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GOLF CLUB COMPONENTS

eTECHREPORT

February-March 2006 eTECHreport - Welcome!

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- **Model Profile – 730CL Intelligent Set**

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- **TWGT Golfwear Now Available**

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- **Driver Profile – 949MC**

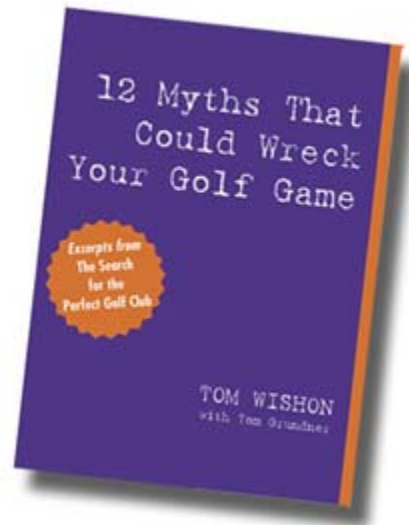
"This driver went into my bag last summer when we completed the first round of prototype testing and it's going to be a while before it leaves. I honestly think that this is the best driver I have designed in my career." This is the comment of designer and TWGT founder Tom Wishon, in reference to the new USGA conforming 949MC drivers which debuted in the 2006 TWGT catalog. [[continues below](#)]

12 Myths a Huge Hit with Clubmakers

The popular book, *The Search for the Perfect Golf Club* now has a "little brother". TWGT wanted to offer an inexpensive way to put out the message of the advantages of custom fitting this year so we created a 32 page booklet of excerpts from the Search book called, *12 Myths That Can Wreck Your Golf Game*. *12 Myths* contains the key elements about why custom fitting will be successful for all golfers and continues to promote the message that custom fitting is superior to buying standard clubs off the rack.

This booklet will be available in Australia in early April.

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Common Sense Clubfitting is now a Reality

It is a year later than I hoped for, but I finally made good on my promise to finish a new fitting book that would bring clubmakers up to date with all of the latest skills, knowledge and techniques of modern custom clubfitting!

The new fitting book, *Common Sense Clubfitting: The Wishon Method* is officially finished and is in the process of final proofing and layout of its 465 pages of new fitting information. Unless we run into any last minute problems, we should have the book all ready to ship early in April.

Let me give you a little rundown on how *Common Sense Clubfitting* is organized:

Chapter 1 – The Common Sense of Common Sense Clubfitting

The entire basis of common sense clubfitting expands on what was first proposed in the *Practical Fitting Program* book in 1997 – identify which of the 5 Game Improvement Factors the golfer most wants and needs to be able to play better. Does the golfer want/need more Distance, better Accuracy, more Consistency, different Trajectory and/or better Feel. Clubmakers who remember the five game improvement factors from *Practical Fitting* will note that I have dropped Backspin from the list and added Consistency.

Chapter 1 then goes on to explain what specifications of the clubs are considered an A or a B effect on each of the five game improvement factors. An "A" effect specification is one that when correctly fit for the golfer, will result in a more immediate and visible change in that game improvement factor. A "B" effect specification is one that has to be substantially different than the same specification in the golfer's existing set for it to bring about a visible improvement in the game improvement factor.

Again, clubmakers familiar with the "Major", "Medium" and "Minor" specification effects that I proposed in the first book will note that I have changed and added quite a number of specifications to the lists of "what spec affects what game improvement factor." These changes are all based on what more I have learned about the real effects of the specifications on performance since the *Practical Fitting* book came out in 1997.

Chapter 2 – Clubfitting Procedures

To many clubmakers, this chapter may very well be the most valuable part of *Common Sense Clubfitting*. The chapter lists in step by step form, each of the steps and procedures of a common sense fitting session with a golfer. But more than that, the chapter also consists of a running dialog between me and an example golfer. In essence, Chapter 2 is a "script" which is just like you are there watching and listening to me personally fit a golfer from start to finish.

In the running dialog between me and the golfer, I have tried to not only tell you what I am doing in each step of the fitting, but I have also attempted to explain what I am thinking and why, every step of the way through the fitting. It is my sincere belief that the best clubfitters are able to continually think about the input they get from a golfer and process those inputs into continuous thoughts about what is best and what is not for the golfer's fitting recommendation. That is what I have attempted to share with all clubmakers in Chapter 2.

Be aware that common sense fitting does not involve wasting time on the minutia that is not important for coming up with the best fitting recommendation for the golfer. Thus, the running dialog of the fitting session in Chapter 2 does not waste time with steps and procedures that are not important.

Chapter 3 – The Fitting Specifications and Their Performance for Woodheads

One by one, I take you through each of the specifications that makes up a driver and fairway woodhead in Chapter 3. This is where I not only explain what specifications are an "A" or "B" effect on each of the five game improvement factors, but I also explain in depth just about everything I know from my 30 + years in the business about WHY each of the woodhead specifications do what they do, or do not do what people think they have done with respect to performance. Just to let you know how in depth this discussion of woodhead performance is, Chapter 3 is over 70 pages long.

