Face Plane Tilt and Loft & Lie

Introduction

You should understand need to have correct loft and lies and the importance of them matching right the way through the set of clubs. On completion of this section you will fully understand the reasons why a player should have the correct loft and lies and the implications of them being incorrect.

The Effects of an Incorrect Lie Angle

An incorrect lie angle may mean the player has to make adjustments to compensate in his/her set-up or swing. The results in the shot itself can be pulls, pushes and generally an unsolid feel at impact. Of course, none of these are desirable.

An explanation of the effects of a poorly fitted lie angle can be seen in the accompanying pictures. It should be noted that although many of the cast clubs used today can be adjusted, it is not recommended that they are moved more than 2 degrees. If you are in any doubt consult the manufacturer.

If a club has an incorrect lie angle then the directional face plane will face either to the left or the right, depending on whether the lie is too flat or upright. This is caused by the position of the clubface at impact, combined with the tilting of the face plane, creating a compound angle.

The angle is made up of 2 parts, the amount of face plane tilt and the loft of the club, basically the more of each, the more off-line the shot will be. Perhaps explaining why a short wedge shot can go so far off target.

The thing to understand is that the leading edge remains square and because the club has loft, when the club is tilted either up or down the compound angle changes, so the anticipated flight of the ball changes.

This means that it is not the clubface that turns as it strikes the ground causing the ball to go off line, but the combination of the tilt and the loft – meaning you could have the same effect with a shot played from a tee peg. See the following pictures below to help understand the directional changes that can occur.

Correct Lie Angle

In Figure 1 the lie angle is correct at the impact position, the leading edge is square to the target and so the anticipated direction is to the target.

Figure 1: Correct lie angle

A Lie Angle that is too upright

Figure 2 shows a lie angle which is too upright at impact; the leading edge is still square to the target. However, because the club has loft, the combination of the tilt and the loft has caused the anticipated flight to be left of the target.

Figure 2: Too upright

A Lie Angle that is too flat

Figure 3 shows a lie angle which is too flat at impact; the leading edge is still square to the target. However, because the club has loft, the combination of the tilt and the loft has caused the anticipated flight to be right of the target.

Figure 3: Too flat

It is essential that as you start to make decisions for your customers on which clubs and which specifications are required you understand the importance of obtaining the correct lie angle for the player. Spend some time to get this clear in your head. The player should also have an appreciation of the importance of the lie angle of their clubs and understand that you may have to make adjustments to them.

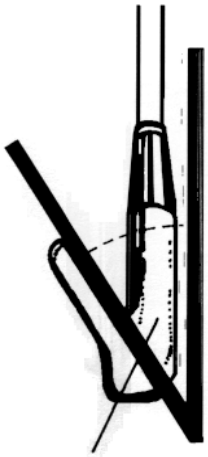
Irons – Lofts and Lies

Regardless of the irons being used, the loft and lie of the club will affect its “playability”. You will look at some of the key concepts and how to work with them.

The illustrations below serve as reminder to you.

Loft

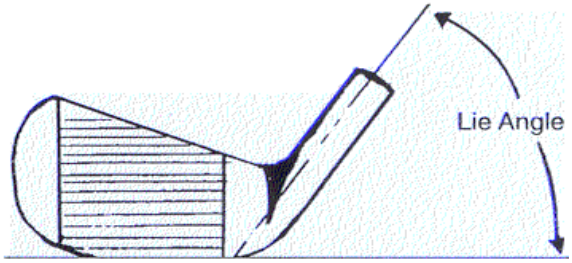
The angle the club face makes with the vertical when the club is grounded in its normal address position. If the face is curved – as with a driver – the loft is measured at the centre of the face.



Angle of loft

Lie

The angle the shaft makes with the horizontal (the ground) when the club is grounded in its normal address position. Lie angles vary depending on the length of the shaft – drivers being around 55°and wedges around 64°.



No.	Length	Lie	Loft
2	39.5	58	18
3	39	59	21
4	38.5	60	24
5	38	61	27
6	37.5	62	31
7	37	63	35
8	36.5	64	39
9	36	65	43
P	35.5	65	47
W	35.5	65	52
SW	35.5	65	56

Lofts, lies and lengths shown on this chart represent an average of measurements used across the industry. These measurements will vary slightly from one manufacturer to another. Lofts will also vary according to the design of the club head.

N.B Some manufacturers also vary from the 1 degree difference between certain clubs. The difference will be ½ degree, because of shaft behavior at impact, usually in the short irons.

Important – Remember there is no standard in golf, always quote the actual measurements.

The Effects of Loft and Lie

Loft

Loft is the main cause of the ball becoming airborne and therefore has a direct effect on distance. Loft also contributes towards accuracy. The more loft a club has, the easier it is to hit straighter. This is because loft increases backspin and backspin counteracts destructive sidespin. It is also important to consider swing speed in relation to loft. Players with slow swing speeds may benefit from using more lofted clubs. These factors are important to bear in mind when custom fitting or customising clubs.

Manufacturer's tolerances should also be considered. Most work to within a tolerance of plus or minus 1 degree. The table below (Figure 4) demonstrates how a consistent loft gap (4 degrees) will produce a consistent yardage gap between each club.

Correct loft graduations

Iron Number	Actual Lofts	Yardage Gaps
5	**27**	
		---------- 12
6	**31**	
		---------- 12
7	**35**	
		---------- 12
8	**39**	

Fig 4: This highlights consistent loft variations which in turn produce consistent yardage gaps.

Compare these consistent yardage gaps to those shown below in Figure 5 which result from the manufacturer's acceptance of a 1 degree loft tolerance. Note the inconsistent yardage gaps.

Allowing +/- 1 Degree Loft Tolerance

Iron Number		Actual Lofts	Yardage Gaps
5	(27)	**26**	
			---------- 18
6	(31)	**32**	
			---------- 6
7	(35)	**34**	
			---------- 15
8	(39)	**39**	

Figure 5: Although the lofts are not consistent they could still within manufactures tolerances. The lofts shown in brackets are based on the actual lofts shown in Figure 4, notice the inconsistent yardages that could be produced.

Lie

Reference to the first part of this section should be made as the lie of the club plays a vital role in shot direction. It is also important to remember that there is no industry standard for lie angle; they will vary slightly from one manufacturer to another. Lie can be described as being standard, flat and upright. As an example, taking a 5 iron with a standard lie angle of 62 degrees, if the same model of club was described as being 2 degrees flat, the lie angle would measure 60 degrees and 2 degrees upright would measure 64 degrees.

It is vital that the actual measurements are quoted when referring to both loft and lie readings as there is no standard measurement within the industry.

Club length is an important factor to consider when discussing lie angle. Any alteration to the length of the club has an effect on lie angle. When a club is lengthened the effective lie angle becomes more upright and when a club is shortened the effective lie angle will be flatter. The formula to follow is 1 degree per ½ inch. It is for this reason, that when we custom fit, correct length should be established before we can start to establish correct lie. This is covered in more detail in the custom fitting module in the 3rd year when custom fitting.

Because there is no industry standard it is useful to collect either manufacturer or repair equipment supplier charts (from websites or written material) so you have records of manufactures different specifications.

Summary

Having completed this section you should understand that:

- Lie angle can influence a shots direction.
- This misdirection direction increases with loft.
- The actual loft and lie figures should be quoted as there is no “standard”
- Loft is the major influence on the distance and height a ball travels.
- Manufacturers accepted tolerances can effectively mean a player has small or large distance gaps between clubs.