

How to Understand your 8-Page Golf BioDynamics 3D Report

This document is designed to assist you in understanding the comprehensive 8-page Golf BioDynamics 3D Swing Analysis Report. As we guide you through an example report you may notice that the 'numbers' are actually taken from Jim McLean's own 3D Report.

The information contained in your GBD 3D Report can be of great value to your Teaching Professional in terms of helping to prioritise technical changes or it may simply be valuable to have a record of what you are doing when you are swinging well. As Jim McLean says, the GBD Report is a great monitoring tool that can tell you "exactly what you are doing, now".

The first section contains the **Summary Comments** or our interpretation of the 'numbers'. These are the key points to focus on in terms of improving your swing mechanics as recommended by your GBD Instructor.

Throughout the remainder of the GBD 3D Report you will notice that your 'numbers', located in the far right hand column, are all colour coded. These 'numbers' will be an average of the swings collected during the session. If they are green, they fall within our "ideal" corridor; yellow they are very close to ideal and finally red means that they fall outside of the ideal corridor. Don't be discouraged by a few red numbers! They help direct us to the problem areas in your swing.

Section 2: Includes an assessment of your posture at address and your alignment at set-up. It is important to have a solid set-up so that fewer compensations are made from the beginning of the movement.

Section 3: Next comes the backswing information-: how well you rotate your body (hips and shoulders) and how stable are as you as you make the turn back. Put simply, are you in a balanced position at the top of the backswing and have you maintained your spine angle? Terms such as X-Factor (the difference between your hip and shoulder turn at the top) and X-Factor Stretch also help to give us insights into your flexibility in trunk rotation and the start of downswing sequence.

Section 4: The Downswing -: there is some positional information such as how open (to the target) your body is by impact and again a few stability measures that indicate whether you have maintained your spine angle.

Section 5: This relates to the dynamics of your swing. It includes important information concerning the timing, transition and downswing sequences as well as body speeds (hips, shoulders, arm and hand). Much of this information can illustrate power losses or what direction a physical training program should take.

Finally a table of data is provided that is solely for our own reference or that of the teaching professional. There is no need for you to even look at this! It is included for completion.

We look forward to working alongside you, and hope this guide can assist you in your journey towards a better golf swing!

The Golf BioDynamics Team

3D Golf BioDynamics Swing Analysis

First Name: Jim **Last Name:** McLean **Test Type:** Initial Test
Date: 19-July-2010 **Email:**
Mass: 82kg **Height:** 180.0 cm **Handicap:** Pro/Instructor

Our interpretation of the summary points are often written in priority order.

Age, height and sex are important as they help determine the "ideal" corridors for the golfer.

Summary

- Your set-up posture is quite good. Just try a little less tilt of the upper body to the right.
- Your backswing move is very solid - well done!
- Downswing: great impact position with very good body speeds. To further improve the efficiency a touch more lateral shift with the lower body (towards the target) in transition and some BioFeedback work to address the timing sequence issue - the hand are peaking too early. Overall, this a a great golf swing Jim!

Alignment

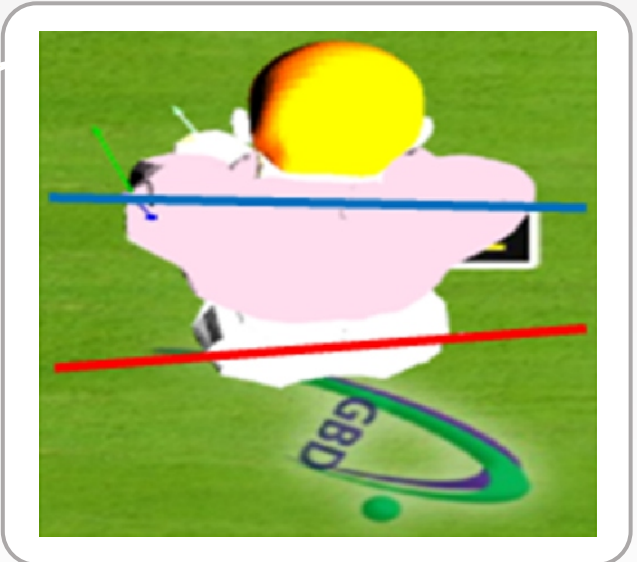
	Corridor	You
Hips	0 to 8°	0 Open
Shoulders	5 to 12°	9 Open

Jim's hips are well aligned (relative to the target line) and lie within the ideal corridor.

Green = within corridor
Yellow = just outside corridor
Red = well outside corridor

This key relates to the entire report; the green numbers that fall within our 'corridor of success' are based on our research of golfers of all abilities, including tour professionals.

