

Trigonometric Beacons – erosion of a valuable asset

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To many surveyors in KwaZulu Natal as well as around the country trig beacons form the core of our survey work and are the starting point of a new survey project. Surveyors continue to use both trig beacons and Town Survey Marks for establishing control and reference marks for their surveys. Over the last decade trig beacons have begun disappearing from our landscape and are being systematically destroyed, either by vandalism and lack of maintenance. Town Survey Marks suffer a similar fate which needs equal attention and will be discussed in another article in the future. Government being the custodians of the trig beacons can use this as a means of employment by creating more trig beacon maintenance teams who were at one time busy travelling the country, painting and repairing/replacing these vanes as they were erected at some cost, surely it is important that every effort be made to preserve them.

The thought often still crosses my mind whilst setting up or even driving and noticing a trig beacon perched on a mountain top as to the effort and time it took for whoever to hike up to the top and build this “monument”. As a surveyor there is a sense of satisfaction when you realise that the number of trig beacons in the area you are working is adequate and will result in a successful survey. There is also a sense of relief when the trig beacon you planned to use is still there, is accessible and will be the starting point of your calculations.

In the world of fast technology that we live in today, many surveyors would ask, “Why don’t you just use GPS”. A valid comment, however there are still surveyors out there that still use conventional ways of fixing their position and what if your GPS is not working at the time of your survey. Besides one would still need a trig beacon or valid reference point to check your GPS onto. What if some time in the future or even tomorrow the use of satellites will no longer be an absolute given? What if for some reason the flow of information from satellites is altered due to unexplained phenomena? At this point in time trig beacons could suddenly become critical and will depend if our existing network of trig beacons being reliable and accurate.

There are approximately 29 000 trig beacons countrywide, many of these are destroyed, and many more require urgent maintenance in order to be used accurately. The men and women who were involved in the location, construction and final calculation of the values of our trig beacons, need to be remembered for their admirable work they carried out. I wonder if the thought ever crossed someone noticing or admiring these trig beacons the effort, time, manpower and resources it took to erect these bold columns on the peaks of our mountains and hills. These beacons are mentioned in logged field books that are kept in safety in the archives of the Surveyor Generals Office around the country.



This trig beacon is in dire need of maintenance. The pillar requires some concrete and a new coat of paint. The rusty vane needs to be replaced and repainted as well



A trig beacon that is painted and maintained. The way a trig beacon should look

Although there is a maintenance team (far less than before) one feels more should be done in terms of increasing the teams in order to re-establish the entire network. The information about the trig beacons is kept by National Geo-spatial Information (NGI) a branch of the Department of Rural Development and Land Reform, based in Mowbray – Western Cape. It is this department that is also responsible for the maintenance of trig beacons, but every one that uses the trig beacons has the responsibility for their wellbeing and also to report to the Chief directorate if there's a trig beacon that is damaged or destroyed.

The following directive was issued by the Director of Survey services for the Chief Director (dated 17 July 2006)

“The TrigNet GNSS base station network has, to some extents and purposes, replaced the passive trigonometrical network requiring that funding of the latter network be transferred to TrigNet. This has resulted in an enforced reduction in maintenance of the trigonometrical network.

A subset of 9836 trigonometrical beacons has been identified for retention within the beacon maintenance program. The criteria used in identifying these trigonometrical beacons are as follows:

- *Primary and secondary beacons requiring less than 2 hour's climb*
- *Block/Platform beacons in excess of 4 meters*
- *Beacons located on man-made structures*
- *Wind pump tower and pipe beacons*
- *Tertiary beacons supplementing the above to ensure adequate horizontal control coverage around built up/development areas*

The list of 9836 trigonometrical beacons, selected for maintenance, may be modified from time to time due to operational and user requirements."

In my opinion the government has already spent an enormous amount of money erecting our trig beacon network (29 000) across South Africa; surely some effort should be made to protect these valuable assets.