Brief History of Bearings

The idea of using a rolling element to move heavy items dates back to ancient Egypt. The Egyptians used logs to roll their large stone pieces closer to the construction areas when building the pyramids.

At first bearings were manufactured of Lignum Vitae[1], a very heavy, hard, naturally oily wood native to Central America and the West Indies. The natural oils in this wood assisted in the manufacturing process by acting as a cutting fluid. These bearings are best known for “wet” applications such as propeller driven vessels, water wheels, and pumps. Wooden bearings were known to be long wearing (approx. 7 year average life span), strong, readily available and easy to replace. They were lubricated with tallow or other animal fats. In many turbine type applications you will still find wooden bearings, however Lignum Vitae is not as readily available as it once was. Many companies are using Rock Maple[2] impregnated with Petroleum Wax as a suitable substitute.

Leonardo da Vinci[3], famous for his painting and drawings, also had many ideas for mechanical engineering projects. Many of his drawings were of pumps, hoists, cranes, and various weapons of war. During his employ as a hydraulic engineer[4] serving the Duke of Milan, he spent much of his time analyzing bearings, linkages, gears and various other mechanical transmission modes. Many of Da Vinci’s ideas are still celebrated in the engineering world today.

With the 1700s the changes in manufacturing processes were changing the way people lived and worked. Iron was becoming more popular and was replacing wood in many factories. With new progress in manufacturing there was also a need for more precise machine tools. The wood turning lathe is known to be the oldest machine tool, and in the mid 1700s, innovations in iron allowed for the production of more precise machine tools. With new inventions, there came a need for more sources of energy to power these machines. The steam engine became a practical source of power with the invention of the Cylinder Boring Machine5, also known as the Boring mill. The invention brought with it easier ways to produce good quality iron on much larger scales than previously. This enabled the growth of industry and the greater need for machinery to be built, which led to new styles of bearings required in the building of these new machines. With the development of new styles of bearings, came the need for new materials to make bearings from.

In 1839 Isaac Babbit6 invented an antifriction alloy with a low melt temperature. This alloy could be formed and molded to produce an ideal surface for bearings. With the introduction of this Babbit Metal, the use of wooden bearings diminished slightly. In the latter half of the 1800s, new steel making processes were created by Henry Bessemer (1813-1898). His new process allowed steel to be made much more economically.

This led to the use of steel in the construction of new buildings and steel also became more widely used in bearing and machinery manufacturing.

With the inventions of the 1900s including motorcars, robotics, computers, and the newer, faster machine tools, bearings have become more significant to production lines. Newer materials have enabled us to produce bearings at a lesser cost to the consumer. Materials used in bearings are also used in common everyday living. One example is polytetrafluoroethylene, commonly known as PTFE, the nonstick coating in many pots and pans. Bearings are now made with a variety of metals, plastics, and, in some cases, wood is still in use.

Notes:

1. Lignum Vitae also known as “wood of life.” Encyclopedia/Handbook of Materials, Parts and Finishes. H.R. Clauser, editor.
2. “Picking Bearings Off A Tree.” J. R. Steuernagle, Woodex Bearing Co., Inc.
3. Leonardo da Vinci (1452-1519) www.infoplease.com
4. Leonardo da Vinci served as a hydraulic engineer to the Duke of Milan in the 1480s.
5. The First Industrial Revolution. Phyllis Deane.
6. The Illustrated Science & Invention Encyclopedia, “How it Works,” Vol. 2. H.S. Stutman, publishers.

See also:

The Columbia Electronic Encyclopedia, Columbia University Press, www.infoplease.com.

Hoo, J.J.C. and W.B. Green, eds., Bearing Steels: Into the 21st Century, ASTM STP 1327, American Society of Testing and Materials, 1998.

Pearson, Philip K., “The History and Future of aircraft Turbine Engine Bearing Steels.” Watner, Carl, The Industrial Revolution (1700-Present);www.neo-tech.com

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