

Reconnaissance

This is one of the most important parts of any control survey and must *always* be done before any angles or distances are measured. The main aim of the reconnaissance is to locate suitable positions for the traverse stations and it cannot be over-emphasised that a poorly executed reconnaissance can result in difficulties at later stages on site, leading to wasted time and increased costs. To carry out a thorough reconnaissance, the following should be considered.

To start a reconnaissance, *information* relevant to *the survey area* should be gathered, especially that relating to any previous surveys. Such information may include existing paper or digital maps, aerial or orthographic photographs and any site surveys already prepared for the project. Using this, *a diagram is drawn* showing the proposed locations of the traverse stations.

Following this, it is *essential that the site is visited*, at which time the final positions for the stations are chosen. For small sites and where no previous information is available, the site visit becomes the reconnaissance.

When locating stations, an attempt should be made to keep *the number of traverse stations to a minimum* and short traverse lines should be avoided to minimise the effect of any centring errors. *If the traverse is to be used for mapping* and measurements are to be taken with a total station, a polygon traverse is usually positioned around the area at points of maximum visibility. It should be possible to observe cross checks or lines across the area to assist in the location of any angular errors.

On a construction site, *traverse stations are put in place* for the best accuracy and ease of setting out, but the effect of the construction must be taken into account as this may block lines of sight as work proceeds. Traverses for roads, railways and pipelines generally require a link traverse, since these sites tend to be long and narrow. In this case, the shape of the road or pipeline dictates the shape of the traverse.

Although these would normally be measured with a total station, if *distance measurements* are to be *carried out using tapes*, the ground conditions between stations should be suitable for this purpose. Steep slopes or badly broken ground along the traverse lines should be avoided and it is better if there are as few changes of slope as possible. Roads and paths that have been surfaced are usually good for ground measurements.

*Stations should be located such that they are clearly intervisible, preferably at ground level, so that it is possible to see the ground marks at adjacent stations and as many others as possible - this makes it easier to measure the angles and enhances their accuracy. However, owing to the effects of lateral refraction and shimmer, traverse lines of sight should be well above ground level (greater than 1 m) for most of their length to avoid any possible angular errors due to observations passing close to ground level (*grazing rays*) – these effects are serious in hot weather.*

*Stations should be placed in firm, level ground so that the total station and tripod are supported adequately when observing at the stations. Very often, stations are used for a site survey and at a later stage for setting out. Since some time may elapse between the site survey and the start of the construction, the choice of firm ground in order to prevent the stations moving in any way becomes even more important. It **is** sometimes necessary to install semi-permanent stations.*

*When the positions of stations have been chosen, a *sketch of the traverse should be prepared*, approximately to scale, to help in the planning and checking of fieldwork. On this, the stations are given reference letters or numbers.*

Based on the specification for the traverse, the final part of the planning for the traverse is to choose the instrument to be used for the survey.