

### **603.06.02 Rotational Requirements**

The rotational requirements of these bearings is treated in a new way. Rotational requirements of the bearings,  $R_b$ , are determined by:

$$R_b = R_s + R_c$$

where

- $R_b$  = Rotation capacity designed into the bearing.
- $R_s$  = Anticipated rotation of the structure in service. (includes live loads and rotations induced by construction/erection sequences).
- $R_c$  = Rotation induced in the bearing by construction tolerances, 0.02 radians maximum (see Design Criteria 14).

### **603.06.03 Use**

Use of multi-rotational bearings is especially indicated where:

1. Low profile, high load bearings are required.
2. Long span, curved, or skewed bridges and other similar structures of complex design are required.
3. Long slender columns or light frames and members exhibit minimum stiffness or rigidity.
4. The direction of rotation varies.
5. The direction of rotation cannot be precisely determined.
6. Settlement of the substructure is anticipated.
7. Self aligning capabilities are required.
8. Load and rotation eccentricity does not significantly alter the net distribution of stress through the bearing and into the substructure and superstructure.
9. It is desirable to reduce the moment applied to truss or space frame panels.
10. Large movements are anticipated.
11. Economical, long life, or low maintenance bearings are desirable.
12. Regular elastomeric bearing pads would exceed 100 millimeters in height.

### **603.06.04 Design Criteria**

Since special details are required to allow for access for inspection, repair or replacement of the bearings, the respacing of joints to eliminate the need for use of these bearing types should be considered.

Some structural considerations in use of multi-rotational bearings are listed below. Reference to "this specification" refers to the design criteria below.

1. Vertical and horizontal loads shall be assumed to occur simultaneously. All loads are service loads. Minimum vertical loads are for dead loads and superimposed dead loads excluding the future wearing surface. Maximum vertical loads are for dead loads, superimposed dead loads including the future wearing surface, and live loads and impact.
2. The total recommended clearance between all guiding and guided sliding surfaces is 1.5 millimeters in order to limit edge stress on guiding interfaces.
3. Avoid specifying total spacing of more than 1.5 millimeters between guides and guided components where possible.
4. In specifying the horizontal force capacity of bearings, it is recommended only one fixed or guided expansion bearing shall be assumed to resist the sum of all the horizontal forces at each abutment, bent, column, hinge or pier.