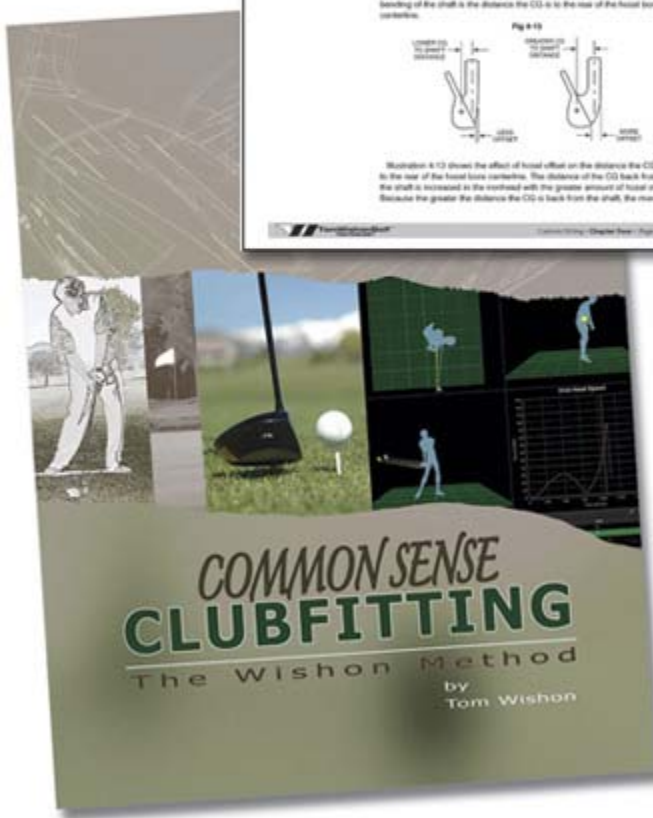
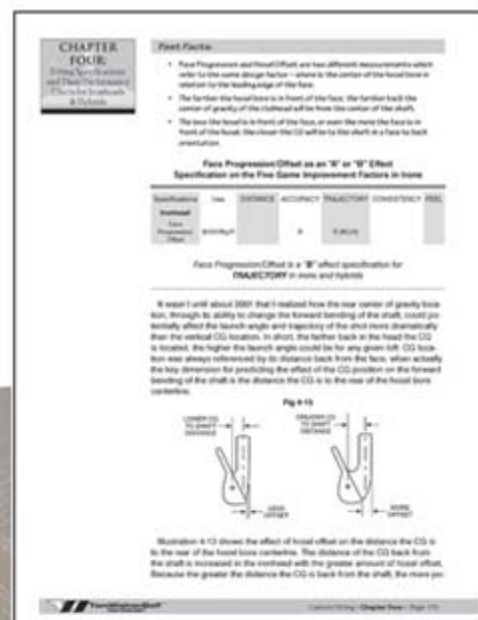
Chapter 4 – The Fitting Specifications and Their Performance for Ironheads and Hybrids

Chapter 4 follows the same path as Chapter 3 through a detailed 60-page discussion of iron and hybrid performance. All of the iron and hybrid specifications are listed and explained, including each one's role as an "A" or "B" effect on each of the five game improvement factors.

Chapter 5 – Shaft Fitting

In what may have been the chapter which was both the most enjoyable to write as well as completely updated from the original Practical Fitting Program book, Chapter 5 explains the complete performance of the shaft in both woods and irons. I lead clubmakers through a complete discussion and illustration of exactly HOW the shaft performs for different golfers with different swing characteristics and exactly WHAT performance changes golfers can expect from the shaft.

In addition to the explanation of each of the specifications of shafts, I list what shaft specs are considered an "A" or "B" effect on the five game improvement factors. Included is a discussion on the use of the new TWGT Bend Profile Shaft System software.



Chapter 6 – The Fitting Effects of the Assembled Golf Club

Chapter 6 is the part of Common Sense Clubfitting that “puts it all together.” Combining the head, shaft and grip into the finished club, Chapter 6 covers all of the specifications of the fully assembled club, including the length, swingweight and MOI of the fully fit and built golf club.

Chapter 7 – Common Sense Clubfitting for the Wedges and Putter

Often the “forgotten clubs” of the fitting session, Chapter 7 goes deeper in the key elements for proper wedge and putter fitting than any other fitting book has ever attempted to delve. Of particular importance is the common sense fitting credo which establishes the point that fitting wedges for the golf course design factors is as important as fitting the specifications of wedges to the golfer.

Chapter 8 – The Golf Swing as it Relates to Common Sense Clubfitting

One of the areas in which I have spent the most time since starting TWGT is researching the actual moves of the golf swing which have a specific relationship to the fitting specifications of a golf club. In Chapter 8, I have identified all of the swing characteristics that clubmakers need to know and need to be able to identify to truly over the highest level of fitting performance for golfers.

Appendix – Technology and Technique

In the “catch all” and “conclusion” to Common Sense Clubfitting, the appendix section includes complete discussions on the proper measurement of clubhead specifications, fitting the beginner or inexperienced golfer, fitting juniors, common sense concepts in clubfitting and use of modern clubfitting equipment.

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TWGT Shaft Bend Profile System for Shaft Comparison

One of the most valuable aids offered to clubmakers in the 2006 TWGT Catalog is the brand new Shaft Bend Profile System software. Shafts have been one of the most frustrating, if not the most frustrating part of the golf club to fit accurately to golfers because of the lack of empirical fitting information about shafts.

