THE BUSINESS JOURNAL OF GOLF

GOLFDOM

SEPTEMBER • 1956

A Specialist in Club Design Explains Difference Between

Balance Readings and Swinging Weights

By DON TAIT

THERE'S a great deal of misunderstanding among younger pros and even many of the older ones as to the relationship between balance readings and swinging weights.

This is partly due to the fact that many persons have the erroneous impression that information on manufacturers' shipping cartons and display boxes refers to balance and swinging weights as being one and the same thing. As you will see later there is a distinction between the two. They should not be construed as being interchangeable.

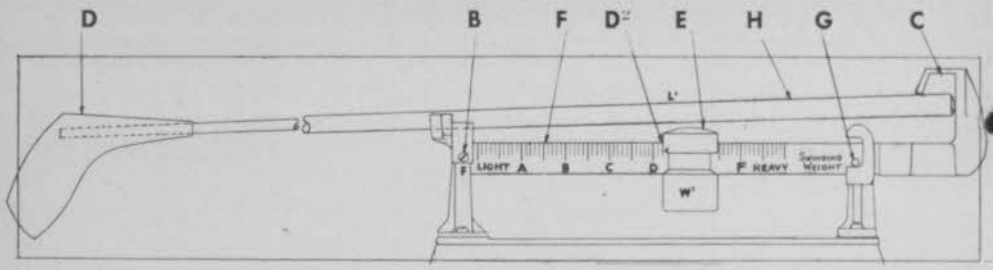
The grasping of this fundamental difference, in my estimation, is going to help the pro in his club fitting work. If he will keep in mind that it is possible to keep balance readings constant by either increasing grip weight or head weight or both (and thereby increase the gross weight of the club) he will have a good understanding of the distinction between the two.

When matching in sets was first introduced some 30 years ago, clubs were assembled with heads, shafts, and grips in relationship to each other. The results were then checked on a device that recorded all weight forward of the hands in what was truly termed swinging weight. The principle of matching still follows the same or more advanced formulas in some cases.

Although the term, "swinging weight," is here to stay, the recording of head feel on labels of display boxes and shipping cartons is actually a *balance reading* and nothing more. When we stick to standard type stock clubs, all is clear, but if we change the length, build up the grips, or disturb the gross weight in various ways, the readings we get on the balancing machine are apt to get a bit confusing.

Let's take a look at the Lorythmic or Adams scale (at the top of the next page), the device presently used to check results of matching for record purposes and manufacturers' information in general.

The balancing action is set up by the location of the fulcrum point B as against the club rest C and the head end D. For example, with the distance between B and C measuring 14-in., any increase in grip



Lorythmic Swinging Weight Scale
For best results clubs should match within four points.

weight will cause the balance reading to become lighter even though the gross weight increases. To operate this type scale, the machine must be placed on a level plane for accuracy. The club is then placed in position on the scale with the cap end tight against the club rest C. The sliding poise E must next be moved on the beam F until the balance rod G breaks free and hangs in suspension. Readings are always taken from front or left side of sliding poise as illustrated in the sketch.

Weight Compensation

In balancing standard stock woods in sets, the driver in an average D-2 unit will finish 43-in. in length, and gross weight will run pretty close to 13¼ ozs. The matching No. 2 wood is usually cut ½-in. shorter. With the shaft weight and the grip weight remaining the same, the head weight D must be stepped up about ⅛ oz. over the head weight on the driver to offset the decrease in length of the No. 2 as against the driver. Both clubs will then finish the same balance.

Following the same formula, the No. 3 is cut ½-in. shorter than the No. 2 Wood and made heavier in both head weight and gross weight, to keep the balance reading at D-2 on all three clubs. The No. 4 Wood is matched to the rest of the set in the same manner. Lighter woods, such as D-0 balance, will finish as light as 13 oz. starting with the Driver at standard length, and the heavier woods will go as high as D-4 to D-6 balance and from 13⅜ to 13⅝ ozs. gross in standard clubs.

