KNCRANES

起重机工作等级计算方法及各国对照表
Service Classification of Hoist

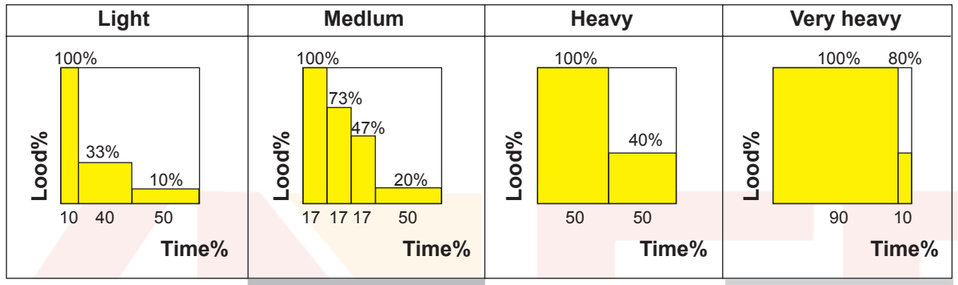
起升机构的安全运行周期取决于是否按特定的工作等级正确使用。根据欧洲搬运协会标准 FEM9.511 和中国国家相关标准规定，起重机的起升机构工作等级由载荷谱和日均运行当量时间确定。

Safe and effective operation of the hoist is dependent on correct classification of the hoist ' s operation group. According to FEM9.511 and China standard the hoist ' s operating group can be determined from load spectrum and average Daily operating time.

载荷谱 Load Spectrum

载荷谱可以根据下面表格确定

The load spectrum can be determined from the table below



轻级 偶尔吊满载 经常吊轻载 固定载荷轻	中级 偶尔吊满载 经常吊轻载 固定载荷半载	重级 重复吊满载 经常吊半载 固定载荷重	超重级 几乎全吊满载 固定载荷超重
Light Occasional full load Usually light load Small fixed load	Medium Occasional full load Usually light load Average fixed load	Heavy Repetitive full load Usually average load Heavy fixed load	Very Heavy Usually almost full load Very heavy fixed load

日均当量使用时间 Average daily operating time

日均当量使用时间可以根据实际使用时间按统计方法测算，参考公式如下：

The average daily operating time of the hoist can be calculated from the running time of the hoisting machinery (Hours/day):

$$t = \frac{2 \times N \times H \times T}{V \times 60}$$

H = 平均起升高度 average hoisting height (m)

N = 平均每小时工作循环次数 number of work cycles per hour (cycles/h)

T = 日均工作时间 daily working time (h)

V = 起升速度 hoisting speed (m/min)

工作级别确定 Determining the operating group of the hoist

当载荷谱和日均当量使用时间确定后，可以根据下面表中数据查出工作级别：

When the load spectrum and the average daily operating time of the hoist are identified, the hoist ' s operating group is obtained from the table below:

载荷谱 Load Spectrum	日平均当量使用时间 Average daily operating time ISO(GB) / FEM （小时 / 天 hours per day)					
	≤ 0.5	≤ 1	≤ 2	≤ 4	≤ 8	≤ 16
轻级 Light			M3 1Bm	M4 1Am	M5 2m	M6 3m
中级 Medium		M3 1Bm	M4 1Am	M5 2m	M6 3m	M7 4m
重级 Heavy	M3 1Bm	M4 1Am	M5 2m	M6 3m	M7 4m	
超重级 Very Heavy	M4 1Am	M5 2m	M6 3m	M7 4m		

例子：

某用户的起重机在载荷谱中为重级，起升速度 V=5m/min，平均工作起升高度 H=3m，平均每小时工作循环 N=5 次，两班制日工作时间 T=16 小时，计算得出当量工作时间 t=1.6，从上表中查得工作级别为中国国家标准 M5（等同于欧洲标准 2m）。

Examples:

If there is a crane which in the Load Spectrum is heavy, the hoisting speed V=5m/min, the average hoisting height H=3m, the number of work cycles per hour N=5 cycles/h, the daily working time T=16h, so calculate the average daily operating time t=1.6. The crane duty class is Chinese GB M5 which is looked up from the form.(The same as Europe Standard 2m)

起重机工作等级比较表 Comparing of crane class

	工作等级 Duty Code					
ISO/BS/DIN	M3	M4	M5	M6	M7	M8
GB	A3	A4	A5	A6	A7	A8
FEM	1Bm	1Am	2m	3m	4m	5m
CMAA	A	B	C	D	E	F
HMI	H2	H3	H4	H5	H5	H6

	对应的起升当量工作周期 Hoist Standard Value （小时 Hr)					
安全工作周期 SWP(h)	400	800	1,600	3,200	6,300	12,500
持续率 Duty %ED	25	30	40	50	60	60
启动次数 Starts (s/h)	150	180	240	300	360	360
运行时间 Run Time(h)	3,200	6,300	12,500	25,000	50,000	100,000
启动次数 Starts	480,000	1,134,000	3,000,000	7,500,000	18,000,000	42,000,000
超载次数 Overloads	1,000	1,000	1,000	1,000	1,000	1,000