



CLUBMATE **GOLF** AUSTRALIA
GOLF CLUB COMPONENTS



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You bet I'm excited! Normally the new designs and products for the coming season are enough to pump me up. [\[continues below\]](#)

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As one of the charter members of the Professional Clubmakers' Society, I have always believed in the need for an independent organization of clubmakers. [\[continues below\]](#)

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Combining loft and extreme rear-positioning of center of gravity to deliver optimum launch conditions! [\[continues below\]](#)

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Am I Excited About 2005?

You bet I'm excited! Normally the new designs and products for the coming season are enough to pump me up. And yes, there are some remarkable things in that basket of goodies to be excited about. But on top of the products, I think that the marketing projects we will unleash on the golf industry on your behalf are going to add up to making 2005 quite an interesting year!

Some of you may know that before I made the decision to start my own company, I was considered to head up R&D for one of the "Big 4" OEM assembled club companies. While that was a huge honor, one of the main reasons I decided not to do that was because I just could not turn loose of the belief that "the best clubs ANY golfer will EVER buy will be accurately fit and custom built by a good clubmaker using high quality clubheads, shafts and grips." I believe strongly that standard made clubs cannot possibly be the best for any golfer, and that all golfers need to be custom fit to play to the best of their ability.

I know what many of you are thinking – Great thought Tom, but most golfers think the OEM clubs are the best and that clubmakers put out knock-offs and cheap clubs. How the heck are you going to change that?

Well sure enough, Rome was not built in a day, but some of the things that we have in store for 2005 might actually get the roads, the foundation and some of the walls built. What we have "in the can" as well as "coming off the drawing board" are going to make a real impact, and are being done to promote clubmaking using TWGT designs directly to consumer golfers!

First, my new consumer book, ***The Search for the Perfect Golf Club***, is done and in the hands of the publisher. It will debut at the PCS Expo in early March, with a nationwide release on April 1st to all the major retail booksellers in the US. Quite simply, the book tells consumer golfers why standard made clubs bought off the rack won't allow them to play their best. Throughout it emphasizes what is important in the performance of golf clubs for all golfers, and countless times offers proof to the readers that the only way they can get the best for their game is by being custom fit. The publisher tells me the initial orders from B Dalton, Barnes & Noble, Walden Books and Amazon.com are very good, so that means that more golfers than ever before are going to be learning the real truth about golf clubs and what clubfitting can do for their game!

When I decided to start my own company, I made a pledge that in addition to offering clubmakers the best designs and technical information on the planet, I was also going to work to change public opinion about custom clubmaking as done by skilled clubmakers using quality, innovative designs. We're doing our best to make that happen in a scope never before accomplished, much less even thought of by the other component companies. A couple of things that we have in the works utilize some very powerful marketing tools and technologies. Our goal is to have name recognition among the general golfing world that will be unmatched in our part of the industry, and we are implementing some very innovative and unique programs to get this done. This is all done to raise the impression of clubmaking in the public's mind while also supporting the clubmakers who have supported us in a very crowded and competitive market. Stay tuned...

Oh, yeah – the new designs for 2005! Some of you have already experienced how incredible a real **0.830 COR fairway wood** can be with the early release of the 515GRT fairway woods. **This is without question THE BEST 3 and 5 wood in the game today**; the **7-wood** joins them in 2005.

Can you say **440cc** and **460cc**? Look for that coming in two of our most popular driver models next year too! How about custom loft fitting in a new line of **CNC milled putters** without having to ever touch the hosel? A **new fitting book** you say? Yes, my hammering of the keyboard did not stop when I finished the new consumer book. And the piece d'resistance? No doubt it will be the **new 715CLC driver**, which I really think will make anyone who bought the R7™ wish they hadn't pulled the trigger so soon!

Add it all up and we here at TWGT can't wait for the 2005 season to arrive! Hope you share our enthusiasm.

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Tom to be a Featured Speaker at 2005 PCS Expo

As one of the charter members of the Professional Clubmakers' Society, I have always believed in the need for an independent organization of clubmakers. Even back when I was a VP with Golfsmith® who promoted their own clubmaking organization, I continued to offer support to the PCS to help with their programs and organization.

