



CLUBMATE **GOLF** AUSTRALIA
GOLF CLUB COMPONENTS

eTECHREPORT

September 2005 eTECHreport - Welcome!

- **Interviews:**

[Listen to Tom's interview on the Golf Talk Radio Show](#) (6MB 25min MP3)

[Read Tom's exchange with Donny Coyle in the BigDogEat.com interview](#)

- **Shaft Fitting Clarification**

Well, darned if we didn't create a little controversy for some clubmakers with the article on Retro-Fitting vs. Real Fitting in the last edition of the eTECHreport! [\[continues below\]](#)

- **De-Myth-tifying Angle of Attack by Matt Mohi**

Because of the ever-increasing circulation of the book, *The Search for the Perfect Golf Club*, we've been getting an increased number of phone calls and emails from regular golfers who either want to know more about custom fitting or directly ask us for the name of a clubmaker in their area. [\[continues below\]](#)

- **Talking the Talk – Points to Ponder for Brand Name Brainwashed Golfers**

If I ever run out of clubmaking subjects to discuss in an eTECHreport, I've come to the realization that all I have to do is keep my eyes on the TWGT Forum and a good topic will always surface from the many threads being discussed there. [\[continues below\]](#)

- **USGA Proposes Limit on Clubhead Moment of Inertia**

Through a release sent August 31 to all golf club manufacturers, the USGA has announced a proposal for a specific limit to the Moment of Inertia (MOI) for all clubheads [\[continues below\]](#)

- **"The Search" Results in Increase in Custom Fitting Business**

It's becoming a simple routine that is easy to predict. The more copies of Tom Wishon's book, *The Search for the Perfect Golf Club*, that golfers buy and read, the more fitting appointments that clubmakers book in their shops. [\[continues below\]](#)

- **New Design Update**

Last month TWGT debuted the two newest additions to the high performance family of 915CFE drivers – the 915CFE 420cc with 15° loft and the 915CFE 460cc with 13° loft. [\[continues below\]](#)

Shaft Fitting Clarification

Well, darned if we didn't create a little controversy for some clubmakers with the article on Retro-Fitting vs. Real Fitting in the last edition of the eTECHreport! I heard from four clubmakers who wrote to disagree with the point we made about a number of the clubhead and assembly fitting specs being more important than the shaft when it comes to offering most golfers the best opportunity to visibly improve distance and accuracy. As a result, I really felt that this month we should clarify our findings with regard to the contribution of the shaft to real shot performance.

For those of you who remember my 1997 book, The Practical Fitting Program, you are aware that one of the key concepts I presented was to classify each of the various fitting specifications as having a "Major", "Medium" or "Minor" effect for being able to deliver a change in Distance, Accuracy, Trajectory, Backspin and Feel. A Major effect was one that if changed and fit perfectly would result in a definite visible change in that performance factor it was associated with. A Medium factor was one that if changed and fit perfectly to the golfer might make a visible change but one that would not be as pronounced as a Major factor. And a Minor factor was one that was not likely to be seen or experienced by the golfer in terms of a real, measurable change in performance.

The reason I took this approach to classify all the fitting specs was because by this time in my work, I realized that some specs of the club have a more visible effect on real game improvement than others. I felt it was more effective to be able to teach clubmakers what fitting specs they needed to focus on to bring about the most visible changes in Distance, Accuracy, Trajectory, Backspin and Feel for the golfers they fit.

1997 Relationships of Shaft Fitting to Performance were...

Shaft Flex

- Major Effect on Feel
- Medium Effect on Distance
- Minor Effect on Accuracy and Trajectory

Shaft Weight

- Major Effect on Feel and Distance
- Minor Effect on Accuracy

Shaft Torque

- Medium Effect on Accuracy and Feel
- Minor Effect on Distance and Trajectory

Shaft Balance Point

- Minor Effect on Feel and Accuracy

Shaft Bend Point (see how outdated that book has become!)

- Medium Effect on Feel
- Minor Effect on Trajectory

In my continued efforts to write the sequel to the The Practical Fitting Program, titled Common Sense Fitting, the experience and work I have done requires an update to the classification and explanation of shaft specs and their effect on the game improvement factors of fitting. This eTECHreport affords you a sneak peak at some of our findings. I will add that for the Common Sense Clubfitting book, I only identify Major or Medium effect specifications and I do not even mention anything that would be a Minor effect. This is because I feel that if a specification can only be attributed to a factor of performance as being Minor in its effect, it is not worth altering in the new fitting. Remember, the goal of Common Sense Clubfitting is to change the specifications of the clubs so that the golfers will truly experience as many real, visible changes in performance as possible.

