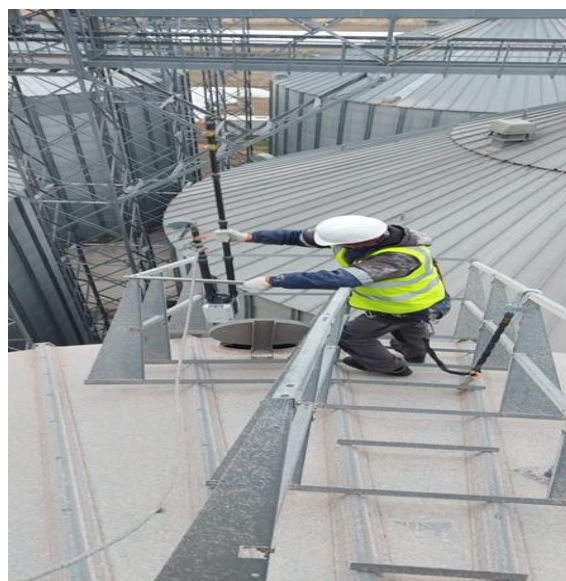
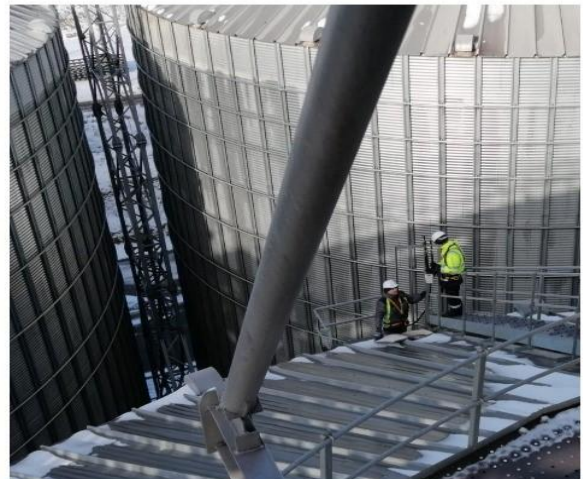
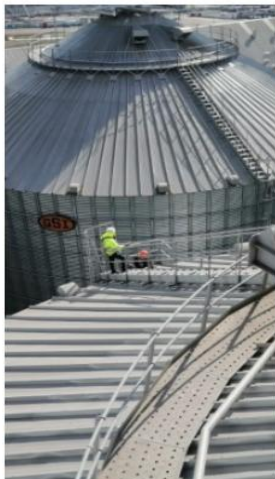
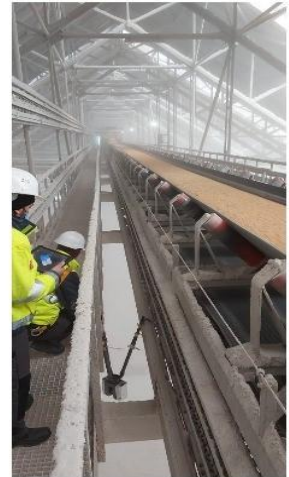


VS (Volumetric Solutions)

Measurement of volumes of bulk materials

Measurement of volumes of bulk materials and inventory of raw materials using modern 3D laser scanning technology.





3D scanning of any physical object refers to the collection of information to make a detailed digital copy of it, taking into account its geometric dimensions.

Measurements of warehouse volumes are an integral part of the work of elevators, enterprises of the agro-industrial complex, ports, mining ore plants, mines, because the raw materials or finished products of which are quite difficult to accurately account for. First of all, we are talking about the volume of bulk materials. The task of accurate measurement of volumes of bulk materials is widely used in the inventory of raw materials and finished products (grain, coal, coke, sand, crushed stone, ore and ore concentrates, etc.).

The traditional tool, used in most cases at present, to determine the volume of bulk materials in warehouses, which is used on the market of Ukraine by inspection and international surveying companies, is geodetic surveying (with the help of an electronic total station), which allows you to determine the volume of materials with an error (device measurement error is not meant) 5-10% or geometric determination of volumes using a laser rangefinder and geometry, which allows to determine the volumes of materials with an error of 20-25%. Geometrical determination of the volumes of grain crops in silage towers, using laser tapes, currently remains the main method of determination. But this method has a high probability of error, because grain crops will never have the perfect shape of a geometric figure, and this process is complicated when the shipment of grain crops begins, because funnels begin to appear in geometric shapes, which are not only difficult to measure, but also very it is difficult to take away this emptiness.

The main limitation when carrying out work using tacheometers and laser rangefinders is the low speed of measurements, a large measurement error, and the physical impossibility of detailed photography of large volumes of materials. When using the methods of traditional tacheometric measurements, at what step is it really possible to survey large volumes of loose materials - for example, one point per 0.5-1 square meter, and how long will the measurements take? It is unlikely that this will be enough to compare with the work of a laser 3D scanner, which performs millions of measurements when determining the volume of bulk materials. In contrast to measurements of storage volumes of bulk materials using tacheometers or laser rangefinders, 3D laser scanning technology allows you to measure and display the shape of the surface of the material in the warehouse in detail, with a step of units of millimeters. Such detailed measurement by a laser 3D scanner allows you to obtain measurement accuracy that is unattainable when using any other existing technology for measuring the volume of bulk materials. The high speed of the scanner is millions of measurements per second, and the modern software for processing the results of laser scanning allows you to quickly measure the composition of loose materials and calculate volumes with an error of up to 1%.

