



CLUBMATE **GOLF** AUSTRALIA
GOLF CLUB COMPONENTS



August 2004 eTECHreport - Welcome!

- **Common Sense Points to Use in Fitting**

Because clubmaking and fitting are technical subjects, it is all too easy to get caught up in the 'minutia and details', and in the process not be able to "see the forest from the trees". [[continues below](#)]

- **MOI Matching – This IS the Real Deal**

Since TWGT completed work on the first ever system for truly matching the Moment of Inertia of all clubs within the set, several hundred clubmakers have invested in the program and have been using it in their custom clubmaking. In complete honesty, not one clubmaker has reported to us that a golfer for whom they MOI matched their clubs has not liked the difference MOI matching made in the swing feel of all of the clubs in their set. Not ONE! [[continues below](#)]

- **New Models (updated)**

Formerly referred to as 'Black Cobalt', the new Wishon PCF Wedge is actually a stunning Platinum Nickel... [[continues below](#)]

- **SAY "HI" TO A REAL HYBRID (by Matt Mohi)**

I have to admit that I am somewhat of an equipment snob. While I enjoy the sense of accomplishment in pureing a muscleback 3-iron, that pleasure drops and fades (which perfectly mirrors the shot I hit most of the time) when I have to reach into my pocket at the end of a round to settle a bet! [[continues below](#)]

- **An Overview of What's Changed in Shaft Fitting**

Last month one of the posts on our TWGT Clubmaker Forum posed the question, "What would you update and change the most from your 1997 book on fitting?" While I chuckled to myself at first when I thought about the new book I'd have to write in response to the question, I was immediately hit by how much things have changed in the world of shaft performance and fitting techniques. [[continues below](#)]

Common Sense Points to Use in Fitting

Because clubmaking and fitting are technical subjects, it is all too easy to get caught up in the 'minutia and details', and in the process not be able to "see the forest for the trees." As many of you know who have followed, read and learned from my golf equipment and fitting research over the years, I much prefer to use a "practical" or "common sense" approach when it comes to advising what combination of head, shaft, grip and assembly specifications are going to make the most difference in shot performance for the golfer. The following is a collection of some of the common sense points of clubfitting that clubmakers can keep in mind when things become too complicated in a fitting session with a golfer.

1. The longer the length, the heavier the total weight, the lower the loft and the stiffer the shaft, the harder the club will be to hit for 99% of the golfers you fit.
2. Unless the golfer has a proven preference otherwise, fit your golfers into the lightest, most flexible shaft that they can control. And remember to spend some time determining what each golfer's definition will be for "control."
3. Face Angle is by far the most powerful fitting specification for addressing accuracy problems. Club Length is right up there behind it.
4. Set Makeup is your most powerful fitting specification for actually lowering the golfer's score through wood and iron fitting. Obviously short game and putting control the score more than the right clubhead, shaft, grip or assembly specifications. But because so many golfers are focused so heavily on their woods and irons, a real change in set makeup—replacing hard to hit clubs with clubs that are easier to hit solidly and get up in the air for the same shot distances—will have a greater effect on score than any other wood or iron fitting change.
5. The golf swing can negate any fitting specification you may recommend. In other words, know when the golfer's need for a major fundamental swing correction cannot be overcome with a fitting change.
6. To forego learning what swing mechanics affect which fitting specifications is to bring more guessing and more trial and error into the fitting process.
7. For 99% of the golfers who play the game, to err on the side of more flexibility in the shaft is to do the golfer a favour.
8. The slower the swing speed of the golfer, the more loft is required to maximize the golfer's potential for distance with the driver. The only exception is when the slow swing speed golfer has a swing move, or ball position that results in a very high flight. In such cases, point (5) above must be remembered.
9. Never overlook putter fitting in your work with a golfer. And while putter fitting, do not neglect putter loft fitting, isolating your focus to only length, lie, putter headweight, head and grip style.
10. The most important wood and iron specifications to address for a real change in ball striking performance are length, set make up, wood face angle, wood loft, iron lie, club total weight, grip size and the correct MOI of the assembled golf club for the golfer.

