

Materials for golf club shafts

Business



Abstract Golf clubs are becoming more advanced to help golf players' achieve the required accuracy and desired results. This has been made possible by the advanced design in technology that contributes to developments in applications to advanced use of materials in making golf clubs. The paper will give a brief introduction to golf clubs, which will be followed by different materials used in making golf shafts.

Pros and cons of various materials that are used in making golf clubs are also considered. The term paper focuses on the materials used in golf clubs, rather than configurations or mechanisms of golf clubs. Introduction In a game of golf, a golf ball is hit by a golf club. A golf club is made up of three main components namely the shaft, the grip and the club head (Cheatum, 1969). A total of fourteen golf clubs constitutes a standard set.

Various materials are used in making the golf club shafts. In recent times, new alloys and composite materials are prevalent in making golf clubs. Woods are used mainly for tee shots or long distance fair way. Iron is used in a more versatile class, and a variety of shots are made by iron shafts. Hybrids that are a combination of irons and woods are commonly used also for various shots. Putters, on the other hand, are mostly used to roll the golf ball into the cup, on the green.

Materials used Different types of woods were used initially in making golf club shafts, however, hickory has taken control, and it is most commonly used of late. Hickory is a tree that chiefly grows in North America, which yields heavy and tough woods. The tree also bears edible nuts. Different types of woods used include; greenheart, purpleheart, ash, blue-mahoo,

orange wood, lancewood, and lemon wood (Gibson, 1958). Hickory wood replaced all these woods in the middle of 19th century due to its strength and heaviness (Concannon, 2009). However, the long-nose club was prone to breaking despite being made from the strong hickory wood.

Dogwood, pear, beech, and thorn were used to make the club heads until the main materials for club heads became persimmon. Developments have been made on golf clubs, and the shafts are made from materials such as carbon fiber, titanium, steel and other metal types. Currently, most of the shafts are made in a way that they are composed of a series of stepped steel tubes or tapered steel tubes, in telescopic fashion; which helps in accuracy for the golfers. Rubber or leather makes the grips in the golf clubs. Wood Woods are used to make golf clubs that drive a golf ball at a long distance towards the hole.

For maximum club speed, wood clubs have a long shaft and a large head. Persimmon wood was historically used, but some manufacturers are coming up with laminated wood. The first metal wood was introduced by TaylorMade Golf, in 1979, which was made of steel (Ford, 1964). Materials such as carbon fiber, scandium, or titanium are being used by recent manufacturers.

Most “ woods” are made from various metals, but they are still referred to as “ woods” which describes their core purposes in the field and their shape. Majority of today’s woods are composed of a graphite shaft and a head made up of titanium, or steel. Of all golf clubs, woods are the most powerful and longest. The driver, which is the biggest wood, is made from hollowed out titanium with shafts that are light. Depending on the player’s preferences,

shafts can range from regular stiffness to extra- stiff. Iron clubs have a solid, all metal head with a shorter shaft in comparison to woods, and they also have a flat angled steel face.

Iron clubs are used for a wide range of shots. These shots range from; rough approaches on the green, tee box on dog-legged or short holes; to situations that are tricky like, getting out of hazards, or hitting from lies, or lobbing over trees or punching through trees. Majority of irons are numbered from 1 to 10 (Concannon, 2009). Commonly used numbers are from 3 to 9. Similarly, to woods, irons got their names because originally they were made from forged iron. Today's irons are made from steel alloys to enable a better-engineered "cavity-back".

A better cavity back provides a higher inertia moment and lowers the center of mass. Consequently, the club becomes easier to hit, and a better distance is provided in comparison to the older forged iron clubs that had "muscle-back". Wedge clubs are a subclass of iron clubs. They have a greater loft in comparison to the numbered irons, in addition to, high mass clubheads, and soles that are wide. The wide soles enable easier use in complicated lies. Wedges are commonly used for; high-accuracy high-altitude and short distance shots.

This includes; hitting the ball onto the green, hitting the ball out of hazards, and placing the ball on the fairway. Wedges exist in five different types namely; pitching wedge, sand wedge, gap wedge, lob wedge, and the ultra lob wedge. Hybrid These types of clubs are a cross between iron and wood. Hybrid clubs have a blend of the wood's higher launch and long distance plus

the iron's familiar swing. Its clubhead has features that are almost similar to a wood club.

The clubheads are convex faced and hollow so as to provide a high impulse and a faster swing speed as seen in metal woods. The heads are, however, smaller in comparison to true woods. The shafts are similar as the ones in the irons thus giving the same swing mechanisms. Hybrids replace irons that are low in number, in the men's sets, usually between numbers 2 to 5. These low numbered irons are actually the hardest clubs to hit by players.

