

## **BALL BEARINGS**

(The World Revolves or Slides on Ball Bearings)

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### **Bearing Timeline**

A bearing is a device that allows free and easy movement between two pieces of an object, either revolving or sliding movement.

- An early type of linear bearing was an arrangement of tree trunks laid down under sleds. This technology may date as far back as the construction of the Pyramids of Giza.
- The first plain and rolling-element bearings were made of wood, but stone, ceramic, sapphire or glass may have also been used. These materials were used to reduce friction and make the movement of heavy objects easier. Wooden bearings may still be seen today in old water mills where the water also cooled and lubricated the mechanism.
- Rotary bearings are required for many applications, from heavy-duty use in vehicle axles and machine shafts. The simplest rotary bearing is the **sleeve bearing**, which is just a cylinder inserted between the wheel and its axle.
- The first practical caged-roller bearing was invented in the mid-1740s by John Harrison for his H3 marine timekeeper.
- An early example of a wooden ball bearing supporting a rotating table, was found in 40BC in the remains of a Roman ship in Lake Nemi, Italy.
- Leonardo da Vinci is said to have described a type of ball bearing around the year 1500.
- One of the problems of early ball bearings is that they would rub against each other, causing additional friction, but this was prevented by enclosing the balls in a cage.
- The captured, or caged, ball bearing was originally described by Galileo in the 1600s.
- The mounting of bearings into a set was not a reality for many years after that. The first patent for a ball race was by Philip Vaughan of Carmarthen in 1794.
- Friedrich Fischer's idea in 1883 for milling and grinding balls of equal size and exact roundness by means of a suitable production machine formed the foundation for creation of an independent bearing industry.
- The modern, self-aligning design of ball bearing is credited to Sven Wingquist of the SKF ball-bearing manufacturer in 1907.

## **Bearing friction**

Low friction bearings are often quite important for efficiency and wear and permit high speeds to be used. Essentially, bearings can reduce friction by shape, by its material, or by introducing a fluid between surfaces.

- **By shape**, gains advantage usually by using spheres or rollers.
- **By material**, uses the nature of the bearing material, such as plastic, because it has low surface friction.
- **By fluid**, uses the low viscosity of a layer of fluid, such as a lubricant or as a pressurized medium to keep the two solid parts from touching.
- **By fields**, uses electromagnetic fields, such as magnetic fields, to keep solid parts from touching.

## **Modern Self-Aligning Bearings**

Swedish engineer and founder of SKF, Sven Wingquist, invented the self-aligning ball bearing in 1907. He felt that it was a revolutionary new bearing but needed good technical support and service to get it accepted. Wingquist knew that being in the forefront of technology with a keen knowledge of customers' needs, as well as of offering technical support and service to the customers would pay off in the long run. And it was also a kind of self-preservation; a badly mounted bearing could give his bearings a bad reputation.

Today the notion of service has a much broader meaning. In fact, SKF long ago established a business concept of providing not only products, service and training, but also products specifically developed for comprehensive service purposes.

Two such products are SKF Multilog System and @ptitude Industrial Decision Support System. On a test ship, they have 28 Multilog sensors mounted on engines, drive shafts and other critical parts of machinery and technical systems. The sensor signals are continuously fed via satellite to a computer at the SKF Headquarters in Goteborg, Sweden, and analysed by @ptitude. Plain text information is then sent the same way back to the Chief Engineer on board, in case @ptitude found some problem that could turn into a failure.

As in 1907, SKF's service offering is to help customers get the best value out of their investments by combining cutting-edge technology with exact knowledge of customers service needs into knowledge engineering. SKF has 100 manufacturing sites all over the world with

sales companies in 70 countries, that are supported by some 15 000 distributors and dealers worldwide.

### **SKF's Energy Efficient Bearings**

**Energy Efficiency**, a traditional focus within The SKF Group, will be raised to a higher level as it introduces a new bearing family. SKF says the designs will reduce energy use by at least 30% compared with standard ISO products. Initial production will start with the two most used types, the deep-grooved ball bearing and the tapered roller bearings will maintain the service life and load-carrying capacity of standard ISO bearings

The new tapered roller bearing will initially target industrial applications that exceed 1 MW power consumption. Typical examples are found in railway applications and transmissions used in heavy industry, ships, wind energy, conveyors and extruders.