The highlight for the PCS is their annual Expo, held at the Galt House Hotel and Conference Center in Louisville, Kentucky the first weekend in March (3rd-6th). The PCS Expo is a 4-day event in which the leading clubmaking suppliers exhibit their products in a trade show environment. Experienced PCS members will stage numerous seminars, along with technical presentations by clubmaking industry leaders, all to enhance the clubmakers' technical knowledge.

Once again, I've been asked by the PCS to address its members. This year's subject is tentatively scheduled to be "A Modern Look at Shaft Fitting."

I told the PCS to think in terms of the word "tentative" when they asked me what I was going to speak about, because this industry seems to change so fast these days that by the time March rolls around, there might be something more timely to address from the standpoint of clubmaking technology.

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Why You Have to Learn the Golf Swing to be a Better Clubfitter

There is no question a set of accurately fit golf clubs has to be built to match the specifications of the clubs to the swing characteristics and physical attributes of the golfer. After all, it is the swing mechanics that come from the physical attributes of golfers that determines why one golfer hits the ball longer, straighter, higher, or lower, and with or without the same amount of backspin than any other golfer. So it stands to reason that it is the swing differences and physical characteristics among golfers that ultimately determine what each golfer's final clubfitting recommendations need to be.

Many of these things have already been taught to clubmakers such that they are as common to a fitting as epoxy is to allowing the head to be attached to the shaft.

For example, we need to know the swing speed of a golfer in order to provide some of the information needed to help select the shaft flex/bend profile. We also use a measurement of the distance from the wrist to the floor as an initial indicator for club length. Many clubmakers take measurements of the golfer's hand and middle finger to help come up

with a grip size recommendation. Iron lie angle is now commonly fit by observing the results of the golfer hitting shots off a lie board. Some clubmakers use a swing computer to recognize the swing path and face angle typical to the golfer as a way to help with determining the best woodhead face angle to maximize accuracy. And some clubmakers now use a launch monitor to read the typical launch angle, ball speed, and backspin amount so they are more aware of what a golfer's swing does to the launch parameters of any combination of clubhead, shaft, length and assembly specs.



Seen in stop action at the end of the backswing, the three basic swing planes of Flat, Normal and Upright are illustrated here. Golfers with a flat swing plane + smooth tempo + smooth back to downswing transition + average to above average athletic ability will tend to be able to control longer club lengths much more successfully than golfers with an upright swing plane + fast tempo + quick back to downswing transition + average to below average athletic ability. Keep in mind that we are talking about a COMBINATION of factors that will lead you to making the decision that either you need to reduce, or increase the length of each golfer's clubs from the initial length recommendation that comes from the wrist-to-floor measurement. And always, always err on the side of shorter whenever you are in doubt in making this judgment.

Every one of these measurements or data gathering procedures are ultimately related to obtaining information about how one golfer's physical parameters and swing mechanics combine to give clues to many of the most effective golf club fitting specifications. We clubfitters are familiar with most, if not all of these things because methods, tools and devices for being able to measure them have been available to us for some time.

But there are a number of things we need to glean from every golfer's swing mechanics and physical attributes for offering the best clubfitting experience that as yet are not easily measured, and have to roughly be observed and then processed by the clubmaker into specific fitting recommendations for the golfer. For example, right now it is pretty difficult to measure points in the golf swing that do have an important contribution to specific fitting recommendations such as:

- the golfer's athletic ability as a means to help determine the final length, weight and swingweight/MOI of the club.
- The golfer's swing plane and swing path to assist in determining the final club length.
- The golfer's release of the wrist-cock on the downswing to help determine the bend profile of the shaft, as well as recommendations for overall flex and torque of the shaft.

- The golfer's "transition" – how smooth, fast, frenzied they change the club's motion from the end of the backswing to the beginning of the downswing – for more input in making the final shaft flex and bend profile recommendation.
- The golfer's position of their lead arm and wrists to the clubhead at the very moment of impact to help determine the best loft for the woods. This would also help contribute to the set make-up determination and whether an equipment change could possibly have an effect on a desired change in the trajectory of their shots.
- The golfer's tempo throughout their entire swing to aid in the final recommendation of total weight, swingweight/MOI of the clubs, shaft flex and the clubs' length. While there are devices that can measure the amount of time from takeaway to impact, swing tempo and swing time can be two different things from the aspect of what some of the fitting specifications need to be.