These pictures are generic but taken directly from the GBD software to help illustrate the body position that match the "numbers" to the left.



This Section reports the set-up positions, specifically showing the bending (forward and backward) and tilting (side-to-side) of the hips, shoulders and head.

Bending

	Corridor	You
Hips	10 to 26°	16 Forward
Shoulders	27 to 40°	41 Forward
Head	35 to 55°	50 Forward

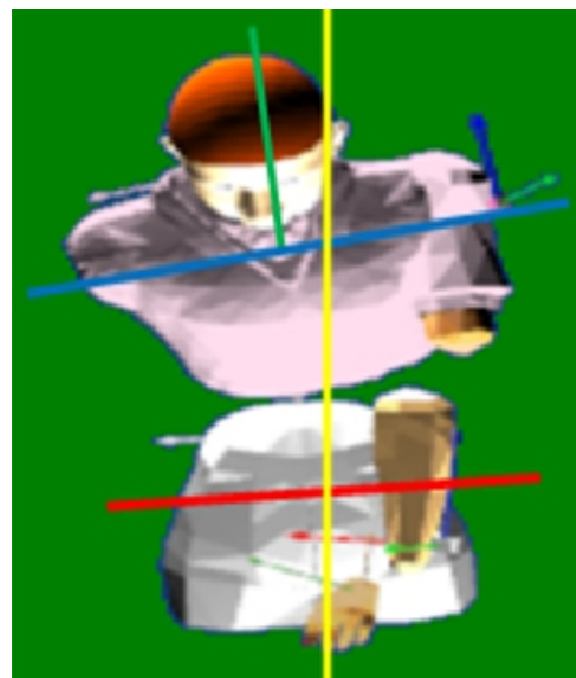
Notice the colors marked on the body segments match the those in the table to the left of the image.



Tilting

	Corridor	You
Hips	0 to 3°	5 Right
Shoulders	7 to 13°	15 Right
Head	-3 to 10°	5 Right

Jim's hips are tilted too far to the right. This means that his left hip is 5° higher than his right.



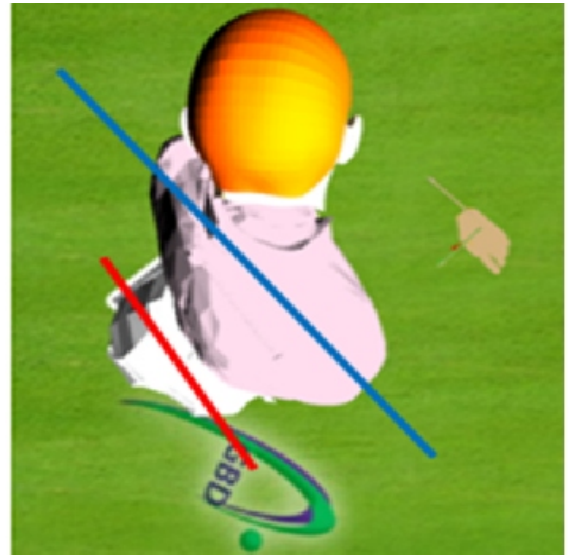
The "numbers" describing Jim's backswing appear here including his body rotations followed by variables that indicate how stable he is during the backswing.

The 'X-Factor' is defined as the difference between the shoulder turn and hip turn at the top of the backswing. Jim's score is ideal. A low X-Factor could be reflective of a lack of trunk rotational flexibility; too high could be related to a hypermobility issue.

Backswing

Rotations

	Corridor	You
Hips	-82 to -98°	-88 Closed
Shoulders	-40 to -54°	-47 Closed
X-Factor	-40 to -50°	-47 Closed
X-Factor Stretch	-10 to -25°	-10 Closed
Head Turn	-20 to -40°	-22 Closed

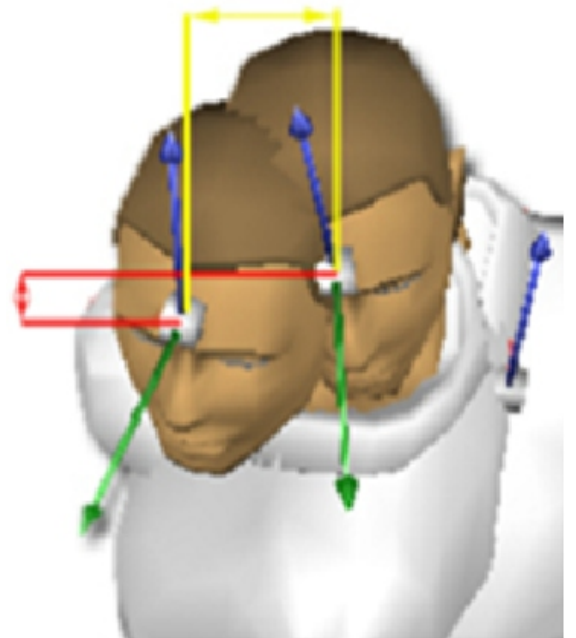


The 'X-Factor Stretch' occurs in the first part of the downswing. As Jim's hips lead out, the X-Factor or the differential created between the hips and the shoulders increases for an instant — it is a very important move for power generation in the golf swing.