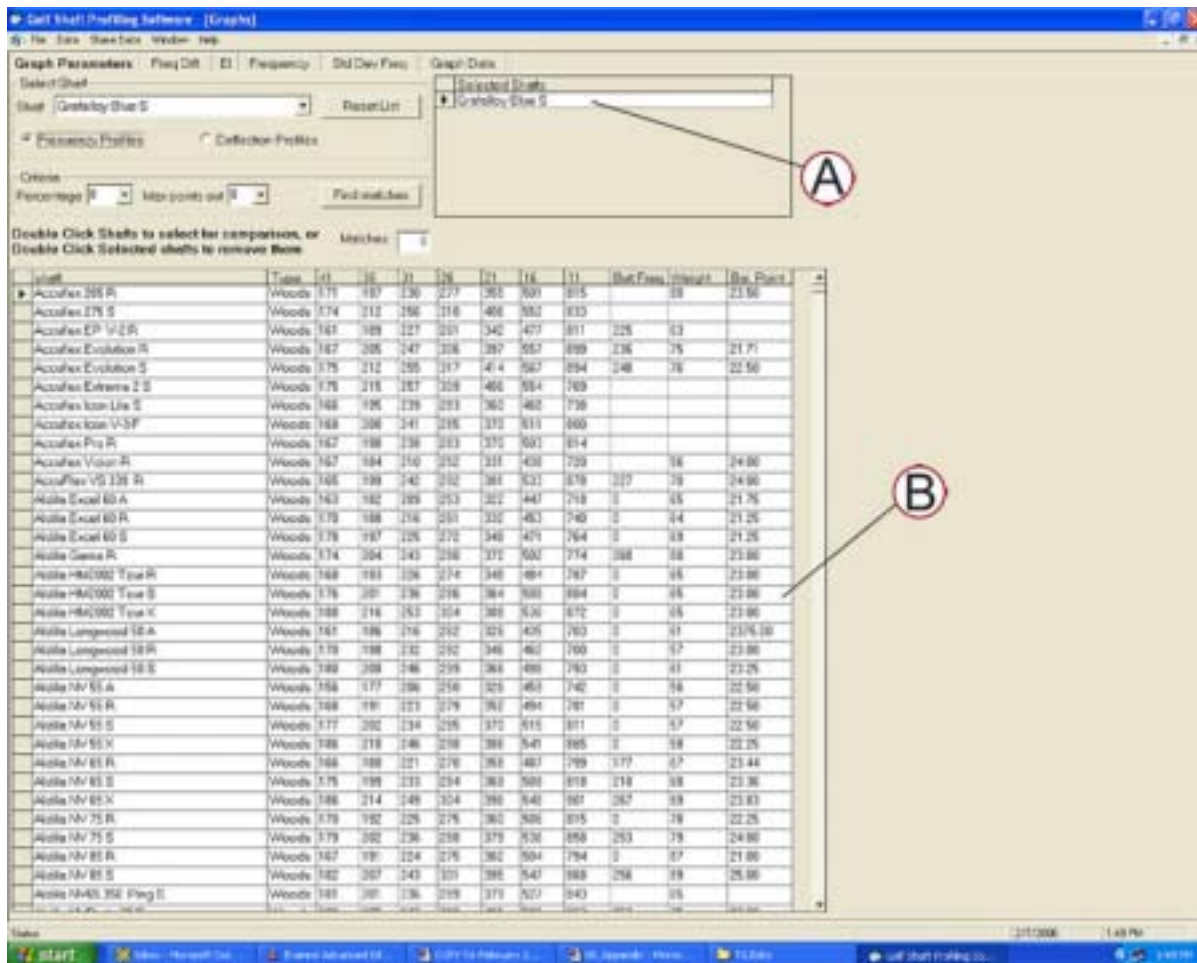
With clubheads we can empirically measure all of the specifications and from that, easily understand their effect on shot performance. For example, loft is measured in degrees and from that, there is no doubt what an increase or decrease in the loft will do to the flight of the ball. The same is true for all of the other clubhead specs, but not so for shafts.

What DOES an L, A, R, S or X mean in real stiffness terms when it comes to real fitting recommendations? How firm is a butt firm designation for a bend profile design in a shaft? Or how flexible is a tip flexible profile in a shaft? The lack of real empirical shaft information has hamstrung clubmakers and has forced shaft fitting to be more of a trial and error process than a real scientific search through comparative data.

The new Shaft Bend Profile System software is the start of what we hope will end up being a truly definitive process for selecting shafts for golfers. In its present form, the software has empirical bend profile measurements for some 500 different popular wood and iron shafts. With the capability to easily accept data updates, the software will