11. A launch monitor can be an extremely helpful tool in fitting, but ONLY if you know how to process the feedback into proper fitting specifications.
12. Proper wedge fitting for loft progression, length, and sole angle can lay the foundation for a golfer to score better, but will not guarantee it because wedges are clubs in which technique and manipulation are so important. However, proper putter fitting for loft, length, lie, grip and headweight can bring about an automatic improvement in score.
13. Hosel offset on woods may address trajectory and accuracy for players who fade and hit the ball lower. Hosel offset on irons should be fit primarily from an “appearance” standpoint.
14. OK, call me prejudiced, but even if we had not developed the GRT (See page 24 of the Spring 2004 (printed) TECHreport for the Wishon 515GRT - [available as a 6.3MB PDF here.](#)) Design Highlights. face design, excessive vertical roll radius on drivers is not a good design parameter for any golfer.
15. Taking the time to learn how to build your custom clubs to be MOI matched is definitely better than swingweight matching. But if you stay with swingweight matching for your assembly, it is far better to err on the side of a little higher swingweight for the vast majority of golfers than it is to err on the side of a lower swingweight. Of course this is based on your fitting for the best total weight of the clubs to the strength and tempo requirements of the player.
16. Very long drivers will only work for players with a smooth backswing-to-downswing transition, smooth tempo, and who do not have an upright swing plane.
17. Any golfer using a driver with less than 11° loft who has a swing speed under 90mph with a level-to-downward angle of attack to the ball definitely has at least 10 more yards of driver distance that is untapped, if you fit them with a higher driver loft.
18. Never make the length of the clubs longer than what the wrist-to-floor measurement chart (See page 16 of the Spring 2004 (printed) TECHreport for the article entitled “Fitting Club Length.” - [available as a 6.3MB PDF here.](#)) would indicate unless the golfer has 1) smooth tempo, 2) normal to flatter swing plane, 3) good ball striking skills.

[to top](#)

MOI Matching – This IS the Real Deal

Since TWGT completed work on the first ever system for truly matching the Moment of Inertia of all clubs within the set, several hundred clubmakers have invested in the program and have been using it in their custom clubmaking. In complete honesty, not one clubmaker has reported to us that a golfer for whom they MOI matched their clubs has not liked the difference MOI matching made in the swing feel of all of the clubs in their set. Not ONE!

We know there are thousands of clubmakers out there, all of whom have a desire to build the best custom clubs possible for each golfer they serve. MOI matching is without question one very good way to achieve that goal. Look at it this way. If we or any other clubmaking company were able to magically develop a head or a shaft that automatically

hit the ball much farther or straighter for all golfers, there is no doubt thousands of clubmakers would all immediately begin offering that head or shaft to their golfers. While MOI matching is not going to add 30 yards or ensure hitting 14 fairways and 18 greens per round, it can definitely improve the percentage of solid, on-center hits for all golfers – and it will bring a more pleasing sense of feel to all golfers with all of their clubs.

MOI matching has long been recognized among golf equipment engineers and technically minded clubmakers as being superior to swingweight – it will make all clubs in the set swing with precisely the same effort from the golfer and with the same swing feel. Thus what it offers to the golfer is the chance to play the game with greater swing consistency.

MOI matching is not a TWGT discovery. All we have done is to recognize its superiority to swingweight matching of clubs and develop a system to finally allow clubmakers to build real MOI matched clubs. Please do not think of our MOI matching system as being a “product” that we are “hyping” as if in competition with any other company’s products. It is real science that is proven to make all clubs in a set swing with precisely the same effort from the golfer to deliver the same exact swing feel.

You may ask the question, “If MOI matching is so superior to swingweight, why don’t the big brand name companies do it?” Major manufacturers of standard made golf clubs do not and likely will not offer MOI matched clubs because MOI matching is individually custom fit to each golfer, same as length, driver loft, or any other fitting specification. In other words, one standard MOI cannot fit all golfers. The major manufacturers can never build every club they make to custom specifications, thus they would never offer MOI matching in custom form.

