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ABBREVIATIONS AND SYMBOLS LIST

- a = Distance between the shaft (mm).
- a_c = Average number of working cycles per month.
- A = Ratio between the diameter of drum or pulley and the rope diameter.
- A_t = Area of neck on the twist lock pin (mm)
- b = Width of gear face (mm).
- b_o = Size factor.
- b_{rct} = Tooth width of the ratchet gearing (cm).
- b_s = Surface factor.
- c_B = load factor for crane.
- ck = Pitch clearance (mm).
- C = Factor characterizing rope construction and the ultimate tensile strength of the wire material.
- C_1 = Factor depending on the rope diameter.
- C_2 = Factor determining the additional production and operational factors not accounted for by factor C and C_1 .
- C_m = Factor correction moment.
- C_s = Distance between the shaft of sprocket (mm).
- C_t = Factor correction torque.
- d_f = Dedendum circle diameter (mm).
- d_i = Diameter inside bearing (mm).
- d_k = Addendum circle diameter (mm).
- d_m = Mean diameter (mm).
- d_o = Diameter outside bearing (mm).
- d_{pawl} = Diameter of the ratchet wheel pawl pivot (cm).
- d_r = Diameter of the rope (mm).
- d_s = Shaft diameter (mm).
- d_0 = Pitch circle diameter (mm).
- D_d = Diameter of the drum and pulley (mm).



- D_k = Diameter of outside sprocket (mm).
- D_1 = Diameter of the compensating pulley (mm).
- D_p = Pitch circle diameter of sprocket (mm).
- D_r = Diameter of tyre (mm).
- D_{rct} = Ratchet wheel diameter (cm).
- D_B = Diameter of naf sprocket (mm).
- e_1 = Crane with very heavy condition of operating.
- e_2 = Factor depending on rope construction.
- f = Coefficient of adhesion of wheels with rail.
- f_c = Correction factor.
- f_h = Life factor.
- f_n = Speed factor for roller bearing.
- f_v = Dynamic factor.
- F = Plan load of sprocket (kg).
- F_g = Hoisting load (kg).
- F_{g1} = Hoisting equipment load (kg).
- F_{rct} = The peripheral force on the outside diameter of the ratchet wheel (kg).
- F_t = Tangential tooth load (kg).
- F_u = Permission maximum load of sprocket (kg).
- F_B = Average limited strength of sprocket (kg).
- F'_b = Permission bending load per width (kg/mm).
- F'_H = Permission surface load per width (kg/mm).
- F_{222} = The rope cross-section (mm^2).
- G = Rigidity module of the steel (kg/mm^2).
- G_o = Magnitude of the weight (kg).
- G_0 = Weight of the trolley (kg).
- GD^2 = Gyration moment of motor and gyration moment of coupling (kg.m^2).
- GD^2_{coupling} = Gyration moment of the coupling (kg.m^2).
- GD^2_{motor} = Moment of gyration (kg.m^2).
- h = The travel of the brake lever (mm).
- H_r = Height to which the load is raised (mm).



H = Height of teeth gear (mm).

i = Ratio of transmission.

i_w = Number of wires.

I = Moment of inertia (cm^4).

I_c = Moment of inertia for coupling (kg.m/sec^2).

k = Coefficient of rolling friction.

k_t = Concentration stress factor

k_H = The factor of strength contact (kg/mm^2).

K = The effort applied by the operator on the brake lever (kg).

l = Lead (mm).

l_h = The length of the helix on the drum (mm).

L_d = Length of the drum (mm).

L_h = Bearings nominal life (hours).

L_p = Length of chain.

m = The module of gears.

m_{rct} = Module of the ratchet gearing (cm).

m_z = Factor depending on the number of repeated bends of the rope z during the period of its wear until it fails.

M = Bending moment (kg.mm)

M_{br} = Braking moment (kg.m).

M_{dyn} = Dynamic Torque In Acceleration (kg.m).

