jib position to avoid obstacles (3.5 m slewing radius)

- **For the 45° jib position to avoid obstacles, the central ballast is only required for „Crane not in operation“!**

Jib length (m)	Necessary central ballast with respective number of tower sections						
	0	**1**	**2**	**3**	**4**	**5**	**6**
31	0	0	0	0	**4.0 t** (2 x 2.0 t)	**4.0 t** (2 x 2.0 t)	**10.0 t** (2 x 5.0 t)
37	0	0	0	0	0	**4.0 t** (2 x 2.0 t)	**10.0 t** (2 x 5.0 t)
42	0	0	0	0	0	**4.0 t** (2 x 2.0 t)	**10.0 t** (2 x 5.0 t)
45	0	0	0	0	**4.0 t** (2 x 2.0 t)	**4.0 t** (2 x 2.0 t)	><

>< = **not possible**

Position of trolley for „Crane not in operation“

Jib length (m)	Position of trolley for „Crane not in operation“						
	0	**1**	**2**	**3**	**4**	**5**	**6**
31	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius
37	"	"	"	"	"	"	"
42	"	"	"	"	"	"	"
45	"	"	"	"	"	"	><

>< = **not possible**

1.3.3 30° luffed jib position (3.5 m slewing radius)

- **For the 30° luffed jib position, the central ballas t is only required for „Crane not in operation“!**

Jib length (m)	Necessary central ballast with respective number of tower sections						
	0	**1**	**2**	**3**	**4**	**5**	**6**
31	0	0	0	**4.0 t** (2 x 2.0 t)	**10.0 t** (2 x 5.0 t)	**10.0 t** (2 x 5.0 t)	✕
37	0	0	0	0	**4.0 t** (2 x 2.0 t)	**10.0 t** (2 x 5.0 t)	✕
42	0	0	0	**4.0 t** (2 x 2.0 t)	**10.0 t** (2 x 5.0 t)	**10.0 t** (2 x 5.0 t)	✕
45	0	0	0	**4.0 t** (2 x 2.0 t)	**10.0 t** (2 x 5.0 t)	✕	✕

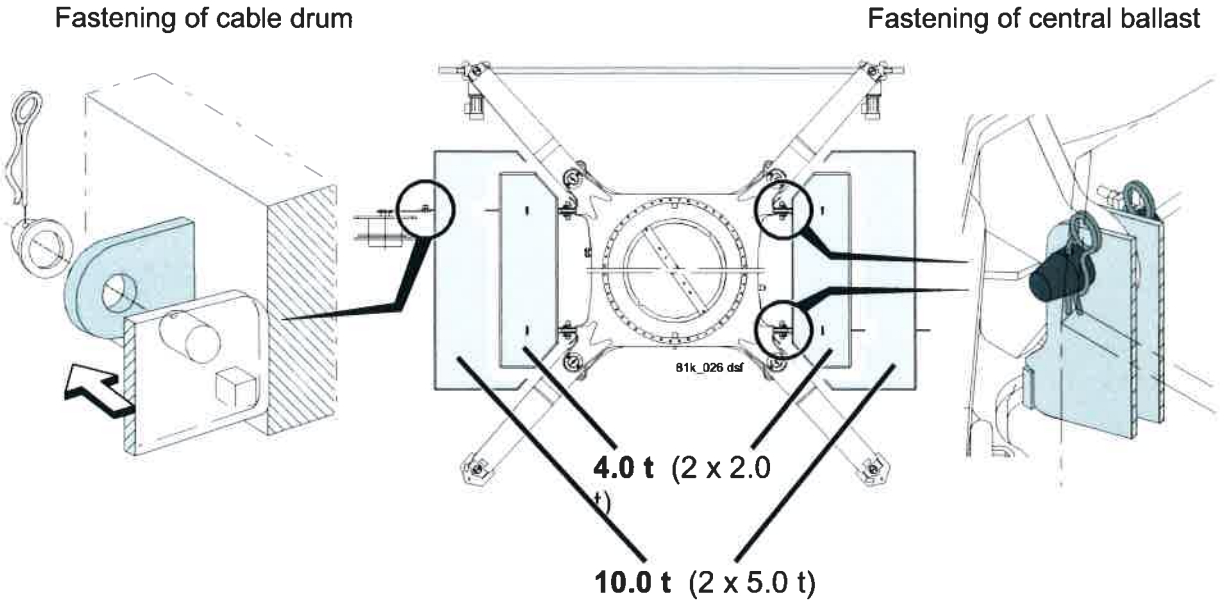
✕ = **not possible**

Position of trolley for „Crane not in operation“

Jib length (m)	Position of trolley for „Crane not in operation“						
	0	**1**	**2**	**3**	**4**	**5**	**6**
31	At **max.** radius	At **max.** radius	At **max.** radius	At **max.** radius	At **max.** radius	At **max.** radius	✕
37	"	"	"	"	"	"	✕
42	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	At **min.** radius	✕
45	"	"	"	"	"	✕	✕

✕ = **not possible**

1.3.4 Arrangement of central ballast: Stationary and rail-going



The production drawings, with in-house production of the ballast blocks, can be requested from **Liebherr-Werk Biberach, TB-Krantechnik**.