- If you have not yet considered getting into MOI matching in your custom clubmaking, you need to.
- If you are not using MOI matching as your manner of assembling the clubs you build to offer more consistency to your golfers, you need to.
- If you are intimidated because you think MOI matching is a complicated method of assembly, do yourself a favor and take a look at [this link](#) to MOI FAQ’s and examples of the system in use on our web site

We know that swingweight matching has been around for nearly a century. We also know that traditional methods of clubmaking can be difficult to give up, because we all dislike change to some extent. But MOI matching is superior to swingweight matching, it will deliver better clubs to your customers, and it will provide you with a valuable point of differentiation to enhance your clubmaking reputation in your local market.

[to top](#)

New Models Now Available

New PCF model Platinum Nickel finished wedges (formerly known as Black Cobalt)

- Available in 52° gap wedge, 56° sand wedge and 60° lob wedge in RH.
- Loft, lie, sole angle and headweight specifications are the same as the current PCF mirror Ni/Cr finished wedges.
- PCF Platinum Nickel wedges are precision investment cast for specification accuracy from very soft HRB80 stainless steel, then vacuum chemical treated to create the beautiful Platinum Nickel finish.
- [More on Wishon P-Series Wedges here.](#)

New 321-5 iron hybrid

- If you have been one of the many clubmakers to build and be amazed at the ease of play and superior performance of the new 321Li Hybrid ironheads, you'll be sure to welcome the addition of the 5-iron head to the line. If you have not yet tried the 321 hybrids, you are missing the absolute best true long iron replacement design in the entire golf industry.
- 321-5 iron designed with 28° loft, 60° lie, 254g headweight, bulge 20", roll 0" flat.
- Investment cast from 17-4 stainless with extra thick rear wall design to move the CG farther back from the face for higher launch angle.
- [More on the 321Li Hybrid Irons here.](#)

New 939H Iron Additions

- 939H is TWGT's full set of matched hybrid and conventional irons that truly looks like a blended set of irons. New this summer to join the 939H family are the 2-pc hollow design #6-iron and AW gap wedge options.
- 939-6H allows clubmakers to extend the total game improvement 2-pc hollow construction all the way to the 6-iron. Most players looking for game improvement help with stronger loft irons do not hit the loft of



modern 6-irons as well as they do the 7- to the wedges. With the addition of the 6-iron in the same hybrid construction design as the #2, 3, 4, and 5 irons in the 939 set, clubmakers will be able to offer players a wider range of performance in the set. 939-6H has the same specifications as the solid conventional cavity back #6 currently available in the 939 set.

- 939-AW narrows the distance gap between today's typical PW and SW lofts. Cavity back, one-piece investment cast design with 52° loft, 64° lie, 284g headweight and 2mm offset hosel.
- [More on the 939H Irons here.](#)

[to top](#)

SAY "HI" TO A REAL HYBRID

by Matt Mohi

I have to admit that I am somewhat of an equipment snob. While I enjoy the sense of accomplishment in pureing a muscleback 3-iron, that pleasure drops and fades (which perfectly mirrors the shot I hit most of the time) when I have to reach into my pocket at the end of a round to settle a bet! The reality is that I don't have the same swing I did when I was a kid and was constantly hitting balls and playing golf without a care in the world. Ah, the good ol' days!

While I have enjoyed playing the cavity backs in my longer irons, and admit to feeling more at ease over the ball looking down knowing that I have the forgiveness of a Cavity Back design, it finally dawned on me last fall that there was an even easier way to go – and it took only one swing to open my eyes.

When we received the first testing samples of Tom's redesign of the long iron hybrid, the 321Li, I quickly agreed to participate in the human side of the testing. I hurried through my regular warm-up routine and wasn't fully in the groove when I took my first swipe with one of the 321-3 iron test clubs with the GI-335 graphite shaft. The ball soared way up high into the air – so much higher than my conventional 3-iron that I had time to turn to Tom and yell "Winner!" before the ball hit the ground.

