

## STORED ENERGY MOTOR BASES



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The term “stored energy” can mean many things to many people. The most recent and easily recognisable use of the term is batteries in conjunction with solar panels. However, in mechanical terms stored energy is a significant advantage which has considerable benefits to the mining, quarry, and extractive industries by dramatically reducing operating costs. For more than 25 years we have used the capacity of rubber torsion springs to store energy for mechanical advantages and maintaining tension of v-belt drives.



Typically a traditional v-belt drive would consist of a driving force such as an electric motor or perhaps an internal combustion engine, and v-belts which transmit the power. Commonly, v-belt change out or adjustment would be carried out by the use of jacking bolts. These may be slide rails, tilted plates, or other methods. Exposed adjusting threads are subject to corrosion and seizure. Some operators may choose to cover these threads in a corrosion proof tape. In all cases this is slow, inefficient and labour intensive. Alignment (facing) of pulleys and keeping shafts parallel can almost be an impossible task. Maintaining the correct belt tension according to the v-belt manufacturer’s specification is more than likely neglected due to the difficulty of the task, resulting in poor performance efficiencies and decreased belt and pulley service life.

The stretch in most modern designed v-belts has been minimised. The use of exotic materials such as Kevlar have resulted in higher power transmitting capabilities. However, the correct v-belt tension must still be maintained to have the most effective transmission of power to the drive and minimise costs.

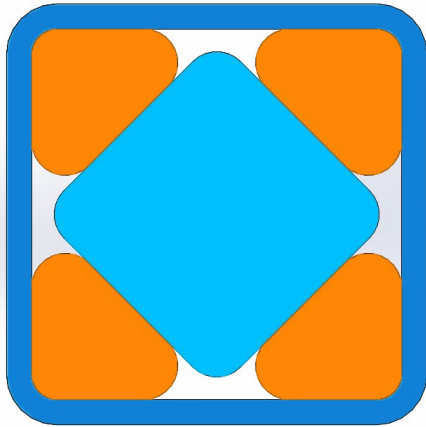


Figure 1



Figure 2

*Figure 1 clearly shows the rubber torsional spring in a neutral position. Figure 2 demonstrates the spring being loaded to an angle of 25 degrees. This stored energy is used to keep the v-belt tension optimised.*

The energy stored in this position is relative to the sectional size of the spring and its length. This technology has been developed in Australia to manufacture some of the largest rubber torsional springs in the world. Primarily these are used in the mining industry to tension v-belt drives but have many other applications such as the tensioning of large chain drives up to six inch pitch.

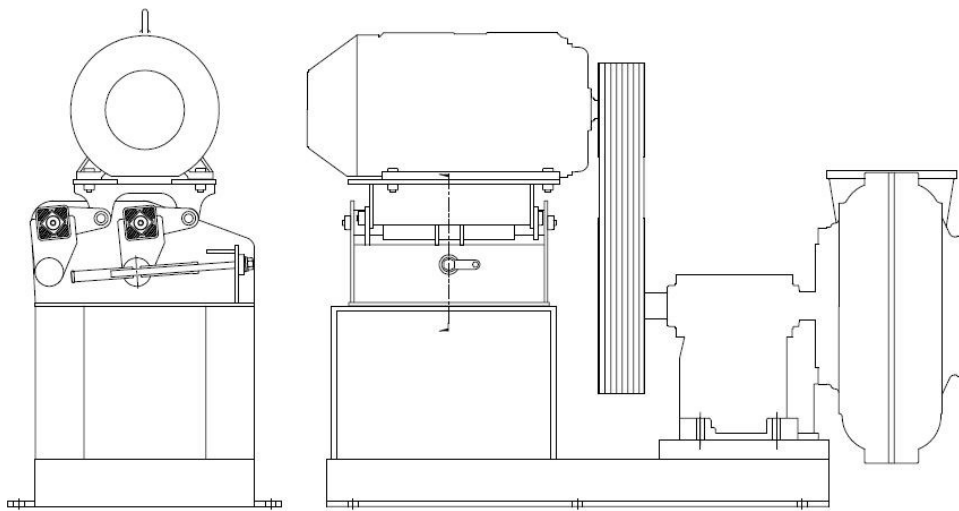
The rubber cord used in the manufacturing of the stored energy springs has been compounded specifically for the harsh environmental conditions found in the mining, quarrying and extractive industries. Forces provided by the spring are linear from 0 to 15 degrees and progressive to 25 degrees.