Matching irons in sets involves the same increase in head weight between clubs to offset the decrease in length. No. 2 irons run between 38½ to 38¾-ins. in most stock sets. Using shafts and grips of predetermined weights, the No. 2 heads on D-2 sets will weigh close to 8⅝-ozs. On D-0 sets, the No. 2 heads normally start around 8½ ozs. and on the heavier D-4 to D-6 sets, the No. 2 heads may go as high as from 8¾ to 8⅞ ozs. This is because of the location of the fulcrum point B and its effect on the head weight D and the grip weight H at standard length. Actually, weight and length increments are a bit more exacting than shown here, but decimals are avoided for clearer understanding.

Same Procedure for Irons

Further, in matching woods, which are long, to irons, which are much shorter, the amount of increase in head weight between clubs on irons is sharply stepped up. Again, this is necessary because of the effect of the fulcrum point B on short length clubs as against those which are longer. To complete a D-2 set of irons as a matching unit, the No. 3 is cut ½-in. shorter than the No. 2 Iron. The head weight on the No. 3 is increased ¼ oz. over the No. 2 head. This in turn causes an increase in the gross weight while the balance remains at D-2.

Keeping the shaft and grip weights the same on all clubs, the head weights and gross weights are then increased in measured amounts from the No. 4 through the No. 9 Iron, to complete the set.

It is on special order type clubs that balance readings often cause confusion.

Following are a few examples of what happens when shaft lengths or grip weights fail to conform to standard stock specifications. Taking grips first, any noticeable increase in grip weight alone brought on either by the use of special all weather grips or a sharp increase in size on a regular leather grip, will cause heavier gross weights but lighter balance readings. The D-2 club with normal medium heavy head and standard length is changed to C-9 or D-0 balance, (though heavier in gross weight) with the application of special heavy type grips. Normal head weights

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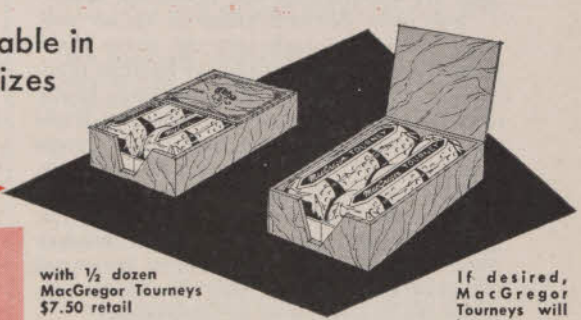

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and normal grips then mean standard balance readings on regular length clubs.

If heavy grips are applied on the same heads and shafts, the result will be lighter balance readings, but heavier gross weights. If both heavy heads and heavy grips are assembled on the same shafts, the results will be extra heavy gross weights but normal balance readings.

Center of Gravity Shifted

What really takes place when extra heavy grips are used without the head weights being increased, even on standard heavy weight clubs, is a shifting of the center of gravity towards the hands. This is referred to as high center of gravity and accounts for big name stars and others using light balance readings even though their clubs are noticeably heavier in gross weight than standard. Control is the important factor here which, of course, is another story.

Finally, we come to the effect of the fulcrum point B on special lengths. A 43-in. wood stepped up to 44-in. without changing either grip weight or gross weight, will cause the balance reading to change several points on the heavy side. This lowers the center of gravity and may result in head feel rather difficult to control. For that reason, the head weight is almost always reduced on extra long length clubs, while the grips are deliberately made heavier, with a view to producing playable clubs.

Making extra long length clubs with heavy balance readings is not difficult. Making the same clubs in the standard balance range poses no problem, but combining extra long lengths and smaller and lighter than regular grips is a different story, especially when light balance readings are specified on the Lorythmic scale.

The most difficult clubs of all to produce using this scale are the extra short length Irons with extra heavy balance readings in combination with extra large, heavy type grips. The No. 2 heads on D-6 Irons at standard length and with regular grips should weigh around 8⅞ oz., which is on the heavy side. When the length is altered 1-in. on the short side of standard and the grips specified are the heavier all weather type, the head weights must be increased to between 9¼ and 9½ ounces, if the same D-6 balance is to be maintained.