All of these stability numbers are within the corridors and tell us that Jim's backswing movement is very sound, putting him into a powerful position from which to make his downswing. Excessive body movement on the backswing can be related to inconsistencies in ball striking.

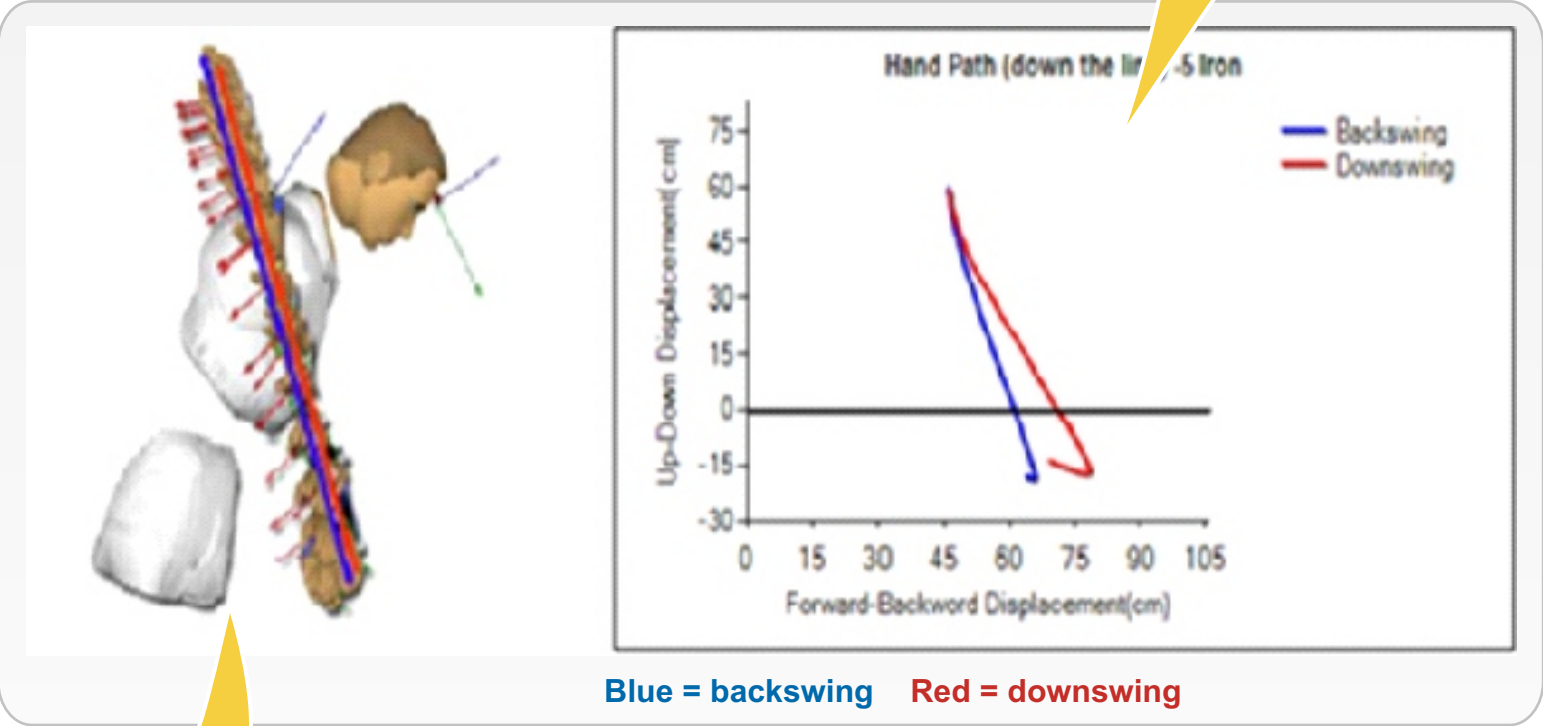
Stability

	Corridor	You
Head sway <small>Address to top</small>	2 to 7 cm	5.3 Away
Head lift <small>Address to top</small>	-2.5 to 1 cm	-0.1 Down
Head thrust <small>Address to top</small>	-2 to 2 cm	1.2 Forward
Hip drop <small>Address to top</small>	-3 to 0 cm	-2.6 Down
Hip sway <small>Address to top</small>	-1.5 to 1.5 cm	-1.5 Toward



