Surveying Profession in the New Millennium

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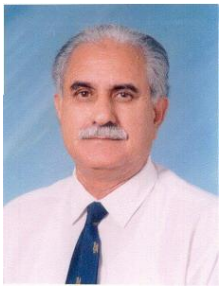

Surveying is one of the oldest professions in the history of mankind on the planet Earth. There was time when it was the only bit of engineering that was practiced. The surveyors have contributed and played a leading role in the development works carried out and monuments built in the early period of civilization in Egypt, Indus valley in Sindh, and Mayas in South America. The precision with which they laid out and positioned those structures could not have been done without the knowledge of setting out and measurements of works. We also see survey party at work carrying out measurement of land in one of the relief on Egyptian monuments. Measurement of land was carried out to assess the tax and to re-establish the boundaries and limits inundated because of the flooding of the Nile.

In more recent times we see that surveying profession has played an important and elementary part in every aspect of the development of this world as we see it today. This could be the building of the Suez Canal, Eiffel Tower in Paris or Underground Train / Subway network in London, the world's largest canal network and massive railway network in the sub-continent of India-Pakistan and Bangladesh. The mapping of the sub-continent was a great achievement and a marvel of surveying of its time. Who discovered the world's highest mountain, Mount Everest***, he was a surveyor***. Who charted the oceans for the convenience and ease of shipping, ***hydrographic surveyors***.

We can go on and on and the list is very long.

This profession has come a long way and has seen many changes and developments in its instrumentation and techniques. From knotted ropes used by the Egyptian surveyor to Gunter's chain for measurement used by the English surveyor. From the wooden quadrant of the early surveyor to the theodolite or transit, from water level tube to automatic leveling instruments and so on. But this profession went through some

major changes in the past nearly 50 years, with the advent of electronic distance measuring devices like the Tellurometer and Geodimeter replacing the indirect measurement of long lines; the self aligning levels or automatic levels, as they are more commonly known, replacing the dumpy and tilting levels. Today surveying and map-making are province of electronic instruments and satellite receivers, positioning or measurement to within a few millimeters in seconds.

Surveying needed teams of people carrying lights to high points, acting as bookers, carriers ahead of and attending upon, the Party Chief, the man who observed with the theodolite. And all this was just to gather the new data. Processing and map-making were separate crafts engaging literally hundreds of folk at the headquarter. The size of the survey party has shrunk over the past fifty years and it will further reduce to one-person crew except on some special and rare assignments when more than one individual will be needed. Back at the office a computer and a plotter, and a CADman or two are needed to handle the processing and plotting the field survey data in the form of a map.

With the miniaturization of the electronics we have seen the birth of electronic total station that does the distance and angle measurement, two basic functions of surveying. Of course the more recent ones do coordinate computations at the same time, thus providing x, y, and z coordinates instantaneously with facilities to store the field data electronically on board or on attached data recorders.

However, the biggest change has come with the arrival of **Global Positioning System (GPS),** satellite based technology providing spatial data on uniform global reference datum known as World Geodetic System 1984.

The traditional role of land surveyor and cartographer has undergone significant technological change, now requiring a combination of traditional skills with those of new technology and spatial data handling skills. This has created a new discipline covering the spectrum from measurement science, through spatial data management, to the transformation of that data into application-specific spatial information.
The society around us in the new millennium is expecting a lot more from the surveying profession than ever demanded in the past. The role of surveying profession is going to expand and the ‘new millennium surveyor’ is going to be ever more busy because his traditional role of carrying out the basic control network for mapping, setting out of works and monitoring line and grade at the construction stage of the projects shall continue. To add to this will be the deformation monitoring of structures and plate tectonic studies and other land mass monitoring. What, of course, has changed and shall further change in the coming years is the instrumentation and techniques. The new instruments are electronic and techniques are computer based; thus the need for the knowledge of computer sciences and exposure to the information technology is a prerequisite.

Information technology has another impact because it allows us to collect such a huge quantity of data. Observation techniques are changing, the quantity of data is increasing, and there is an increased requirement that we provide data, which is fit for the purpose and with shorter, turn around times.

There is so much talk of GIS (Geographic Information System) which is a very powerful tool for assessment of resources, both man made and natural, environmental issues, and planning strategies for the optimal utilizations of resources. A UK government study some years ago showed that 70 per cent of all business decisions require geographic information. In fact, the amount of spatial data required for government business is more than that - and for the military, it is probably nearer 80 per cent.

Now, where does the geographic data for GIS come from or who provides the data and ensures that the geographic data is accurate and correct? It is once again the surveyor or the ***Geomatics Engineer*** as we are going to be known in the coming years.