All this and more must be considered in talking head feel, center of gravity, balance point, swinging weight or any combination of these features.

Humor in Milwaukee

Humor was injected into the badges worn by contestants, officials and others at the recent Miller Open in Milwaukee with all the real and legendary activities of persons who help put over a big pro tournament worked in by Frank Marasco, Milwaukee Sentinel sports cartoonist, who conceived this unique treatment.

USGA Sets Tournament Dates for 1957

Joseph C. Dey, Jr., executive director, recently released the following schedule of USGA competitions for 1957:

International

Aug. 30-31 — Walker Cup, Minikahda Club, Minneapolis, Minn.

Championships

June 13-15 — Men's Open, Inverness, Toledo, O.

June 27-29 — Women's Open, Winged Foot GC, Mamaroneck, N. Y.

July 17-20 — Junior Amateur, Manor CC, Norbeck, Md.

July 29-Aug. 3 — Amateur Public Links, Hershey Park GC, Hershey, Pa.

Aug. 12-16 — Girls' Junior, Lakewood CC, Denver, Colo.

Aug. 19-24 — Women's Amateur, Del Paso CC, Sacramento, Calif.

Sept. 9-14 — Men's Amateur, Country Club, Brookline, Mass.

Sept. 30-Oct. 5 — Senior Amateur, Ridgewood (N. J.) C. C.

Green Construction

If You're Planning to Build New Greens or Alter Old Ones This Report From A Recent Oklahoma Turf Meet Is Must Reading

THE architect on occasions is able to pick natural sites for greens that cut down greatly on the amount of soil necessary for green construction. At times sites can be chosen that are so natural that it would be difficult to improve upon them other than perhaps furnishing surface drainage.

There are architects who, after studying terrain of the proposed course, pick natural sites for greens and other features which they believe will lend to the playability, utility and basis principles of course construction and harmonize with natural terrain. They then try to plan the layout so the best features of the terrain may be utilized.

However, with modern soil moving equipment the architect is now able to modify areas of little character into molds of architectural achievement that blend into surrounding terrain. Strategic design must be given consideration and alternate ways must be furnished golfers .

This, however, is a panel on green construction, and it is not meant to discuss architectural features of course construction.

Base of the Green

The base of the green may be constructed of any soil at hand unless it contains material that would cause excessive subsequent shrinkage or would be deleterious to plant growth. It should be compacted and watered to prevent shrinkage.

Percentage of Slope for Putting Surface

There should be a minimum of grade of not less than 6 in. in 50 ft. and in most cases the maximum slope shall not be over 3 percent unless designed for a particular purpose. In almost every instance the slope should not be so severe that the ball will gain momentum after being stroked. A high percent of the putting surface should be suitable for cup cutting areas.

Where sudden rises or undulations are thought to be necessary in the putting surface the limit of slope, in most cases, should not be in excess of where the base is 10 times that of the altitude.

Multiple Distinct Cup Setting Areas

Several distinct cup setting areas in each putting surface are recommended. These shall be divided by gentle sloping undulations or long sweeping rolls or mounds and folds that, in most cases, can accommodate a cup cutting area themselves without undue penalty to the player.

Different pin positions may demand that a shot be played from entirely different angles from the fairway from day to day. This will require large greens.

The modern trend is that pin positions be targets for the low handicap player and the whole green may be used for the average player.

Pin positions themselves are relatively level, discontinuing the past practice of the whole green or parts of the green with large areas of continuous slope. In this regard pin areas have no general pattern but drain to the nearest outlet on all sides.

Division of Drainage Areas

Mounds may be used to divide drainage areas for surface runoff, orientation and character and to lend to and blend into surrounding terrain. Mounds are constructed so they do not gather water that is carried on to the putting surface. This requires long experience in construction and moulding.