These two photos contrast an early unhinging of the wrist cock on the downswing with a very late release. Normally golfers with a late release will also have a higher level of athletic ability than golfers with a very early release, so this observation is also helpful in your assessment of the golfer's athletic ability. The earlier the release of the wrist cock, the more tendency toward 1) shafts that are a little more flexible in the comparison of the shaft's swing speed rating to the golfer's actual swing speed, 2) shafts that would be tip medium to tip flexible in bend profile, 3) shafts that do not

have less than 3.5 degrees torque, 4) knowing that shafts designed to offer differences in trajectory just won't deliver that performance for golfers with an early release. The later the release of the wrist cock, the more tendency toward 1) shafts that are a little more stiff in the comparison of the shaft's swing speed rating to the golfer's actual swing speed, 2) shafts that would be tip medium to tip firm in bend profile, 3) shafts that do not have more than 5 degrees torque, 4) knowing that shafts designed to offer differences in trajectory should be able to deliver that performance difference for golfers with a later release.

All of the previous points are very important for clubmakers to be able to evaluate in a fitting session and are at present, not able to be "measured" in the sense that swing speed, lie board, or the wrist to floor dimension are able to be measured.

As a result, these important swing and physical characteristic points all have to be "taught" so the clubmaker can develop the proper "judgment" to be able to come up with the best set of clubfitting specifications for every golfer. Some of these points can be taught in a print publication using still photos. Others require video monitoring to stress the points for observation in the clearest form and what they relate to in fitting decisions.

These two photos illustrate what usually happens at impact as a result of the golfer's release of the wrist-cock. Typically the golfer with the late release ends up at impact with a straight line extending down from their lead arm all the way to the clubhead. Likewise, the earlier in the downswing that the golfer unhinges the wrist cock, the more tendency there is for them to arrive at impact with the clubhead having passed the hands, and thus the wrists "broken forward". There can be exceptions to this, and thus the reason it is a swing point that should be analyzed separate from the release of the wrist cock for all golfers. In addition, (not illustrated here) it is also possible for the golfer's hands to be in front of the clubhead at impact, though this is normally less typical when the golfer swings a wood club. If this swing position is directly related to the golfer's release of the wrist-cock (early = clubhead in front of hands; later = straight line at impact) then the fitting judgments are the same as listed for the release of the wrist cock.



Through 2005, we at TWGT will be doing our best to provide video examples on our web site to teach the swing as it relates to fitting in the areas of swing tempo, back-to-downswing transition, and athletic ability so as to offer real examples in motion to guide you in making the best judgment call.

In addition, while we can show things like the difference in wrist cock release, swing plane, swing path and at-impact arm/wrist position in still photos, over the coming year look to our web site for real motion images on these critical areas to teach you more about how the golf swing clearly relates to many of the fitting decisions you will make.

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The Wishon 919CCG Beta Ti Driver & Steel Woods

Combining loft and extreme rear-positioning of centre of gravity to deliver optimum launch conditions!

Kudos for the 919CCG

*"Okay you win the 919 is a killer of a driver.
 "...took it to the course and was absolutely crushing the ball
 with outstanding accuracy."*

– Dan Brooks via email

*"I play the WWMD (Wishon Weapon of Mass Destruction) 919,
 hand selected to 11 degree loft with 1.1 degree closed face
 angle..."*

– Chris Davis via email

*"Tom, I built a 919CCG High Launch demo (14°) and have
 been using it for two weeks now and it is longer than any club I*



have used for several years and much to my dismay, it is almost always in the center of the fairway!!"

– Bobby Boone via email

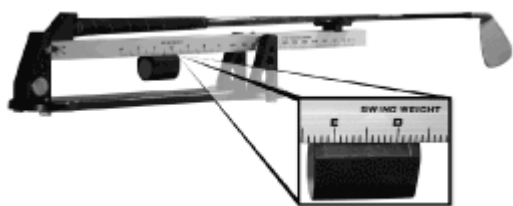
"I love my 919CCG 13°. A buddy tried it one day and asked me to make one for him. (this buddy does not change clubs very often). He is happy with his also. Tom is really going to have to come up with some unbelievable new driver in the future to make me quit playing this one."