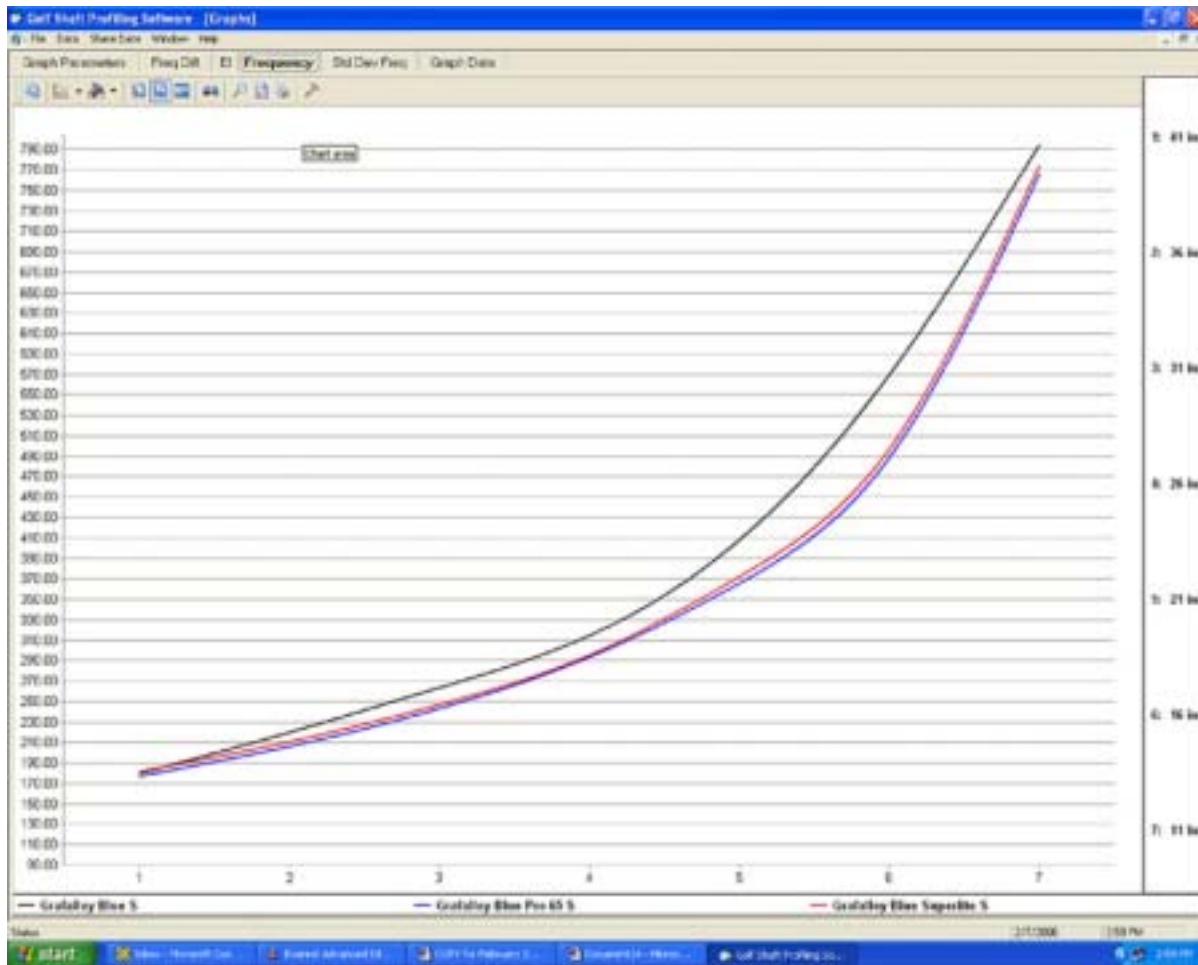


eventually hold illustrative bend profile data for thousands of shafts. But let's take a look so you can see how all this works, and how it can make a difference in your fitting.



A. Thousands of Possible Shaft to Shaft Comparisons

In image #1, you see the main screen of the Shaft Bend Profile System software. The part of the screen notated as "A" is where you select the first shaft to which you want to compare the stiffness and bend profile of any other shaft(s). Once you select the first shaft, you then can select the shafts you wish to compare to it from the main data base noted by the "B". All you have to do is double click on the box to the left of the name of the shaft(s) you want to compare.



In image #2 you can see that I have selected the Grafalloy Blue S flex wood shaft and I wish to compare it to Grafalloy's Blue Pro 65 S flex and Blue Superlite S so I can find out the difference between these three shafts flex wood shaft. By clicking on the tab FREQUENCY at the top of the main screen, up comes the illustration of the actual bend profile graph lines for all three shafts.

Up and down on the left side of the screen is the scale for the frequency measurements in cycles per minute. Across the bottom are the 7 points along the length of the shaft that the frequency is measured on each shaft. #1 is the first butt frequency measurement done at a 41" beam length clamping position with the frequency analyzer, #2 is the 36" beam length clamping point, #3 is the 31" beam length measurement and so on down to the last frequency measurement point #7 at 11" from the tip of the shaft.

Now look at the graph lines. The butt section of the shafts is at the lower left hand end of the line, depicted in bend profile frequency measurements 1 and 2 (the 41" and 36" beam length positions). The tip section is at the upper right and is stiffness described in measurement points #6 and 7 (16" and 11" beam length measurements). The center section of the shafts is between the two and represented by frequency measurement points #3, 4 and 5.

Note that the black line is the Grafalloy Blue S, the blue line is the Grafalloy Blue Pro 65 S, and the red line is the bend profile measurement for the Grafalloy Blue Superlite S. You can see that the Blue Pro 65 S and the Blue Superlite S are very close to each other and traveling on virtually the same bend profile line. To contrast, the Blue S, represented by the black line, is much higher up on the graph field than the other two shafts.

What does all this mean? Let's take a quick look at each of the three shaft's individual frequency measurements to learn what this means by clicking on the tab at the top of the screen for **Graph Data**.

The screenshot shows the 'Graph Data' window in Bend Profile Software. It contains two tables of data for three shafts: Graphik Blue S, Graphik Blue Pro 65 S, and Graphik Blue Superlite S.

Frequency Data Table:

Unit	41	36	31	26	21	16	11	Butt Flex	Weight	Butt Flex
Graphik Blue S	179	220	262	314	428	559	764		81	
Graphik Blue Pro 65 S	176	206	243	293	388	498	705	8	15	21.00
Graphik Blue Superlite S	181	210	246	295	372	496	774			

Deflection Data Table:

Unit	44	31	24	20	14	10	Butt Flex	Weight	Butt Flex
Graphik Blue S	0.00	0.80	0.00	0.00	0.00	0.00	3	10	0.00
Graphik Blue Pro 65 S	0.00	0.80	0.00	0.00	0.00	0.00	3	10	0.00
Graphik Blue Superlite S	0.00	0.80	0.00	0.00	0.00	0.00	3	10	0.00

By clicking **Graph Data**, up comes the individual bend profile measurements for each of the seven positions on each of the three shafts. Let's take a look at the two butt section measurements for each shaft, listed under the headings of "41" and "36". As you can see, the Blue S is 179/220, the Blue Pro 65 S is 176/206, and the Blue Superlite is 181/210. In the butt section of a shaft, it is generally accepted that 10-12 cpm is equivalent to a full letter flex. Five or less is really insignificant in the large picture of comparing the whole shaft's stiffness. Granted, in the "36" stiffness measurement, there is a high to low range of 14cpm between the three shafts, that being the difference between the "36" reading of the Blue Pro S and the Blue S. In addition, the Blue S is 10cpm stiffer for the "36" reading than the Blue Superlite S. So from looking at the data for the butt sections of the three shafts only, the conclusion can be made that the Blue S is going to be about 1/3 to 1/2 flex stiffer at the very least than the other two shafts in the butt section.

Now let's move down and look at the three center section measurements under data points "31", "26" and "21". Here you are seeing that the Blue Pro 65 S and Blue Superlite S are very close to each other, with differences in succession of 3cpm, 2cpm and 6cpm. In the center section of shafts, a 20cpm difference is equivalent to a full flex level. Therefore, the differences of 3cpm, 2cpm and 6cpm for the center sections of the Blue Pro 65 S and Blue Superlite S are insignificant, and thus supporting the conclusion that these two shafts are virtually identical in the center section. Because the "36", "31", "26" and "21" measurements of the Blue Pro 65 S and Blue Superlite S are all small, this is one way the Bend Profile Software leads you to suspect that the 181cpm to 176cpm reading of the "41" measurement of the Blue Pro 65 S and Blue Superlite S shafts may be an aberration that would not show up if we had a larger population of the two shafts to test. Normally, when a shaft is intentionally designed to be stiffer in the butt section, the "36" measurement would have a greater difference than the 4cpm shown between the Blue Pro 65 S and Blue Superlite S. So this is a hint that when considered along with the fact that the three center section measurements are so close to each other, the entire butt and center sections of the Blue Pro 65 S and Blue Superlite S are so close that they are the same from a pure fitting standpoint.

