

2.4.2 Basis of design of the crane support structure

Considerations for the design of the crane support structure, including the support tower, shall include the design working life of the crane installation, which shall be in accordance with Clause 2.3.

2.4.3 Stability

The stability of the tower crane against overturning shall satisfy the requirements of each of the load combinations listed in Table 2.4.3. Each of the loads shown in Table 2.4.3 shall be multiplied by the ultimate coefficients given when calculating the ultimate overturning moments and the ultimate stabilizing moments due to that load.

The following relationship shall be satisfied:

$$\Sigma \text{Ultimate stabilizing moments} > \Sigma \text{ultimate overturning moments}$$

TABLE 2.4.3
SUPPORT STRUCTURE COEFFICIENTS

Load combination numbers	Description of loads		Coefficient
In-operation basic stability	1	Dead (Restoring)	0.9
	2	Dead (Overturning)	1.0
	3	Maximum Working Capacity	1.6
	4	Horizontal Dynamic	0.0
	5	Wind (Operating)	0.0
	6	Wind (Out-of-operation)	0.0
In-operation dynamic stability (with wind)	1	Dead (Restoring)	0.9
	2	Dead (Overturning)	1.0
	3	Maximum Working Capacity	1.35
	4	Horizontal Dynamic	1.0
	5	Wind (Operating)	1.0
	6	Wind (Out-of-operation)	0.0
In-operation backward stability	1	Dead (Restoring)	0.9
	2	Dead (Overturning)	1.0
	3	Maximum Working Capacity	-0.3
	4	Horizontal Dynamic	0.0
	5	Wind (Operating)	1.0
	6	Wind (Out-of-operation)	0.0
In-operation dynamic stability (no wind)	1	Dead (Restoring)	0.9
	2	Dead (Overturning)	1.0
	3	Maximum Working Capacity	1.45
	4	Horizontal Dynamic	1.0
	5	Wind (Operating)	0.0
	6	Wind (Out-of-operation)	0.0

(continued)

TABLE 2.3.1(A) (continued)

Load combination numbers	Description of loads		Coefficient
Out-of-operation (extreme wind)	1	Dead (Restoring)	0.9
	2	Dead (Overturning)	1.0
	3	Maximum Working Capacity	0.0
	4	Horizontal Dynamic	0.0
	5	Wind (Operating)	0.0
	6	Wind (Out-of-operation)	1.2
Out-of-operation (during erection and dismantling)	1	Dead (Restoring)	0.9
	2	Dead (Overturning)	1.0
	3	Maximum Working Capacity	1.25
	4	Horizontal Dynamic	1.0
	5	Wind (Operating)	0.0
	6	Wind (Out-of-operation)	1.0
In-operation (with wind)	1	Dead (Restoring)	0.9
	2	Dead (Overturning)	1.0
	3	Maximum Working Capacity	1.45
	4	Horizontal Dynamic	0.0
	5	Wind (Operating)	1.0
	6	Wind (Out-of-operation)	0.0

NOTES:

- Horizontal dynamic effects include the effects of loads due to travel, slewing, luffing, or trolleying and their effects either individually or in any combination.
- The footings, foundations, or tracks upon which the tower crane rests are to be assumed to be horizontal and rigid.
- Loads need not be further multiplied by impact, dynamic, or other coefficients.
- Load combinations are derived from the range of conditions to which a tower crane is subjected in the normal course of operation on site.
- Restoring coefficient may be 1.0 if actual loads are confirmed.

2.4.4 Ballast

Where ballast is provided for crane stability, requirements for the location and the method of fixing shall be stated by the crane manufacturer or in the installation design. The various components that comprise the ballast shall be clearly and legibly marked with the centre of gravity of the component together with the tare mass.

2.4.5 Footings and foundations

The footing and foundations shall be designed in accordance with the relevant Australian Standards and with regard to the results of a report on geotechnical conditions specific to the location of the installation.

2.4.6 Tie frames and ties

The design of the tie frames and ties shall have regard to the expected period of use relative to out-of-operation wind in accordance with Clause 2.3.