COMPUTER PROCESSING OF RADIO SOUNDING DATA FOR GROUND-PENETRATING RADAR SDI K-5

Yuriy Vashpanov, Dr. of Sci., Prof. (OSACEA), Anatoly Kudelya, PhD, Associate Prof. (KNUCA), Tatyana Podousova, PhD, Associate Prof. (OSACEA)

The technology of radio-wave method allows survey of ground areas in terms of determination of their lithological structure by genesis, detection of horizons filtration flows of the ground waters, the minerals deposit search and, etc.

For increase of probability of identification of soil layers on specific resistance or definitions of their condition in time, ground-penetrating radar (GRD) SDI–K-5 to measures two components of an electromagnetic field: vertical magnetic H_z and electrical E_x components, and differential phase shift, ($\Delta\varphi$). These data register in electronic memory of the ground-penetrating radaron a SD cardautomatically. All procedures of data gathering and their processing can be automatically carry out on in advance chosen algorithm.

The radio-wave of the tomographic image cut of a body a dike dam was obtain Sounding wavelength λ=75 m on the two real point with distance between them 4 m.The body of a support of a dam can be defined like the big specific resistance ($\rho \geq 1200$ Ohm×m) is looked through like concrete within distances of the measurements 2,5 m to 5,5 m. The dam a roadbed also can be defined on the same big specific resistance to depth of an order to 2m.

We used a method for the convert experimental data to a 3D surface graph, which published in our paper [1-2]. Experimental data of radio sounding using of the Ground-Penetrating Radar SDI K-5 was written in the ASCII table by microcontroller and then imported to OriginLab program. The GPR SDI K-5 transferred*x*, *y* coordinates of measurement points, magnitudes of magnetics and electrical fieldsH_z and E_x,and a total magnitude of signal*S*. A total number of our measurements is 50.3D topographic images of the underground structure are obtained.

References

1. Vashpanov Yuriy, Son Jung-Young, Heo Gwanghee, Podousova Tatyana, and Kim Yong Suk *Advances in Civil Engineering*, 2019, Article ID 2398124.

2. Vashpanov Yuriy, Heo Gwanghee, Son Jung-Young and Podousova Tatyana *Materials Science and Engineering* 2021, Article ID012028.