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A Simple Device to Measure Sod Strength

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Summary. A simple, inexpensive device to measure the linear tear strength (tensile strength) of a strip of turfgrass sod was constructed for use in a research program. The device was fabricated from readily available components. A standard torque wrench served as the force-measuring device, providing torque readings that were converted readily to linear force measurements. The device worked very effectively.

In turfgrass research, there is occasionally a need to measure the linear tear strength (tensile strength) of a strip of turfgrass sod. There is no need for an expensive or complicated device to accomplish this. All that is needed is a frame, a stationary clamp to hold one end of the sod strip, a moving clamp for the other end, and a device to measure the force required to tear the sod strip.

Materials and methods

A steel framework was welded as shown in Fig. 1. An expanded metal (steel-mesh) top was welded to the frame. The expanded metal supported the sod strip during mounting, but the sod strip did not touch the expanded metal during the tensile test. A clamp unit at the rear of the device held one end of the sod strip stationary, while a moving clamp unit at the "front" allowed the strip to be stretched. Both clamp units consisted of a pair of wooden boards pressed together by common pipe clamps (available at hardware stores and home centers). The boards had 1.5-inch (38-mm) nails driven through for gripping teeth. The device was sized to accommodate standard 12-inch (305-mm) wide sod strips.

The heart of the device was the pivot mechanism for the moving clamp

unit. The moving clamp was mounted on two arms connected to a shaft that pivoted in bushings under the table. The head of a 0.5-inch (13-mm) bolt was welded to the end of the shaft so that a socket wrench could be used to rotate the shaft and, thus, the moving clamp unit. If the moving clamp unit was installed with the rotating arm about 10° behind center and the sod strip taut, the tensile test could be completed by rotating the front clamping unit through vertical to about 10° ahead of center. With a 6-inch (152-mm) arm, this 20° of rotation provided about 2.1 inches (53 mm) of horizontal displacement (sod stretch) with negligible vertical movement (0.37 inches or 9 mm). This horizontal displacement was adequate for stretching sod strips to tensile failure.

The force to rotate the shaft and moving clamping unit forward was provided by a common 0.5-inch-drive torque wrench, which was read by the operator. Since the rotating arm was 6 inches (152 mm) long, the sod tensile strength (in pounds) was obtained by multiplying the torque reading (in pound-feet) by two.

Results

An inexpensive and easy-to-use sod tensile strength test device was constructed. The basic test unit was

Fig. 1. Sod strength testing device showing torque wrench in place. Wrench is pulled clockwise to apply load to sod strip.

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fabricated from steel, wood, and common pipe clamps. The force-measuring device was a common torque wrench—no expensive force-measuring instrumentation was required. The device could be operated easily by one person, although two people made the operation somewhat more efficient. The tensile strength figure was obtained by multiplying the torque wrench reading by two—no complicated calculations were required.

The test device was used by Parish et al. (1991a, 1991 b) in a sod strength test and performed well.

Literature Cited

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