greatly to the increased cost of golf course maintenance. There is perhaps no other problem which requires more study and more understanding.

Work Planning

One of the golf course superintendent's most important tasks is the thorough planning of his work, insuring the most efficient use of his crew. It is believed that more golf course superintendents are preparing their own budgets at the present time than in the past. This appears to be a good thing for the golf course superintendent because the very necessity for thinking through his year's program helps him in laying plans for efficient use of his labor.

Needs

The changes in practices discussed have contributed to excellent turf. They have contributed to efficient maintenance. In many cases these changes have resulted in the cheaper performance of some operation. However, turf maintenance is not becoming cheaper. One of the disturbing factors about golf course maintenance is its ever rising cost.

There is only one way to provide good maintenance at a reasonable cost. That way is through greater efficiency. We need improved methods, improved machinery, better and more precise herbicides and fungicides, and more capable men. Education and research provide the key. It is estimated that industry spent for research in 1955 (4 billion dollars) a sum equalling 1% of the national economy for 1955 (400 billion dollars). Golf courses spent for research, an amount equalling approximately 3/100 of 1% of the estimated cost of golf course maintenance for the year 1955. A thirty-fold increase in our research efforts would go a long way toward increasing the efficiency of golf course operation to a point comparable to the efficiency of American industry. If every golf club in this country were to set aside 1% of its annual maintenance budget for research, there can be little doubt that increased maintenance efficiency would repay this cost many times over.

MAINTENANCE MANUALS ARE MEANT TO BE READ

By CECIL PUTTY

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Maintenance and parts manuals are provided with every major piece of equipment that is purchased by a golf course superintendent. Have you ever read one of them? Experience indicates that most people neglect to read thm and quite often neglect to file them. The maintenance manual should be read thoroughly before the equipment is ever put into operation. It shows how to operate the piece of machinery, the adjustments that need to be made, the points which need to be lubricated, the frequency with which they need to be lubricated, and it usually contains a catalog of spare parts.

Equipment manufacturers go to considerable lengths to determine the best method of operation for their machine, its lubrication needs, and the proper adjustments for most efficient operation. Most pieces of equipment are thoroughly engineered to do a specific job. However, proper adjustment and operation in accordance with the design and capabilities of the machine are necessary if it is to be effective and efficient. Failure on the operator's part to read the maintenance and operation manual is very likely to result in a reduction in the efficiency of the machinery, simply because recommended procedures have not been followed. By all means, read the manual that comes with your equipment and then file it so that it may be used as a ready reference in case repair or replacement parts are needed.

From a talk presented at the Central Texas Regional Meeting of the Texas Turfgrass Association.

Manufacturer Knows Machine

Manufacturers do not build a machine in a "hit or miss" fashion. Much painstaking engineering and testing goes into the development of a piece of equipment to be used for any specific purpose. When machinery reaches the market, you may be sure that it has undergone a great deal of study and testing and you may be sure that the manufacturer is thoroughly familiar with the capability and capacities of each machine. For this reason, he indicates in the manual the capabilities of each machine, and he allows a reasonable margin of safety. If you want to do more work than the capacity of a machine provides, then you should buy a larger piece of equipment. Machinery operated within its limits of capacity will last longer and operate better.

Daily Maintenance

Perhaps putting green mowers are one of the most specialized pieces of equipment used on a golf course and in most cases they are used daily. They provide an excellent example for daily maintenance because they must be adjusted precisely, they must be kept sharp, and they must be maintained properly, if they are to do a satisfactory job of mowing. The rules for daily maintenance of any piece of equipment are rather simple: After operating, let the machine cool; when it is cool, wash it thoroughly and allow it to dry; lubricate, adjust and inspect the machine; store it in a clean place ready for the next day's operation.

Storage

Storage in a clean, dry place is desirable in order that the efforts necessary for lubrication, washing and adjusting will not be nullified by dirt and grime. A storage area should have a concrete floor or other suitable surface that can be kept clean. Storage and maintenance areas should be equipped with a wash rack, a grease rack, and a large enough storage area that equipment does not have to be crowded.

Equipment maintenance, operation and storage is mostly a matter of good common sense. Good common sense dictates that one read the manufacturer's manual and that one practice cleanliness, thorough lubrication, and operation within the capacity of the particular machine.

QUESTIONS AND ANSWERS

QUESTION: What is the difference between Penncross and Pennlu?

ANSWER: Pennlu is an improved creeping bentgrass selection developed and released by the Pennsylvania Agricultural Experiment Station. It is a *vegetative* bentgrass; increase must be made through the planting of stolons, runners, or sods of the parent material. Pennlu is reported to have performed consistently better than other bentgrass selections at the Pennsylvania Station in density, disease tolerance, vigor, texture, and ability to withstand a wide temperature range.

Penncross is an improved creeping bentgrass selection that was developed by Prof. H. B. Musser of the Pennsylvania State University. Penncross turf is developed from *seed*. Penncross seed is grown by planting three separate select vegetative creeping bentgrass strains side by side and allowing them to go to seed. During this time cross-pollination takes place and the result is Penncross *seed*.

Penncross seed production is the job of qualified commercial seed producers who