POLYETHELENE PIPE

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ABSTRACT

Polyethelene pipe is a petroleum-base product. It is highly resistant to corrosion from all forms of acid with the exception of banana oil. Polyethelene pipe is effective from approximately 0 to 325 pounds of working pressure, depending on the size of the pipe, the well thickness of the pipe, and the temperature. The main ingredient in polyethelene pipe is resin. The quality of the pipe is determined by the type of resin used.

Two of the main advantages of polyethelene pipe over steel pipe are that it can be produced for about one half the cost of steel pipe and that it is resistant to minerals in the soil. Whereas minerals will eat steel from the outside in, even though it is chemically treated on the inside, the minerals from the soil will eventually eat through from the outside. Polyethelene pipe will not be deteriorated by minerals. Polyethelene pipe compares to most other pipes of equal size and strength to be about 20 to 30 percent lighter.

Tools for operation include a 110 volt AC generator for heating facers necessary to fuse the pipe together, a depth gauge, a facing tool, and an alignment jig.

There is a constant struggle for capitol to invest in drilling programs and therefore we must constantly seek new ways to save money and time. Polyethelene pipe when used in its proper perspective is one of the answers to this problem.

Polyethelene pipe is a petroleum-base product. Designs for all low pressure installations in community or oil field are available wherever needed. It is highly resistant to corrosion from all forms of acid with the exception of banana oil. Polyethelene pipe is effective from approximately 0 to 325 pounds of working pressure, depending on the size of the pipe, the wall thickness of the pipe, and temperature. Temperature is the only thing that will effect the strength of the pipe. The lower the temperature, the stronger the pipe. Polyethelene pipe is effective from -80° to 180°. The main ingredient in polyethelene pipe is resin. The quality of the pipe is determined by the type of the resin used.

Polyethelene pipe can be produced for about one half the cost of steel pipe. It takes half a day to lay 4,000-4,500 feet of 2 inch steel pipe, a gang truck, an average of 4 men, threaders, 36's, 24's, and lazy boys, while with polyethelene it takes only 30 minutes, 2 men, a 110-volt generator, a heating iron, thermostatically controlled to a degree of between 475° to 500° and 2-inch polyethelene collars or a butt fusion unit. On longer lines it saves a considerable amount of money because of the time element involved in laying steel.

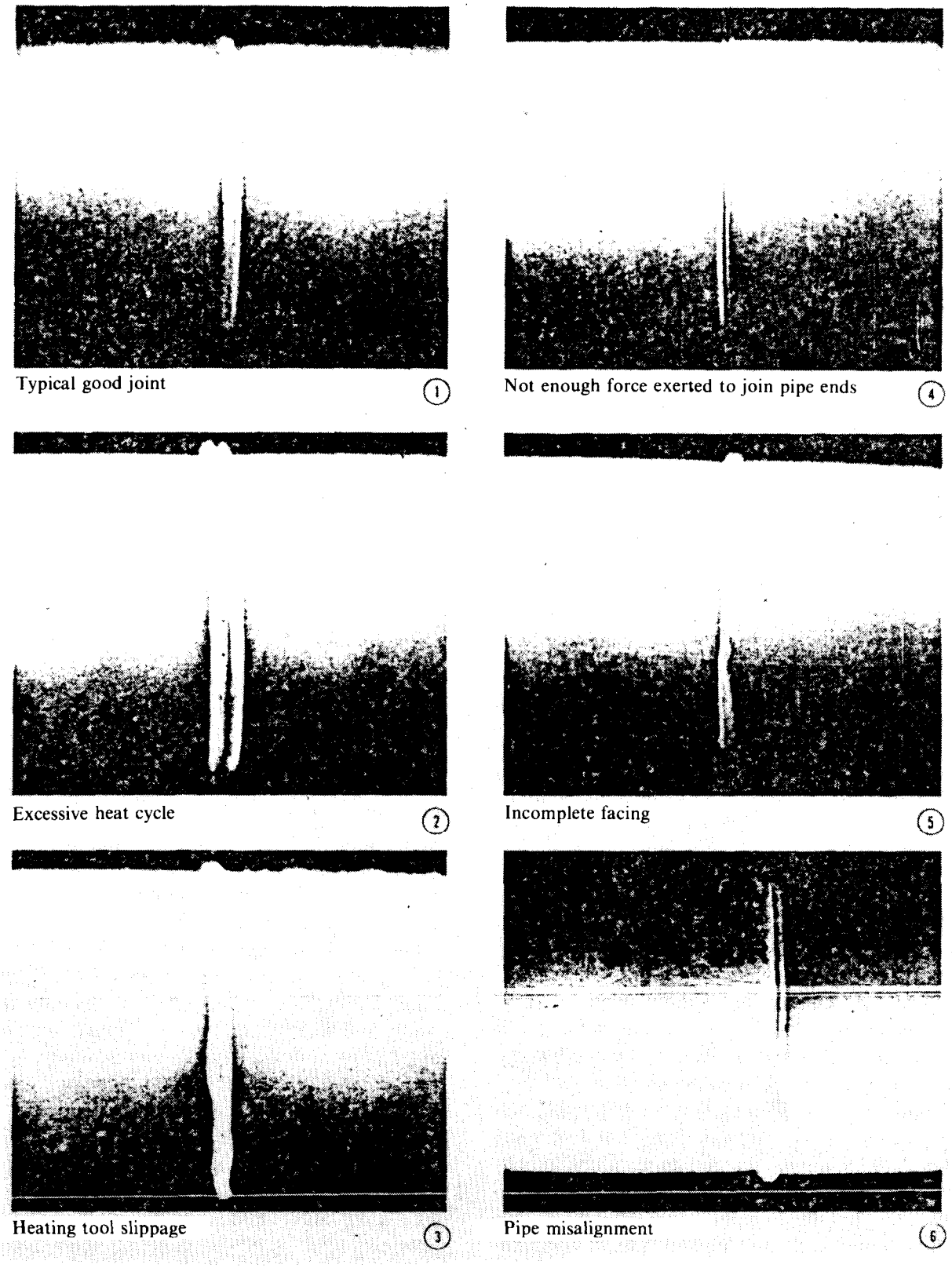
In times past, it has been stated that polyethelene pipe was a solution to paraffin problems, but it is only a partial solution. It takes longer for paraffin to build up in polyethelene pipe because of the smooth interior and the lack of frequently inserted collars.

