

7. Load rating and life

If the track rollers operate on a flat surface/raceway, the outer ring deforms (fig.1)

When compared with a bearing mounted in a suitable housing, track rollers have the following characteristics:

- Modified load distribution

This is accounted for by using the load factors C_w and C_{ow} when calculating the life.

- Alternating bending stress on the outer ring

This is taken into account by the load coefficients F_{rperm} and F_{roperm} (see dimension tables). The stresses must not exceed the allowable limits.

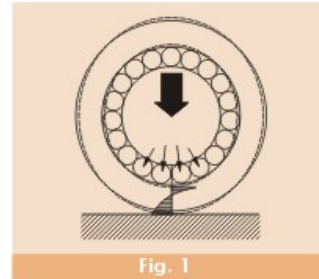


Fig. 1

7.1 Load ratings and life calculation

The dynamic load rating of the track roller is determined by the fatigue limit of the material. The life of the track roller is defined as the period of use before the appearance of fatigue. The ability of a track roller to carry dynamic loads is statistically derived.

7.1.1 Life calculation

The formula to calculate the nominal life is as follows:

$$L = \left(\frac{C_w}{P}\right)^3$$

$$L_h = \frac{833}{H_{nosz}} \left(\frac{C_w}{P}\right)^3$$

$$L_h = \frac{1666}{V_m} \left(\frac{C_w}{P}\right)^3$$

L = nominal life in 10^6 m reached by 90% of a statistically significant number of apparently identical bearing operating under the same loading condition before the onset of metal fatigue.

L_h [h] = nominal life in hours

C_w [N] = Dynamic load rating. Is the load that would yield a nominal life of 10^6 m.

P [N] = equivalent dynamic load

H [m] = stroke

n_{os} [min^{-1}] = frequency of operation

V_m [m/min] = mean operating velocity

7.1.2 Radial dynamic limit load F_{rperm}

When selecting the product it is necessary to insure that no loading condition will exceed the allowable load.