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HEAVY LIFTING APPLIANCES

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RULES FOR THE DESIGN OF HOISTING APPLIANCES

BOOKLET 6

STABILITY AND SAFETY AGAINST
MOVEMENT BY THE WIND



The total 3rd Edition comprises booklets 1 to 8
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This booklet is part of the "Rules for the design of hoisting appliances" consisting of 8 booklets :

- Booklet 1 - Object and scope
- Booklet 2 - Classification and loading on structures and mechanisms
- Booklet 3 - Calculating the stresses in structures
- Booklet 4 - Checking for fatigue and choice of mechanism components
- Booklet 5 - Electrical equipment
- Booklet 6 - Stability and safety against movement by the wind
- Booklet 7 - Safety rules
- Booklet 8 - Test loads and tolerances

and must not be used separately.

BOOKLET 6

STABILITY AND SAFETY AGAINST MOVEMENT BY THE WIND

CONTENTS

	<u>Clause</u>	<u>Page</u>
STABILITY (SAFETY AGAINST OVERTURNING)	6.1.	6-3
- Special measures	6.1.1.	6-4
SAFETY AGAINST MOVEMENT BY THE WIND	6.2.	6-4
NOTES	6.3.	6-4
LIST OF SYMBOLS AND NOTATIONS	See booklet 1	

STABILITY (SAFETY AGAINST OVERTURNING)

Stability against overturning shall be checked by calculation, assuming the tipping point to have been reached by increasing the working load and the dynamic and weather effects by the factors specified in table T.6.1., the rail track or the base of the appliance being assumed to be horizontal and rigid.

In the case of floating cranes, due account shall be taken of the inclination imparted to the appliance as a whole.

Table T.6.1.

Stability requirements

Checks to be made		Loads to be considered	Amplifying factors
Static check		- Safe working load	1,6
		- Horizontal effects	0
		- Wind	0
Dynamic check	Appliance under load	- Safe working load	1,35
		- Two horizontal effects (2)	1
		- Limiting working wind (1)	1
	Appliance under no load	- Safe working load	- 0,1
		- Two horizontal effects (2)	1
		- Limiting working wind (1)	1
Checking for maximum wind (storm wind)		- Safe working load	0
		- Horizontal effects	0
		- Maximum wind	1,1
Check for breakage of sling		- Safe working load	- 0,3 (3)
		- Two horizontal effects with no load (2)	1
		- Limiting working wind (1)	1

- (1) The limiting working wind in the most unfavourable direction.
- (2) Travel motions used for positioning only must be considered independently. Stability calculations for this motion must be made separately. For the case of collision, the stability calculations shall be based on dynamic considerations.
- (3) Unless calculations justify a lower value.

6. 1.

SPECIAL MEASURES

Supplementary means of mooring or guying may be provided to ensure stability when out of service.

Furthermore, it is permissible to impose definite positions of the appliance or of certain of its components when out of service, or alternatively to allow freedom of movement of the latter (crane jib for example). Such measures should only be adopted after agreement between the user and the maker as they impose conditions on operation.

6.2.

SAFETY AGAINST MOVEMENT BY THE WIND

Independently of the stability against overturning, a check should be made that the appliance cannot be set in motion by maximum wind increased by 10 %. This check shall be carried out assuming a coefficient of friction equal to 0,14 for braked wheels, and a resistance to rolling of 10 N/kN for unbraked wheels mounted on anti-friction bearings or of 15 N/kN for bushed wheels.

Where is danger of movement, a mooring device such as a chain, clamp, manual or automatic locking pin, etc... shall be provided.

For the design of clamps, the coefficient of friction between the clamp and the rail shall be taken as 0,25.

6.3.

NOTES

When calculating stability the loadings should not be modified by the coefficients Ψ , λ and γ_c specified in clauses 2.2.2.1.1., 2.2.3.3. and 2.3.4.

It is the intention that moorings, guys, locking devices and other special arrangements provided for the operations of the appliance appear in the calculations as righting moments.

