Department of Environment and Conservation

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Biodiversity

Standard Operating Procedure

Using An Optical Square

SOP No:4.2

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Significant Native Species and Ecological Communities – Resource Condition Monitoring Project

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1 Purpose

This protocol details the method for using an optical square with particular relevance to establishing an accurate survey area, which includes right angles. This protocol can be utilised when other methods for establishing a square or rectangular survey area, for example a vegetation quadrat (see SOP 6.1) may not be suitable, for example when establishing large quadrats.

The key purpose of this protocol is to provide detailed methods for using an optical square. The objective is to provide an easy to use method which can be utilised consistently by DEC staff or other groups as a standard operating procedure.

2 Scope

This standard operating procedure applies to anyone wishing to establish a survey or monitoring area which includes right angles. The SOP is applicable for use in any field survey situation where establishment of perpendicular lines are required.

3 Equipment and Materials Required

- Optical square (1)
- Measuring tapes (2)
- Flagging tape
- Mallet
- Quadrat marker pegs

4 Procedure

Pre-field Preparations

The following steps will need to be completed to become familiar with using an optical square:

- Remove optical square from case and rotate protective cover by holding optical square prism cover lightly, and rotating the handle clockwise to reveal the three prisms;

Figure 1 Optical Square

Figure 2 Optical Square showing three prisms

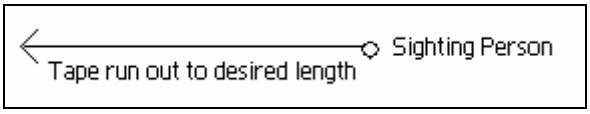
- Hold the optical square up to your eye and you will see that the middle yellow prism 'window' shows the view straight ahead;
- Now move the optical square slightly upwards in front of your eye to look through the bottom prism and you will see that it shows the view 90 degrees to your left; and then
- Move the optical square slightly downwards in front of your eye and you will see that the top prism shows the view 90 degrees to your right.

Field-based methods

One team member (the person 'sighting') will direct other team members when running out measuring tapes. This 'sighting' person should stand at the point designated as the first corner of the survey area (for the purposes of this document the area will be referred to as a quadrat) and again familiarise themselves with use of the optical square before providing directions for establishing the quadrat as per the instructions below.

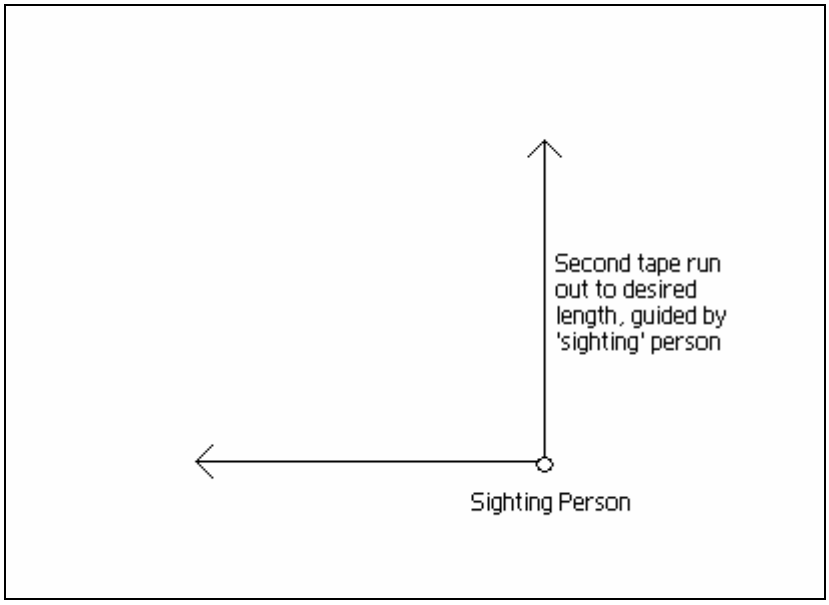
Step 1 A tape measure should be run out in a straight line from the sighting team member to the required length, to form one side of the quadrat (see Figure 1.1). The team member running the measuring tape out can improve their visibility for the sighting team member by holding flagging tape while running the tape out, for example in tall grassland.

