THE LASER — AS USED IN ALIGNMENT

by

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For many years people have thought of the laser as something used with success in the fields of communications, medicine, industry, and, of course, Buck Rogers, Star Wars and the Hollywood Bowl with laser music. Communications has used the laser extensively to beam back signals from distant planets, the medical field to heal the detached retina and remove cataracts from the eye, the industrial field to cut, or rather, melt the extremely hard diamond, and now the field of machinery to solve precision alignment problems. Some people have considered the laser to be one of the greatest advances made in the field of precise alignment. This could be so in certain conditions or uses, especially in the field of turbomachinery.

The piano wire in its day was the ultimate in alignment and many people still believe the piano wire for the simple reason that you can see it as a centerline. Optical alignment superseded the piano wire and it will be used for many years to come as one of the best methods of aligning and realigning turbomachinery. However, we again face the skeptics who believe there is something mysterious about optical alignment because they cannot see this centerline, this invisible line of sight. Is the laser, with its "red beam," going to solve the mystery of alignment?; some people will say "yes," some will say "no," and then there are some who just don't believe we need sophisticated equipment to check alignment of machinery. As a user of both optical and laser systems, there will be times when the laser will have preference over the optics, and vice versa.

Looking at some of the preferences of laser over optics, one must consider bores, be they bearing bores, labyrinth bores, or housings, as they are sometimes called. In other words, being able to sight through a turbine and perhaps two compressors all with the rotors removed, and aligning all three units in their desired position. On some makes of gas and steam turbines, plus compressors, the actual bearing housings are aligned, bolted and doweled. Sometimes bearings such as stated require realignment with the machined labyrinth housings of the case. This would be an ideal use for the laser; however, it is one that does not present itself very often.

One factor that some people point out in the laser preference is that is removes the human element from making a mistake in making alignment measurements; however, it also makes people believe that the measurement being taken is an actual measurement and not fictitious as it can be read easily from the digital readout meters by all concerned.

The optical preference would be when one is involved on a compressor train measuring cold to hot alignment. To use the laser involves special fixtures to accept the laser detector targets as the target takes the place of the optical scale. This is a time problem rather than a problem of taking measurements to a service organization, but would not necessarily be a problem to a plant using a laser as the target fixtures would then become permanent. Stating the position of a service organization, the optical methods offer more versatility over the laser methods when a wide variety of turbomachinery has to be checked.

Alignment is a prime factor in all machinery and the laser is extremely useful for checking reciprocating compressors, such as crankcase bearing saddle alignment, compressor cylinder to crosshead guide alignment, or plastic extruder barrel to driver alignment, to name only a few examples.

There are several laser systems on the market; however, there is only one which is made to NAS standards, namely Keuffel and Esser. This can be a considerable savings especially if you have been using the optical method of alignment and the fixtures that go along with it. The prime example would be the laser instrument, which has the same diameter as an alignment telescope; another would be the laser detector targets being the same diameter as the optical targets. In short, to get into laser alignment from scratch will cost approximately twice what it would if you already have the optical fixtures.

No matter what method of alignment be used, be it laser, optical [1], Acculine [2], proximity probes with water cooled stands [3], or Dodd bars [4], they are all infinitely better than not using any method whatsoever. Everyone has their preference; if you don't have one, get one.

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