



**BRITISH  
ENCODER**  
PRODUCTS COMPANY



## Shaft Loading and Sealing vs. Bearing Life Expectancy

The mechanical life of the Encoder is mainly determined by the loading on the bearings the unit is subjected to.

Two types of loading must be considered, radial, and axial. Radial loading is the perpendicular force applied to the shaft. Axial loading is the parallel force, or force that is applied along the same direction of the shaft. Bearing life is determined by several factors. As either the radial or axial loading increases, the life is shortened. For this reason, the minimum amount of shaft loading or misalignment should always be the goal when installing the Encoder.

The actual bearing life is derived by the above mentioned loads, and the speed of rotation. The higher the speed of rotation, the shorter the life of the bearing. These things all work together, so in a worse case condition which involves high shaft loading at high speeds, bearing life might not be what you would expect. The same amount of load impressed on the Encoder at lower rotational speeds, might never cause any concern with the life expectancy of the bearings.

One thing to remember when installing the Encoder, is the fact that the radial shaft loading increases as a linear function the further away from the bearing the force is applied. Much like holding a heavy object with your arms outstretched. With a pulley or sprocket mounted at the end of the shaft, the bearing life might again, be compromised. The same thing applies when units with extended shafts are used. It is always best to place the pulley, sprocket, wheel, or whatever as close to the bearing as possible.

Another factor concerning bearing life, which really doesn't apply to the Encoder is heat. Excessive temperatures can thin out the grease in the bearings and this can cause failure due to lack of proper lubrication. Foreign matter getting into the bearings can also cause rapid failure, whether it is in a liquid or solid form. Ball bearings are precision devices with very critical internal clearances. Anything that disturbs these clearances will surely shorten the life expectancy, often quite drastically. For that reason, most of our Encoder models are available with shaft seals. The shaft seals help to seal the unit along with the bearings against the ingress of any foreign substances that can, and will, cause early failure.

So to realize the maximum life potential of the Encoder, please take the necessary precautions when installing the unit to insure proper shaft alignment and specify shaft seals when needed. For more information regarding the availability of shaft seals, and what type please refer to our complete product line catalog or contact BEPC Customer Service at +44 (0)1978 262100 or email [sales@encoder.co.uk](mailto:sales@encoder.co.uk)

TB-103.doc, Rev B, 09/30/05, BEPC Version