

Progressive Pigging

Progressive pigging is a special method for pigging lines with reduced internal diameters. This method of pigging is necessary due to the fact that most pigs cannot accommodate extreme reductions. Also, trying to remove a large amount of buildup from a line with a single pig fW1 can spell certain disaster by completely plugging the line. The two types of reduced internal diameter lines are: concentric and non-concentric, in which the buildup is on the bottom of the pipe only. The following procedure is for progressive pigging lines with concentric buildup. These are recommendations only and should not be considered absolute. In all cases, it is advisable to consult with knowledgeable pigging personnel for variations in the procedure.

For this paper we will be using an extreme example of a 16" pipeline with a 6" concentric buildup of mineral scale, thereby resulting in a 4" effective internal diameter, in order to demonstrate the full realm of variables for progressive pigging.

The first step involves ascertaining the internal diameter of the line. This can be achieved by viewing the inside of the pipe at either end or removing a fitting such as valve; using a light-density swab to prove the line (described below); or using an educated guess. Because deposits can be heavier in some sections of the line and lighter in others due to piping and flow variations, it is recommended to use a line-size-light-density swab to prove the line. From our example, this would be a 16" swab. The swab is able to negotiate the reduced diameter and will also be able to expand up to its full shape in sections where there the buildup is lighter. The swab will also remove a layer of soft deposits or loose debris, (if any), establish pig run time, pressure and velocity. These need to be noted for future reference. When retrieved, the swab's outer diameter is measured. This needs to be performed rather quickly due to the fact that the swab will soon expand to its original shape. The measurement obtained is the smallest effective internal of the diameter of the line.

We are now ready to begin the progressive pigging method. With our example, we have an 8" effective internal diameter. Therefore, we begin pigging with an 8" medium-density bare pig followed immediately with a line-size (16") swab. The swab will help keep the 8" pig moving in sections of the pipe where the internal diameter is larger than 8". This step may need to be repeated until the 8" pig is retrieved with minimal wear. The next step is to run an 8" medium-density criss-cross pig, again followed immediately with a 16" swab. The criss-cross will remove more of the deposited buildup. This step may also need to be repeated until the 8" pig is retrieved with minimal wear. Next, we run an 8" medium-density criss-cross wirebrush pig, also followed immediately with a 16" swab. The wirebrush pig will remove even more of the buildup. Depending on the length and type of buildup, this step may or may not need to be repeated.

We have now successfully completed the first stage of progressive pigging. By increasing the diameter of the pigs and repeating the above three steps, we continue pigging until reaching the full internal diameter of the pipe. Depending on the length of the line, type of build, the increasing diameters of the subsequent pig runs may be in increments as small as 1/4" and as large as 2", (or next nominal pig size --10" for our example). The last stage of progressive pigging is to run a line-size medium-density bare pig to perform a final sweep of the line removing any loose debris. By adopting a routine pigging program, progressive pigging should not be needed again to clean the line.

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