– Andy from the TW Forum

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MOI-Matched Clubs - a year later by Matt Mohi

One of the exciting new pieces of technology that TWGT provided to clubmakers this past year was the MOI System



of building a matched set of clubs. This year, we have written extensively about MOI Matching as a replacement for swingweight matching and about why it is the best way to build a set of clubs that truly feels the same from club to club to the golfer. It has been gratifying for us to work with clubmakers who were at first skeptical about this approach, and then have them report how happy their

customers are with the final product. As we near the end of the year, I thought it would be a good opportunity to reflect on the impact MOI has made in 2004 and what we believe the future holds for MOI Matching.

Why is MOI Matching of Clubs important?

Every time we swing a golf club we have to exert a certain amount of force to return the clubhead to square. Building the clubs in a set to be matched to the same MOI ensures all of the clubs will require the same exact amount of force to swing. If the golfer doesn't have to sub-consciously make adjustments in their swing from club to club, the result can be an increase in on-center hit consistency and a more controlled swing tempo.

What is the difference between swingweight and MOI?

Swingweight is a static means to measure the distribution of weight in a golf club about an arbitrarily set fulcrum point of 14 inches. MOI is a more dynamic measurement of how much force needs to be made by the golfer to swing the club around their body. We all know that it is possible to "fool" a swingweight machine by positioning weight on different sides of the fulcrum, but this won't work with MOI, because MOI is a real parameter dealing with the application of a real force to swing the club.

How does MOI Matching Affect the Overall Fitting Process for the Golfer?

This is an area in which we, along with clubmakers using the MOI System, are continuing to learn more and more about. We believe that clubmakers must continue to follow their current methods for fitting each of the specifications of the clubhead, shaft, and grip as well as the length of all the clubs. Once these fitting recommendations are known, then MOI is brought into the process as the replacement for swingweight matching of the clubs when they are assembled. Read on...

How does MOI affect club assembly?

This certainly is “where the rubber meets the road.” The best way to illustrate this is with an example. Let’s say you take the approach of building a “test club” for the golfer to make sure of your fitting recommendations for the head, shaft, grip and length. Many clubmakers will build such a test club to have a very light initial “swingweight” and then gradually add weight to the head in the form of lead tape while the golfer hits shots. Eventually a “swingweight” is found, and when combined with the head, shaft, grip and length recommendations from the clubmaker, creates an excellent fit. This fitting approach lends itself very well to MOI matching. Once the trial and error of adding lead tape has resulted in the best on-center hit performance for the golfer, that club’s MOI can be measured and used as the benchmark MOI to build every other club in the set. The goal of MOI Matching is to build all of the clubs in the set to the same MOI as the club the golfer hit the most consistently and on-center. Normally, when clubmakers build true MOI matched sets, they will note that the swingweight progresses from low to high as the clubs move from longer to shorter in the set.

How does MOI affect building to a butt frequency progression of the shafts?

The current method of assembling golf clubs so that each club increases in the butt frequency reading by the same increment is done on the basis of a 1/2” change in length (irons) and a 7 gram change in headweight resulting in an even progression of the butt frequency change through the set. Building MOI matched clubs will change the butt frequency progression from what it is in a swingweight matched set – how much this changes depends upon the profile of the shaft and the MOI of the clubs. Remember, in an MOI matched set, the swingweight progresses higher for each club through the set. Thus the butt frequency progression will change as a result of the different headweight progression of an MOI matched set.

However, if you’ve been reading our recent articles regarding how butt frequency is not as important for shaft fitting and matching as previously thought, then you know it’s only part of what we study to determine the overall playing “flex” of the shaft. If you wish to retain a consistent progression in the butt frequency of an MOI matched set, then gradually increase the tip trim through the set over what is normal for the shaft’s standard installation. However, you can still account for a heavier or lighter headweight the same way you always have when accommodating a higher swingweight.

How does MOI Matching apply to already assembled golf clubs?

The TWGT MOI Matching System has a separate module just for this purpose – to allow MOI matching of clubs that are already built to a matched swingweight. This is done primarily through a headweight adjustment that depends on what the best actual MOI is determined to be for the golfer.

How hard is it to incorporate this “new” method of building?

