TECHNICAL NOTES

A Simple, Lightweight Point Frame

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Abstract

A simple, lightweight, yet rugged point frame is described. This frame can be easily constructed at a relatively low cost (1975 cost of materials=$6.00 per frame).

Heady and Rader (1958) described a four-legged steel point frame which they found well suited to sampling California annual rangelands. Since then, several modifications of this basic frame have been proposed. Smith (1959) described a three-legged frame constructed from angle aluminum. The modified design, using aluminum, was 8.5 kg lighter than the 19-kg steel frame and was equally sturdy. In addition, the hinged third leg allowed easy positioning of the frame at any desired pin angle regardless of slope. Rader and Ratliff (1962) replaced the holes previously used to guide sampling pins in the cross arms with notches. This eliminated much of the drudgery of repeatedly raising pins. It also reduced sampling time by allowing repeated use of a single pin rather than the ten pins previously required. An added advantage was that the pin could be easily removed for transit, thus reducing the chance of bending pins while moving from one sampling area to another. The purpose of this paper is to describe a further modification of the point frame which incorporates many of the best features of the above designs.

This frame (Fig. 1) is somewhat similar in appearance to one previously described by Neal et al. (1969) but differs significantly in materials and construction. It can be constructed with ordinary shop tools in about one man day. Material costs are realatively low. Cost per frame in 1975 was only $6.00.

Three legs, each 57 cm long, and two cross arms, each 30 cm long, are cut from 20 × 20 × 3 mm-angle aluminum. They are fastened in place with two small bolts per joint. The back leg is attached to the frame using a 5-cm piece of angle aluminum and a 2.5 × 2.5-cm hinge (Fig. 2). The hinged third leg gives the frame stability while allowing the operator to select a wide range of pin angles or to compensate for steep topography by simply positioning the leg closer to or farther from the main body of the frame. A small chain attaches between the leg and the main body of the frame to facilitate positioning of the pins at a preselected angle. A wide range of angles can be easily obtained by adjusting the length of the chain.

Ten 6 mm deep V-shaped notches are cut at 2.5-cm intervals into the cross arms with a triangular file. A longer distance between adjacent notches may be required where vegetation is very sparse or tends to be contagiously distributed (Crocker and Tiver 1948). However, the authors found the 2.5 cm spacing worked well for sampling blue grama (*Boutelous gracilis*) rangelands in New Mexico.

Fig. 1. *Point frame and piano wire pin used to sample New Mexico rangelands.*

During sampling, the single pin is held in position by ceramic magnets positioned directly behind each notch. In order for the magnets to hold the pins firmly, they must be placed as close as possible to the pins. This is accomplished by using a 2.8 × 28 × .3 cm thick wooden spacer strip to which the magnets are held flush with the vertexes of the notches by a small screw. The spacer strip is held in place by two bolts.

Ten points per frame are obtained by moving a single pin from notch to notch. This proves to be a very rapid procedure. When the tenth point has been recorded, the point is removed and the frame folds easily for transit to the next location.

The notches of the frame will accept a wide range of different types and sizes of pins. In contrast to previously used pins (Heady and Rader

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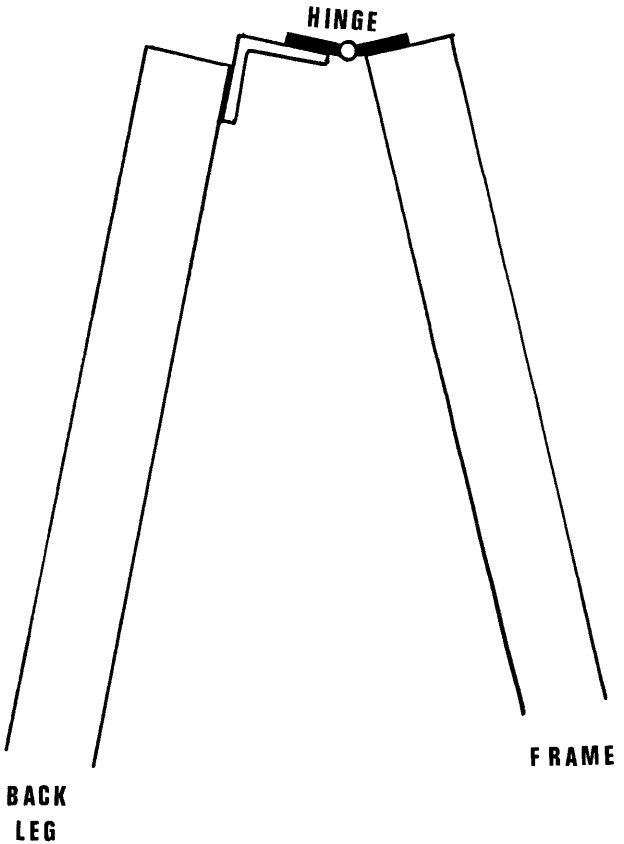

Fig. 2. *Diagram showing attachment of hinged third leg to the body of the point frame.*

1958; Smith 1959) made from welding rod, which tended to bend, the pins employed here are piano wire. Piano wire is quite resilient and not only resists warping but also tends to stay in the notches well by absorbing some of the torque exerted on the pins during sampling. Small diameter piano wires (<2 mm), however, tend to be too limber, while large wires (>6 mm) are too massive to be firmly held by the magnetic brakes. A 3-mm diameter pin works well.

In summary, the authors have found the frame described here to be well suited to sampling blue grama rangeland in New Mexico. It proved to be sturdy, lightweight (approximately 1.1 kg), and easy to use.

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