

USEFUL INFORMATION

There are several factors that need to be taken into account to achieve proper rope lay on a winch drum and rope life. Of these factors the most important is the magnitude of the D/d ratio (Drum/Sheave to Rope Diameter) and the fleet angle.

BENDING RATIO OF ROPE (D/d)

When the wire is bent, over a winch drum, a tensile load is subjected to the outer fibres of the rope. The magnitude of these tensile stresses is inversely proportional to the radius of the bend. Thus the larger the radius is the lesser the stresses will be.

TABLE 1 depicts the recommended minimum drum and sheave diameters in terms of the rope diameters for various rope constructions. These values are the minimum values when working on a single layer of rope and for speeds below 1 m/s. An addition of 5% should be added to the recommended diameter with every 0.5m/s increase in speed above 1m/s.

ROPE CONSTRUCTION	MINIMUM RECOMMENDED DRUM AND SHEAVE DIAMETERS
6 x 19 (9/9/1) F or IWRC	28 x Rope Diameter
6 x 25 (12/6 F+6/1) F or IWRC	23 x Rope Diameter
6 x 36 (14/7+7/7/1) F or IWRC	19 x Rope Diameter
6 x 41 (16/8+8/8/1) F or IWRC	18 x Rope Diameter
6 x 43 (14/14/7F+7/1) or IWRC	18 x Rope Diameter
6 x 49 (16/8+8/8/8/1) IWRC	18 x Rope Diameter
15 Strand N/S 9x6/6x19(9/9/1)IWRC	26 x Rope Diameter
18 Strand N/S 12x7(6/1)/6x7(6/1) F or IWRC	26 x Rope Diameter
18 Strand N/S 12x9(9/9/1)/6x19(9/9/1) F or IWRC	24 x Rope Diameter
8x25 (12/6F+6/1) IWRC Spin Reduced	19 x Rope Diameter
6x13(7/6Δ)F	42 x Rope Diameter
6x30(12/12/6Δ)F	42 x Rope Diameter

TABLE 1: The minimum recommended ratio of rope to drum and sheave diameters at < 1m/s.

In situations where the rope will only work intermittently the drum and sheave diameters can be reduced by as much as 25% from the recommended minimum values as listed in TABLE 1. Further reduction from this is not recommended under any circumstances as this will result in severe increase in bending stresses and will result in rapid rope fatigue. Please see FIGURE 1 for Illustration of D/d.

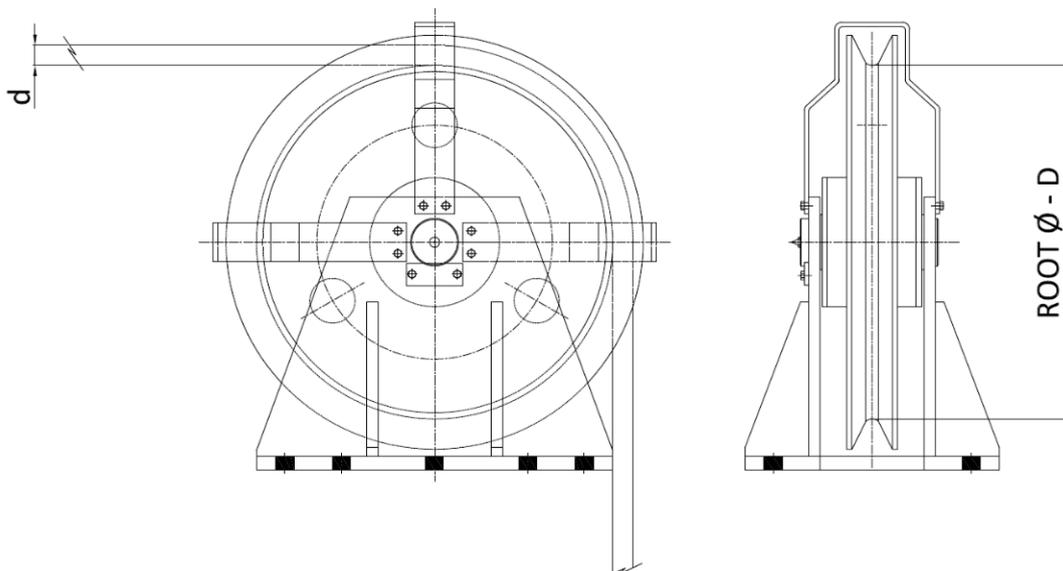


FIGURE 1: D/d Sheave Root DIA to Rope DIA

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FLEETING ANGLE DRUM TO LEAD SHEAVE

The fleet angle \emptyset , as displayed in FIGURE 2, governs the position of the lead sheave with respect to the drum. When the rope is at one end of the drum, against the drum flange, this fleet angle may not exceed one and a half degrees (1.5°) for plain drums to two degrees (2°) for grooved drums left or right from the centre line passing through the centre of the sheave groove and the midpoint of the drum.