M_{st} = Static Moment Of Motor (kg.m).

M'_{dyn} = Dynamic moment braking (kg.m).

M'_{st} = Static moment braking (kg.m).

n = Speed of the shaft (rpm).

n_{drum} = Drum speed (rpm).

n_{output} = Speed of little sprocket (rpm).

n_r = Speed of tyre (rpm).

n_w = Wheels speed (rpm).

N = The life of the rope (months).

N_{br} = Braking power (kW or HP).



N_{cs} = Critical speed of shaft (rpm).

N_{rated} = Rated power (kW).

N_{st} = Static Power (kW or HP).

p = Pitch of sprocket (mm).

P = Equivalent radial load (kN).

P_a = Permission maximum pressure (kg/mm²).

P_d = Plan power (kW).

P_k = The total peripheral braking force on the drum surface (kg).

P_{max} = The force exerted on the wheels (kg).

P_{rct} = Pressure on unit length of the ratchet wheel tooth (kg/cm).

Q = Load (kg).

Q_{tot} = Total load (kg).

s_f = Safety factor.

t = Thickness of the pin (mm).

t_{br} = Breaking time (sec).

t_s = Starting time (sec).

T = Torque on the shaft (kg.mm).

v = Pheripheral velocity (m/s).

v_c = Velocity of chain (m/s).

v_d = Velocity of the drum (m/min).

v_h = Hoisting velocity (m/min).

v_r = Travelling velocity (m/min).

v_t = Trolley velocity (m/s).

V_d = Volume displacement (cm³).

w = Width of the pin (mm).

W = Resistance to motion (kg).

W_g = Gears weight (kg).

W_s = Shaft weight (kg).

Y = The tooth form factor.

Y_b = Bending deflection (mm).

z = Number of teeth gear.



- z_p = Amount of pulley.
- z_1 = The number of repeated bends.
- z_2 = Number of repeated bends per cycle (raising and lowering) at the full lifting height and one-sided bending.
- z_3 = The number of bends (bends).
- Z_{adh} = Adhesive force (kg).
- Z_i = The maximum permissible tension (kg).
- Z_p = Tension on the rope (kg).
- Z_{rct} = Number of teeth ratchet gearing.
- α = Pressure angle (degree).
- α' = Angle of wrap (degree).
- β = Braking coefficient.
- B' = Factor of change in the endurance of the rope due to lifting the load to less than the full height and to lifting less than the full load.
- δ = Coefficient accounting for effect of the mass of transmission mechanism.
- δ_s = Permissible deflection for the shaft (cm).
- δ_w = Diameter of wire (mm).
- δ_y = Deflection of the shaft (cm).
- σ = True tensile stress in the rope (kg/mm²).
- σ_a = Bending strength (kg/mm²).
- σ_b = Breaking strength (kg/mm²).
- σ_{bend} = Safety bending stress (kg/cm²).
- σ_{bw} = Endurance strength for building steel (kg/mm²).
- σ_{bwn} = Ultimate tensile stress (kg/mm²).
- σ_B = Tensile strength (kg/mm²).
- σ_{comp} = The tension stress (kg/mm²).
- σ_i = Permission of bending stress on the shaft (kg/mm).
- σ_{max} = Local unit compressive stress (kg).
- σ_{zul} = Permission tensile stress (kg/mm²).
- μ = Coefficient of friction.
- τ = Shear strength on the pin (kg/mm²).



τ_a = Permission shear strength (kg/mm^2).

τ_{tw} = Endurance strength for building steel (kg/mm^2).

τ_{twu} = Ultimate shear stress (kg/mm^2).

ϕ = Coefficient dynamic for constant load.

ρ = Density of the steel (kg/mm^3).

η_p = Pulley efficiency.

η = Efficiency of the mechanism.

ω = The wall thickness of a welded drum (mm).

ω_m = Coefficient of movement resistance.

θ = Torsion deflection (degree).