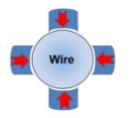

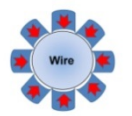
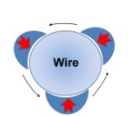


Wire Straightening Theory & Practice

Over the years there have been several approaches taken to straighten wire with each in its own way resolving certain issues or problems that were encountered when trying to form something from the wire. Many of these approaches continue to be used even though the necessities of modern wire forming applications have evolved beyond the point where they can achieve success. This document will address the theory and practices to consider when trying to straighten common materials and special wire alloys produced for more modern applications.

Typically wire is straightened by manipulation. The two widely used methods are the [“roll” style straightener](#) and the “rotary” style. The basic approaches that each style employs is illustrated below. The rotary method will generally deliver the best results, but is very expensive to implement, is slow, and can leave marks on the wire called “barber poling” which appear spiral in nature if not set up correctly. In the case of the roll straightener, the wire is maneuvered or forced to traverse a course around [roll bearings](#) like a skier running a slalom course. The wire is bent past its elastic point and then redirected to a straightened state. In the case of the rotary style, the straightening dies are rotated around the wire as it is pulled through the device. The rotational speed and direction of the dies as well as the feed speed and tension value applied to the wire must all be carefully controlled in order to obtain good results. Roll straighteners, on the other hand, can be configured with multiple planes that can produce similar results of a rotary straightener but are less expensive, [easier to set up](#) and, depending on bearing selection, can be operated at speeds into the thousands of feet per minute.

The two lists below provide “tips” on how to get the best straightening results possible. The first list will give you “tips” that should be applied regardless of style selected. The second list will provide “tips” that relate to the two basic machine styles available in the market place. The more of these featured “tips” a product offers or can work with the better performance will be.

	<p>Typical 2-Plane roll style approach. Good for breaking “cast” and general straightening of low tensile wire and strip</p>		<p>Roll style straighteners can be configured to do other shapes. Hex, triangle, rectangle, oval, diamond, “D” shape, square, “I” shape, etc.</p>
	<p>4 Plane roll approach – emulates the “rotary” approach. Works very well on higher tensile wires and more critical straightness requirements.</p>		<p>Rotary approach – The rotating items are called “dies” and are made from, ceramic (typ), brass, carbide, bronze, etc. based on application.</p>

General Considerations

Wire Line	The wire should travel in as straight a line as possible when being “paid off” from the spool, coil, or reel and through the straightening device.
Back Tension	The wire should always be “pulled” through the straightening device with consistent back tension or resistance.
Pulling Force	The pulling force applied should be as consistent as possible. Avoid “herky – jerky” pulling action at all times.
Lubrication	Try to use a lubricant on all applications. This will result in a more consistent friction value for the straightening device to deal with. There are many evaporating lubricants available with several being FDA approved.
Tensile Value	As the wire tensile value approaches 300 ksi a “roll” style straightening device is less effective.