

Sports Equipment Design

STARTING SALARY: VARIES
MEDIAN INCOME: VARIES



Sports engineering is an excellent way to impact athletes, sports and businesses around the world. Engineers in this field are some of the most dynamic, innovative and creative engineers on the planet. Not only is this industry full of diverse, fun and intriguing opportunities, but most of the engineers working in the sporting goods industry became engineers because they love sports and wanted to either increase their performance or enhance the sport overall. A company that wants to design a new swimsuit for Olympic athletes would prefer to hire an engineer who swims. A company that wants to design a new baseball bat would prefer to hire an engineer who plays baseball. A company that is designing high-performance mountain bikes would prefer to hire an engineer who has a keen interest in bike design or races bicycles. The industry offers some awesome careers for athletically inclined engineers!

For example, chemical and materials engineers will find a wealth of employment in the athletic shoe industry. Constantly on the lookout for new materials for soles and outer coverings, shoe manufacturers are in ongoing competition for the best cushioning, lightest overall design, most comfortable and best traction products. Finding new materials that add “breathability” for the long distance runner, springiness for basketball players, increased traction for skateboarders, flexibility and grip for wrestlers, more cushioning for long jumpers and/or strength and comfort for skeleton racers can make the shoe industry a challenging and rewarding field for an athletically minded engineer.

On a pair of athletic shoes:

- Mechanical engineers may design systems for manufacturing, motion analysis or impact testing and be involved in building and/or testing prototypes.

Job Outlook

Many types of engineers can find employment as Sports Engineers. See Job Outlook for Mechanical, Biomedical, Chemical, Materials, Manufacturing, Computer, or Industrial for expected growth and opportunities.

- Biomedical engineers may design systems for motion analysis and biomechanical analysis of injuries, stress patterns, or kinesthetic optimization.
- Chemical, materials or textile engineers may develop or design new soles, fabrics or other materials for shoes.
- Manufacturing engineers may design systems or processes for manufacturing shoes more efficiently.
- Computer engineers may design software or hardware to aid in pressure or impact detection analysis, manufacturing processes or information systems.
- Industrial engineers may maintain the bill of materials and routing information, cost standards and recommend pricing for new products. Or, they may be involved in learning about and training on manufacturing techniques.

For more information about sports engineering or preparing to work as a sports engineer, pick up a copy of *High Tech Hot Shots: Careers in Sports Engineering*.

Glossary of Terms

Alloy - the combination of two or more metals to optimize material properties. Most cast titanium clubheads, for example, consist of 90 percent titanium, 6 percent aluminum and 4 percent vanadium yielding a combination that is stronger than pure titanium.

Angler - Person using pole or rod and reel to catch fish.

Balata Balls - originally a derivative of the rubber tree, it once was used in the outer covers of all golf balls; makes an exceptionally soft-feeling golf ball; was largely replaced in golf ball covers by Surlyn and other man-made products; balata is now produced artificially in laboratories, hence the difference between traditional balata (balls that would cut all the way through the cover) and modern balata (balls that dent more than they cut).

Bearings - Bearings have an inner and outer part, which the balls ride on, allowing the wheel to turn.

Blank - The main component of a finished fishing rod, minus the guides and handle.

Carve - To make a long, curving arc while skating.

Composite - a blend or mixture of different substances; the broad category of composite golf shafts includes graphite (graphite fibers mixed with resin) and other hybrid shafts not made entirely of metal.

Cooperative Education (Co-op) – Program that combines real-world experience with college classes.

Core - the center of the golf ball, bowling ball, baseball, etc.

Coverstock - The material that makes up the outer shell of the ball; the hardness, texture, and shine of a bowling ball.

Deck – Also called a board. The platform that the hardware is mounted to, usually maple laminate.

Dimples - cup-like depressions on golf balls. Deeper cups produce more spin while shallower ones reduce spin and increase distance.

Durometer - A measurement of the resiliency, or hardness, of a urethane wheel.

Fakie - Riding backwards.

Fast Action Rod - A fishing pole that will flex initially in the upper 1/3rd of its length.

G-Max rating - Hardness guidelines for synthetic/infill systems set by the U.S. Consumer Product Safety Commission.

Graphite - a lightweight substance employed in aerospace applications before its use in golf; graphite golf shafts are made with graphite fibers and glue (resin).

Grind - To ride on an object like a ledge or handrail with just the trucks making contact.

Heavy Test line

Iron Byron - the mechanical golfer unveiled in 1966 by True Temper, the world's largest shaft manufacturer; modeled after the swing of Byron Nelson; originally conceived to test shafts; now used to test clubs, balls and shafts; cost: \$150,000

Juiced - To give energy, spirit, or interest to.

Ollie - A no handed air performed by tapping the tail of the board on the ground or ramp surface. Named after Alan Gelfend.

Piezoelectric device – Generates electricity to reduce vibrations in skis, bikes, snowboards, baseball bats, golf clubs, and more.

Prototype - An original, full-scale, and usually working model of a new product or new version of an existing product.

Radius of Gyration (RG) - Identifies how fast a ball begins to rotate once it leaves the bowler's hand

Reel Seat - mechanism that holds the reel to the rod, usually using locking metal rings or sliding bands.

Sealed Bearing - A bearing system that uses a physical seal to keep out water and debris.

Slow action rod - A fishing pole that will bend initially over its entire length.

Surlyn - the most widely used cover substance for golf balls; the invention of this material led to the cut-proof golf ball; not as soft as balata, but unquestionably the king of indestructibility among golf balls.

Sweet spot - the precise point on a whacker where contact with the ball feels best.

3-piece ball: Golf ball that is generally manufactured with a solid or liquid center (first piece) surrounded by tightly woven rubber strands (second piece) and covered with a balata or man-made material on the outside (third piece).

Truck - The hardware that is comprised of the axle and base plate mounted to the underside of the board.

2-piece ball - Consists of a solid core and a cover surrounding that core.

Wheel - Attached to the truck - rolling devices that are usually made of urethane. In addition to the standard wheels, there are now those which have a nylon or high-tech plastic on the interior part of the wheel.