Custom Fitting with TrackMan

Performance Studio and High Speed Cameras

Leif Granstad

13-12-09

The player wants custom fitting for better dispersion control, ball flight and feel of their golf shots. The swing, club and ball are depending on each other to create what the player wants. Better tools such as TrackMan Performance Studio with its hardware, software and a detailed and transparent process will give you better results and more satisfied players.

Table of Contents

Ball flight

When a player wants to change/alter their golf clubs they want to change the ball flight or the feel of the shot and get a more consistent ball flight and better dispersion control.

We know that Ball flight creates from Speed, Launch Angle, Spin and Spin Axis.

Read more in TrackMan University at www.mytrackman.com/university

To create Ball Speed you need Clubhead Speed and Ball impact in clubhead as we measure in Smash Factor. The Smash Factor are the relation between Club Speed and Ball Speed. It gets higher if you hit the ball in the “sweet spot” and lower on off-center hits. The “sweet spot” is where the center-of-gravity is in the club face.

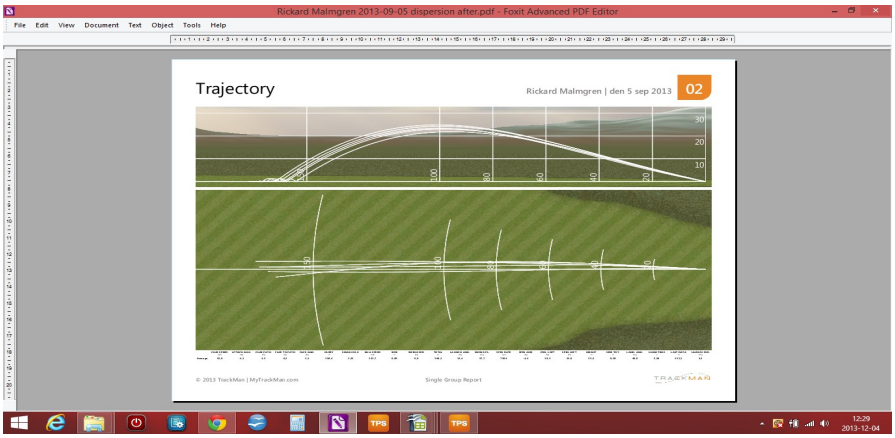
To create ball Launch Angle you need Clubhead Dynamic Loft and Attack Angle.
Example with a 6 iron: 19DG Dynamic Loft and -3,7DG Attack Angle gives 13,4DG Launch Angle.

To create Ball Spin you need Club Speed, Clubhead Spin Loft and Ball impact in clubhead as we measure in Smash Factor. Spin Loft creates from Attack Angle and Dynamic Loft.
Example with a 6 iron: 93,4 mph, 23DG Spin Loft and 1,36 Smash Factor gives 7060rpm Spin Rate.

To create the ball Spin Axis you need Clubhead Face Angle, Club Path. Face Angle and Club Path creates the D-Plane which creates Spin Axis. Where the Face Angle decides 85% and the Club Path decides 15% of the Spin Axis. Example with a 6 iron: -1,4DG Face Angle and 2,3DG Club Path gives -3,2DG Spin Axis. Remember that a clubhead lie angle that is 2DG to much upright will result a 2DG more closed Face Angle.

To create the Club Path you need Swing Plane, Swing Direction and Club Attack Angle. Example: With a driver Swing Plane at 45DG and a Swing Direction at +2DG and an Attack Angle at +2DG the Club Path is 0DG.

Picture below shows the players data:



