WHAT IS A PRESSURE RELIEF VALVE

All drilling fluid circulation pumps are positive displacement type pumps and so they deliver a constant volume of fluid irrespective of the pressure against which the pump is pumping.

In a drilling operation, this means that if a blockage occurs at the drill bit or in the borehole, the pressure in the system will increase until something happens to relieve the pressure; for example, a waterswivel hose may burst or one or more cylinder covers may be blown off the circulation pump. The pressure relief valve is therefore a critical piece of safety equipment on the drill rig.

Pressure relief valves from different manufacturers may look different, but all pressure relief valves fitted to positive displacement pumps used in drilling applications are *spring type* relief valves and they work on the same principle.

COMPONENTS AND OPERATION OF A SPRING TYPE PRESSURE RELIEF VALVE

Figure 1 shows a simple spring type pressure relief valve and the principles of operation of the valve.

A compression spring exerts a force onto the top of a ball that seats neatly into a valve seat. Fluid pressure acts on the bottom side of the ball while the compression spring acts on the other.

When the fluid pressure exceeds the force exerted by the spring, the ball is pushed out of the valve seat and fluid is allowed to flow past the ball and out of the relief port thereby relieving the system pressure.

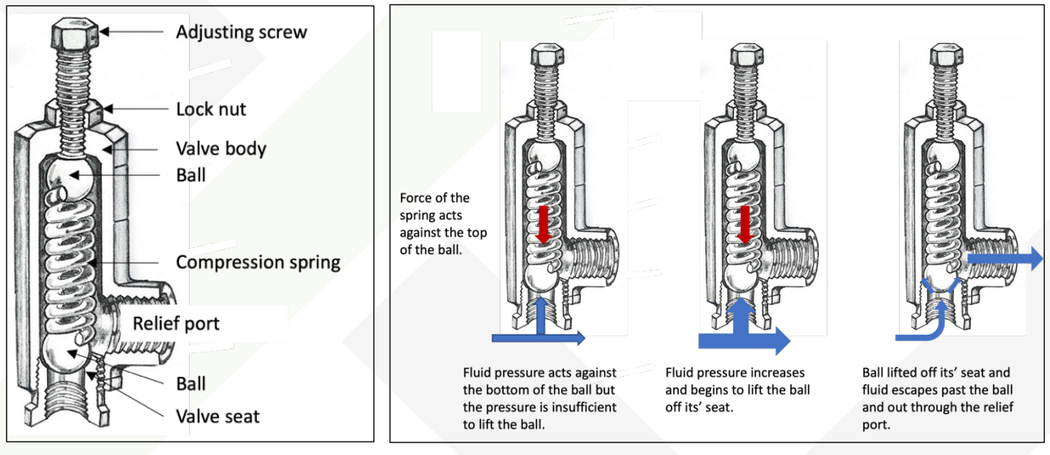

Figure 1: Components and operation of a spring type pressure relief valve

The force exerted by the spring on the ball can be altered by the adjusting screw - if the screw is turned in, the spring will be more compressed and so the force needed to lift the ball will be greater – and so the relief pressure will be greater.

Figure 2 shows two different pressure relief valves fitted to circulation pumps. The valve on the left has the relief port at the bottom of the valve while the valve on the right has the relief port on the side of the valve. Both valves are however spring type valves and they are identical in terms of their operation.

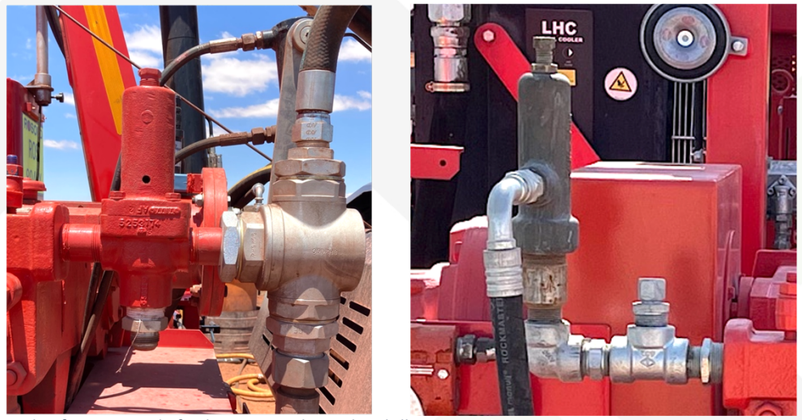

Figure 2: Example of pressure relief valve commonly used in drilling operations

ESSENTIAL FEATURES

When the pressure relief valve operates, some drilling fluid is forced out through the relief port and so the volume of drilling fluid that flows downhole to the drill bit is reduced. If the Driller continues to drill with the relief valve relieving, it is possible that the bit could burn in, it is essential therefore that the Driller knows if the pressure relief valve is relieving. A hose must therefore be installed at the relief port that runs under the drill rig to the floor of the control panel so that the Driller can see and / or hear when the relief valve bypasses fluid.

The relief valve in the right hand photo above is correctly installed but the valve on the left does not have a hose attached to the relief valve port.

INSPECTION OF PRESSURE RELIEF VALVES

Pressure relief valves are an essential piece of safety equipment and as such they must be regularly inspected, maintained and repaired.

Daily inspection by Drillers and safety officers will include:

i. checking for leaks at the discharge hose and at the relief port,
ii. checking that the relief valve has not been tampered with or altered in any way.

Correct operation of the pressure relief valve must be checked at least once every 6 months and all pressure relief valves must be stripped, and serviced on an annual basis.

Under no circumstances should the relief pressure be altered without the approval of the Site Supervisor.