

Marek Banaś: **A Review of Robust Estimation Methods Applied in Surveying** • Geomatics and Environmental Engineering 2012, Vol. 6, No. 4

This paper provides a review of popular outlier-robust methods used in surveying. The presented methods have been divided into two groups i.e. active and passive methods. The first group comprises the following methods: the Huber Method, the Hampel Method, the Danish Method, the Gaździcki Method, the Least Absolute Deviation and a Choice Rule of Alternative. The second group of methods is represented by the so called iterative data snooping (IDS) and τ -test. There are M -estimation rules presented in the introduction to the review of active methods.

Keywords: outliers, robust estimation, adjustment of observations

Paweł Hanus: **Model of Transformation of Cadastral Maps of Former Austrian Annexation with Additional Conditions on Transformation Parameters** • Geomatics and Environmental Engineering 2012, Vol. 6, No. 4

Transformation of cadastral maps of former Austrian annexation, taking into account accepted solutions is very troublesome. Lack of control points cause, that for correct transformation it is necessary to get such points by direct measurement in the field. Points being measured in the field can be treated as control points. Unfortunately, since such maps were made in the end of XIX century, many details being drawn on them were changed. It also concerns parcel boundaries. In many cases surveyor is not able to identify suitable amount of control points and determine their coordinates. In such case very helpful can be complement of transformation equations with additional conditions, assuming that identified on the former cadastral map boundary point is to be placed on boundary, measured in the field. Despite the fact, that ends of boundary changed over the years, yet direction of boundary is the same, very often. Addition of such conditions permits on improving results of such made transformation.

There is a model of such example, together with an computational example, presented in the paper.

Keywords: transformation, cadastral map of former Austrian cadastre, parcel boundaries, control points, conditional equations

Robert Krzyżek, Bogdan Skorupa: **Analysis of Accuracy of Determination of Eccentric Point Coordinates of the KRAW Permanent Geodetic Station in RTK GPS Measuring Mode with the Application of the NAWGEO Service of the ASG-EUPOS System** • Geomatics and Environmental Engineering 2012, Vol. 6, No. 4

A short analysis of the behaviour of the spatial coordinates of eccentric points KRA8 and KRA9 of the KRAW permanent geodesic station in the ASG EUPOS system over time was conducted. Measurements were conducted on eccentric points in real time in RTK GPS mode, over several measuring cycles. Two GPS receivers of various manufacturers were applied for research measurements. Obtained measurement results – spatial coordinates – were related to values accepted as error free, obtained from the ETRV 2000 measuring campaign.

Keywords: ASG EUPOS, RTK GPS, NAWGEO service, control network

Robert Oleniacz, Magdalena Kasietczuk: **Co-incineration of Large Quantities of Alternative Fuels in a Cement Kiln – the Problem of Air Pollutant Emissions** • Geomatics and Environmental Engineering 2012, Vol. 6, No. 4

Over the last few years, a significant increase in the use of alternative fuels in the Polish cement industry has been observed. These are mainly waste and waste-derived fuels. The national leader in this field is Chel̄m cement plant, with the share of alternative fuels in the cement kiln heat balance reaching in 2012 the level of 78.5%. In this paper, an analysis of the emission rate of air pollutants from cement clinkering process in the above-mentioned cement plant in the years 1998–2012 was carried out, using the results of continuous and periodic measurements. The compliance with the emission limit values applicable for cement kilns co-incinerating waste was assessed, and the influence of large amounts of burnt alternative fuels on the emission of substances such as nitrogen oxides (NO_x), sulphur dioxide (SO_2), total dust, carbon monoxide (CO), hydrogen chloride (HCl),

hydrogen fluoride (HF), total organic carbon (TOC), heavy metals (Hg, Cd, Tl, Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V) as well as polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs).

Keywords: cement kiln, alternative fuels, waste co-incineration, air pollutants, emission

Tomasz Owerko, Edyta Puniach, Olga Sukta: **Application of IBIS System to Measuring and Analysis of Displacement on the Example of Bridge** • Geomatics and Environmental Engineering 2012, Vol. 6, No. 4

This paper presents the issue of building structure measurements. The article presents capabilities of ground-based interferometric radar IBIS in precise survey of bridge spans displacements. Of is shown by an example of complete survey and data processing of a railway bridge.

Keywords: radar interferometry, measuring of displacement, bridges

Karolina Piotrowska, Ewa Panek: **Testing of Selected Phytoindicators for the Environmental Assessment of Areas under Various Levels of Pollution** • Geomatics and Environmental Engineering 2012, Vol. 6, No. 4

The aim of this paper was to determine the suitability of six plant species in biomonitoring of pollution from atmospheric trace metal deposition.

Concentrations of Cu, Cd, Pb were determined in: mosses (*Pleurozium schreberi*, *Polytrichum formosum*), two years old needles of the Norway spruce (*Picea abies*), the common silver fir (*Abies alba*), the common larch (*Larix decidua*) and in leaves of the common white birch (*Betula pendula*). The material was collected in three different areas under various levels of pollution (Krakow Agglomeration; Spisz-Gubałów Foothills; Silesian Beskid).

The highest concentrations of trace metals occurred in: the moss species *Pleurozium schreberi*: 6.17–10.83 mg Cu/kg d.w., 0.6–2.37 mg Cd/kg d.w., 7.0–27.17 mg Pb/kg d.w. and in the leaves of the common white birch: 4.82–15.33 mg Cu/kg d.w., 0.28–2.32 mg Cd/kg d.w., 1.33–5.41 mg Pb/kg d.w. In turn, the needles of the Norway spruce contain little amount of trace metals: 2.00–8.00 mg Cu/kg d.w., 0.07–0.45 mg Cd/kg d.w. and 0.17–3.83 mg Pb/kg d.w.

The both moss species seem to be better biomonitors of atmospheric pollution in less polluted areas, because of higher

elemental concentrations in most cases, especially in terms of an ability to accumulate Pb and Cu.

However, the common white birch is a better bioaccumulator of Cd. This species has similar accumulation abilities as the common larch. Both trees are good phytoindicators in the monitoring of highly contaminated areas.

Spruce needles showed lower concentrations of trace metals than other species collected at the same site. However, all selected indicators are suitable for comparative studies on bioindication of urban and industrial air pollution.

Keywords: trace metals, phytoindicators, mosses, needles, leaves

Joanna Urbańska, Krzysztof Urbański: **Selected Aspects of Reclamation of Soda Waste Landfill Sites** • Geomatics and Environmental Engineering 2012, Vol. 6, No. 4

This paper presents leading trends and methods for the reclamation of soda industry waste landfill sites. The article constitutes a synthetic study of the literature regarding the problems of land management of soda waste sedimentation tanks.

Keywords: reclamation, soda waste