



## Hose Technology and Safety for Hydraulic Jacking Applications

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How can I predict when a hose is going to fail? What are the signs? How can I make my hose assemblies last longer? Studies have shown that over 50% of hydraulic system downtime is the direct result of hose failures. While a hose assembly may appear very simple, it is potentially the most dangerous component of a hydraulic system.

Several simple steps can be used to help eliminate hydraulic leaks that cause unnecessary downtime, which costs money and creates maintenance problems. Several causes of hose failures, and ways to remedy them for longer hose life are:

**Examination:** Carefully examine all hose lines after internal pressure has been removed from the system. Look for cuts, nicks, scratches, crush points and soft spots on the hose cover. The purpose of the hose cover is to protect the reinforcement, the strength member of a hose. If the cover is damaged exposing the reinforcement, it is only a matter of time before moisture will begin corroding the wires or damaging the adhesion between the reinforcement plies, leading to early hose failure.

**Twisting:** Look for hose twist, and follow the printed layline information. Does the layline spiral around the outside of the hose cover? If so, performance tests have shown that a 7 degree twist per foot of hose can reduce a hose's service

life by as much as 90-95%. To avoid twisting at the time of installation, use two wrenches when tightening the connections.

**Tight Bends:** Exceeding a hose's minimum bend radius can cause adhesion breakdown between the layers of construction, in addition to causing wire damage to the reinforcement. This significantly reduces the hose assembly's life and system performance. Follow the manufacturer's literature for minimum bend data.

Hose should not bend directly at the hose-fitting union. A minimum of at least 2X the hose's outside diameter should extend straight out of the end fitting before starting to bend. Bending at the hose-fitting union will cause undue stresses on the reinforcement, resulting in weak spots and ultimately creating a location for premature failure.

When reeling up hose, make sure to protect the hose end fittings, and more importantly, the hose leading into that fitting by using hose guards. Hose guards will help protect this area from the abrasion caused by their dragging along the ground and reducing the chance of them snagging on something during retrieval. Also, make sure the diameter of reel is large enough to accommodate hose lines connected together with quick disconnect coupling, or other type of hose unions. Make sure they lay freely around the reel and don't cause excessive bending at the hose-fitting connection. Bending the hose at the fitting will cause damage to the reinforcement, and possibly damage the hose cover causing premature cracking and flaking away of the rubber cover material.

**Minimize Connections:** Re-

view your system designs and try to decrease the number of connections used. "Every connection is potential leak".

**Protect from Sunlight:** Whenever possible remove your hydraulic hose from direct sunlight. Sunlight leaches out elastomers causing the cover to weather check (crack), and ultimately allowing moisture to penetrate into the reinforcement. Place protective covers over hose assemblies or store under a protective cover when not in use.

When routing hose lines always allow sufficient length for hose to shorten under pressure. Most hydraulic hoses will shorten under pressure. Allow enough room for this to occur.

### **Remember— Safety Comes First:**

Route hose assemblies so that all bends are directed away from the operator.

When searching for leaks, use caution. Some areas can be dangerous for hands and faces.

When servicing or replacing hose lines, make sure pressure has been relieved.

Never remove a hose line from an extended cylinder.

Make sure all the components are rated for the system's maximum pressure. Hose and fittings generally have a 4:1 safety factor. In static applications such as jacking hose those safety factors are normally reduced to 2:1. Special care should be used in selecting the proper products for these systems. "Cheaper is often not better". You usually get what you pay for in this industry.

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