Immediately, I knew that this club was in the "VERY easy-to-hit" category. Apparently a lot of clubmakers have found the same thing because the 321 hybrids' success this year for clubmakers has proven that our initial experience was correct. I am convinced that if there were an award for the golf industry's "Club of the Year", no question the 321 hybrid with its matching GI-335 graphite shaft would give everyone a run for their money.

What is it that makes the 321Li so easy to hit? It really is a combination of several design features; some attributed to the design/performance aspects of the head, some which are the heads' interaction with the specially designed shaft. Because the overall success of the 321 is a combination of the head plus the shaft, I would like to touch upon a couple of things to look for when fitting golfers – most of which comes up in the interview process. First let's take a look at the design/performance features that make the 321Li so unique in the broadly defined world of "hybrids".

Headweight for True Long Iron Length and Distance

Many Hybrids on the market today are simply narrow-bodied fairway woods. They have the same headweight as fairway woods of the same lofts, and thus are designed to be built to fairway wood length. For golfers that just ends up

being a duplication of their fairway woods' performance, only with a different shape. Tom's design concept was not to replicate what could be done in fairway woods, but to create a much easier to hit head that could fit into the bag by delivering real long iron distance. The 321s are designed at the same loft, lie, and weight as their traditional iron design counterparts.

Small Tip Iron Shaft

Since Tom inaugurated the practice of studying the bend profile over the entire length of the shaft to determine its total contribution to shaft performance, one thing that he knew is that the club would be much easier to hit with the shaft designed to have a .335" tip section as opposed to the .370" tip section diameter of conventional iron shafts. This smaller diameter allows for a much more active tip section to take advantage of the 321's more rearward Center of Gravity. Additionally, Tom created a little longer tip parallel section than is found on traditional .335" graphite wood shafts, so that clubmakers would be able to custom trim to fit the particular golfer and also be able to use the GI-335 shaft with a special coiled shim in .370" bore long and middle-iron heads.



Clubhead Rear Center of Gravity (CG)



As Tom has addressed in previous TWGT technical publications, one of the most important effects of the CG in any clubhead is the effect it has on the forward bending of the shaft that takes place after the golfer un-hinges the wrist-cock on the downswing. Because of the more rearward CG in the 321 hybrid heads – far greater than on an iron – the 321 will hit the ball higher than its traditional iron counterpart even if it were used with a conventional .370" tip iron shaft. But with the .335" tip graphite shaft designed to match with the 321s, we have a deadly combination for golfers.

Face Progression/Offset/Onset

I speak with a lot of clubmakers who ask, "What's the offset of the 321?" Well the 321 doesn't have any offset but it still has the same hosel to leading edge appearance of an iron. The real offset measurement of the 321 heads is 0. Yet visually, it appears to the eye that there is a small "offset" because of the way the hosel blends into the face. Hybrids, which are designed with a similar "onset" to fairway woods, simply do not look good in the playing position because of their more narrow body shape. This subtle visual distinction allows a smoother transition to the irons.

The 321Li vs. Other Hybrids

In doing a little research, I looked up the specifications of one of the more popular hybrids from a major assembled club OEM. What I found was an interesting contrast to the design parameters that Tom created for the 321. I put together a little chart so that a side-by-side comparison could be made:

Club	Loft	Shaft Diameter	Headweight	Standard Length
321Li - #2	18°	.355"	231g	39.5" steel / 40" graphite (or fit to golfer)
OEM - #2	16	.370	?	40.5"
321Li - #3	21	.335	238	39" / 39.5" (or fit)
OEM - #3	19	.370	?	40"
321Li - #4	24	.335	245	38.5" / 39" (or fit)
OEM - #4	22	.370	?	39.5"
321Li - #5	28	.335	253	38" / 38.5" (or fit)
OEM - #5	25	.370	?	39"

The first thing that really struck me was the strong lofts of the assembled OEM hybrids. We know that loft is the primary determinant in how high a ball will fly and strengthening them only makes this more difficult for the golfer. Additionally, the .370" tip minimizes how the Center of Gravity of the head affects the shaft bending. This isn't to say that this club doesn't produce good results for golfers, but it really isn't a replacement for long irons as much as it is a toned down fairway wood with a larger tip diameter, which from an ease of hitting standpoint makes no sense for most golfers.