Grading Shoulders and Aprons

All areas surrounding the green, including

SUCCESSFUL supts., architects, course builders, equipment and supply authorities and turf research scientists participated in a green construction discussion at a recent Oklahoma Turf Conference session.

The meeting had as its panel of experts Floyd Farley, John Darrah, Al Houchin, Charles Wilson, Wm. Daniel, Marvin Ferguson, Leslie Snyder, Lester Hare and Bob Dunning. Models of green construction and demonstrations of soil performances added to the value of the session which supts. and other golf turf authorities declared was the top practical feature of conference programs for the year.

Supts. and chairmen having new green or alteration jobs to be considered will find the accompanying digest of the discussion of considerable dollar-and-cents value.

The transcript has been made available by Bob Dunning of Bob Dunning-Jones Co., Tulsa, Okla.

shoulders and mounds, should be graded to be conducive to maintenance with gang type mowers or multiple reel power mowers. There should be room for this type of machinery to operate between traps or bunkers and the putting surface proper.

The maximum percent of grade on shoulders or areas surrounding the greens should be no more than 30 per cent.

Finished Surface Related to Base

From the standpoint of establishment of future turf all undulations and mounds and divisions between cup cutting areas that are to appear in the finished surface are part of the base of the green or the sub-grade and there should be no pockets where water can stand. A green should be constructed so that surface run off is in several directions, never **all off** the front of the green.

Rimming the Green

Immediately outside the putting surface there shall be provided an area 10 ft. wide that shall be hereafter known as the No. 1 buffer zone.

This zone should be covered to at least 12 to 18 in. with an approved top soil medium sandy loam in nature that doesn't contain material deleterious to plant growth to blend into and be a part of the surrounding area. This is rimming the green and is furnished as a means of blending into the surrounding terrain, for holding within its inside circumference prepared topsoil mixture of the putting green.

This rim shouldn't interfere with surface runoff. There should be soil in sufficient quantities on remaining shoulders so that the rim area shall blend into and be a part of the surrounding terrain without any sudden breaks.

Drainage Considerations

For the ultimate in green construction, drainage must be considered in five phases: (1) Surface; (2) Internal; (3) Lateral; (4) Air and (5) Drainage by diffusion.

For the very best in green construction there should be installed a herringbone system of 4 in. farm tile provided with proper protected inlets and outlets. Tile should be placed in the subgrade so that it will be at least 24 to 30 inches below the finished surface of the green on a carefully prepared grade of proper fall and bedded into 2 in. of crushed rock or approved gravel.

A space of from 1/16 to 1/8 in. should be left between tile joints to facilitate entrance of water. Joints should be protected with a small piece of tar or waterproof building paper to prevent materials from dropping into tile. Care should be exercised not to have these strips too long; otherwise they will cover the sides of the joints and prevent water from entering easily.

Trenches should be back-filled with approved crushed rock or gravel to the surface of the subgrade with laterals staggered and properly spaced. The base should then be covered with at least a 6 in. gravel blanket or crushed rock containing a minimum of fines, but there should be some fines.

There should be no pockets in the finished grade of the crushed rock or gravel blanket. Installation of tile affects drainage in three phases: internal, lateral and by diffusion, allowing interchange of atmospheric and soil gases, helping to prevent an over-abundance of carbon dioxide and preventing formation of carbonic and other organic acids toxic to vegetation. The latter is particularly true of the gravel blanket.

Demonstrations of water absorption and percolation show clearly that soils vary in absorption, percolation and drainage.

Fine Gravel — nearly all the water runs right through.

Medium Sand — about half the water runs through.

Fine Sand — water moves through it slowly.

Silt and Clay — water starts to go in, then stands on top.

Soil mixtures vary in moisture holding capacity in their relation between oxygen and water and this, in turn, is affected by:

Texture (size of particles)

Structure (arrangement of particles) and Physical condition affects root growth, moisture, heat, air and anchorage.