Figure 1.1: Step 1 for using an optical square



Step 2 Another team member should then run a second measuring tape out from the sighting team member. When starting to run the second tape out, the sighting team member should ensure that they can see the second person's tape through the yellow window, and that this tape aligns exactly with the tape viewed through either the bottom or top prism window (depending on which angle the first tape was run out) so that it appears that the two tapes form two halves of a single straight line. The tape should be run out to the desired length (see Figure 1.2), with the sighting team member ensuring that this tape is consistently aligned with the first tape through the optical square.

Figure 1.2: Step 2 for using an optical square



Step 3 The sighting team member should then move to one of the other corners and repeat the process to complete each side of the quadrat (see figures 1.3 and 1.4).

Figure 1.3: Step 3 for using an optical square

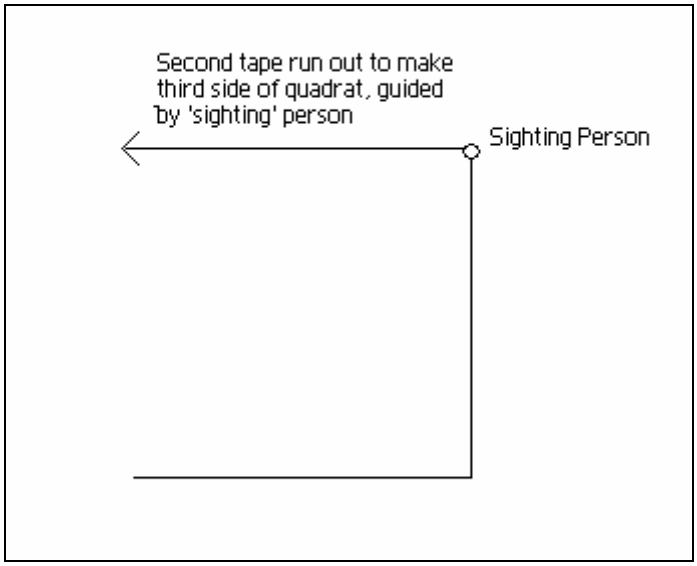
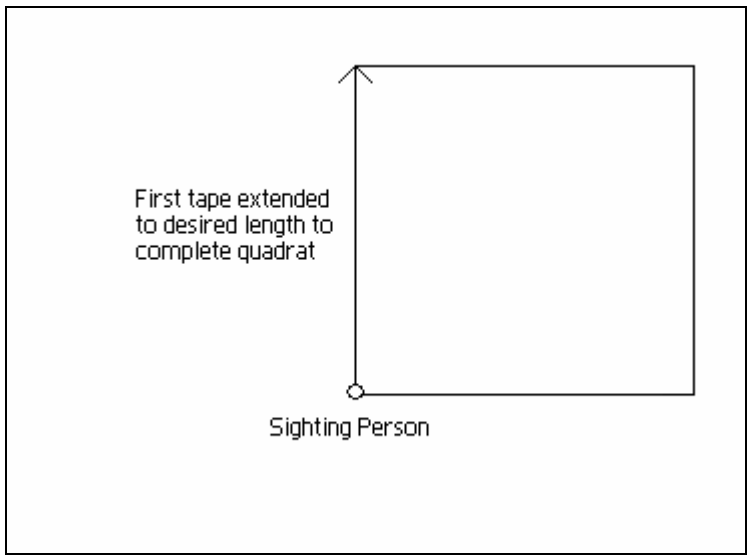


Figure 1.4: Step 3 for using an optical square



Alternative methods for establishing a square or rectangular survey area using an optical square are shown in Crossin (1960).

5 Safety Considerations

Normal field work safety considerations should be reviewed prior to undertaking any field work. Preparation of a job safety analysis may be required prior to field work.

6 Further Reading

The following SOPs have been mentioned in the advice regarding using an optical square. It is recommended that the following SOPs are also consulted when proposing to establish a quadrat using an optical square:

SOP 6.1 Establishing Vegetation Quadrats

7 References

Crossin, E.C. *The Use of the Optical Square for Sample Plot Layout*. Ecology, Vol. 41, No. 4 (October 1960) pp. 809-810.