2005 Relationships of Shaft Fitting to Performance are...

Shaft Primary Flex

- Medium Effect on Distance

Primary Flex is what I now call the overall flex of the shaft as viewed for how it relates to the golfer's swing speed and basic swing motions. It is different than the bend profile of the shaft, which isolates the distribution of the shaft's stiffness in specific areas of the shaft. The shaft's primary flex has a medium effect on distance for the majority of golfers only when the golfer changes from a primary flex that is far too stiff or in some cases, way too flexible, to one that is well matched to their swing speed and downswing fundamentals of the back to downswing transition, downswing acceleration and wrist-cock release. If the current shaft is reasonably well matched in terms of primary flex to the golfer's swing speed and downswing moves, changing to another shaft with a similarly well matched primary flex for the golfer will not really deliver any visible change in distance.

- Medium Effect on Trajectory

In our research we have yet to see a change in the primary flex of the shaft result in more than a 2-2.5 degree increase in launch angle for the golfer. Any greater increase in launch angle could only happen when the new primary flex is in the range of 2 or more flex levels less stiff than the golfer's previous shaft. Typically, it is not really a common event in fitting to change the primary flex for a golfer by 2 or more flex levels. In addition, we now know that a mid- to late-release of the wrist-cock on the downswing with a decent level of downswing acceleration are required swing moves to allow a shaft to demonstrate any effect on trajectory. Thus not all golfers have the swing ability to experience any visible trajectory difference strictly from a change in the shaft. But because there are golfers who do have these swing abilities, and because a change of 2-2.5 degrees in launch angle is enough to be visible, the consequence of the primary flex on trajectory has to be considered as a medium effect factor in fitting.

- Medium Effect on Feel

For golfers who have the ability to note the sensation of the shaft bending from the transition to impact, a change of one full primary flex level can create enough of a difference to be detected. In addition, most golfers will have the ability to detect when the sensation of impact with the ball is more solid with a change from a shaft that has a primary flex that is too stiff to one that is well matched to the swing speed and downswing moves of the golfer. As a result, the primary flex can be considered to have a medium effect on the overall feel of the shot. A change in the primary flex of the shaft is not classified as a Major effect for two reasons:

- Many golfers will not have the ability to detect the sensation associated with a typical one flex level change in the primary flex of their shafts;
- While a change of more than one primary flex level can definitely result in a more dramatic change in feel, such a two flex level change in shafts is not a common outcome in fitting sessions for golfers

Shaft Weight

- Medium Effect on Distance

The shaft weight is the main factor that controls the total weight of any club. If the total weight of a club is decreased by more than 25 grams, most golfers will experience an increase in clubhead speed. However, the increase is typically not more than 1-2 mph for each 25 gram decrease in the club's total weight. If greater swing speed increases than this are seen from a 25g shaft weight decrease, it is usually because of a length and/or swingweight/MOI change that was established to be a better match for the golfer along with the drop in shaft weight.

This year, it is estimated over 85% of all drivers sold will be built using a graphite shaft with a raw weight between 65-75 grams. Drivers built and sold with graphite shafts within this weight range have been available to golfers for many years. Thus it will be rare for a golfer to undergo a reduction in driver shaft weight that would exceed 25 grams.

Where a shaft weight change may represent a definite Medium effect, even bordering on a Major effect, would be in the irons. At present, fewer than 30% of all iron sets are sold with graphite shafts. Thus clubmakers do have the chance to fit and build more sets of graphite shaft irons (and some fairway woods as well since the number sold with graphite today is not quite that of drivers) that will deliver a shaft weight drop of 40-50 grams. If the length and swingweight are well matched to the golfer, along with the other specs of the shaft, the golfer should experience a noticeable distance increase from the resulting increase in swing speed.

However, because golfers' swing speeds with irons is slower than woods, and because irons have much more loft than woods, the distance increase from a 40-50g drop in shaft weight will be a little less dramatic. All in all, shaft weight has to be considered a Medium effect on Distance because the distance increases are great enough to be seen, but small enough that they won't contribute to much of a change in the golfer's overall game.

- Major Effect on Feel

Shaft weight can be considered to have a major effect on the total weight feel of the club simply because the range of possible shaft weight change extends from 40g all the way up to 130g. Since the shaft is the major contributor to the total weight of the club, this 90 grams of potential shaft weight change leaves plenty of room for the shaft weight to have a major effect on the feel of the club.

Realistically, very few golfers will ever undergo a shaft weight change approaching 90 grams. But, it is possible when switching from the average steel shaft to the average graphite shaft, the resulting reduction in shaft weight would be at least 40-50 grams. When you consider that this could represent a reduction of 15% or more of the total weight, that amount is enough to be easily noticed by the golfer, causing a major effect on feel.

Shaft Bend Profile

- Medium Effect on Distance

In Common Sense Clubfitting, the shaft's bend profile replaces the out-dated term of shaft bend point. What the industry used to refer to as the bend point of a shaft is really the distribution of stiffness over the length of the shaft. It is this distribution of stiffness over a shaft's length which is what we now refer to as the bend profile of the shaft.