Swing

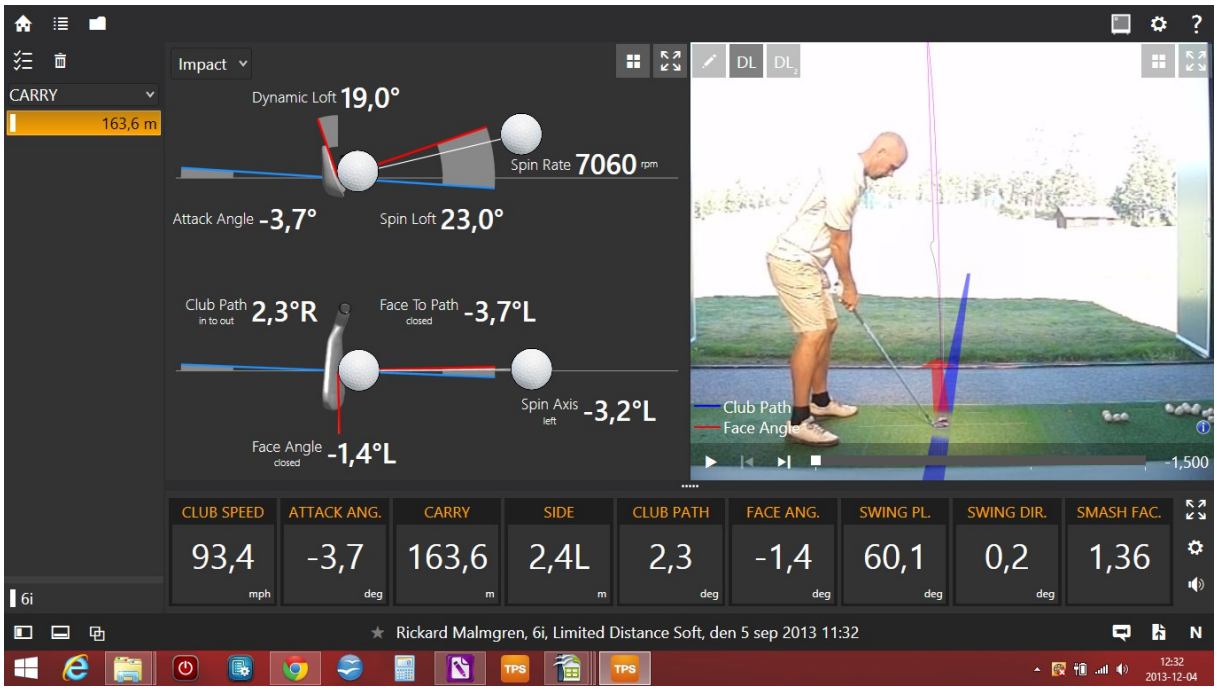
To create a consistent ball flight you need a stabile swing. It´s all about the swing isn't it? Yes, but you also need a ball and a golf club! To be able to swing stabile you need good conditions, such as a golf club that fits your swing. We need a golf swing that we can repeat in balance and Swing Plane. We want to keep it consistent in:

- Balance and balance pressure
- Pelvis rotation and plane
- Spine angle
- Shoulder rotation and plane
- Hand plane and rotation
- Golf clubs butt plane
- Clubhead plane
- Clubhead rotation

Read more in:

- Read more about D-Plane and B-Plane in TrackMan University at www.mytrackman.com/university
- Search for the perfect swing: The Proven Scientific Approach to Fundamentally Improving Your Game, by Alastair Cochran, John Stobbs
- The Golfing Machine 7th Edition, by Homer Kelley
- SAM BalanceLab, by Science & Motion, is a force plate, that will help you see what the balance pressure is during the swing.

Picture below shows the graphic of one shot of the player:



Golfclub

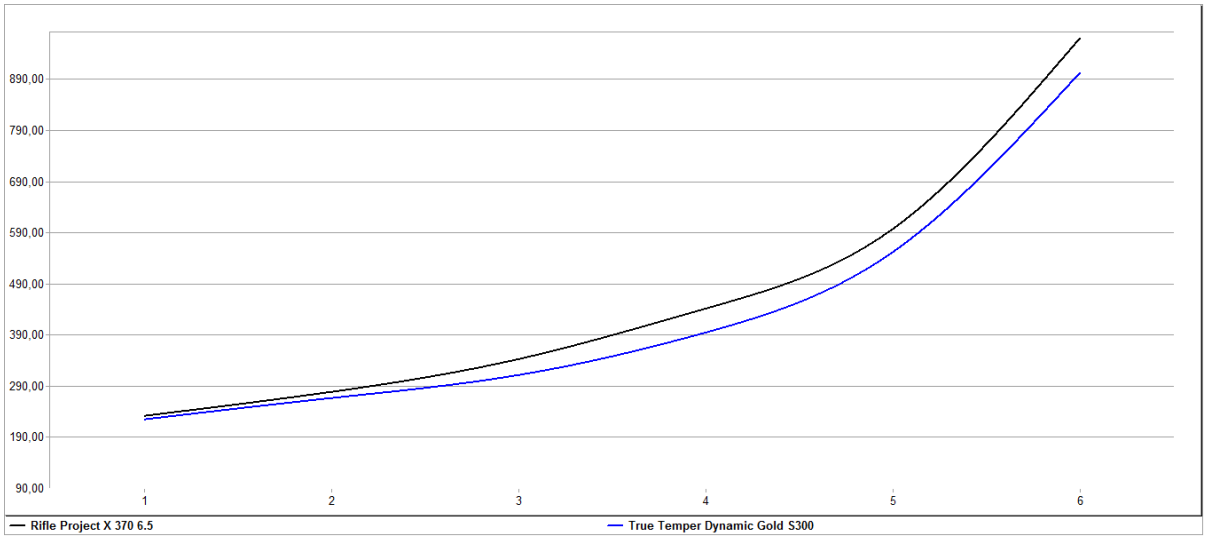
The golfclub is the instrument the player uses to create the consistent ball flight. The better golfclub the smaller dispersion of the shot! The best golfclub is custom fit to the player with the right CLUB SPECIFICATION:

- Length
- Total weight
- Balance point, swing weight, MOI
- Shaft with the right specifications, Flex, Bend-profile, Torque and Weight.
- Clubhead handpicked with the right specifications, Loft, Lie, Sole angle and sole width, Face angle , Offset and Face Progression, Center-of-gravity, MOI, Roll, Bulge, Weight and Material.
- Grip with the right specifications, Size, Weight, Texture, Torque and Feel.

Read more in:

- Golf Club MOI Speed Match System, by GolfMechanix, will help you to choose the right MOI value.
- Shaft Bend Profile Software, by Tom Wishon Golf Technology, will help you to choose the right shaft.

A shaft is measured thru 7 different zones, that affects, Feel, Ball Launch Angle and Ball Spin.
The picture below shows the Dynamic Gold S300 and Project/X 6.5 shafts bend profile compared thru 7 different zones, the Project/X 6.5 (the top line) are stiffer in the tip section (to the right) and almost the same stiffness in the butt:



Custom Fitting

How do we achieve the best instrument for the player?

Start with checking the players Swing and trajectory goals and playing conditions

To be able to help the player the best way, you have the get a good grip on what circumstances the play in and how they perform out on the course.

Ask the player about their swing and trajectory goals and conditions they are playing in:

- On your good shots, what is your ball flight?
- On your bad shots, what is your ball flight?
- Which ballflights do you want?

How do your divots look like (irons and hybrids) on your good shots?

- None, Mid-small =< 2 golf balls or Big => 2 golf balls.

On your shots (irons and hybrids) are you trying to?

- Sweep the ball, Attack the ball or Mix.

How is your impact (irons and hybrids) on your bad shots?

- Thin, Mixed, Fat, Toe or Heel.

How is your impact (driver and fairway) on your bad shots?

- Thin, Mixed, Fat, Toe or Heel

What is the normal condition you are playing in?

- Hard ground/turf, Mixed or Soft ground/turf

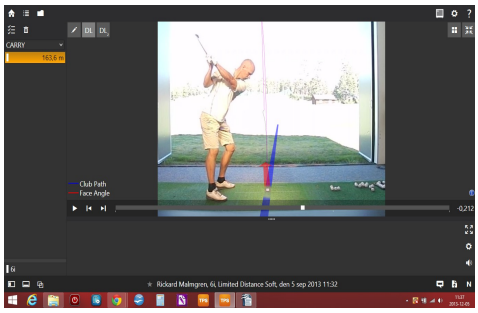
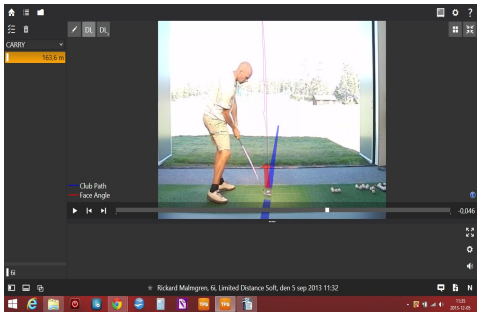
We have to check the PLAYERS PHYSICAL STATUS:

- Length, measure the wrist-to-floor length with a ruler.
- Hand-size, measure the size with a Hand-size plate.
- Estimate the overall strength and athletic ability,
    - 1, weak
    - 2, average
    - 3, strong

We also have to check the PLAYERS DYNAMIC STATUS. All the values are from TrackMan Performance Studio:

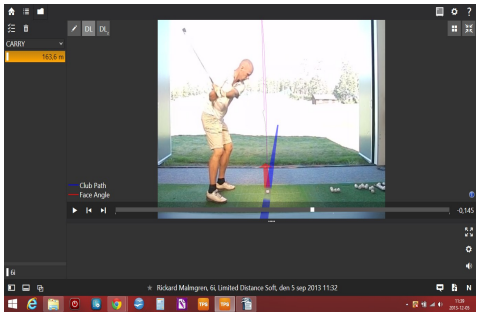
- Swing Tempo, from start to impact
  - 1, slow, more than 1.2 secs
  - 2, average, 1.0-1.2 secs
  - 3, fast, less than 1.0 secs

  Picture below shows a fast down swing at the top -0,265 s and at impact -0,038 s:

- Backswing to Downswing Transition
  - 1, smooth
  - 2, average
  - 3, fast
- Wrist-cock Release, in P5 according to The Golfing Machine
  - 1, early, full release in P5
  - 2, mid, beginning release in P5
  - 3, late, no release in P5

  Picture below shows P5 with no release:



- Club Speed with 6 iron and/or Driver.
- Swing Plane.
- Swing Direction.
- Club Path, Face Angle and Face to Path.
- Consistent swing characteristics such as Forward flexing, Ball position, Stance, Aim, Balance and balance pressure through the swing.
- Attack Angle, will affect the Sole Width and Sole Angle (bounce) with it´s leading edge of the golfclub.
- Dynamic Loft, will affect the Sole Angle with it´s leading edge of the golfclub.

- Spin Loft
- Smash Factor
- Launch Angle
- Trajectory
- Spin Rate
- Spin Axis
- Land Angle

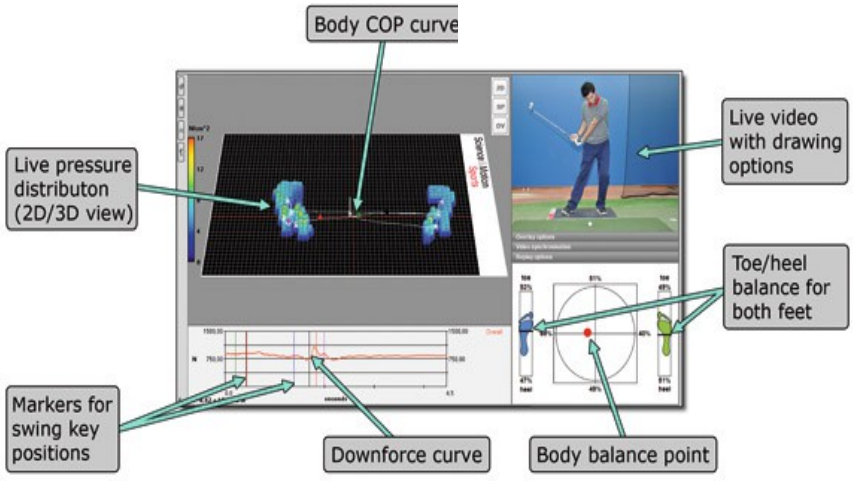
After this you have to check the PLAYERS DYNAMIC STATUS with the player's swing and trajectory goal.

Read more in:

- COMMON SENSE CLUBFITTING The Wishon Method, 2006, by Tom Wishon.
- TRACKMAN Performance Studio, with high speed cameras, will help you to show exactly the PLAYERS DYNAMIC STATUS.
- Golf Club MOI Speed Match System, by GolfMechanix, will help you to choose the right MOI value.
- SAM BalanceLab, force plate to see what the balance pressure is during the swing.

Picture below shows Golf Club MOI Speed Match System:

Picture below shows SAM BalanceLab:



Step-by-step custom fitting

Follow this Step-by step instruction and you will do a great job in the custom fitting process:

1. Check the players swing and trajectory goal
2. Check the conditions he or she are playing in
3. Measure the PLAYERS PHYSICAL STATUS
4. Measure the PLAYERS DYNAMIC STATUS, with the players own club, 6 iron, wedge and/or driver
    a. Is the ball flight normal?
    b. Measure the CLUB SPECIFICATION
5. Do you have to change the CLUB SPECIFICATION?
6. Let the player try another club that you think gives them a ball flight closer to their goal, with better CLUB SPECIFICATIONs
    a. Is the ball flight better?
7. Do you have to change the CLUB SPECIFICATION? If yes, back to no. 4
8. When you have the right CLUB SPECIFICATION let the player try different brands in different price regions to help them decide which is the best price/performance.
9. Build one club for the player.
10. Delivery fitting for perfect lie and loft
11. Let the player practice with the club for a week.
12. Do you have to change the CLUB SPECIFICATION? If yes, re-build the club and back to no. 8.
13. When you have the exactly right CLUB SPECIFICATION build the golf set according to the SET MAKE-UP.