TWGT believes strongly that the purpose of a hybrid is to truly replace the conventional long irons with clubs that blend smoothly in with the other irons. Making hybrids as this major OEM does confuses the issues of distance between clubs.

Fitting the 321 Hybrid Long Irons

Now that we know the design/performance aspect of the 321, how do we incorporate that into the fitting process? How do we integrate hybrids with the total composition of the golfer's set-make up? Whether low single-digit or 30+ handicapper, this is a club that will benefit all golfers as a replacement for their long irons. Of course some low handicap players may still want to have a conventional 3 and 4-iron in their set. But as witnessed at the British Open this summer, even some of the most skilled golfers are taking advantage of the design benefits. Personally, I don't feel that I have lost any sense of control or "workability" using the 321 #3 (21°) as the replacement for my 550C #3-iron. In fact, from the mental side, I have more confidence in the 321 overall, so I know there is less tension in my swing when I set up for the shot.

Hitting conventional long irons properly requires the following swing mechanics for success: 1) a higher than average swing speed (>80mph with the 5-iron) to generate more backspin to help keep the ball in the air. 2) Never allowing the clubhead to pass the hands before impact. 3) Keeping the head down and well behind the ball at impact. Obviously, these are swing moves that only the most skilled ball-strikers possess. Therefore, most golfers can and should replace their conventional low-loft irons with the 321 hybrids.

The most common sense way to fit the golfer for the 321 hybrids is first to determine what is the longest iron that they have the most confidence in hitting. Generally speaking with low handicap players that would be the #4 or even the #5. With middle handicap players that may be the #5 or 6-iron. With high handicap players it usually is the #6-iron or even the #7-iron (hmmm, does that mean Tom has a 321-6 in the works??). After all, TWGT is all about making shotmaking as easy as possible. With the stronger lofts that the golf industry has moved to for all iron sets today, even conventional 5-irons are tough to hit solid and high a high percentage of the time. Thus clubmakers should know to

advise hybrids up to the point of the golfer's longest conventional iron with which they have the most confidence in hitting.

For the length, the 321 hybrids should be assembled to continue in the same 1/2" length increment increase up from the longest conventional iron they will retain in their iron set. With the weight bore in each 321 head, building to the same swingweight as the other conventional irons is easily done.

If you are performing real MOI matching using the TWGT MOI Matching System, you will build the 321 hybrids' MOI to match the same MOI you determine is best for the golfer's irons.

If you haven't yet exposed your golfers to how incredibly easy the 321s are to hit, you really are missing a golden opportunity to bring a whole new level of enjoyment in the game to a huge number of golfers. I know it's made my game better and more profitable!

[to top](#)

An Overview of What's Changed in Shaft Fitting

Last month one of the posts on our TWGT Clubmaker Forum posed the question, "What would you update and change the most from your 1997 book on fitting?" While I chuckled to myself at first when I thought about the new book I'd have to write in response to the question, I was immediately hit by how much things have changed in the world of shaft performance and fitting techniques.

I realize that in previous editions of the TWGT eTECHreport as well as some of the issues of our print magazine, TWGT TECHreport, we have written a fair amount about some of the more modern aspects of shaft analysis, shaft design, performance and fitting. Because this is such a hot topic to so many clubmakers, I wanted to offer an overview of some of the most important changes in shaft fitting over the past 2-3 years all in one place, so that you will have a single reference as well as another jolt to help you adjust your shaft thinking.

1. The Shaft's Main Contribution in the Club is to Total Weight, Launch Angle and Feel, with a Minor Contribution to Dispersion.

There have been a few myths that have surrounded what the shaft contributes to the performance of the shot. In no way can the shaft add or enhance swing speed, nor can it cause significant changes in accuracy. First and foremost, the shaft is the primary determinant of the total weight of the club. Therefore, it is very important for clubmakers to think of shaft weight first when they are trying to achieve a much lighter or heavier total weight in the clubs to meet the strength and tempo requirements of the golfer.