This graph demonstrates the movement of the sensor on the hand (from a down-the-line view). The blue line illustrates Jim's backswing path and the red line shows us the downswing path. This graph shows Jim's hand path is slightly out-to-in. Remember, it is the hand path not the club head path. The hand path could be slightly out-to-in but the club could be in-to-out, neutral or out-to-in!

Ideal Hand Path

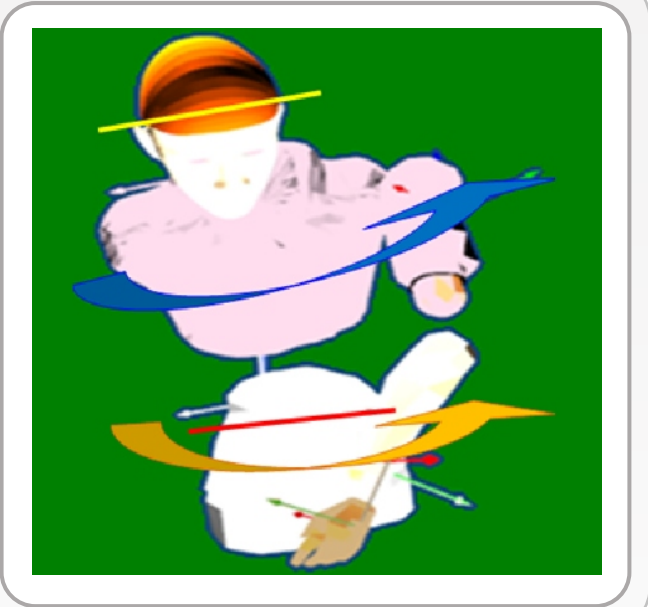


This model shows the ideal hand path throughout the golf swing.

This is excellent, Jim's body is well rotated by impact and his hips are slightly more 'open' than his shoulders.

Impact Zone - Rotations

	Corridor	You
Hip Turn	25 to 55°	40 Open
Shoulder Turn	25 to 55°	36 Open
Head Turn	10 to 40°	8 Open
Hip Tilt	10 to 15°	19 Right
Hip Bend	0 to 10°	5 Forward

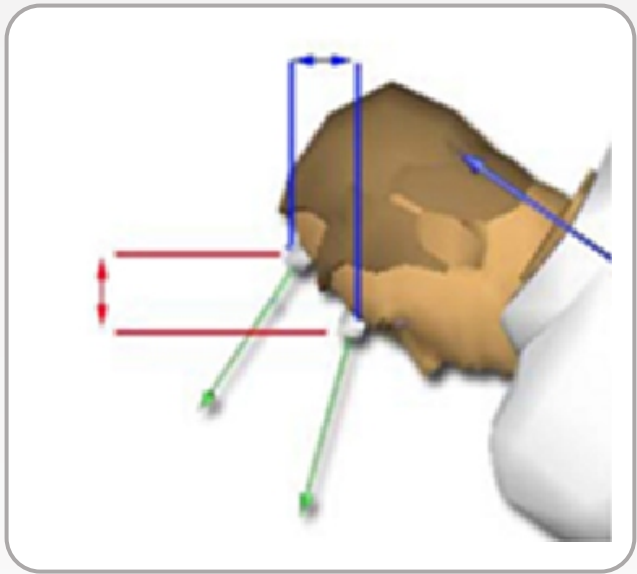


Similar to his address position, Jim has a little too much 'hip tilt' (left hip higher than the right) through the impact zone.

Impact Zone - Stability (Spine angle control)

	Corridor	You
Head drop <small>Address to impact</small>	-6 to 1 cm	-4.6 Down
Head thrust <small>Address to impact</small>	-2 to -2 cm	-0.8 Backward
Head sway <small>Address to impact</small>	-3 to -2 cm	1.6 Away
Hip sway <small>Address to impact</small>	-11 to -14 cm	-9.1 Toward

There is a slightly less than optimal lateral shift of the hips toward the target by impact.



Body Speed

	Corridor	You
Hips	$\geq 400^\circ/s$	454
UT	$\geq 550^\circ/s$	825
Arm	$\geq 780^\circ/s$	880
Hand	$\geq 1300^\circ/s$	1,442

The peak speeds of the hips, shoulders, arm and hands on the downswing are displayed here. It can give us insights into swing efficiency and the existence of any power leaks.