To contrast, now look at the three center section measurements of the Blue S to the same measurements for the Blue Pro 65 S and Blue Superlite S. Here you see a big difference of approximately 20/20/35 cpm for these three

measurement points of the center section of the shafts. Most definitely this says that the Blue S is slightly stiffer in the butt to much stiffer in the center section than the Blue Pro 65 S and Blue Superlite S. In other words, a player who likes the stiffness feel of the Blue Pro 65 S and Blue Superlite S will feel that the Blue S is too stiff. Or a player who likes the Blue S shaft will think the Blue Pro 65 S and Blue Superlite S to both be too flexible.

But we're not quite done because we still have the tip section measurements to compare. First, a word about using frequency for tip section measurement comparison. If there is a "weakness" in using frequency measurements for bend profile comparison, it is seen in the tip section measurements. It is very difficult for even the best frequency analyzer on the market today to capture precise, "without a doubt" measurements for the tip section of any shaft because the cpm oscillation is so fast. In truth, this is a case for using electronic deflection measurements instead of frequency for illustrating a more precise view of the bend profile measurements of shafts. And to that eventual end, the Bend Profile System software is already set up to accept deflection measurements when companies like us, or dedicated clubmakers like Ted Strickland and Jerry Hoefling, find the time to perform that many deflection measurements on the proper equipment.

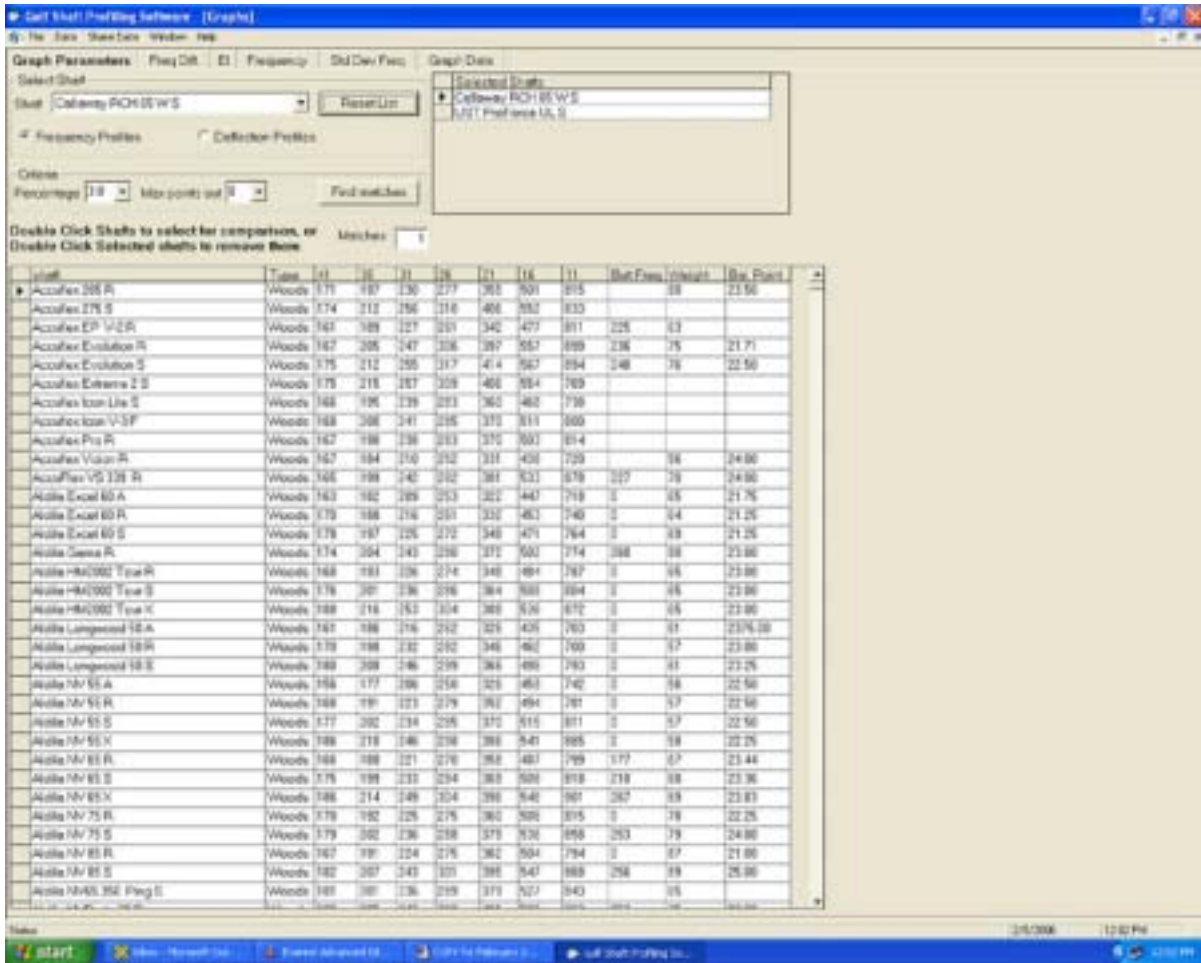
In the meantime, please do not feel that my statement means the current Bend Profile System is suspect. On the contrary, the software is set up so that data from any number of different samples of the same shafts can be entered and subjected to standard deviation statistical analysis. So as more and more of the same shafts are entered into the system, the measurements become more accurate and representative of the actual design of each shaft. Remember too, all shafts are subject to +/- tolerances. You can have ten samples of the same shaft and see ten different sets of bend profile frequency measurements for each of the seven bend profile measurement points. Granted, for most of the better shaft companies, the range won't be all that much, but there will be a range so the Bend Profile software is set up to help improve the accuracy of its data base through standard deviation.