Used in the demonstration were glass containers with drainage outlets containing the same quantity of soil of different characteristics and beakers with equal quantities of colored water. Quantities of water that different soils retained were checked on return of water to beaker by drainage and the rapidity of drainage also was checked.

Choice of Basic Soils for Topsoil of Greens, Silt and Clay Content

Basic soils chosen for topsoil of greens before addition of sand and peat may entail a wide discusson of soil tpyes.

However, in Oklahoma, there can usually be found a clayey sand containing from 10 to 25 per cent clay with a minimum of silt from 0 to 3 or 4 per cent. Even these soils will vary widely as to size of sand particles.

It is realized that in many parts of the country that these types of soils are not readily available and consequently the choice of basic soils will necessarily come from other types such as loams, clay loams, sandy loams, etc. When possible, choice of soils should come from those containing near medium size sand particles and minimum of silt.

For Oklahoma, our choice of soil should come from medium sandy clays or clayey sands containing approximately 20 per cent clay and the minimum of silt from 0 to 3 or 4 per cent. If the sand part of this soil is of medium size then we have an ideal situation. A most important phase is to be able to choose and distinguish this type of soil. For complete accuracy mechanical analysis is necessary.

Soil Mixture — Sand and Organic Matter

To this material there is added a graded sand such as Muskogee No. 820 and 15 percent peat by volume. If we were to start out

with our choice of basic soil with a clayey sand with a clay content of about 22 per cent, then we'd want to bring the mixture, with the addition of peat and sand, to within 5 to 8 percent clay content. Well graded sand must be used.

That part of the sandy soil that is not clay is sand. Therefore our final mixture is:

4 parts sand, 2 parts soil, 1 part peat, which is 79.42% sand, 6.29% clay, 14.28% peat.

Mixture by Volume

The proportion of exchange capacity comes through addition of peat and its intermixture with the clay fraction. This collodial material gives adequate nutrient and water-holding capacity, plus well aerated soil and adds to its friability and structure.

Material for the topsoil of the greens should be stockpiled to conform with the mixture by volume as follows:

4 parts No. 820 Muskogee sand
2 parts Selected Soil
1 part Eli Colby Brown Hypnum Peat

Or approximately 57 per sent sand, 28 per cent soil and 15 per cent peat.

Final mixture will be determined by clay content of the local basic soil.

These materials should be worked so that they become thoroughly mixed and incorporated into each other in a uniform mixture of the above percentages of even consistency throughout, and there should be no clods or lumps.

Mixing should be done with grinding and screening machinery or so that the surface underneath will not be undercut. This material should then be placed on greens to a uniform depth of 12 ins., or as desired, covering the entire putting green surface inside the rim. Allowance should be made for shrinkage. There should be no pockets where water could stand.

Materials for Topsoil & Drainage of Greens Based on 1000 sq. ft. of Surface.

For shrinkage and the drifting of topsoil material into the drainage blanket an arbitrary figure of 44 cu. yds. of material is set to cover 1,000 sq. ft. to a 12 in. depth. This will allow approximately 15 per cent for shrinkage. Note: This is especially true where crushed rock or washed gravel is used for the drainage blanket.

Percentages of Sand, Soil and Peat:

Sand	Soil	Peat
44	44	44
.57	.28	.15
25.08 cu. yds	12.32 cu. yds	6.60 cu. yds.

Muskogee No. 820 sand 25.08 cu. yds. per 1000 sq. ft .

Selected soil 12.32 cu. yds. per 1000 sq. ft.

Eli Colby Brown Hypnum Peat 6.60 cu. yds. per 1000 sq. ft.

Crushed rock, ¼ x 1½ ins., required to a 6 in. depth and for back filling tile trenches approximately 22 cu. yds, per 1000 sq. ft.

Tile—150 ft. per 1,000 sq. ft.

"Y" joints between 3 and 4 joints per 1,000 sq. ft.