Timing Sequence

Order that peak speeds occur in downswing

	Hips	UT	Arm	Hand
Ideal	1	2	3	4
5- Iron	1	2	4	3
-	0	0	0	0

No shots were 'captured' using a driver. Otherwise, the results would be seen here.

Jim's hand speed reached its peak a little early and/or the arm speed a little late—they are 'out of sequence'. This reflects the average of all the swings that were captured.

Timing Lags

	Corridor	You
Hips to UT	25 to 40ms	16.7
UT to Arm	15 to 30ms	20.8
Arm to hand	25 to 40ms	-4.2
Hand to Impact	15 to 45ms	66.7

Some of the body segments reach their peak speeds in the incorrect order, thus the timing lags are displayed as red. These 'lags' are VERY sensitive, giving insight into swing efficiency.

Transition Sequence

Order that body segments change direction

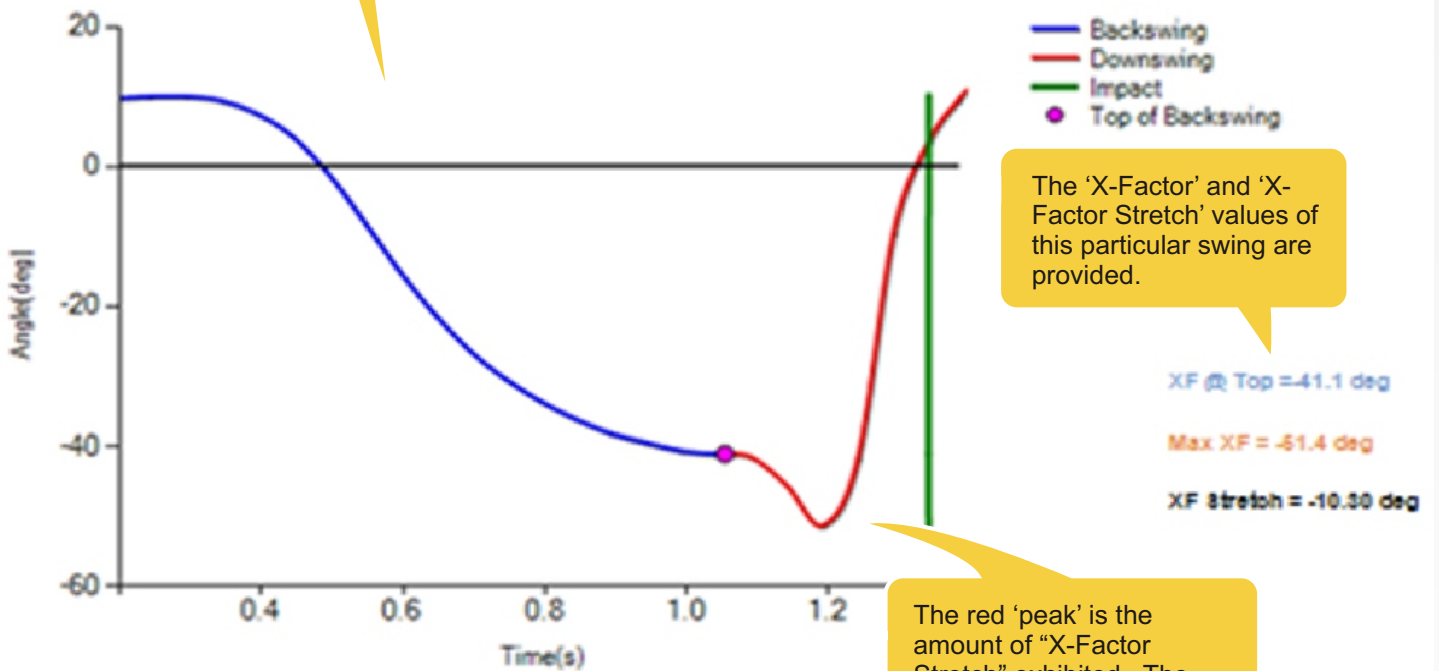
	Hips	UT	Arm	Hand
Ideal	1	2	3	4
You	2	2	1	3

The perfect transition would see the hips changing direction first in the downswing. Here, Jim's arms change direction first, hips and shoulders next and hands last.

This graph illustrates how the 'X-Factor' changes throughout one of Jim's swings. The blue line reflects the backswing movement (until the maximum hip turn) and red the downswing movement.