Back to the tip section measurements. We said that 10cpm at the butt and 20cpm in the center section is the frequency difference equivalent to a full flex difference in stiffness feel in a shaft. At the tip section that difference has to be in the range of 30 to 40cpm over the "16" and "11" bend profile measurements to display a discernable difference in the bending feel of the tip section of two shafts. In the case of the three Grafalloy shafts, the Blue S is much 70+ cpm stiffer in the "16" reading than the Blue Pro 65 S and Blue Superlite S. While the last "11" reading drops to a 20cpm difference, again, this is more likely a slight anomaly in the reading because of the huge difference in the "16" measurement. So the conclusion is that the Blue S is all around a noticeably stiffer shaft than either the Blue Pro 65 S and Blue Superlite S.

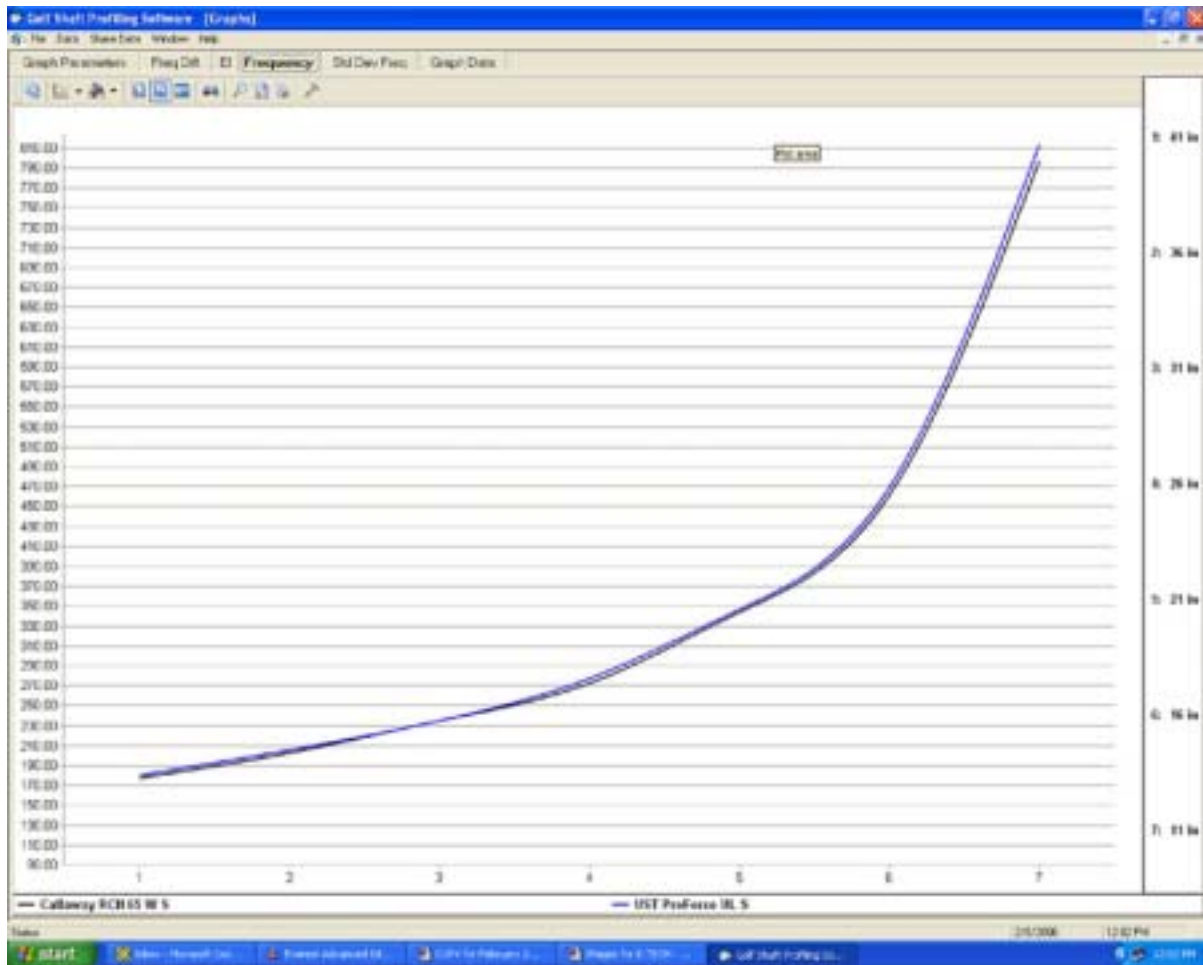
From a fitting standpoint we can say that the Blue Pro 65 S and Blue Superlite S are virtually the same shaft from a bending feel and bending performance standpoint, with only their weight and torque being points of any difference between them. But the Blue S is a totally different shaft and definitely for a higher swing speed player who also would have to possess and strong downswing acceleration and a late release of the wrist-cock. These are all swing characteristics which are matched well to butt firm, center firm and tip section firm bend profile designs.