Shaft bend profile could potentially have a medium effect on distance when a golfer changes from a shaft bend profile that is very poorly matched to their swing to one that is well fit to their downswing moves. For example, if the golfer is not playing with enough loft on the driver for their swing speed and angle of attack and has a shaft that is much too tip- and center-section stiff for their downswing moves, shifting to a shaft with a much more flexible tip and/or center section could increase the launch angle to a point that would get the golfer closer to their optimum launch angle for increasing distance. Do keep in mind that this effect is more pronounced in the woods than it is in the irons because iron shafts simply cannot and do not bend as much as wood shafts during any golfer's swing.

On the other hand, if the golfer is using the right loft in the driver to optimize their launch angle, changing from a tip/center firm to tip/center flexible bend profile will likely not have much of a visible effect on distance. Feel? Yes, for sure the feel would be different and it is possible that if the new bend profile felt more pleasing to the golfer, this could have enough of a positive psychological effect to smooth out their tempo and rhythm, resulting in a little more distance.

But the point to keep in mind is that this example of possible distance improvement is not directly related to the shaft's bend profile—purely from the standpoint of a difference in bending—as much as it can be from a ball speed and launch angle change that is related more to the feel of the new bend profile.

- Medium Effect on Trajectory

Since the bend profile offers its medium effect on distance through a change in the launch angle of the shot, and since launch angle is directly related to the shot trajectory, it has to follow in common sense clubfitting that the shaft bend profile also has a medium effect on the trajectory of the shot. However, there is a difference in how much the shaft will be able to change the trajectory of an iron shot as opposed to a shot hit with the woods. This is because all iron shafts are stiffer and shorter than all wood shafts of the same primary flex. That difference means a wood shaft will have the ability to bend more in the downswing and thus be able to change the launch angle more visibly than an iron shaft.

Clubmakers have to remember that when fitting golfers who have developed very good swing moves, which they can repeat with a high level of consistency, changes in trajectory that are very slight to an average player will be perceived to be more pronounced to the skilled ball striker. This is simply because the average golfer experiences a much wider range in the typical day to day observation of the shape of their shots than will the skilled player. Thus when a skilled player sees a shaft change the height of their shots by 5 to 10 feet, this will always stand out as being a more noticeable change. The point is that such small changes in trajectory are not going to result in much of a real measurable difference in distance for these players, so the overall effect of the shaft bend profile on the trajectory of the shot is still considered to be a medium factor of fitting.

Shaft Torque

- Medium Effect on Accuracy

The shaft's ability to resist twisting on the downswing is governed by the torsional stiffness design of the shaft (mistakenly called shaft torque, but hey, we're all used to it so no big deal) combined with the golfer's swing moves that generate more or less of the twisting force on the shaft. The more aggressive the golfer's transition move between the end of the backswing and start of the downswing, and the more aggressive the overall downswing of the golfer, the more the shaft could twist on the downswing and deliver the face of the clubhead to the ball in a more open face angle position.

The relationship between the golfer's downswing moves, the torque design of the shaft and the goal of ensuring the shaft torque does not contribute to misdirection is simple – golfers who are physically strong, possess swing speeds higher than 90 mph, have a strong transition and aggressive downswing should NOT be fit into shafts that are designed with a torque higher than 4.5 degrees. The higher the torque and the more forceful the swing of the golfer, the more the possibility the shaft can contribute to problems with shot accuracy.

Golfers who are physically weaker, possess swing speeds under 90 mph, have a smooth transition and a more passive downswing should NOT be fit into shafts with a torque design lower than 3.5 degrees. However, in this case, the result of such an ill-advised fitting of the shaft's torque will not result in a problem with accuracy but will be a major cause of a lack of solid feel when the golfer makes contact with the ball.

If you look collectively at all of the fitting effects of the shaft on shot performance, you can see that only one Major effect exists, and that one is related to the Feel of the shaft and the club as well as the feel of the impact with the ball. While in the interest of the length of the article I have not written the Major and Medium effects that will be in the new Common Sense Fitting book for the specifications of the clubhead, I can tell you that there are 7 Major effects that loft, lie and face angle have on the various game improvement factors of Distance, Accuracy, Trajectory, Consistency, Backspin and Feel. In contrast, the majority of the shaft specifications that have a visible effect on shot performance fall into the Medium effect category.

In Common Sense Clubfitting this means that yes, the shaft has definite fitting effects that should never be ignored in the goal of creating the best possible set with which they can play. In short, do your best to fit the shaft properly to the golfer, but do practice common sense in fitting and realize the lion's share of visible and measurable shot performance improvement will result from how well you fit the specifications of the clubhead.

