Soil Compaction

by Gary Shampeny
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In the bentgrass/bluegrass/ryegrass regions of the country, soil compaction on fairways is an increasing concern for many golf course superintendents. To minimize soil compaction, the superintendent has turned to smaller, lighter-weight types of mowing equipment that minimize ground pressure. The types of mowers that are most often selected by the superintendent for this purpose have been the triplex greens-mower, triplex trim mower or the fiveplex fairway mower.

Techniques and types of mowers that will accomplish a reduction in soil compaction are not readily answered, and there is a general lack of agreement. For example, if you were to poll 12 superintendents to determine which of the three mowers previously mentioned is the best for minimizing soil compaction, you would get three different answers with 12 different reasons. This is to be expected, as each superintendent has established a management program for his particular course which is based on the many differing variables that exist for his soil, turfgrass, and own unique style of management and maintenance. What is really lightweight as it pertains to the triplex greenmower, triplex trim-mower and the fiveplex fairway mower?

Let us first examine some of the factors which affect the amount of pressure a mower exerts on the soil:

- The weight of the machine including operator and fluids
- Distribution of the weight (fore, aft, lateral)
- The amount of tire surface contacting the soil, which is determined by the tire design and tire pressure.

The mowers we are discussing will have a range of 8.5 to 18.8 lbs. pressure per square inch (PSI). The reference chart shows the published or (as tested by Toro) PSI exerted by several types of mowers.

The second issue to be discussed is: How much soil is being compacted by the mower as it makes its pass down the fairway? To determine the percent of width of cut compacted, all one has to do is to take the sum of the tire widths and divide it by the width of cut (WOC). For example, the GM300 has a WOC of 59 inches and a total tire width of 28.5 inches. (28.5/59=0.48 (48%). Thus, 48% of the WOC is subjected to compaction.

After looking at the reference chart, you will notice that the difference between 8.5 PSI versus 18.8 PSI and 17% versus 48% WOC is quite significant. However, 9.8 PSI and 17% versus 48% WOC is also quite significant. 9.8 PSI and 48% WOC compacted by the GM300 must be compared against the 11.4 PSI and 18% WOC compacted by the RM450-D. Which is better and why?

When PSI and percent WOC compacted are combined the trade-offs will have to be balanced. Note that the RM450-D is better than the GM300 when it comes to minimizing soil compaction. Why? Because the 450-D PSI is only 16% greater than that of the GM300, but the percent WOC compacted by the GM300 is 182% greater than that of the RM450-D.

When discussing lightweight fairway mowing, there is a need to understand PSI and how each mower related to soil compaction. This will enable you to make the best choice of equipment for your particular operation.

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(Soil Compaction cont'd.)

REFERENCE CHART

Product	Width of Cut	Total Tire Width	Ground PSI	% of WOC Compact
GM300	59"	28.5"	9.8	48%
GK IV	62"	28.5"	8.5	46%
Turf Pro 84	84"	25.0"	9.7	30%
Motor 213	84"	23.5"	14.0	28%
RM 216	74"	23.5"	---	32%
Motor 180	71"	21.5"	15.0	30%
RM 350-D	138"	34.0"	13.5	25%
RM 450-D	138"	25.0"	11.4	18%
HF-5	133"	34.0"	10.7-13.0	26%
Motor 350	138"	24.0"	18.8	17%

Golf Professional/Golf Course Superintendent Relationship

On October 26, 1987, Al Fierst, Oak Park C.C., Roger Stewart, Riverside G.C., and Bruce Williams, Bob O'Link G.C. were speakers at a seminar on the relationship between the Golf Pro and the G.C. Supt. The seminar was part of a day long education seminar sponsored by the Illinois Section of the P.G.A. These three G.C. Superintendents presented a talk on ways of improving this relationship and presented the Superintendent side of many issues. Some of the topics covered included improving communication and cooperation, gaining mutual respect for both positions, golf car management, range management, scheduling events and outings, as well as several other issues which require these two department heads to work together. These Superintendents were extended this invitation by the Illinois PGA as a way of starting a dialogue between our two professions to improve our ability to work together and provide the best results for the people who play our courses. All three Superintendents agreed that continuing this dialogue at a monthly meeting with some Golf Professionals presenting some issues may be a worthwhile endeavor. We all can agree a better relationship makes everyone's job easier and more interesting.

Roger A. Stewart, Jr., CGCS
Riverside Golf Club

'When tillage begins, other arts follow. The farmers, therefore, are the founders of human civilization'

—WEBSTER