Dynamics

X-Factor-5 Iron

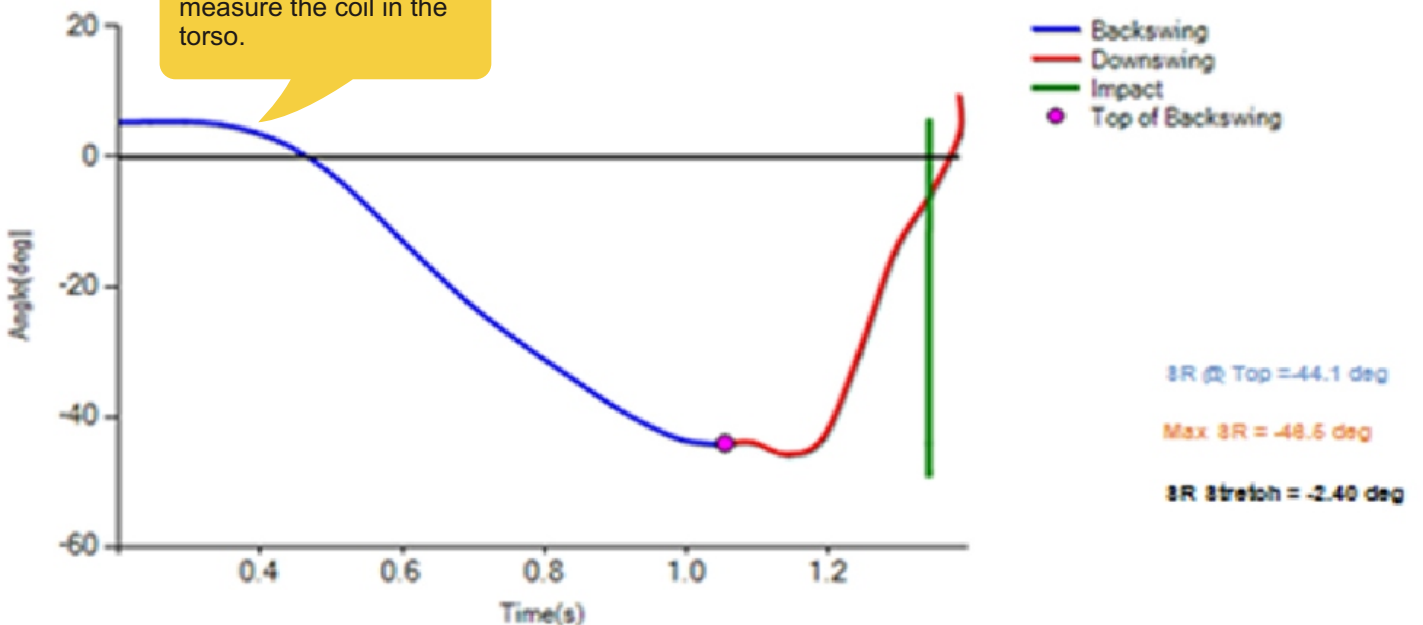


The 'X-Factor' and 'X-Factor Stretch' values of this particular swing are provided.

The red 'peak' is the amount of "X-Factor Stretch" exhibited. The PGA Tour average is about 17 degrees!

This graph of 'Spine Rotation', used by TPI3D, is another way to measure the coil in the torso.