[to top](#)

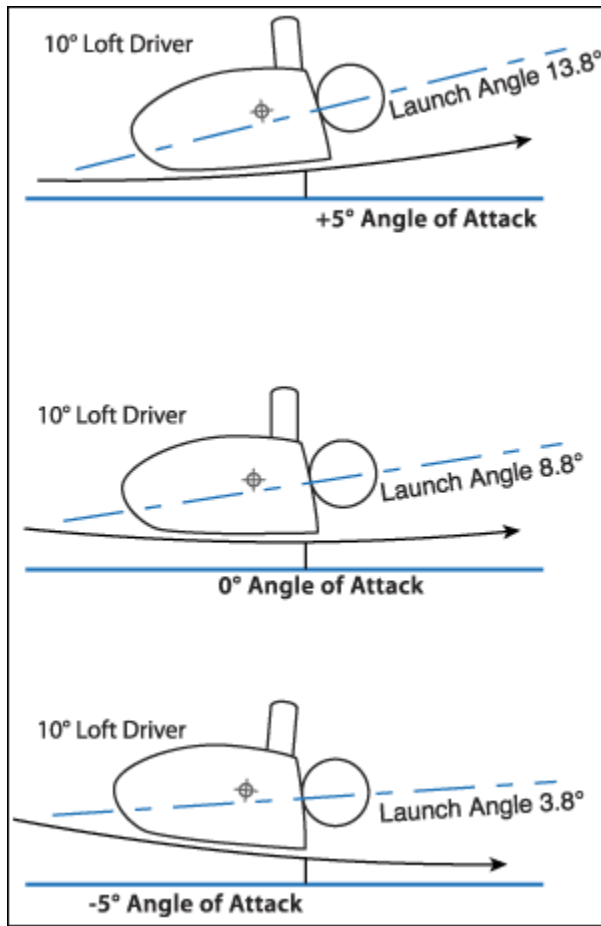
De-Myth-tifying Angle of Attack

By Matt Mohi

Because of the ever-increasing circulation of the book, *The Search for the Perfect Golf Club*, we've been getting an increased number of phone calls and emails from regular golfers who either want to know more about custom fitting or directly ask us for the name of a clubmaker in their area.

Because the book clearly explains the principle of increasing driver loft to gain more distance, one of the questions many of these golfers ask is what driver loft increase will deliver more distance for them off the tee. Sadly, we have to inform them that we can't tell them what exact driver loft they should be playing unless we know their launch angle for a given loft. But after we explain to them why this is a critical point to know to be able to recommend the precise loft that will add yards off the tee, they are excited to see a clubmaker to be properly fit and take the guesswork from their equipment needs.

There is a myth that circulates in the clubmaking industry that there is a certain driver loft angle that will result in more distance for each swing speed level. The largest component company in the industry printed such a chart in their 2005 catalog. We want to be sure you understand there is no possible way to determine precisely what driver loft any golfer



needs to increase distance without being able to closely identify the golfer's ANGLE OF ATTACK into the ball with the driver. To find the angle of attack, you need to know what launch angle the golfer achieves for a given, known loft angle.

Angle of attack is a descriptive term that indicates the angle at which the clubhead is traveling with respect to the ground when impact occurs. In general terms, a golfer can come into impact with the clubhead traveling on an upward, level or downward angle of attack. The three illustrations included in this article will give you a clear concept of what the three options for the angle of attack look like. If you have two golfers with the same swing speed, the one with the upward angle of attack will always need a lower loft to achieve their maximum distance than a golfer with a level or downward angle of attack into the ball.

The golfer's angle of attack is a product of a number of their swing characteristics combined with their ball position. The farther forward the ball position, the more the head is behind the ball at impact, and/or the more the golfer flexes the wrists forward at the moment of impact, the more tendency there will be to deliver the club to the ball on an upward angle of attack. To contrast, the farther back the ball position in the stance, the more the head is in front of the ball at impact, and/or the straighter or more bowed the lead hand/wrist at

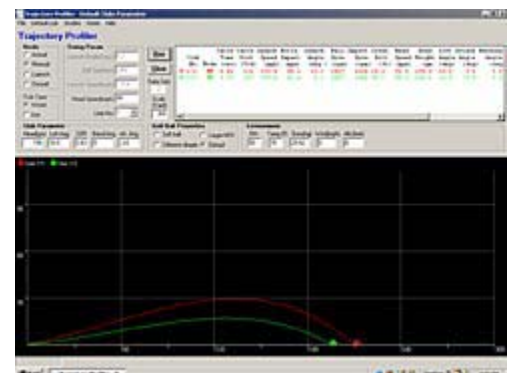
the moment of impact, the more chance the golfer will arrive at impact with the clubhead traveling on a downward angle of attack.

The reason a golfer with an upward angle of attack needs less loft to achieve maximum distance is because the upward angle of attack is actually increasing the loft of the clubhead at the moment of impact. By looking at the two illustrations for the upward and downward A's of A, you can easily see the loft is greater on the head delivered in the upward A of A. Hence if the swing is delivering the clubface to impact with more loft, that means the real loft of the head may need to be lower, and vice versa for the downward angle of attack. How much is why you need some way to measure the launch angle the golfer achieves with any given loft angle.