Find Matching Shafts

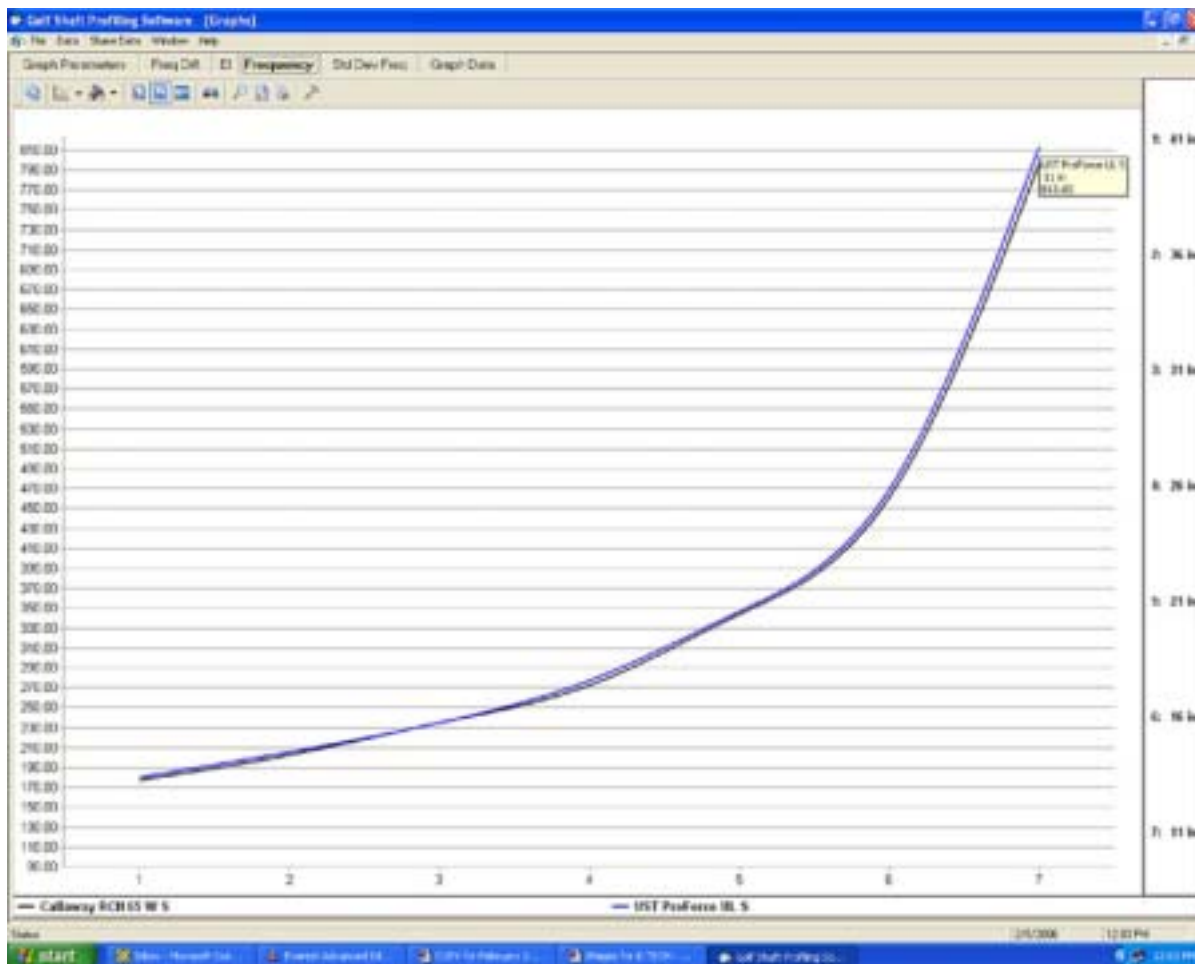
Comparing the bend profile of overall stiffness of any of the hundreds of shafts in the data base is not the only value of the Bend Profile System software. Have you ever had a reshaft to do and wanted to know what shaft would be the closest to the one you have to replace? The Bend Profile System software is also designed to sort and compare all shafts in the data base to find matching shaft bend profiles. Let me show you how that works.



On the main graph screen above, look at the area in the upper left side under the heading of "Criteria". There are two boxes named "Percentage" and "Max Points Out". Under percentage you can select how close you desire all of the bend profile measurements of the matching shafts to be to the shaft you want to duplicate. If you select 1%, the software will only select shafts in which each of the bend profile measurements are only 1% different than the selected shaft you wish to duplicate. An allowance of 3% or less will ensure the matching shafts are so close to the selected shaft that no feel or performance difference will result.



Let's say you have a Callaway driver with a broken RCH 65 S flex shaft and the golfer wants the new shaft to be as close as possible to the original. Find the Callaway RCH 65 S in the data base and click on it as the selected shaft. Then go to the "Percentage" window under "Criteria" and successively select 1%, 2% and 3%, being sure to click on the button labeled "Find Matches" after each percentage selection. No matches are found in the 1% and 2% deviation, but under the 3%, the program finds the UST ProForce UL S flex shaft.



Click on the "Frequency" tab at the top of the page to display the bend profile graphs of the Callaway RCH 65 S and the UST ProForce UL S shafts. As you can see, the two lines are virtually on top of each other. While you can click on the "Graph Data" tab at the top of the screen to compare each of the seven bend profile measurements to see how close they are, the Bend Profile System software allows you to also place the cursor arrow directly on top of the bend profile lines at any place along the graph to read the measurements. In the above image, the cursor has been placed on the 11" measurement position where the two shaft lines deviate the most. A quick check of both shafts' bend profile measurements shows that the two shafts are extremely close. Thus the UST ProForce UL S is a very close replacement to the Callaway RCH 65 S shaft.

The Bend Profile System software is designed to accept updates whenever Ted, Jerry or TWGT obtain more shafts for bend profile testing. Updates will be made available to all clubmakers who purchase the software so that over the succeeding years, the data base will grow to include all new shaft offerings. As we gain access to more of the OEM proprietary shafts, these too will be included as well.

All in all, the new TWGT Bend Profile System software really is a must for all clubmakers who are serious about shaft fitting.

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Model Profile – 730CL Intelligent Set

Since receiving the 2006 TWGT catalog, the clubmakers' response to the new 730CL Intelligent Set for golfers with an 80mph driver swing speed and lower has been nothing short of phenomenal! We've had to boost production on the

730CL heads and shafts to meet this early interest and demand and we expect to be caught up with the demand by the middle of March.