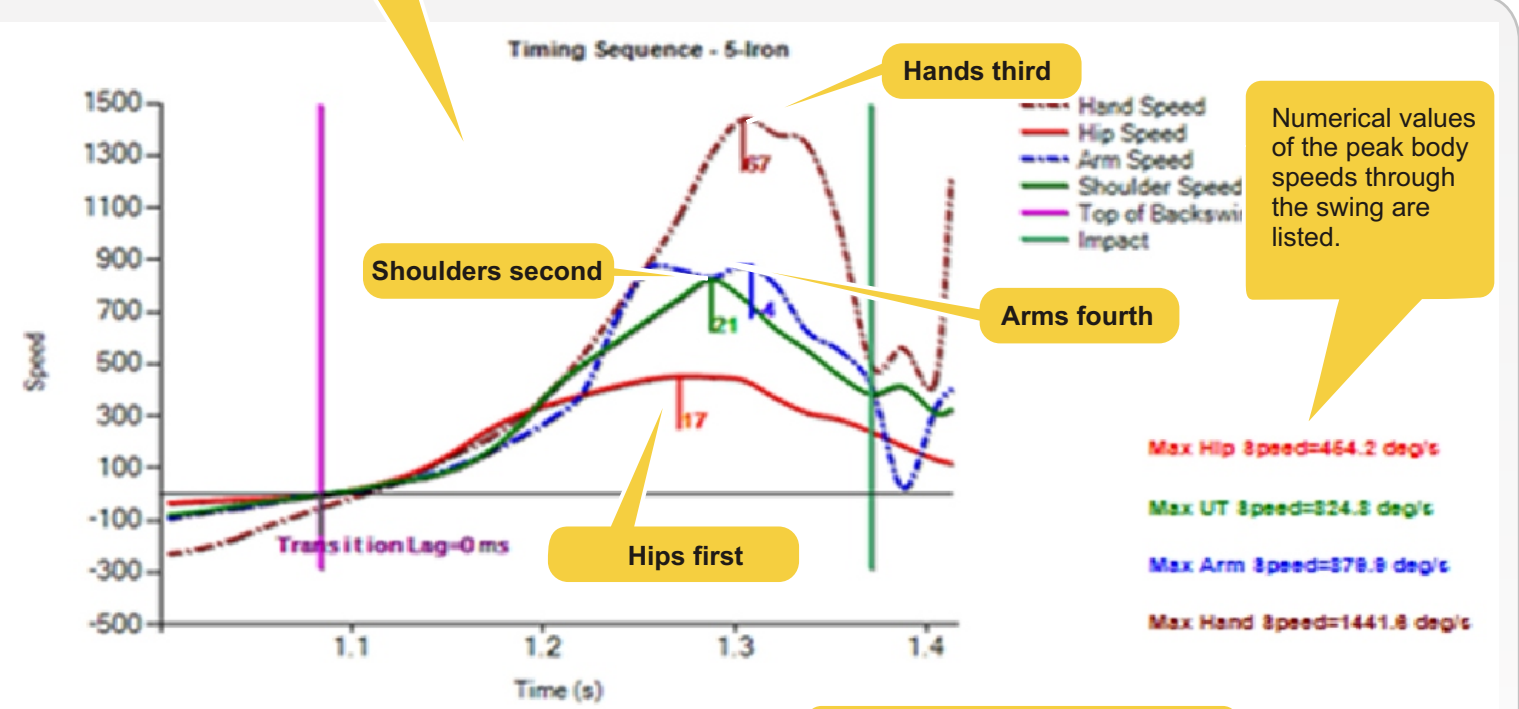
Spine Rotation-5 Iron



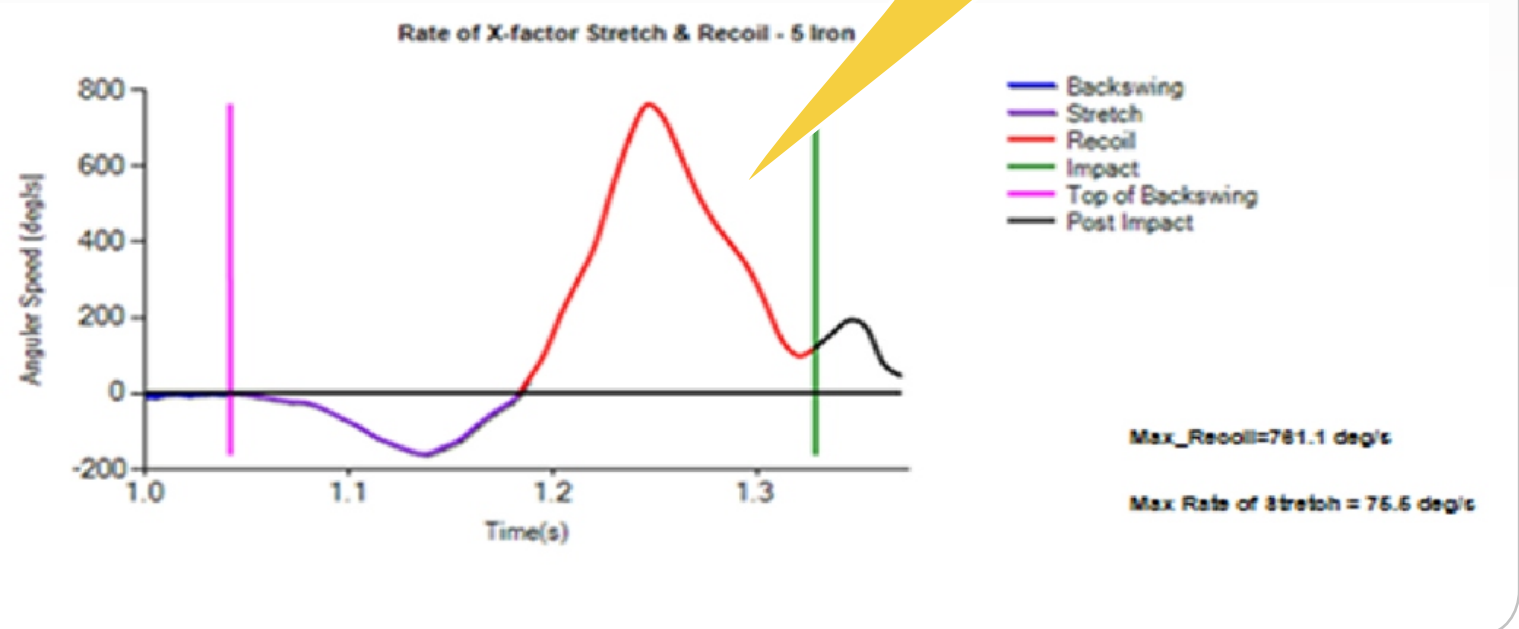
SR @ Top = -44.1 deg
 Max SR = -48.6 deg
 SR Stretch = -2.40 deg