[Click image to enlarge](#)

Let's take a look at how this works with the Trajectory Modeling Software (image at right).

You can see that this represents a significant difference between the resulting launch angles and carry distances. For this example of the golfers' driver swing speed of 90 mph and 133 mph ball velocity (0.83 COR, 198g headweight) the ideal launch angle will be 14-15 degrees. The golfer indicated by the green data lines with the downward angle of attack will need to have a much higher driver loft to be able to increase his launch angle by a significant



amount to get to his optimum launch angle and distance. In this case, this golfer with a 90 mph swing speed and 3 degree downward angle of attack should be fit into a driver with at least 15° of loft.

For the 90 mph golfer with the 3 degree upward angle of attack indicated in red, the launch angle produced with the 10.5 loft driver used in this example is a little higher than 12°. To bring this golfer up to the desired 14-15 degree launch angle to maximize his carry distance, a driver with 12.5° will bring about the optimal 2 degree increase in the launch angle.

How do you determine golfer's angle of attack? In very general terms, whenever the launch angle is higher than the loft at the point of impact on the driver being used in the test, the golfer has an upward angle of attack. If the launch angle is more than 1 degree lower than the loft at the point of impact on the driver being used in the test, the golfer has a downward angle of attack. In between the two is the level angle of attack.

How much the angle of attack is up or down is very roughly equivalent to the difference in degrees between the launch angle and the loft at the point of impact on the driver being used in the test. I say roughly because due to the friction of the ball sliding up the lofted face, the angle of attack increment is about a degree lower than simply doing this simple subtraction. But the good news is that if you can get the golfer's angle of attack within 1 degree of accuracy, the output from the Trajectory and Ball Flight software for the best loft for maximum carry will be within 1-2 yards! For pure and total A of A determination you have to use the Trajectory and Ball Flight software with the real loft at the point of impact on the test club and the measured launch angle, and for that the instructions are in the HELP files.

Remember, in fitting driver loft we need to factor the golfer's Angle of Attack into the determination of what that loft needs to be for each golfer and their swing speed. To start with, you must at least note the golfer's trajectory as higher than normal, about average or lower than average for that loft being hit. Thus when you see a golfer hit the ball remarkably high using a driver with 10° loft, you can pretty much assume you are seeing an upward angle of attack. And if you see another golfer hit the ball visibly low using a driver with 11-12° loft, you are likely seeing a downward angle of attack. From that you can at least know which golfers really need the increase in loft and which ones do not.

[to top](#)

Talking the Talk – Points to Ponder for Brand Name Brainwashed Golfers

If I ever run out of clubmaking subjects to discuss in an eTECHreport, I've come to the realization that all I have to do is keep my eyes on the TWGT Forum and a good topic will always surface from the many threads being discussed there.

This month is no different thanks to a thread that started with the following post:

My small repair/clubmaking business is slowly growing. My repairs are getting a reputation as top quality; But the biggest comment I get on component clubs is that they are all "knock offs". I would like some info about knock off clubs and why Wishon designs, etc. are not knock offs. I see this as one of the big misconceptions in component clubs. I want to inform my prospective customers about top quality component clubs and knock offs. If any of you have ammunition for this any help would be appreciated.

Following is an edited assortment of some of the posts written by fellow clubmakers in response to the posted request for information:

POST 1

I think you just have to start listing down items with the component companies as well as the heavily marketed brand name clubs.

- Such as which component company sits on the technical advisory panel of the PGA? Or serves as the Technical Advisor writing equipment articles for the PGA of America's web site, www.pga.com
- Who among the 'knock-off' companies have written technical books about clubfitting and clubmaking technology
- You can call and ask the "other" knock-off companies who their technical designer is and have them list the industry firsts that they have produced. Then ask the big brand name golf company this same question
- Have the 'knock-off' company executive tell you the name of at least 3 foundries from whom they buy their clubheads and their key management
- Ask the big brand name golf companies' management if they know who Tom Wishon is, then ask them if they know who Mr. X is at the 'knock-off' company
 - Take a few of the components from 'knock-off' and OEM companies and Tom Wishon and have a gram scale near by and then take a few measurements. You will be amazed
 - Give the customer a questionnaire with the correct answers to be able to inquire about the important design and fitting elements in a golf club. Tell them to contact ANY other golf company and make the customer the offer that if the company they speak to comes up with all the right answers, ask for their number and tell him you will give him a finders fee and assemble HIS first set of clubs from them for free.
 - Lastly or first show him a copy of Tom Wishon's new book, "The Search of the Perfect Golf Club". Sell him the copy with the proviso to give him a money back guarantee if he finds fault in the content.

In closing I think the questions like all in sales are "The customer is looking for your answer to get him to feel comfortable." Additionally if after all of this he still doesn't want to buy a custom fit set from you just give him your card and tell him not to lose it. He WILL need it when he gets his Callaway or Taylor Made clubs and needs to have it cut to a length or altered to a point they can play as well as possible for him.