Second, it has a medium contribution to the launch angle, and from that, the trajectory of the shot. However, the loft and the CG position in the clubhead are the primary specifications to consult when you wish to make a significant change in the height of the golfer's shots. The shaft can enhance the desired trajectory by a small amount (1-2 degrees in launch angle) when the overall flex is fit traditionally to the golfer. What I mean by "fit traditionally" is that yes, it is possible to fit a golfer with a much too stiff, or far too flexible shaft and see more visible changes in shot height. Traditional fitting for the flex involves identifying an accurate swing speed range for the shaft, and keeping the golfer's swing speed measurement within the range as stated for that shaft.

The shaft does not have a significant effect on shot accuracy. In other words, the torque of the shaft can cause a slight change in accuracy but not more than a single digit change in dispersion yardage. Of course, if the torque is over 6-7 degrees and the golfer is physically strong with a powerful, late release of the wrist-cock, accuracy could be affected in a very measurable amount. But then too, this has to be a common sense part of torque selection for the golfer. There are PGA Tour players who use shafts with torque of 4 to 4.5 degrees and do not suffer from misdirection problems. Thus for most golfers of average-to-stronger swing ability, keeping the torque no less than 3 degrees and no higher than 6 degrees is a safe credo of fitting that will never cause shot performance problems.

2. Butt Frequency Cannot Be Used to Rate the Stiffness of a Shaft, nor as the Chief Determinant of a Shaft's Swing Speed Range.

I admitted before that I might have been one of the prime troublemakers in this area. In my 1991 book, *The Modern Guide to Shaft Fitting*, I introduced butt frequency measurements as a means for identifying flex and swing speed ranges of shafts for fitting purposes. OK, cut me some slack now. That book was written 13 years ago and a lot has changed since then in terms of our awareness of shaft flex design and flex fitting parameters.

I will be the first to admit that yes, it sure would be easy if we could say that in a driver of 45" length, 250cpm is an R, 260cpm is an S and 270cpm would be an X. Sorry about that, but thanks to pushing the envelope of the shaft's whole bending stiffness design, it is not possible to judge the flex of a shaft by its assembled club butt frequency only. Some shaft design companies, TWGT included, have begun to specifically manipulate the stiffness of the center, center and tip, and/or tip section areas of shafts so as to offset or enhance the butt stiffness of a shaft to achieve differences in the launch and feel characteristics. As a result, and just to cite one example, there are shafts today with an assembled driver butt frequency of 230-235cpms that are definitely considered an "R flex", and not an L or A flex as the old averages for butt frequency used to indicate. Same thing with irons as well.

From this, it is also not possible today to accurately "calculate" the swing speed rating of a shaft from the butt frequency. Again, I confess to having helped develop the first 'tables' that compared butt frequency to torque to conveniently reveal a swing speed rating for any shaft. Such tables are worthless today because they are not based on true engineering formulas for bending characteristics of shafts. And modern stiffness engineering of the entire shaft is not properly taken into account either. In the end, swing speed ratings today have to be created from real player testing, taking into account differences in swing mechanics and shot performance of golfers.

3. The Player's Swing Mechanics Which Specifically Relate to the Bending of the Shaft are Extremely Important to Reference in Shaft Fitting.

While shaft fitting principles of the 90s did begin to recognize the importance of comparing different golfer swing mechanics to shaft design features, not nearly enough importance was placed on this aspect of shaft fitting. Today, when you think about the performance contributions of the shaft being chiefly club total weight followed by shot launch angle, it is vital to know which moves in the golf swing dictate what type of shaft design.

The most important factors of the golf swing that relate to shaft fitting are (1) Swing Speed, (2) Golfer strength and tempo, (3) Transition from Backswing to Downswing, (4) Position and manner of wrist-cock release, (5) Position of hands/wrists at impact.

Swing Speed is still the starting point for eliminating shafts that are not suitable in terms of the shaft's swing speed rating, provided the swing speed ratings are reasonably accurate in their estimation from the shaft maker or shaft seller.