The midpoint of the drum is denoted by distance LD in FIGURE 2.

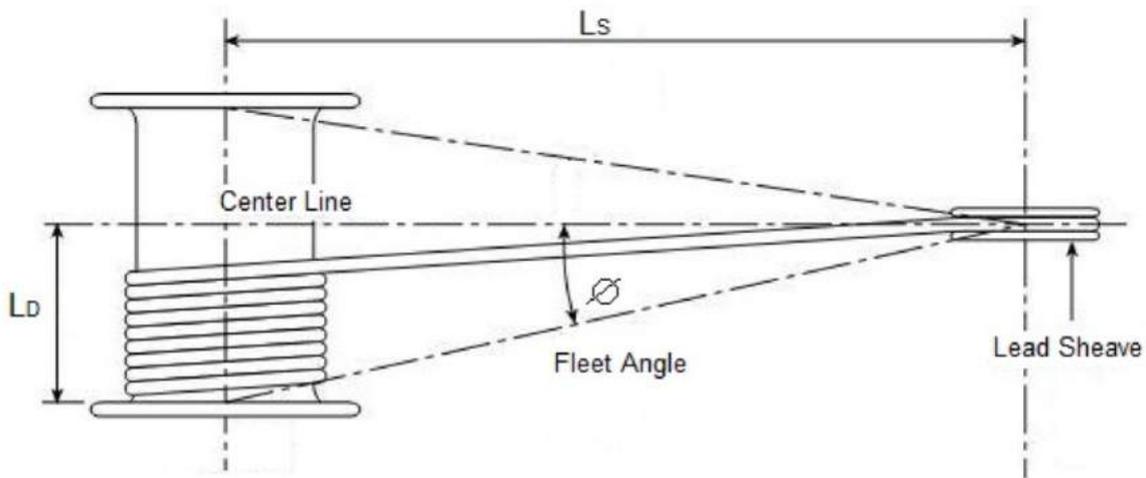


FIGURE 2: Fleet angle between the centre of the sheave groove and the midpoint of the drum.

Fleet angles larger than these suggested parameters can cause bad rope winding on drums and the rope can rub against the flanges of the sheave groove.

A safe rule of thumb that can be used is to multiply the length of the drum by 16.

This will be equivalent to the distance LS that the lead sheave needs to be away from the winch.

This distance will automatically result in a fleet angle of between $1.5 - 2^\circ$.

FLEETING ANGLE SHEAVE TO SHEAVE

It is recommended that sheaves operate centre line to centre line where possible.

The fleet angle \emptyset between two sheaves can be up to 2.5° left or right of the centre line passing through the centre of each sheave groove.

Refer to FIGURE 3 for an illustration of this.

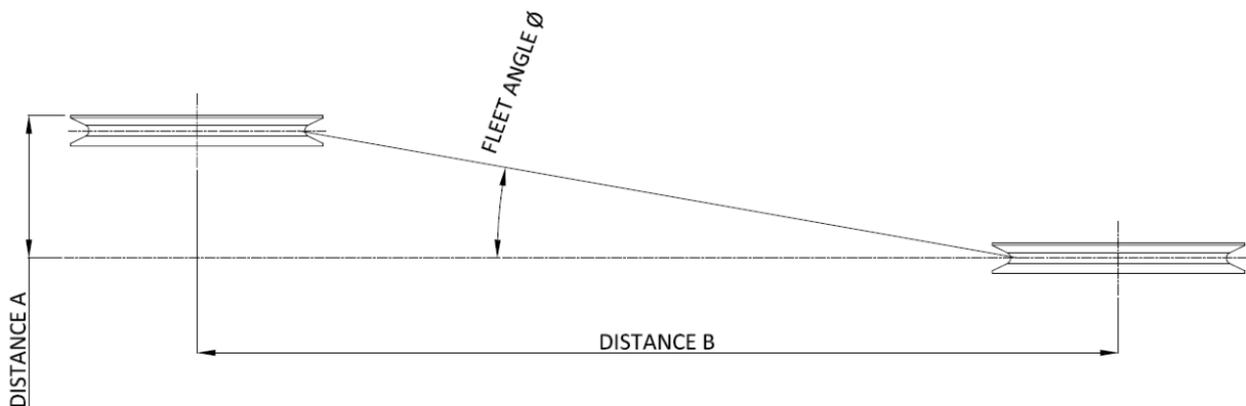


FIGURE 3: Illustration of the fleet angle between the centres of two sheaves.