To help the player to perform at their best on the course you also have to do a SET MAKE-UP or a GAP ANALYSIS.

1. Let the player hit all his clubs and see where the gaps are. Normally it´s between the pitching wedge and the longest wedge or between the longest iron and fairway wood.
2. If it´s a gap between the irons check the loft of the clubs and adjust if it´s incorrect.
3. If it´s a gap between the wedges check the loft of the clubs and adjust if it´s incorrect.

To help the player to perform at their best on the course you have to check the lie angle on the clubs.

1. Let the player hit all his clubs with lie tape beneath the clubs and adjust the lie to be correct.
2. Be careful of what the swing plane should be, so the players swing doesn´t change to fit the club.

Case study 1, male, right handed player

Check the players swing and trajectory goal.

- The players want to hit the ball with a small PUSH/DRAW

Ask the player about their swing and trajectory goals and conditions they are playing in:

- On your good shots, what is your ball flight? - With the 6 iron = PUSH/DRAW
- On your bad shots, what is your ball flight? - With the 6 iron = STRAIGHT/DRAW
- Which ballflights do you want? - With the 6 iron = PUSH/DRAW

How do your divots look like (irons and hybrids) on your good shots? – With the 6 iron = Mid-small

On your shots (irons and hybrids) are you trying to? – With the 6 iron = Attack the ball

How is your impact (irons and hybrids) on your bad shots? – With the 6 iron = Fat

How is your impact (driver and fairway) on your bad shots? - Fat

What is the normal condition you are playing in? - Mixed

Check the PLAYERS PHYSICAL STATUS:

- Length and measure the wrist-to-floor length = 187cm, 37”
- Hand-size = Men´s standard +1/32”
- Overall strength and athletic ability = 3 = Strong

Check the PLAYERS DYNAMIC STATUS with their own club:

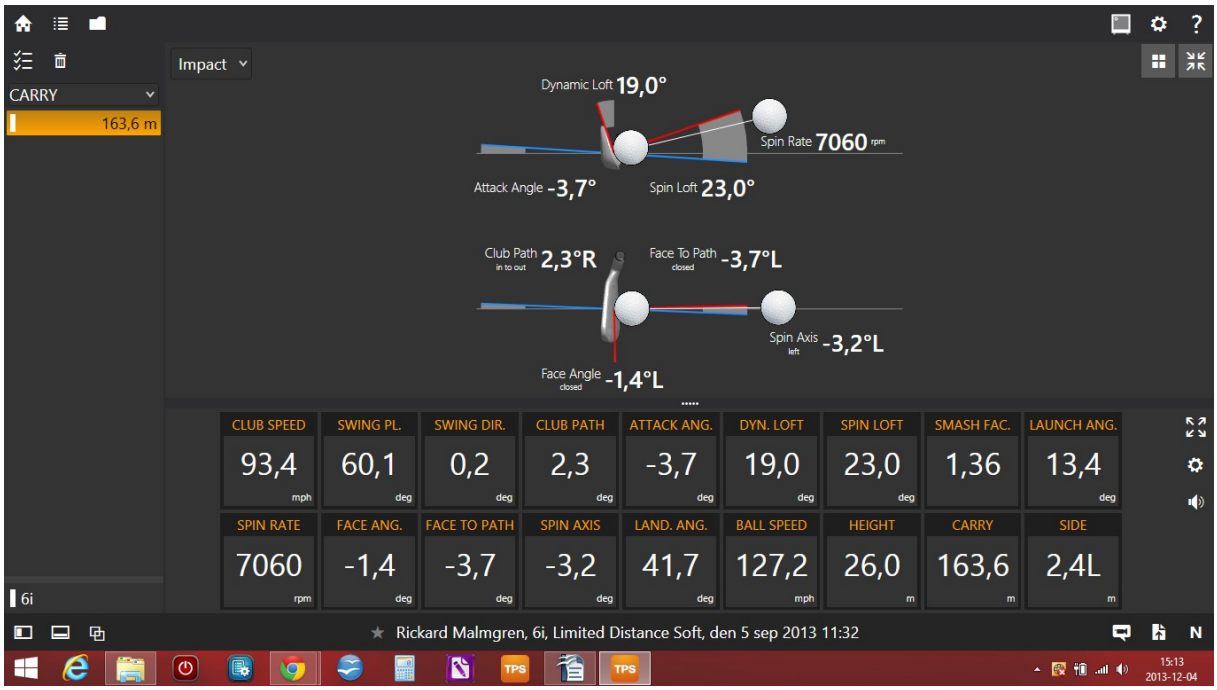
Change the specifications of the the club and measure again until you are within your swing and trajectory goal:

- Swing Tempo = 3 = Fast, less than 1.0 secs
- Backswing to Downswing Transition = 3, fast
- Wrist-cock Release = 3, late, no release in P5
- Club Speed, 6 iron = 92mph, +- 2mph
- Swing Plane, 6 iron = 58dg, +-2dg
- Swing Direction, 6 iron = -1dg, +-2dg
- Club Path, 6 iron = 2dg, +-2dg
- Face Angle, 6 iron = 0dg, +-2dg
- Consistent swing characteristics
    - Forward flexing
    - Ball position
    - Stance
    - Aim

- Balance and balance pressure thru the swing

- Attack Angle, 6 iron = -4dg, +-1dg
- Dynamic Loft, 6 iron = 19dg, +-1dg
- Spin Loft, 6 iron = 24dg, +-1dg
- Smash Factor, 6 iron = 1,35, +-0,02
- Launch Angle, 6 iron = 13dg, +-1dg
- Trajectory, 6 iron = PUSH/DRAW
- Spin Rate, 6 iron = 7200rpm, +-200rpm
- Spin Axis, 6 iron = -4dg, +-4dg
- Land Angle, 6 iron = 40dg, +-2dg

Picture below shows the graphic of one shot of the player:



This ended up in this CLUB SPECIFICATION for the 6 iron:

- Length = 38” = +0,5”, to achieve consistent Swing Plane.
- Total weight = 433 gram, to achieve consistent centered hits.
- Balance-point, swingweight, SW = D3, MOI = 2760kgcm2, to achieve that the centered hits are at Center-of-Gravity, also called sweet spot.
- Shaft with the right specifications
    - Flex, Butt = 334cpm, with a stiff butt and tip section and softer mid section, to take away the left side with small lead bending which results in less closing of the face.
    - Bend-profile = Strength = 3, Transition = 3, Tempo = 3, Release = 3, Speed = 92mph
    - Torque = 2.3 = low, to take away twisting at off-center hits.
    - Weight = 125g uncut weight, 115g cut weight, to match players strength.
- Clubhead handpicked with the right specifications
    - Loft = 29DG, to achieve the right trajectory together with correct length in the SET MAKE-UP. This is a stronger loft than standard which will affect the Sole Angle (bounce) with it´s leading edge of the golfclub.
    - Lie = 63DG, to achieve consistent Swing Plane and not to affect the Dynamic Face Angle (when the lie is too much upright the Dynamic Face Angle is closed).
    - Sole-angle and sole-width = 2dg, to resist fat shots.
    - Face-angle, Offset and Face Progression = Offset = 1,8mm, low offset to take away the left side and not to affect the Dynamic Face Angle.
    - Vertical Center-of-gravity, 18,00mm, to have the correct trajectory and playability.
    - MOI = 780kgcm2 , to achieve that the centered hits are at Center-of-Gravity, also called sweet spot with some forgiveness.
    - Roll = n/a, only for metal woods.
    - Bulge = n/a, only for metal woods.
    - Volume = n/a, only for metal woods.
    - Weight = 263g
    - Material = Forged in 1020 Carbon Steel, to match the players preference for best feel of impact.
- Grip with the right specifications
    - Size = Men’s standard +1/48” + including extra tape + ridge, to match the players preference and to resist twisting during the shot.
    - Weight = 52g
    - Texture = Smooth and sticky, to have the best feel of impact.
    - Torque = low, to take away twisting at off-center hits.