Golfer strength and tempo is a major factor to consult in the determination of the total weight of the clubs, i.e. the weight of the shaft. It is also one of the factors contributing to the torque, as well as a final determination of the bend profile of the shaft.

Transition from Backswing to Downswing is important for selecting the shaft's butt stiffness and overall stiffness purely from a standpoint of a bending feel that will be comfortable for the player.

Position and manner of wrist-cock release is all-important when it comes to the shaft's contribution to the launch angle of the shot, as well as the feel of the shaft for golfer comfort and confidence. Golfers with a very early release rarely note a trajectory difference between different shafts, while golfers with a late release will.

Position of the hands/wrists at impact is an important aspect (along with the release) for predicting whether a shaft will or will not exhibit its launch/trajectory design for the golfer. "Flexing the wrists forward" at impact, in which the clubhead is ahead of the hands, will mean that all shafts will likely hit the ball the same trajectory for the golfer. In short, ignoring the swing mechanics of the golfer in any shaft fitting is a sure way to end up with a shaft selection that does not perform or exhibit a feel to the golfer as hoped.

4. The Amount the Shaft Bends in the Beginning of the Downswing is Much More About Feel – The Amount it Bends in the End of the Downswing is More About Shot Performance.

Because golfers have to rotate the club 90 degrees on the backswing to make a proper turn away from the ball, all bending of the shaft at the very beginning of the downswing will be in a plane that will be 90 degrees perpendicular to the plane in which the shaft bends just before impact. If a golfer uses a shaft that bends a lot in the beginning of the downswing, it is very likely that the golfer will detect this action and may or may not prefer that feeling. But this bending action in the beginning of the downswing will NOT transfer to the plane that the shaft bends before impact. Thus there is no "load and unload" springing of the shaft.

All of the shaft's bending just before impact, which is the action of the shaft that dictates the shaft's contribution, or not, to the launch angle of the shot, comes from the golfer's wrist-cock release. As the golfer unhinges the wrists, the arms slow down as energy is transferred to the club, which begins to accelerate in response.

This unhinging of the wrist-cock generates centrifugal force on the club, which is the means by which the shaft is able to bend forward before impact and thus contribute to launch angle. The later and more powerful the release and the softer the shaft's overall flex and/or tip flex, the more the shaft can bend forward to thus increase launch angle. The earlier the release, the less powerful the release, and/or the stiffer the shaft overall or in the tip section, the less the shaft will bend forward before impact, and the less the shaft will contribute to the launch angle.

However, the shaft cannot bend forward any more than the distance from the shaft centerline to the CG position in the clubhead. It is because of this principle of physics that the shaft can only contribute moderately to the launch angle of the shot.

5. The Shaft is Not The "Engine" of the Golf Club or Shot.

The shaft may be considered the "transmission" of the club, because without it, there is no movement of the ball. But in no way is the shaft the most important component of the club or the shot. It is the "transmission" because it transfers the energy and bending capability from the golf swing to the club. If you had to choose one component to be the "engine" of the club, it would have to be the clubhead. The reason is because the clubhead has far more control over the ball speed, the launch angle, the spin rate and direction of the shot than the shaft.

If a golfer changes shafts and finds that they cannot hit the ball as well with the same clubhead, it is primarily because of the change in the golf club's feel, total weight, and weight distribution/balance/MOI. What confuses the issue so much to lead clubmakers to believe the shaft is more important than it really is? The answer is, the overall aspect of "FEEL," which is comprised of the golfer's many perceptions: from how much they feel the shaft bend, to the overall weight, balance and MOI of the club, and how that affects their swing motion and timing.

TWGT is absolutely committed to helping clubmakers unravel the mysteries of shaft fitting. While we have discovered a number of areas of shaft performance that have been new and informative, we know there is still work to do to present differences in shafts that are going to be clear and concise for clubmakers to be able to perform shaft fitting with more confidence. To that end we remain committed, and will continue to offer truthful information, not hearsay or myths, to help guide your shaft selection for golfers.

[to top](#)