Building a set with all clubs matched to a single MOI will take a little more time than the traditional way of building clubs matched to swingweight. Each club will require you to make 4 measurements: 1) the pendulum period using the MOI Matching System period counter, 2) total weight, 3) length, and 4) balance point. These measurements are input into the MOI software, which determines the headweight or length adjustment to achieve the MOI match for each club. Clubmakers who are already offering MOI matched sets of clubs to their golfers typically apply an up-charge of \$50 to \$150 per set, depending on what their local market conditions will allow. Without question, clubmakers who offer this superior matching method must



be able to explain the difference between MOI and swingweight matching in order for their customers to recognize the value of MOI matching.

Who benefits from MOI Matched Clubs?

All golfers will feel the benefits, whether professional or beginner. In fact a strong case can be made that for golfers working to improve their golf swings, a consistent MOI from club to club will enhance their learning curve. Very talented golfers are often able to adjust to whatever club is in their hands. The rest of us are not that skilled. Thus having a set that is MOI matched so that each club truly requires the same, exact swing effort can definitely lead to a higher incidence of on-center hits and a more consistent swing move at the ball.

What has been the feedback from golfers?

We're happy to report that many golfers have commented both to us and to their clubmakers about the benefits of their newly MOI matched sets. We still haven't received a single negative comment from anyone. Clubmakers who have incorporated it into their build and fit processes have been happy to have something special to offer their customers that is above and beyond what nearly all retailers offer. This is cutting edge clubmaking technology that truly does have the backing of real science and is not simply another marketing claim.

Why haven't the big brand name golf companies started offering it?

MOI matching does not help if all clubs for all golfers are built to the same individual MOI. MOI matching is a form of the most individual matching of swing feel of the clubs to the swing tempo, strength, and athletic ability of each golfer. The big brand name companies are only set up to build their clubs to one standard set of specifications, which is the reason why all their clubs are made to be D1 or D2 swingweight for men and in the middle and high C range for women.

What MOI is best for a golfer?

One option that has worked very well is to have the golfer choose a favorite club from an existing or previous set to use as the MOI matching benchmark. Another option is to build the set to match the MOI of the longest club in the set. Both of these methods work well, as proven by clubmakers. However, another way was described previously in this report – build a test club and through the addition of lead tape, find the proper headweight that results in the best feel and highest percentage of on-center hits for the golfer. The MOI of that test club can then be measured and used as the MOI benchmark for the rest of the clubs in the set.

To sum up some of our additional discoveries about MOI fitting:

- Slower and smoother swingers like an MOI on the lower side of the spectrum.
- Faster and more aggressive hitters like an MOI on the higher side of the spectrum.
- If the MOI is too high for a golfer, it usually will cause an early release of the wrist-cock on the downswing. If too low of an MOI, and the golfer doesn't get the proper "resistance" for his force production, it results in a faster tempo and more off-center hits.

From these observations, you can see that it isn't too different than the current practice of building clubs with lower swingweights for slower swing speed players and smooth tempo swings, and building clubs with a higher swingweight for golfers with faster swing speeds and a quicker swing tempo.

Please don't get the impression that building sets that are MOI matched is overly complicated, or that talking about it to your customer is difficult. The story that I like to use is akin to that of a Tour Pro's bag. If you've been on the

practice tee and looked into a Pro's bag, you might have noticed little strips of lead tape all over their clubs. They aren't usually adding lead tape to hit a certain swingweight, but to adjust their clubs on the range to a certain feel while they are hitting balls. Their highly developed sense of feel allows them to self-MOI match their clubs to a certain extent.

We know that golfers have played well using swingweight-matched sets. This shows how adaptable people are to their equipment. An MOI matched set may not appeal to everyone, but we did want to give clubmakers yet another tool in their arsenal for building great clubs. More and more, TWGT is looking for the relationships between swing movements and equipment to help clubmakers find a better way to expertly match the equipment to the unique swing needs of EACH golfer. MOI gives us yet another area to investigate for better performance. It is a proven scientific method of matching the force requirements of the club to the ability of the golfer.

Our hope is that this, along with our other contributions on this subject(1), clarifies the "hows and whys" of MOI, so that you can feel more comfortable applying this technology in your clubmaking. If you have any questions, please contact us, and we'll be more than happy to explain things further.

1) See "The How-to and the Why of MOI Matching Clubs Within Sets" article in the Spring 2004 print edition of the TWGT TECHreport, as well as "[MOI Club Matching](#)" in the 'How to' section in our website.

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