This Timing Sequence graph shows the peak speeds of Jim's body segments (hips, shoulders, arm and hand) during the downswing of one particular swing. Here we see the hips peak first, then the upper torso or shoulders second, with the sequencing of the arms and hands in the reverse order. The hand speed peaks a little too early.

Dynamics



The Rate of Recoil gives us important insights into the power the muscles of your trunk (the ones that rotate the shoulders past the hips) can generate.



This table gives more information on a number of 'swing parameters' at different stages of the swing. For example we can see that Jim's 'hip tilt' at the top is about 5 degrees. This is a little less than ideal.

Appendix

Swing parameter	Jim McLean			
	15-Jul-2010		5-Iron	
	A	T	I	F
Pelvic Rotation (deg)	-0.4	-46.6	36.2	95.2
X-Factor (deg)	9.8	-41.1	3.7	23.6
Upper Torso Rotation (deg)	9.4	-87.7	39.8	118.8
Pelvic Bend (deg)	15.9	11.1	5.2	2.7
Spine Bend (deg)	25.2	-3.4	26.5	-29.2
Upper Torso Bend (deg)	41.1	7.8	31.7	-26.5
Pelvic Tilt (deg)	4.6	-5.1	18.6	11.6
Spine Tilt (deg)	10.8	-36.2	17.3	18.7
Upper Torso Tilt (deg)	15.4	-41.3	36.0	30.3
Head Rotation (deg)	0.0	-22.3	8.5	73.2
Head Bend (deg)	50.3	46.1	50.4	-2.0
Head Tilt (deg)	4.9	-8.3	10.1	39.0
Pelvic Sway (cm)	0.0	-1.2	-9.1	-15.0
Upper Torso Sway (cm)	0.0	-1.7	-0.4	-16.8
Head Sway (cm)	0.0	5.3	1.6	-22.1
Hand Sway (cm)	0.0	43.1	-14.4	2.9
Pelvic Thrust (cm)	0.0	5.0	1.9	6.6
Upper Torso Thrust (cm)	0.0	3.5	-1.2	2.1
Head Thrust (cm)	0.0	1.2	-0.8	-6.5
Hand Thrust (cm)	0.0	-18.2	5.2	-30.0
Pelvic Lift (cm)	0.0	-2.6	0.2	0.3
Upper Torso Lift (cm)	0.0	-0.6	-0.9	7.7
Head Lift (cm)	0.0	-0.1	-4.6	15.8
Hand Lift (cm)	0.0	77.4	4.6	91.3
X-Factor Stretch (deg)			-10	
Max. Pelvic Speed (deg/s)			454	
Max. Upper Torso Speed (deg/s)			825	
Max. Arm Speed (deg/s)			880	
Max. Hand Speed (deg/s)			1,442	
Max. Hand Speed cm/s			788	
Hip - Upper Torso lag(ms)			17	
Upper Torso - Arm lag(ms)			21	
Arm - Hand lag(ms)			-4	
Hand Impact lag(ms)			67	
Backswing Time (ms)			850	
Downswing Time (ms)			283	
Total Swing Time (ms)			1,133	
Hip posn(Downswing hip rot=0) (Sway,Thrust,Lift)		-6.00	2.00	-1.00
Max hip sway on downswing (cm)			-12.5	

A lot of the information in this table is available earlier in the GBD 3D Report; here it is all in one place. This table is generally included for our reference and that of the instructor.

This measure is used to determine if the hips are "thrusting forward" called 'early extension' in TPI language. The ideal value here is zero.