However, the entire set of irons can be replaced by manufactures that produce hybrids that are generally referred to as "iron replacement" sets.

Putter Putters were originally made from copper, bronze, brass and stainless steel. Softer materials like polymeric materials are currently used. These are a special type of clubs that have a loft which does not exceed ten degrees.

Putters are designed to be used in rolling the ball along the grass done from a point on the putting green towards the cup. Putters have a loft which helps in lifting the ball from whatever indentation. Grooves on the face are incorporated into newer putters in order to enable them, roll rather than skidding off upon impact.

Through this, the bouncing over the turf is reduced, and the rolling distance is increased. Putters are allowed to have certain special features which cannot be found on other clubs. These features include; two striking faces, bent shafts, appendages tailored to help in aiming and non-circular grip cross-sections. Chipper It is a sub class of putter, but has more lofted face. It is used to lift balls from higher grass and dropping it on the green.

They can be used to replace high lofted iron. The player is able to make a shot from a stance with a chipper, whereas, with a lofted iron, it is more difficult. This is brought about by the lie angle difference between the two. (Cochran, 1994) Advantages of using wood Wood is cheap and easier to find. Disadvantages of using wood In comparison to metallic made shafts, wood has various disadvantages. One of them is that they are not long lasting.

Wood is not strong enough as metal, and its lifespan is shorter than that of any metal secondly, wood material is prone to cracks, splits and breakages if not used or maintained properly. They are also harder to make if compared to metallic shafts, which are easily casted and molded, as they require carving. In addition, wood provides a low moment of inertia. Finally, they do not provide a better spring off the face and eventually shorter distances are achieved. Advantages of using steel Steel shafts are usually composed of chrome plate and carbon steel finish, and sometimes they also contain stainless steel. Steel strips are rolled into tubes and drawn into machines to get the required thickness and diameter of the shaft.

The shaft is molded to add the kick point and flex after the step pattern is formed. Steel shafts are generally heavier and weigh approximately 90g to 120g. The heaviness helps in providing a faster swing, in addition to a mid to, lower handicap. Furthermore, the heavy weight provides a reduced torque and an increased club head control, to players who drive the ball to longer distances. Steel shafts are also more durable and less expensive if compared to graphite shafts. Disadvantages of using steel The major disadvantage with using a steel shaft is that it is not able to absorb vibrations in case of bad shots.

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This is a major let down to new in-experienced players, who have not perfected the art of swinging and, therefore, find the vibrations that are unfiltered uncomfortable; especially during cold weathers that intensify the vibrations into player's hands. Strong and experienced players don't find this to be much of a problem. Advantages of using graphite shafts Graphite shafts are made by wrapping a graphite tape with an epoxy binder around a steel mandrel. The mandrel is removed after the shaft is heated. Upon cooling down, the shaft is sanded, and then it is cut and painted.

After the painting, the shaft is sealed with a laminate material that is hard. Graphite shafts are ideal for players who have a slower swing speed, therefore, requiring additional help in driving the ball to longer distances. This is due to the low weight of graphite shafts, which is between 50g to 90g. Another advantage of graphite shafts, it is their ability to absorb vibrations as compared to steel shafts. This is an advantage to newer players who are not experienced or older players that are recovering from a wrist or hand injury. Graphite shafts have a great flex.

This means that they bend more when the club is swung (Cook, 2008) . Disadvantages of using graphite In comparison to steel shafts, graphite shafts are less accurate since they are designed for distances. They also require more care so as to retain their durability. On the other hand, they are more expensive, not as the steel shafts, and their stiffness are less inconsistent compared to a set of steel shafts. Advantages of using Iron Iron helps making shafts that are easier to handle by golfers with low handicaps. Forged iron or blade iron is used in making iron shafts.

Forged iron is one which out of pieces of metal and not from casting. Cavity backed clubs result from the use of cast iron. It is less in weight at the center of the club head, and this makes it better for beginners because the weight is proportioned into providing the club with a much more space from which the ball can be hit (Bruce & Evelyn, 1962). This eventually produces higher results. Muscle backed irons results from blade irons. Its weight is evenly distributed and a smaller center of gravity results from this.

This is especially helpful to those with a low handicap. In addition, when golf balls are hit in an imperfect way by irons, more forgiveness is offered.

Disadvantages of using iron A disadvantage of using iron in making club shafts is that they are less flex if compared to steel or graphite. In addition, iron shafts have a low absorption rate of vibrations if compared to graphite shafts. Conclusion Recreational players are increasing as the days go by. Golf popularity is also expected to continuously grow.

Therefore, there is an emphasis is developing and designing golf clubs that make the game of golf enjoyable. Innovations and development in technology will continue to provide more modernized golf equipment and materials. The pursuit for more advanced and better golfing will always go on, and the sky is actually the limit.