Special Application Conditions - Restricted Spaces (continued)

EDT self-aligning bearings are not symmetrical around the major O.D. so they can be reversed in the housing which changes a design dimension without compromising the design load or requiring redesign of the product. This allows EDT bearings to retrofit into locations where other bearings will not physically fit without design changes to the rest of the equipment. EDT Locking Sleeves can also be installed from either the right or the left of every bearing which gives added flexibility to the installer. The combination of part's flexibility results in a total of four installation options that can be readily adjusted in the field (see Fig 21-1).

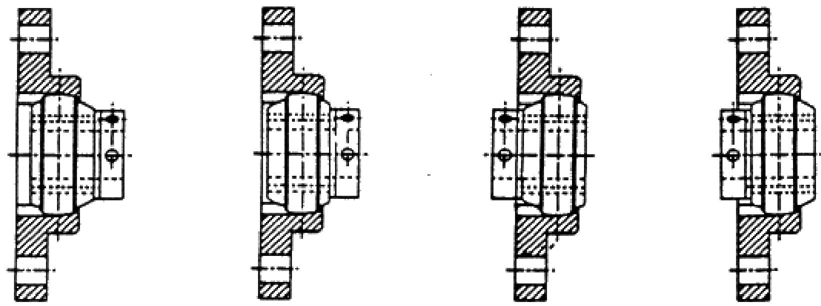

Fig 21-1

General maintenance and lubrication are growing problems as the equipment density of floor space increases in processing and manufacturing plants. EDT products reduce or eliminate lubrication and eliminate the catastrophic failure that often occurs with rolling element bearings in harsh environments. EDT bearings can reduce the unplanned maintenance that is required under extreme environments, which in turn reduces the overall cost of operations. Elimination of lubrication can reduce machine clutter because central lubrication systems can be eliminated.

Vertical shaft

Vertical shaft applications for rolling element and plane bearings must be carefully considered. There can be problems if details are not anticipated or are overlooked. For rolling element bearings, a tapered roller or an angular contact product is specified on many occasions because of their thrust capabilities.

For plane bearings, the same details that must be known for rolling element bearings apply. On plane bearings, the thrust surface is provided by either the full face of the bearing (in the case of EDT's Poly-Round® bearings) or on the polymer flange (in the case of EDT's ALL-ROUND® series). With both of these bearing styles, the thrust surface and the flange of the Locking Sleeve must be ON TOP of all of the bearings (see Fig 21-2). One bearing is chosen to be the first installed and the flange of the Locking Sleeve will be in full contact with the bearing. For all subsequent bearings on the same shaft, the flange of the Locking Sleeves will also have full contact. After the required "freewheel spin" to test for any misalignment, the units can be locked down and the drives connected. To prevent problems that often occur on vertical shafting, a final safety precaution is required: A SPLIT set collar must be placed directly on top of each Locking Sleeve flange to insure the shaft remains securely in the bearing despite load and vibration that would loosen the set screws on the flange of the locking sleeve (see Fig 21-2).

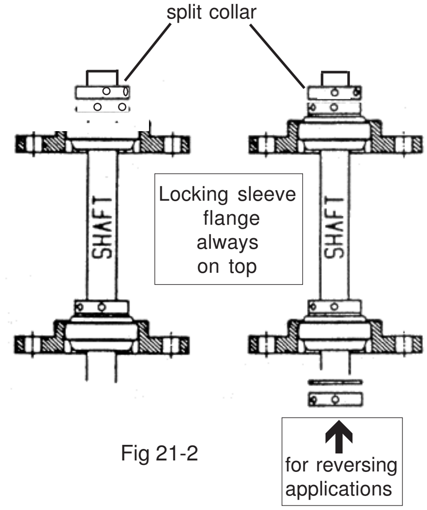

Fig 21-2

continued on next page...

It is necessary to use an appropriate threadlocker on ***ALL*** setscrews because the continuous expansion and contraction of metals, however sleight, cause threaded products to vibrate loose.

For reversing vertical applications, a polymer thrust washer and split locking collar will be require below one bearing assembly (see Fig 21-2, page U-21).

Vibration & Impact

Vibration and impact cause problems in multiple ways. These problems manifest themselves differently under varying conditions, so they are addressed here separately.

How **vibration** affects any bearing will depend on the frequency and amplitude (strength) of the motion. A plane bearing operates with *freeplay* in the bearing so it can rotate or slide. This *freeplay* allows the shaft to shuttle back and forth in the bearing which can cause damage to the bearing and possibly to the machine. *Freeplay* can be a major source of heat in a bearing that can lead to early failure.

Rolling element bearings encounter this same *freeplay* action, although to a much lesser degree. The condition of the bearing races quickly become a serious issue when the shaft is loaded and then unloaded in the bearing; in some cases, this will cause the races to crack and fail.

Clearly, it is best to try to identify the source of the vibration and control it at the source as much as is possible. If that cannot be done, then high frequency vibration is most effectively handled by utilizing a preloaded rolling element bearing.

Impact load is different from higher frequency vibration and is generally better handled with plane bearings than ball bearings. There are a lot of issues to be considered here such as the choice of material that is necessary to perform in other parameters of the application. As a rule of thumb, higher performing materials are harder and more brittle while lower performing materials generally are softer and much more impact resistant. Fortunately, high impact situations usually do not require use of higher performing materials.

Rolling element bearings have hardened races in order to support the movement within ball bearings – the end result of hardening is more brittleness. Impact applications are normally solved with plane bearings than with rolling element bearings. As with all other harsh applications, vibration and impact will loosen setscrews, so an appropriate threadlocker is required.

Drive Design

Some drive designs are easier on bearings than others. Many systems are designed with a cantilevered drive but this type of design loads the bearing unevenly. Whenever possible, drives should be placed BETWEEN a pair of bearings. If a cantilevered design is required, the pair of bearings supporting that drive shaft should be separated as far apart as practical.

Whenever possible, shaft mounted gear reducers should have some support that relieves the cantilevered shaft as the sole support.