You can win some but you can't win 'em all just like in any other sales.

POST 2

Wishon is the brand name, just like Wilson, Ping, Callaway, etc. It's just that this brand comes in component form so they can be customized to the individual.

Same or better tolerances, just not mass marketed as a standard made club, bought off the rack.

POST 3

I did an article in my area that got a lot of attention. It was titled: "Without a Shaft and Grip, ALL golf clubheads are Components!"

Then I went on to explain how clubs off the rack with the "Famous" names are NOT like the same clubs played by the Pros. Pros have their clubs professionally fit to their swing, just like I can do for any golfer too.

POST 4

By showing up in your shop or opening up a dialog about golf clubs, the customer has just presented you with an opportunity to educate him and sell him a better club. I think just about everyone has had this customer show up in the shop. He/she is of one or the other mind sets.

- all they know are about knock offs and the lower price they bring.
- all they know are OEM product and everything else is inferior due to the brainwashing of advertizing (another subject altogether)

I give this as ammo for your needs.

In order to truly know if something is a "knock off" you must first know what the industry defines as a "knock off"

A knock off is considered a product that will take its notoriety from a heavily advertised product such as an big brand name marketed golf club. A knock off can also be a clone - an exact copy of an original design in all aspects of appearance. A look-a-like is a product that will also take its notoriety from a heavily marketed brand name product. However, the design is usually altered in some manner so it does not infringe on any patents backing the original design of the product.

Well above the knock-off level is the golf club that is an original equipment design (OED), or original design components. These are products that are from companies with designers or contracted designers to create an original product. The only thing lacking between the OED and an OEM is the advertising budget to convince you that the product belongs in your bag.

POST 5

OK, Try this one:

If someone tells me they have never heard of any of my brands of components from which I propose to fit and build their custom fit clubs, I ask them if they have ever heard of a [Koenigsegg CCR](#).

Most reply: "No, what kind of club is it?"

I say: "It isn't a golf club, it's a car. It is the fastest production made automobile in the world. It has an 806 HP engine and holds the world speed record for production automobiles at 240MPH. It also retails for \$590,000. So the fact that you've never heard of my custom made, designer golf clubs says more about you than it does about the component clubmaking designs from which I will fit and build your golf clubs, doesn't it? Since you've never heard of the World's fastest production model automobile either."

POST 6

Just so you have a list to put forth in front of your doubting customers as to what Ping, Nike, Callaway, Taylor Made, Titleist have contributed in the form of new club design technology since 2003 compared to TWGT. . . .

Big Brand Name Golf Club Original Design Technology since 2003

- Taylor Made R7/R5 - first drivers to allow weight distribution movement around the head in an effort to change ball flight.
- Callaway Fusion - Graphite rear body/Ti front body for different weight distribution in the clubhead
- Titleist-Cameron/Ping - advent of the super-size mallet putters with higher MOI than before
- Nike - Slingshot irons with a more rear located CG and an attempt to thin the face for higher COR for an iron

TWGT Original Design Technology Since 2003

- GRT face on the 515GRT drivers, now the 949G/Ti and 915CFE drivers too, to get rid of less loft at the bottom of the face for more consistent launch angle - subsequently developed to also be 0 roll on the 515 fairway woods for higher COR and more consistent launch angle. (Tommy Armour Golf Co. copied this in 2005)
- MOI Matching System period counter and software for swing feel matching of all clubs in a set to real Moment of Inertia – recognized by virtually all mechanical engineers as being superior to swingweight matching for making each club in the set swing with precisely the same feel. (No other OEM company has done this)
- Variable thickness, thin face design on the 770CFE irons with three different steel alloys through the set to maximize face deflection on center for higher ball speed - variable face to increase off center hit ball speed. (Several models of OEM thin face irons are slated for introduction in 2006)
- 0.335" tip diameter iron shaft on the GI-335 shaft to match with the 321Li hybrids - to increase launch angle far more dramatically for the 321Li which are also designed to be real irons in terms of their length and loft. (No OEM has done this and as yet, no other hybrid is as easy to hit high in the air as a real iron replacement)
- More rear located CG in a driver than ever before – Model 949G/Ti with its 44mm rear CG location compared to the Callaway Fusion's 38mm rear located CG.
- First fairway woods ever developed with an 0.830 COR in the 515GRT #3, 5, 7 woods. (Two other golf companies have since followed this trend)
- The CLF Series interchangeable loft putters to fit different golfers with differences in their putting strokes to ensure best roll of the ball off the face (no other golf company has done this)
- Rotating weight arm to change weight distribution/CG internally in a driver head up to as much as a 40 gram change - 715CLC driver (No other golf company has designed any other form of weight change driver other than through exterior weight ports that only allow 25 grams of weight movement around the head)
- The first Titanium drivers designed to be visually longer from face to back than from heel to toe to enhance the rear CG position, yet still conforming to the USGA's rule which states in actual measurement a clubhead cannot be greater in face to back breadth than heel to toe length – 919CCG drivers. (Nike is introducing such a driver shape in the fall of 2005)

[to top](#)

USGA Proposes Limit on Clubhead Moment of Inertia

Through a release sent August 31 to all golf club manufacturers, the USGA has announced a proposal for a specific limit to the Moment of Inertia (MOI) for all clubheads. The proposal for establishing a limit to the clubhead's resistance to twisting at impact is a follow up of the USGA's communication of March 30, 2005 in which the ruling body stated they were investigating three areas of interest regarding golf equipment technology that are pertinent to club performance.