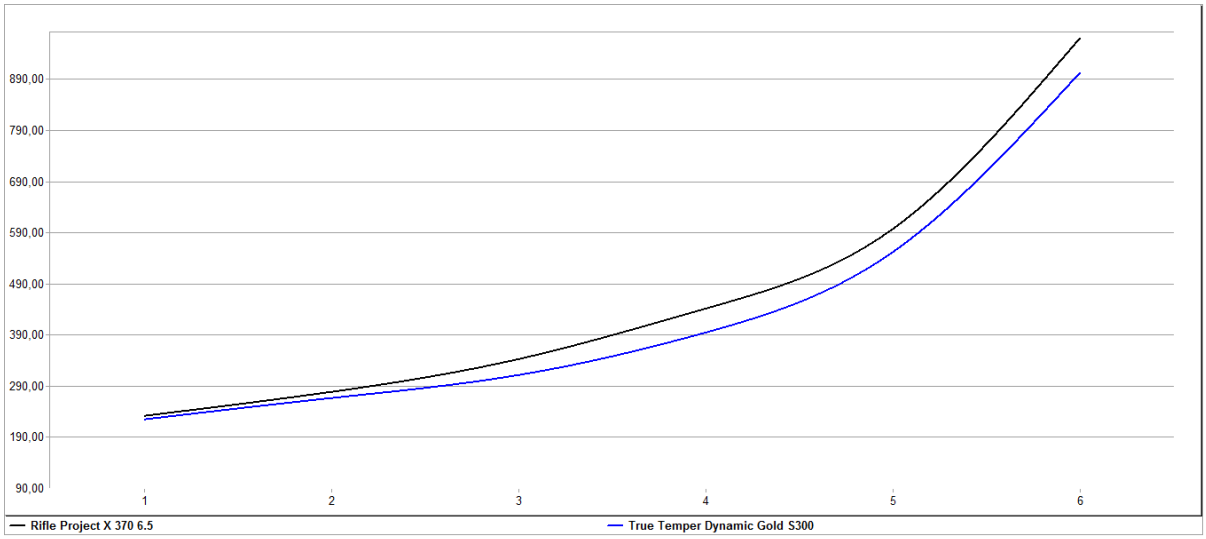
Golf club components:

- Shaft = Rifle Project X 6.5

- Head = Mizuno MP-64

- Grip= Iomic Sticky 2.3 white

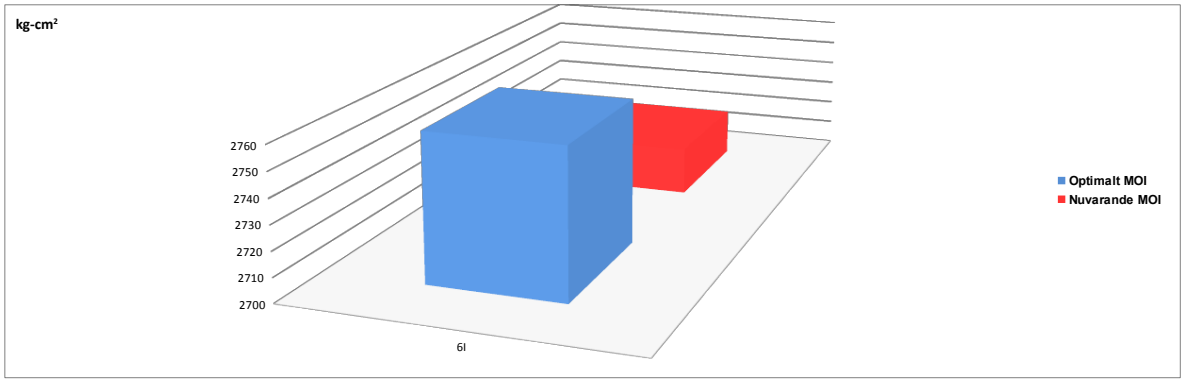
The picture below shows the old shaft and the new shafts bend profile compared thru 7 different zones:



The new club compared to the old clubs MOI value:

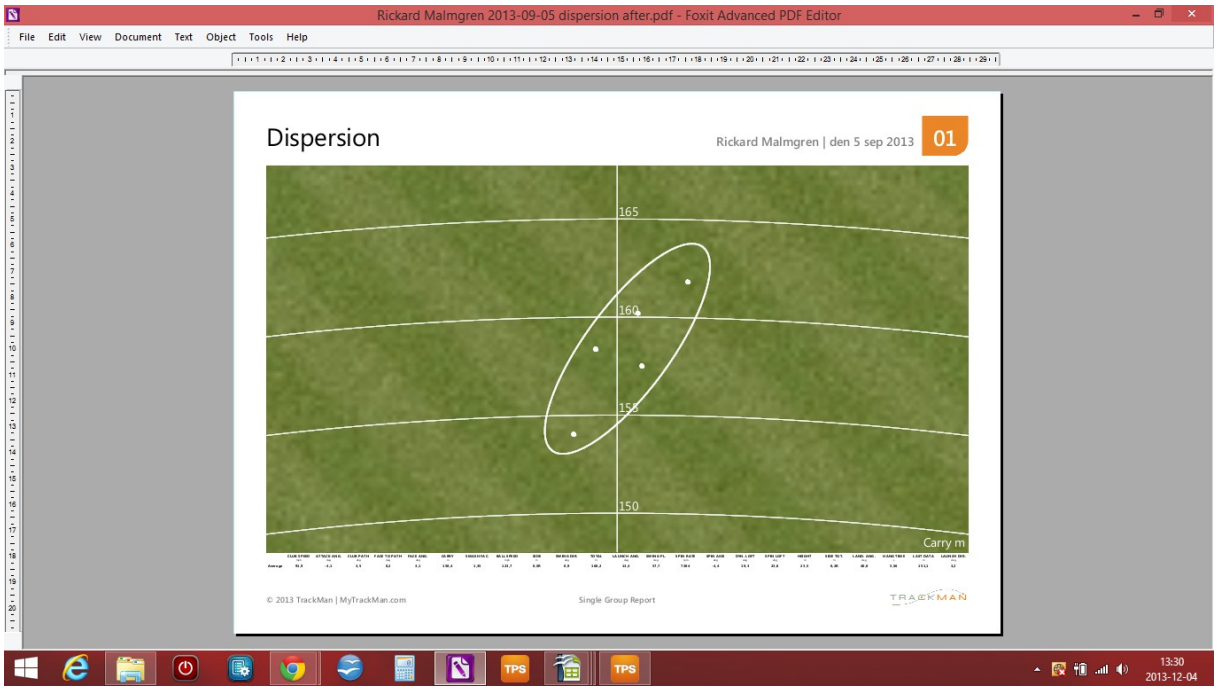
Tee View
Ökad prestanda med skräddarsydd golf

Rickard Malmgren



When you are finished you always let the player hit a few shots with the new golfclub to see if you achieved the goal to get a narrow disperion. Check the PLAYERS DISPERSION CONTROL with the new club in TrackMan PS:

The picture below shows the dispersion with the new 6 iron club:



Summary

The player wants custom fitting for better dispersion control, ball flight and feel of their golf shots. The swing, club and ball are depending on each other to create what the player wants. Better tools such as TrackMan Performance Studio with its hardware, software and a detailed and transparent process will give you more satisfied players.

Recommendation

When you work with custom fitting you need a detailed and documented process. You also need hardware and software that you rely on. You should have a transparent and iterative process that let the player be a part of the decisions of designs and performance. This will result in players that are more satisfied and hopefully they will recommend you to other players.

When you custom fit you have to be accurate with all your measures and careful with your choices of components and specifications to match the clubs to the player and their swing. It´s very important that you have the right toolbox to do an excellent work.

Hardware and software to use for the custom fitting process:

- TrackMan IIIe with TrackMan Performance Studio, with High Speed Cameras, will help you to show exactly the PLAYERS DYNAMIC STATUS.
- High speed cameras Casio Exilim, with 300fps.
- SAM BalanceLab, by Science & Motion, force plate, that will help you to see what the balance pressure is during the swing.
- Golf Club MOI Speed Match System, by GolfMechanix, that will help you to choose the right MOI value.
- Shaft Bend Profile Software, by Tom Wishon Golf Technology, that will help you to choose the right shaft.
- Frequency meter, that will help you to measure the butt stiffness of the club.
- Swing weight scale, that will help you to measure the Swing weight of the club.
- Loft and lie machine, that eill help you adjust the loft and the lie of the club.
- Scale, that will help you to measure the total weight of the club.
- Ruler, that will help you to measure wrist/floor distance.
- Hand measure plate, that will indicate grip size preference.
- Caliper, that will help you to measure grip size.
- Iron design options: 6-50 pcs of different heads and 10-60 pcs of different shafts
- Wedge design options: 6-30 pcs of different heads and 10-60 pcs of different shafts
- Driver design options: 5-30 pcs of different heads and 10-60 pcs of different shafts
- Fairway design options: 5-30 pcs of different heads and 10-60 pcs of different shafts
- Hybrid design options: 5-30 pcs of different heads and 10-60 pcs of different shafts
- Grip options, 6-30 different designs

Sources

- TrackMan University at www.mytrackman.com/university
- COMMON SENSE CLUBFITTING The Wishon Method, by Tom Wishon
- Search for the perfect swing: The Proven Scientific Approach to Fundamentally Improving Your Game, by Alastair Cochran, John Stobbs
- The Golfing Machine 7th Edition, by Homer Kelley