I wanted to offer a little insight into the 730CL as a way to help you understand more about the specifics of the design, who it's for, who it's not for and give you some tips its fitting so you can be assured of making more golfers happy with this set.

First and foremost, the 730CL is designed for ANY golfer, male or female, with a driver swing speed of 80mph and lower. That means most women golfers, but it also means a lot of senior men are well fit into this set. Golfers with such swing speeds do NOT need a full set of 14 clubs. 14 club sets are designed with 3-4 degree loft increments and 80mph and slower swingers simply cannot get more than 5-6 yards difference in distance when loft increments between clubs are the typical 3-4 degrees.

730CL consists of a 400cc-15° titanium driver, 20° Long Fairway, 26° High Fairway, all hybrid body irons in a #5 (30°), 6/7 (36°) and 8/9 (42°), and a more conventionally designed PW (48°) and Dual Wedge (54°) which is designed to be a sand wedge. The 6 degree loft increments are designed to offer the golfer with an 80mph swing speed a more useable distance difference between clubs.

The matching 730CL graphite shafts are designed as an A/L combination flex. By custom tip trimming, the shafts are able to be well fit to golfers with a driver swing speed from under 60mph all the way up to 80mph. To build the set, clubmakers need to order three of the 730CL wood shafts, three of the 730CL iron shafts and two of the 730CL wedge shafts

A key performance element of the shafts is the 0.335" tip diameter design of the 730CL iron shafts. In the same way that the GI-335 hybrid iron shaft complements the 321Li and 785HF hybrids, the 0.335" tip 730CL iron shaft is a perfect design for the hybrid body #5, 6/7 and 8/9 irons. Again, the A/L combination flex design is a part of the 0.335" tip 730CL iron shafts to customize flex for the 80mph and slower swinger.

One of the best performance features in the 730CL design is the thinner spring face of the 400cc-15* titanium driver. Each 730CL driver is shipped with a warning sticker attached to the face – WARNING, do not allow any golfer with a swing speed of 90mph or higher to hit this driver or the face will cave in!! This means the 730CL driver is designed so the face will flex more for the 80mph and slower swing speed player than any other driver made today. Slower swinging golfers who use drivers designed to withstand all swing speeds cannot possibly make the face flex inward as much as golfers with higher swing speeds. That means loss of potential distance simply because they have a slow swing speed.



TWGT attempted to convince the USGA that the 730CL driver could not possibly "do harm" to the organization's desire to limit distance for the elite players because the driver cannot possibly be used by any golfer with a swing speed of 90mph or higher. The USGA still decided to rule the 730CL driver as non-conforming, despite our best efforts to convince them the driver posed no threat to their credo for distance control.

Clubmakers and golfers who are concerned about this ruling do have the option of choosing the 915-460cc High Launch or the 915-420cc High Launch drivers, both which are conforming to the USGA Rules for spring face, as the driver option to complete the 730CL set.

Player hit testing conducted for the 730CL set last summer was more fun than almost any other hitting evaluation TWGT has conducted. This was because all of the participants simply could not believe how easy the 730CL clubs were to hit, all the way through the fully hybrid body irons and into the two wedges.

This season, the 730CL is primed and ready to allow clubmakers to deliver more game improvement for men or women with an 80mph swing speed or lower.

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TWGT Golfwear Now Available

In response to the demand we received from a lot of clubmakers all through 2005, TWGT has created two different color golf shirts and two different outer wear garments with the distinctive TW logo.

The new TW logo shirts are a super high quality soft collar golf shirt made by Cutter & Buck from their new Dry-Weave material. Super soft to the touch and with the quality that keeps the shirts looking new after many trips through the laundry, the TW logo shirts are available in Tan or Black weave in sizes M, L, XL and XXL. When you order, remember – Cutter & Buck shirts do run generous in their sizing.

Complementing the Cutter & Buck TW logo shirts are a forest green wind vest and short sleeve wind shirt, both embroidered with the TW logo on the left breast. The knit waistband ensures the wind vest and wind shirt will keep their shape and not hang down after many washings.

CMGA will not hold a complete stock of this clothing range, but can make it available on special orders.

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Driver Profile – 949MC

"This driver went into my bag last summer when we completed the first round of prototype testing and it's going to be a while before it leaves. I honestly think that this is the best driver I have designed in my career."

This is the comment of designer and TWGT founder Tom Wishon, in reference to the new 949MC drivers which debuted in the 2006 TWGT catalog.



The 949MC drivers are an example of how TWGT pushes the envelope in design to continue to create the finest clubhead designs for custom fitting and clubmaking. Clubmakers will remember in 2004, TWGT introduced a driver with a composite crown and tungsten backweight called the 949G/Ti. Because of the use of the composite material on the crown, the 949G/Ti and all other composite + titanium drivers pushed the price of quality driver heads up to a higher level than before.

Use of the composite material on the crown was considered necessary to create the discretionary weight movement to be able to move the Center of Gravity farther back from the shaft. However, as is often the case with Tom, shortly after the 949G/Ti was introduced, he went to work on trying to determine a way to keep the CG far back in the head for a higher flight and higher MOI, but without the costly use of composite material on the top of the head.

The result is an all new Milled Crown manufacturing technique which brought about the completion of the 949MC drivers for 2006. By precisely CNC machining the undersurface of the crown and side skirt areas of the head body, Tom was able to get rid of enough top and forward weight to push the CG back in the head and achieve a USGA maximum allowable MOI of 4700 g-cm². As a nice "side effect", by achieving the design parameters without the use of more expensive composite material, the 949MC drivers are less expensive to manufacture, a savings which TWGT has passed on to clubmakers!

The maximum MOI combined with the variable thickness CNC machined SP700 titanium face is why Tom kept one of the first prototypes in his bag as his "first string driver."

The 949MC drivers are available in 400cc in a 10.5 loft and a 460cc version in both a 9 and 10.5 loft. Both 10.5 loft versions of the 949MC are available and in stock now, with the 9 degree model in the 460cc size slated for availability in early April.

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