*Mechanical engineers checking a shipment of rubber cord.*

The functional application of each and every design depends on the following factors:

- the kW, frame size and poles of the electric motor
- the number, type, and section of the v-belts to be tensioned the angle of the drive and driven pulley
- the mass of the electric motor and whether it has to be lifted as well as tensioning forces to adjust the v-belts



*Typical overhead drive*

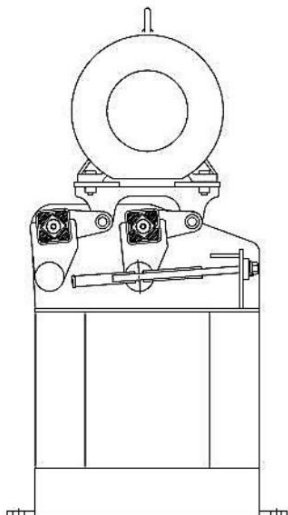
The design of the mechanical structure (which the rubber torsional spring is an integral part of) may consist of the most basic and agricultural design to more sophisticated and mechanically astute which provides minimum maintenance and long service life. These advanced designs make for simplistic and time saving adjustment systems which in return provide efficiencies in labour costs that most operators are seeking today.



*The most basic of all designs. A single rubber torsion spring. Exposed adjustment screws and mechanical locking devices. Limited in its capabilities and service life.*

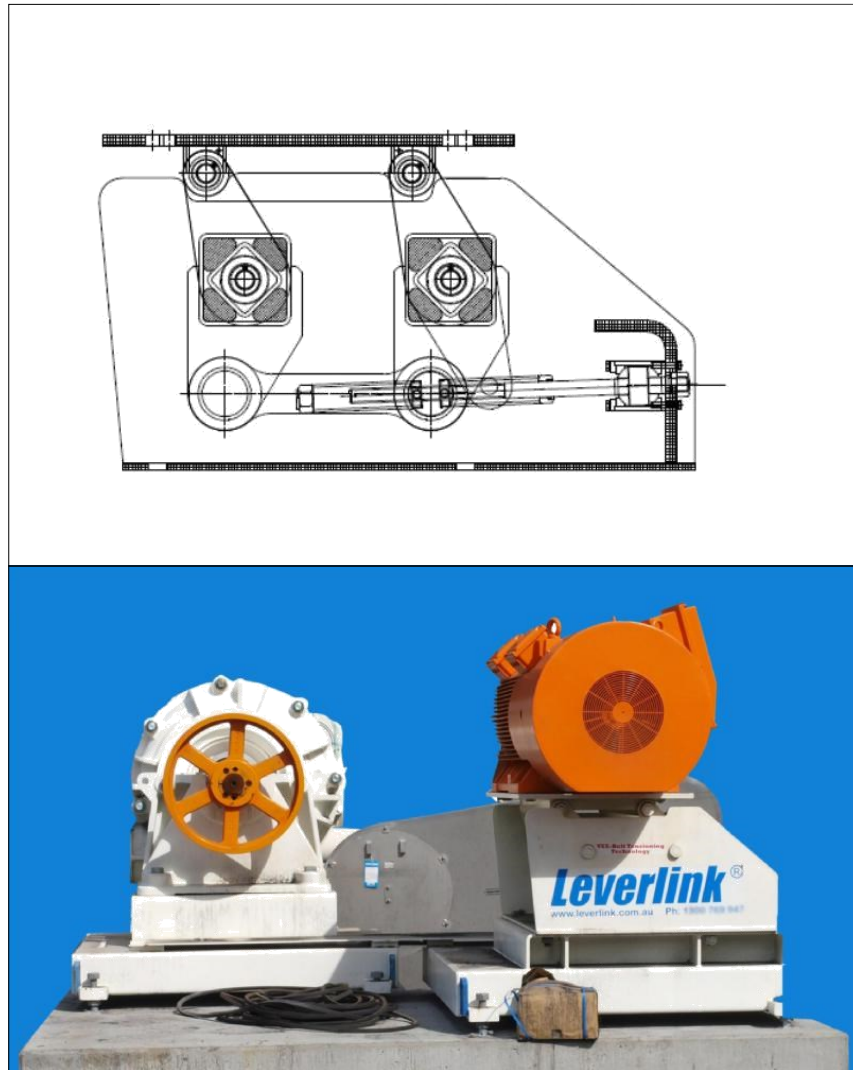
The rubber torsion springs in the design below is an example in which the mass of the electric motor as well as forces to tension the v-belts must be included into the design. It is not uncommon for motors in excess of 500kW and 5000kg to be mounted in this arrangement.

A design of this type is mechanically operated and all adjusting mechanisms are enclosed and lubricated.



This along-side drive arrangement is designed for electric motors 200kW and above. The dual rubber torsion springs provide a safe and stable platform for large motors.

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Previously we have discussed the technology of the stored energy capabilities of the rubber torsional spring. However, it also brings other benefits to the drive in that it can absorb shock load, which is often experienced in some applications. This can mean the difference between breaking shafts or belts in a rigid or fixed drive design.

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