The USGA believes a limit to clubhead MOI is required because "further increases to MOI could reduce the challenge of the game by reducing the skill required to hit the ball straight (and) result in an increase in average driving distance." The USGA has proposed a limit on clubhead MOI also because they believe the clubhead size limitations that are already in place in the Rules of Golf will not effectively prevent increases in clubhead MOI beyond the levels achieved by clubheads that were submitted to the USGA prior to March 2005.

The USGA proposes to implement a test and limit for clubhead Moment of Inertia to become effective March 1, 2006. It is proposed that the MOI around the vertical axis through the clubhead CG be limited to 4750 gm-cm² (1.623 lb-in²) plus a test tolerance of 50 gm-cm² (.017 lb-in²). Every club that has already been submitted to the USGA and already ruled conforming to the Rules of Golf by the USGA would remain conforming with this proposed limit. Until a final decision is made on the proposal, no ruling will be made on any clubs measuring above the proposed limit.

Additional testing details:

- Clubs will be tested for MOI as submitted by the club manufacturer. It is expected that submissions will weigh at or near the nominal head weight as intended for the finished golf club. Submitted clubheads having unusually low head weights may require additional information from the submitter confirming that the submitted weight is at or near the nominal head weight of the finished golf club.
- Clubs with movable weight designs need to meet MOI limits in all intended configurations.
- Any type of weight adjustment, like any other post-manufacture modification, should conform to all Rules of Golf.

While clubhead MOI in other directions has also increased, the

USGA does not believe that those parameters need to be separately limited. Therefore, no limits are proposed for these parameters. If future research should indicate that a limit for these or other MOI parameters is needed, the USGA reserves the right to propose and implement additional MOI limits.

At this time, MOI limits are not being proposed for clubs other than driving clubs. Should future research indicate the need for limits on MOI of clubs other than drivers, the USGA reserves the right to propose and implement such limits.

For its testing purposes, the USGA proposes to use a commercially available moment of inertia tester (Inertial Dynamics Inc. Model MOI-005-104 Moment of Inertia instrument) according to the proposed test procedure.

[to top](#)

"The Search" Results in Increase in Custom Fitting Business

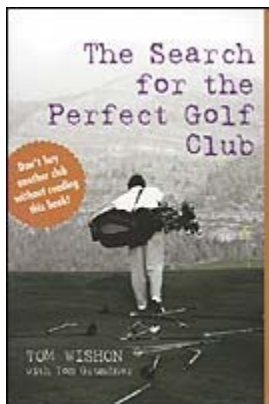
"A few years ago, Tom Wishon, with his experience as a designer, helped me understand more about a particular aspect of golf club performance.

"With this book, Tom will help you understand the entire field, make good buying decisions and get the most from your game."

- Arnold Palmer (Member, Golf Hall of Fame)

"In the course of my career I don't know how many pro-am rounds I have played. In all those rounds, rarely have I seen amateurs with clubs that genuinely fit their game. For me, Tom Wishon stripped away the mystery of club fitting, which I believe helped me to become a Top 20 player on the PGA Tour. "I am convinced this book will allow average golfers to get on the right track with their equipment as well. It is a 'must read' whether you are a scratch player or a beginner."

- **Scott Verplank (PGA Touring Pro)**



"If you are a woman golfer, you **MUST** get this book! It's the best club information for women golfers I've seen. Tom covers everything we need to know (but maybe were afraid to ask). Do not buy a club from the rack before you learn how much better off you could be with custom fitting."

- **Carol Mann (Member, Golf Hall of Fame)**

It's becoming a simple routine that is easy to predict. The more copies of Tom Wishon's book, *The Search for the Perfect Golf Club*, that golfers buy and read, the more fitting appointments that clubmakers book in their shops.

Every week we at TWGT hear from more and more clubmakers who have booked fitting sessions that result in sales of custom built golf clubs to total strangers who have read the Search book and sought out a clubmaker in their area. Each month since the book's introduction in April, the hits on the Clubmaker Locator link on our TWGT consumer web site (<http://www.twgolftech.com/>) and the contact emails we have received from regular golfers asking for more information about custom fitting have increased.