Fertilizing New Greens

The putting green proper and the No. 1 buffer zone shall be fertilized as follows:

Per 1,000 sq. ft. 60 lbs. Milorganite, 30 lbs. Superphosphate 20% grade, 10 lbs. Muriate of Potash 60% grade, 4½ lbs. Nu-Green or 6 lbs. Ammonium Nitrate.

Also to be incorporated per 1,000 sq. ft.: 50 lbs. dolomite if required, 10 lbs. arsenate of lead.

Any changes in these recommendations will be in accordance with the analytical results of soil samples tested and any future analytical results of approved materials.

Three-fourths of these materials shall be mixed with prepared topsoil at time of its thorough mixing and before placing .One-fourth of the material shall be used as a top-dressing and lightly raked into the surface with a Del Monte rake or other approved tool.

Arsenate of lead an dolomite shall be incorporated throughout the topsoil at time of mixing and before placing. Arsenate of lead will prevent earthworms and grubs for a 7 to 10 year period.

After the putting surface is returned to a fine grade it shall be compacted to produce a firm seed bed, not tight or loose.

Grass Selection

The best seeded grass for Okla. greens that is readily available is agreed to be Seaside Bent. It is thought that Polycross Bent should be given a thorough trial. Of the bent grasses planted vegetatively, C-7 Cohansey, C-1 Arlington and C-19 Congressional are the most widely discussed as to desirability.

Establishment of Turf

a. Stolonizing:

Stolons: Require minimum of 5 bu. to 1000 sq. ft. Use 10 bu. for rapid coverage. Long field-pulled stolons preferred. Pull apart by hand or shred with Verti-cut.

Scatter stolons evenly ahead of rolled steel door mat, unrolling mat as grass is spread. When mat is fully unrolled, scatter top dressing of the same consistency of topsoil of the greens over mat lightly to cover about half of the grass. This will require about ½ to ¾ cu. yd. to 1000 sq. ft. Roll mat and move to next location.

Roll topdressed grass with full loaded water-ballast roller.

In regard to spreading topdressing over stolons, there are spreaders on the market that will spread topdressing evenly and adequately.

Proper Care

Water: Start watering at once, gently, with hose nozzle, not to flood. Water lightly and frequently so that grass stays moist. No drying out can be tolerated. On dry days sprinkling may be necessary every hour or two.

b. Seeding: It is generally agreed that the same method of fertilizing, as covered above, should be used in both seeded and stolonized greens. A firm seed bed is desirable. All agree that seeding should be done in two or more di-

(Continued on page 45)

Bill Markham's Saginaw (Mich.) CC pro shop is an excellent example of good layout. Altho the shop is small, there is little congestion even when a typical weekend crowd of golfers converge on it. This is because merchandise is shown in racks and counters located adjacent to the walls with exception of a single island display. Large open area in center is key to quick, efficient, front to back service Markham is able to give shopping golfers.

Saginaw Solves Space, Display Problems

Congestion has been eliminated at this pro shop where fixtures have been moved back against the walls and interchangeable counters make it easy to shift merchandise displays . . .

THE pro shop space problem, something of a universal headache at both large and small clubs, has been solved for Bill Markham of the Saginaw (Mich.), CC through the simple expedient of moving racks and counters back against the four walls and leaving the center of the shop open except for a single counter display.

In the words of Markham, who had the advice and assistance of the Saginaw Industries Co. in completely rearranging the layout of his shop, "we have done away with all the obstacle-course drawbacks of the old shop and come up with a new arrangement that makes it much easier for golfers to shop and for our staff to wait on them."

One of the remarkable things about the Saginaw CC pro shop is the quick and painless way in which merchandise display setups can be rearranged. In many shops when the pro decides that he wants to relocate equipment and apparel in order to give his merchandise what will be revived sales appeal, it first calls for a great deal of measuring and probably an

Here is closeup of island display, the top of which Markham uses for showing easy-to-reach, quick moving items. Counter at left side of room is open. Stock is displayed at staggered levels, a method recommended by top merchandisers.

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