

Section 01. Innovations in Engineering

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The use of a multicopter in mine surveying

Surveyor is a mining engineer who conducts a spatial geometric imagery on the surface (open-pits, sections, etc.) and underground. This survey is then transferred to the program on the computer (AutoCAD, Credo, Base, Cival 3D and others).

At the moment, the best way to survey is 3D surveying. Most mine-surveyors prefer to work by old-fashioned methods with an electronic total station and milestones. But time does not stand still.. Now the surveyor can use the multicopter. This device can be used not only in quarries, but also in the filming o urban areas, monitoring construction sites and railways. Previously, this method was used in engineering then it came to topographic surveys. The speed of the data acquisition using the unmanned aerial vehicles and the high level of data accuracy offer the potential to increase efficiency and cost-effectiveness for large-area surveying at a mining site.

Multicopter is an unmanned aerial vehicle (UAV) equipped with a high-precision laser, whose accuracy is 10 millimeters with the smallest measured distance of 50 meters.

Pluses of UAV application in mine surveying are as follows:

- a) Fast work ;
- b) Surveying accuracy;
- c) One person can cope with it;
- d) Productivity about 1000 km² / hour;
- e) Maximum permissible weight – 25 kg;
- f) Built-in 2 cameras, which can be controlled not only through the remote control, but also through VR-glasses.

There are some significant minuses as well:

- a) Expensive equipment;
- b) Not suitable for long-term surveying (more than 30 minutes);
- c) Does not stand in front of adverse weather conditions (wind, frost).

Although this device is expensive, it justifies the money with its advantages. Use of this technology in multiple projects, including open-pit mines and dams, where the continuous calculation of volumes and the systematic monitoring of progres scould be crucial for investors. The choice of multi-copter can help cope with the most challenges of the modern surveying.