For years, serious clubmakers have longed for something that could drive customers into their shops to increase their custom fitting business. That "something" is a reality in the form of *The Search for the Perfect Golf Club*. And since the last several months have proven the book will generate business for clubmakers, the only thing preventing a true wave of change in the way golfers buy their clubs is simply getting word out to more and more golfers about the book.

If you care about increasing your business in custom fitting and you wish to have custom clubmaking recognized for its true benefit to golfers over the business of standard made assembled clubs bought off the rack, the industry of custom clubmaking needs your help to get the Search book into more golfer's hands. Here's how you can help:

1. If you have a shop in which regular golfers stop to browse, **DO STOCK COPIES OF THE BOOK**. When you start a conversation with the golfer, put a copy of the book in their hand and do your best to get the golfer to buy and read it.
2. If you have booked a fitting(s) as a result of the book, do ask the golfer to tell his/her friends about the book and encourage them to either lend their golfing friends/acquaintances their copy, or tell them where to buy the book. (Your shop if you stock copies, or any of the major bookstore retailers – Borders, Barnes & Noble, B. Dalton, Amazon.com, etc)
3. Call or write the sports editor/writer for your local newspaper and tell him/her about the book. If you have a copy, let the writer borrow it so they can read and learn first hand what the Search book is all about – helping the golfer make the best equipment buying decisions. Many newspapers have a frequent golf column in the sports section and all too often, the writer in charge of the column is looking for something to add of interest to their golfing readers.

These are just a few ideas for spreading the word of *The Search for the Perfect Golf Club* so more golfers will hear of it, buy it, read it and take action to contact clubmakers like YOU. Please remember this is NOT about promoting TWGT – it is about promoting custom clubmaking. In that task we are ALL in this together for the simple reason that "a rising tide raises all ships." There has never been anything before the Search book that had the real chance to change golfers' opinions about custom clubmaking. The book will do its job to re-educate golfers, but it needs ALL of you to do a little part to help spread the word. We ask you to please take some time to help in this collective "crusade" for custom clubmaking.

[to top](#)

New Design Update



This year, TWGT expanded the custom shaft fitting options for clubmakers with two new original shaft designs that have proven to be a superb match for golfers in search of more distance and comfort with their driver and fairway woods.

In August TWGT debuted the two newest additions to the high performance family of 915CFE drivers – the 915CFE 420cc with 15° loft and the 915CFE 460cc with 13° loft. Initial reports from clubmakers who have ordered, fit and built these two new High Launch drivers of larger head size are super positive.

2004 PCS Clubmaker of the Year, Jerry Hoefling from Saginaw, Michigan called us to say, "*The 915's are the best performing driver I fit golfers with in my shop and now that you have two new and larger size high launch models, there is not a golfer I can't fit with one of the 915's.*"

If you are unsure of the golfer type best matched with one of these two new 915CFE High Launch drivers, here are some tips based on our fitting experience that will help.

- For golfers with a driver swing speed of LESS than 85 mph and a 0° level angle of attack into the ball

(see [Matt Mohi's article this month on angle of attack](#), what it is and how critical it is to factor into the driver loft fitting equation), the 15 degree model of the 915 420cc driver is the best fit to achieve the best launch angle for the golfer.

- For golfers with a driver swing speed of MORE than 85 mph but less than 95 mph and a 0° level angle of attack into the ball (again, see [Matt Mohi's article this month on angle of attack](#)), the 13 degree High Launch model of the 915 460cc driver is the best fit to achieve the best launch angle for the golfer.
- If the golfer who is 95-100 mph also has a downward angle of attack, in which their launch angle is ALWAYS 2-3 degrees lower than the loft on the driver being used to measure their launch angle, they will still be well fit into a 915-420cc High Launch with 13 degrees loft. Remember this is because of the DOWNWARD angle of attack. Any golfer over 95 mph with a level or upward angle of attack should never be fit into either of TWGT's new High Launch drivers.
- For golfers with a slight upward angle of attack in which their launch angle is 2-3 degrees HIGHER than the loft at the point of impact on the driver being used to test the launch angle, those with a driver swing speed of 80 mph or lower would be best fit into the 915-460cc High Launch with 15 loft. Those with an upward angle of attack like this with a swing speed from 80-92 mph will be best fit with the 915-420cc High Launch with its 13 degrees of loft. Those with an upward angle of attack and a swing speed higher than 93 mph would **not** (repeat **NOT**) be a good candidate for one of these two new 915CFE High Launch drivers.

Both of the new 915CFE High Launch driver heads are in stock and available for immediate custom fitting for your golfers. Both incorporate the 10-2-3 beta titanium forged face with variable thickness construction, proven to increase off-center hit forgiveness and ball speed. TWGT's unique GRT face is also a key part of the face design for both of the new 915CFE drivers as well to ensure more consistent launch angle and distance.

One more item to mention. We'll be adding a Left Hand 915 420cc 10° Driver in 2006! Just thought you might like to know.

[to top](#)