

# Geodesy in Today's Practice

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## SUMMARY

The author takes a very personal review of his university education as a start-up for his professional career. After thirty years in different occupations / activities such as industrial firms, administration bodies, federations and professional associations. The value of a more generalized and comprehensive scope of subjects shall be illustrated by means of some geodetic highlights.

Against the background of internationalization and globalization the reasonability of such an educational path shall be discussed.

## ZUSAMMENFASSUNG

Nach 30 Jahren Beschäftigung in einem Wirtschaftsunternehmen, einer Verwaltung, in Verbänden und Berufsvertretungen zieht der Verfasser eine persönliche Bilanz über seine universitäre Ausbildung als Vorbereitung für den eingeschlagenen Berufsweg. Anhand einiger vermessungstechnischer Highlights wird die Wertigkeit eines mehr generalisierten und umfassenderen Lehrangebots deutlich.

Vor dem Hintergrund der Internationalisierung / Globalisierung wird die Sinnhaftigkeit eines solchen Ausbildungsweges hinterfragt.

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## 1. MOTIVATION

Thirty years ago I finished my geodesy-study in Bonn / Germany. A variety of different course contents, most of them with a definitely theoretical background, shaped my understanding of the discipline of surveying. After this I finished my second state examination to acquire the qualification as a senior administration official. It was my first contact with different municipal authorities. After having survived this shock I made a vow never to become a civil servant. Therefore I decided to find a job in the industry and I was very fortunate: I became an employee of RWE, the biggest electricity company in Germany.

To my satisfaction: Looking back at thirty years – it was the right decision for me. In the following some highlights of my career will be presented, bearing in mind my university education.

### 2.1 Project Work

The prime objective of a project is the optimization of the competing factors which are time, costs and quality. Thus, taking the given resources into consideration, the qualitative requirements of the aims must be realized within a fixed time frame.

There is a tremendous number of publications dealing with administrative project management making rational attempt to convey the necessary basic knowledge by presenting methods, techniques and tools. Also methods of time scheduling/progress control, budgetary planning, controlling are structural preconditions that have a considerable effect on the success of a project. Besides that, soft factors such as communication, information, negotiation, partnership, valuation and openness are the bottlenecks of each interdisciplinary cooperation.

Many projects in the field of power plant building (coal, nuclear and hydro power stations) have been carried out by the author. To get more details please see my article FIG Brighton 1998.

University Capabilities: Engineer-surveying, business management, mathematics,  
Land-surveying

Missing links: All the soft factors

## 2.2 Supervision of Nuclear Power Stations

Surveying in nuclear power stations which is necessary for production sequences, is always subject to restrictions in terms of time as, for economic reasons, it is in most cases integrated in outage cycles. In spite of these restrictions it is often possible to meet these special circumstances by means of utilising new technologies permitting conclusions with regard to the quality and reliability of the survey.

For example: An essential part of a nuclear power plant is realized by the fuel assemblies (FA). One central topic within the scope of FA-technology is the periodical supervision of its physical status. The observation of oxidation processes and length changes of FA's as well as visual inspection have contributed to improve the layout and manufacturing of FA's. Deformations of FA's like relative shift and torsion are examined with great interest. These deformations cause temporal delay when charging the core during a revision, and as a result they reduce economy essentially. Six FA's were surveyed in order to derive the efficiency of underwater photogrammetry and lots of special preparations have to be done before starting the campaign. To get more details please see my article FIG Helsinki 1990.

University Capabilities: Photogrammetry, IT, instrument construction

## 2.3 Supervision of Water Pumping Stations

High resolution measurements will be carried out immediately under the upper reservoir in Vianden / Luxembourg. These observations are used for recording and verification ground control processes. The resolution of the signals is 0.1 to 0.01 arc seconds. This high relatively signals resolution requires the question to the constancy of the local gravity vector because of the changeable water-transportation between the upper and lower reservoir. Seven million metric tons of water can be let out in only four hours.

One of the biggest problems was the determination of the gravitational potential of the water masses (the geometry of the water form is very inhomogeneous) and the influences of each other. Besides that the earth tides (the determination of time-dependent gravitational effects in the monitoring of engineering constructions) have to be taken into consideration dependent on the high signals resolution.

Dependent on the water-level the changing of the equipotential area lead to levelling changes of 0.1 to 0.2 millimetre. The old geodetic principle always to measure under equal conditions was confirmed very impressively.

University Capabilities: Mathematics, soil-mechanics, geology

## 2.4 Corporate Real Estate Management

Many corporate groups want to reduce the amount of capital tied up in real estates. They want to invest more disposable capital in their core business. One resolution is to build up a useful managing of all own real estates portfolio process with the aim to put up an added value through creation of transparency and improvement of cash fees. The tied up property

should be made available through reduction and an optimizing process.

This leads to challenges for the real estate management as follows: Decrease of the capital tied up in real estate and cost minimization in the use of real estates for financial benefit. Creation of transparency in the stock of real estates (according to a regulation of the EU commission all capital market based companies are required to submit consolidated balance sheets in compliance IFRS provisions by 2005). Efficient setup of a stock of strategically important real estate resources and liquidation of strategically insignificant real estates. Value adding in real estate management and transparency and following view of real estate risks.

University Capabilities: Business management, Valuation

## **2.5 Professional Association**

In the last two decades of the 20<sup>th</sup> century, many companies wanted to build up their documentation in a digital way. This includes especially the documentation of plants above and under the surface, high and lower voltage routes or the certification of real estates. All of them need the cadastral background. The author tried to tie together all interests of the greatest industrial companies in Germany (this means also a package of several 100 Mio €) to become a qualified participant in the discussion with the AdV (Working Committee of the Surveying Authorities of the states of the Federal Republic of Germany). But he failed very soon because of the situation in Germany. The AdV has no bad image. The AdV has no image at all. It is an association of 16 states of the Federal Republic of Germany with no authority to carry through majority decisions. Therefore the AdV always limped behind of actual developments.

After some years of unpleasant discussions, the companies have built up their own secondary documentation and they don't need the AdV any more.

University Capabilities: Administrative law, cadastral surveying

## **2.6 Military**

In my life I have started a second career at the age of nineteen. Before starting my studies of geodesy I joined the German army for two years and finished with the rank of lieutenant. Every year I went back to the army for two or three weeks. Now I am a colonel of reserve and ordered by the Bundeswehr Geoinformation Office in Euskirchen.

At the beginning of my report I pointed out the training of the soft factors. In every project you work with people who act very individually. Communication and information problems, status and prestige values are involved which cannot be integrated by administrative project management alone. One must also state that considering the given complexity of the problem definition, interdisciplinary communication and cooperation are required while taking disciplinary, administrative, structural and psycho-social (leadership attitude) aspects. To deal with these factors I learned in the German army.

University Capabilities: Basic knowledge

### 3. SUMMARY

Irrespective of the individual technical specialization in certain aspects, everything is basically a matter of managing complex systems by coordinating the behaviour of people under constantly changing conditions. It is predictable under the point of view of a changing world that my children will have to work in different employments with different working conditions in their lives. Thus, when looking back to my life, I am convinced that it will be essential to get a more generalized universal education to be better fitted for the struggle of life.

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