

Cage with high load tapered roller bearings

[Tapered roller bearings](#) are usually separated, that is, the inner ring assembly with roller and cage assembly can be installed separately from the outer ring. Tapered roller bearings are widely used in automobile, rolling mill, mining, metallurgy and plastic machinery industries because they can withstand large axial and radial loads. In rolling mills and some special occasions, tapered roller bearings need not only high bearing capacity, but also regular inspection of raceways, in order to timely grasp the damage of raceways. At present, for the tapered roller bearing with smaller roller diameter, the support welding can not be adopted because of the size limit. Connect the cage, and the use of stamping cage will lead to bearing bearing capacity decline, and the installation and use of the raceway is not easy to observe the situation.

Here is a new structure cage that can effectively solve the above problems.

1 bearing structure

The cage of [tapered roller bearings](#) has stamping cage and support welding cage. For the sake of stress and technology, when the diameter of tapered roller is less than 30 mm, steel plate stamping cage is used; when the bearing diameter is more than 650 mm, the support welding cage is generally used. The tapered roller bearings of this kind of structure are not suitable for the occasion that the raceway needs to be repaired because the tapered roller bearings of the tapered roller bearings pillars of the stamping cage are inconvenient to be disassembled and can not be disassembled many times. To ensure the strength of the stamping cage, the width of the cage pocket beam is larger than a certain value, so the number of rollers is less and the corresponding rated load is lower than that of the bearings of the support welded cage. At present, tapered roller bearings are commonly used in the strut welding cage structure. The strut is connected with the two gaskets of the cage through the hollow roller's strut hole. The connection mode is that the stud thread end is connected with the large gasket thread hole of the cage, and the stud groove end is welded and fixed with the small gasket of the cage. The structure generally requires that the roller diameter $D_w > 30$ mm, if the roller diameter is less than 30 mm, because the machinable pillar hole is too small, the strength of the selected pillar is not enough; if the processing of the pillar hole is too large, the roller in the case of loading, the pillar hole stress is large, easy to cause roller fragmentation. In order to increase the number of rollers and increase the rated load when the diameter of tapered roller is less than 30 mm, solid roller support can be used to weld cage structure. The strut is connected with two gaskets through the outer side of the roller to limit the position of the roller loaded into the inner ring.

2. Design of welding cage for solid roller support

The cage structure adopts full-loaded solid tapered roller and prop welding cage, and a sufficient number of solid tapered roller is installed in the inner raceway. The connecting prop is placed outside the roller and welded with large and small gaskets of the cage, and two adjacent props in each cage are disassembled without welding. In the design, the average clearance S between rollers is determined according to the bearing size, usually 0.7-2.5 mm. The clearance

S1 between the prop and the adjacent rollers is generally guaranteed to be slightly less than S value and not stuck to the roller. The tilt angle of the support hole of the shim is increased by adding the half cone angle beta value of the roller to the tilt angle of the hollow roller bracket welding cage, and the cage is guided by the roller. The diameter of the support and the thickness of the cage gasket are determined according to the strength requirements.

Removable prop is based on the prop in its concave end position machining a circular through-hole, fixed with steel wire perforation prop. The hole size is usually 1.5 mm. The small gasket end support hole of cage has no chamfer at the disassembly hole, and the other uses large chamfer, which can be used for sinking hole treatment to ensure welding quality for the support and its welding; a groove is opened at the center of the through hole of the disassembly support hole, and the groove depth makes it possible to insert wire into the through hole of the end face of the support groove after the disassembly support is installed. Fastening and dismantling. The two gaskets of the cage are connected by pillars when assembling the support holes of the small gaskets of the cage. Each row of two detachable pillars is connected by pillars. The rest are welded through the through holes of the end faces of the small gaskets of the cage. Sure. The two detachable props are installed in the two detachable mounting holes of the small gasket of the cage. After being installed in place, the two detachable props are fixed in the deep groove machined by the end face of the small gasket of the cage through the circular through hole at the end of the groove with hard wire. When the bearing needs to check the raceway after work, the wire is removed and the two detachable props are rotated out. The Limited three rows of rollers can be removed to observe the raceway usage.

3. concluding remarks

The problem that the [tapered roller bearing](#) can't inspect the raceway after assembling and using is solved by using the solid roller pillar welding cage. The contradiction between the stamping cage and the rated load of the bearing is solved fundamentally, and the bearing bearing carrying capacity and service life are improved. In actual production, it can save a lot of cost of cage mold and reduce the manufacturing cost and cycle of bearings to adopt support welding cage for small batch small diameter [tapered roller bearings](#).