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Robust Automatic Lubrication & Elegant Hydraulic Systems

HYDEN155 CABLE SAFE VALVE FOR REDUCED CABLE FAILURES

Cable-Safe and Reel-Safe systems significantly reduce failures to trailing cables that occur near the boot and anchor where the high majority of such failures occur and also have a positive impact on the failures that occur elsewhere in the production cycle. Fig 1 shows that the majority of failures have been due to inadequate cable tension during reeling-in and this occurs primarily when the cable reel is fullest at or near the anchor. Hyden systems provide up to a 50% increase to the reel-in tension with the following benefits:

1. The higher tension for reel-in prevents the formation of 'loops' and cable 'over wrapping'. This is particularly important during back spooling because these problems result in failures shortly after the car passes the anchor and is in the payout mode.
2. During normal reeling-in, higher tension raises the cable to be visible to the operator and a run over is less likely.
3. During back spooling, higher tension raises the cable to above axle height and a run over is less likely.
4. A higher tension whilst manoeuvring the car at the boot reduces the potential to crush the cable.

A high reel-in tension is not possible with constant pressure systems because the pressure is limited to the maximum during the payout mode where all efficiency losses in the cable reeling system add to cable tension whereas these same losses detract from the tension during reeling-in. The combination of these losses and the change in radius at the reel limits reeling-in tension with a full reel to about 25% of the cable rating.

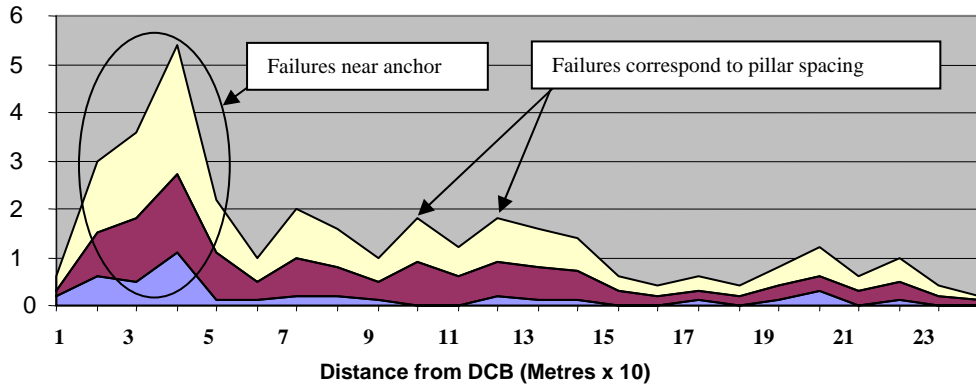
Hi-Low systems are similarly limited because the high reel-in pressure continues to be applied after the reel has switched to the payout mode so that there is a sudden doubling of the cable tension. This has frequently been misinterpreted as a shock from a reversal in the rotational direction of the reel. Standard Hi-Low systems also do not address the increase in tension due to the inertia of the reel during braking while reeling-in. Hi-Low systems also have an additional problem of instability leading to cable whip on start up or after stopping after payout.

Cable-Safe and Reel-Safe systems are dual pressure systems but the change from high pressure to low pressure occurs just prior to the reel stopping or reversing to avoid excessive tension and thus they operate to within 50% of the manufacturer's tension limits for reeling-in with a full reel and work at the limit with a near empty reel during payout.

In summary, the increased cable pressure for reel-in increases the maximum acceleration of the reel to prevent the cable from going slack while the accelerates, turns or hits bumps and thus prevents the cable from whipping and forming loops or over wrapping on the reel. The valves are also connected to brake pressure to force the valve to the low setting to prevent over tension during braking and slack in the cable is reeled-in at the low pressure setting and whip is avoided.

Damage Sites

Fig 1: Damage Zones For Shuttle Car Cables (Rutherford Cables)



MAJOR REPAIRS

SHEATH REPAIRS

TOTAL