One of the strong points for polyethelene pipe is its resistance to minerals in the soil. Minerals will eat steel from the outside in, even though it is chemically treated on the inside; the minerals from the soil will eventually eat through from the outside. Minerals will not deteriorate polyethelene pipe. The life expectancy of polyethelene pipe is uncertain because it has not been in the oil field industry more than 8 years. But up to and including the present time, there have been very few problems with polyethelene pipe and most of those are due to the overselling of it. Salesmen have sometimes claimed that it will do things it is not designed to do, withstand pressures it will not stand, and so forth.

Another advantage of polyethelene pipe is it takes fewer connections to install. With the 2-inch through the 6-inch lines, the polyethelene pipe can take a 45° turn whereas with steel pipe this is not possible.

FIGURE 1– VISUAL EXAMINATION OF THE BUTT FUSION JOINT

Butt Fusion Joint Appearance



Typical good joint (1)

Not enough force exerted to join pipe ends (4)

Excessive heat cycle (2)

Incomplete facing (5)

Heating tool slippage (3)

Pipe misalignment (6)

Handling polyethelene pipe is a fairly easy process since it compares to most other pipes of equal size and strength to be about 20 to 30 percent lighter. When stacking pipe for hauling or stocking, avoid excessive heights because they can cause bottom rows to become unrounded. Coiled pipe can be strung from reels or by hand if coils are small enough to permit. Naturally when unloading the pipe a person must avoid gouging it. When and if gouges occur always cut out and replace the gouged sections. However, polyethelene pipe is not as easy to damage as some would have us to think. Polyethelene pipe can be used and reused. Say we had a 3,000 or 5,000 foot flow line. This flow line is laid to a tank battery from a pumping well or a salt water line (whichever the case) and the well depletes or you wish to discontinue its use. You can recoil the pipe in a matter of a very short time and put it to use somewhere else. In the case of many other types of pipe, the cost of reuse would be must greater. Also polyethelene pipe (even though it does not seem logical) is very durable in case of rock because it has a tendency to give instead of wear.

Electrically heated tools operating off of 110 volt AC are recommended for heating polyethelene pipe and fittings to make fusion joints. These tools are thermostatically controlled and have temperature indicators in the irons to permit adjustment to proper heat, which on most polyethelene pipe is from 475° to 500°. There are one or two polyethelene pipe products in the market that are heated at a lower temperature because they have a lower melt temperature. The fusion temperature on these is 350° F.

A variety of heater facers are available for heating irons for socket type fitting such as couplings which require a male and a female heating surface to heat the inside of the fitting and the outside of the pipe simultaneously. Saddle fittings such as service saddles, tapping T's, and repair saddles require a contoured heating surface to match the saddle and the pipe. A flat-surfaced iron is required for making butt fused joints.

Other tools required are a depth gauge to insure proper penetration into the socket fitting by the pipe, a facing tool to square the ends of the pipe for butt fusion so the pipe will fit smoothly together, and an alignment jig to make sure the pipe is lined up and to hole it in place while making butt fusion joints.

Of greatest importance is to keep the faces of the heating irons clean of any foreign substance while the pipe is being welded. Foreign substances cause faulty welds and will finally cause a breakdown in the weld.

Cutting polyethelene pipe is a very simple operation. It can be done best with a regular carpenter saw for larger sizes and with a special pipe cutter for smaller sizes much like a steel pipe cutter but much lighter.

Production fusion joints should be inspected to ensure that the joining process is done according to proper procedures and that the person doing the work is qualified to perform such a procedure.

Joints in polyethelene pipe should be checked visually on a sampling basis by the inspector (Figure 1). If there is any reason to suspect the fusion is bad, it should be cut out and refused. Inspectors should be qualified by field experience and by their ability to recognize proper fusion procedures and joining.

There is a constant struggle for capital to invest in other drilling programs and other types of production, whether it be oil or gas. Therefore, we must constantly seek new ways to save money and time. I am firmly convinced that polyethelene pipe, when used in its proper prospective, is one of the answers to this problem.