

GEODETIC WORKS FOR SLOVAK GAS INDUSTRY

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ABSTRACT

The Slovak Gas Industry (further SGI) is a natural state monopoly enterprise in the field of gas industry in Slovakia. It deals with purchase, transit, distribution and sale of natural gas. It buys the natural gas from Russia and assures its transit across the Slovak territory to Czech Republic, Austria, Croatia, Slovenia, Italy, Germany and France. The SGI is the second biggest gas transporter in the world. The length of transit pipeline system is 2,260 km in 4 – 5 lines (pipelines with diameter of 900 – 1400 mm). The distribution long-distance pipelines measure approximately 5,880 km and the local distribution network is about 19,660 km long. Together with the transit system it represents about 27,800 km gas pipelines installed on the Slovak territory.

Surveying the lines of transition gas pipeline system started in 70-ties of the past century. The pipelines were surveyed partially in an open trench, but regarding the conditions of construction site (fast burring of pipeline in the trench) they were in most cases surveyed only after pipeline burial, i.e. the pipeline axis was found by electromagnetic locators followed with measurement at each about 100 m in the straight line or more frequently in the curves. The surface equipment of gas pipeline (orientation poles, connecting objects and outputs of cathodic protection) and other underground equipment related to the pipeline (anode victims, connecting cables, long-distance telemetric metallic cables, crossing foreign engineering networks seen in the trench etc.) was measured additionally. The results of surveying were plotted in analogue manner to the state maps in 1 : 5,000 scale, containing also the lists of co-ordinates of the surveyed points. Approximately since 1990, the digital mapping and processing is employed.

Geodetic works at the anticorrosion inspection of pipelines by use of the so-called intelligent pig consist of setting-out of pipeline defects and surveying the defects and welds after reparation. The main problem is that the accuracy of distance measured by the pig for long distances is much lower than the possibilities of geodetic methods.

The transit gas pipeline system represents a certain potential risk for its surrounding owing to very high gas pressures and therefore some of its elements must be subjected to a regular safety monitoring. This, besides the other aspects, involves a special geodetic measurement of spatial stability of some technological equipment situated on the surface. A significant static damage of the equipment may result in the breakdown with catastrophic consequences on ecological safety of the surroundings and may also cause considerable losses due to interruption of gas transfer. Such equipment is for

example the air passages of large-diameter pipelines over the waterways and compressor stations.

Measurement of displacement on the passages over the waterways and measurement of settlement of technological equipment on the compressor stations.

Majority of geodetic works is being performed for the local distribution networks in the villages and town, i.e. from the regulation stations of natural gas on the village borders thorough the main distribution systems in the village up to the individual connections to the houses (users) terminated with the main house closing valves. The local networks are mostly surveyed during the construction of new networks, but also the existing old networks, which were not mapped digitally in the past are added gradually. In the recent years also topology of measured elements (line, point, area) has been maintained with their links, to facilitate the loading of measured data into an object-oriented GIS.

These works done for the SGI have brought about a considerable merit, owing to a rapid technological modernisation and development of the Slovak geodetic companies, which are today employing the most advanced measuring, computing and image processing technology, starting with the total stations and GPS to AutoCad 2000, MicroStation under the Windows NT, Geomedia etc.

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