We are ready to offer our clients a wide range of services and developed system solutions that take into account all specific conditions for each specific situation

We have extensive experience in carrying out measuring works to accurately determine the storage volumes of bulk materials and cooperation with well-known foreign companies in Ukraine. When determining the volumes of bulk materials in warehouses, we use modern equipment recognized all over the world - the scan station of the Swiss company Leica with 3D laser scanning technology, which makes it possible to measure and display the shape of the surface of bulk materials in warehouses in detail and calculate the volumes with minimal error .

Stages of performed works:

1. 3D laser scanning of objects;

warehouse

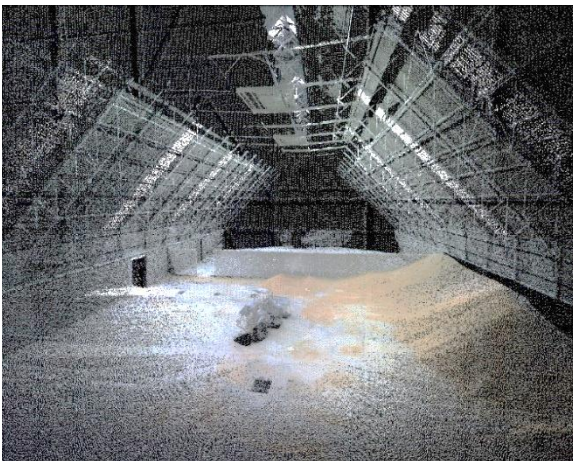


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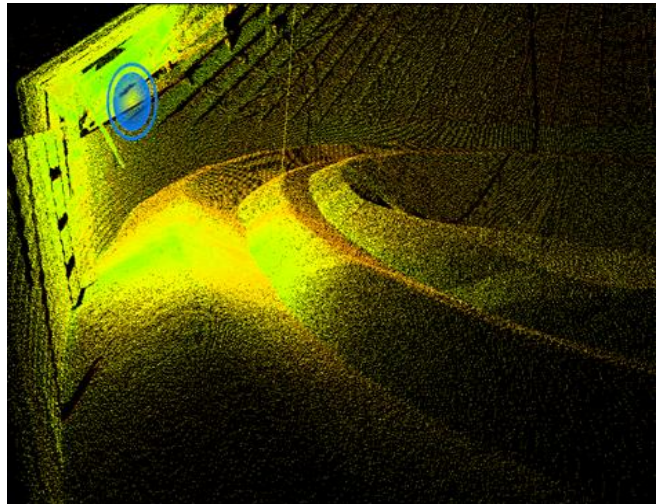
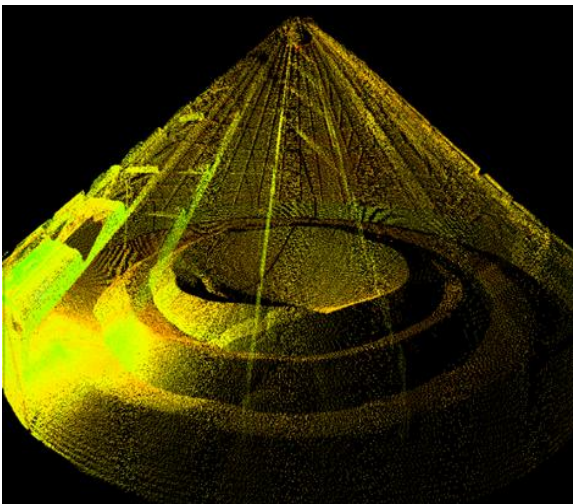
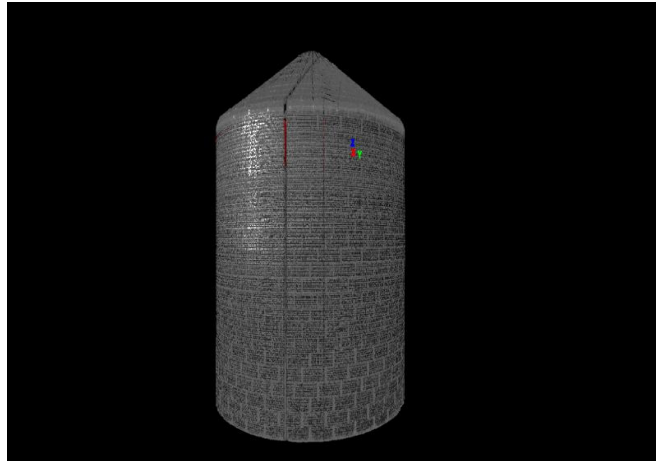


2. Stitching of the received scans into a single cloud of points;

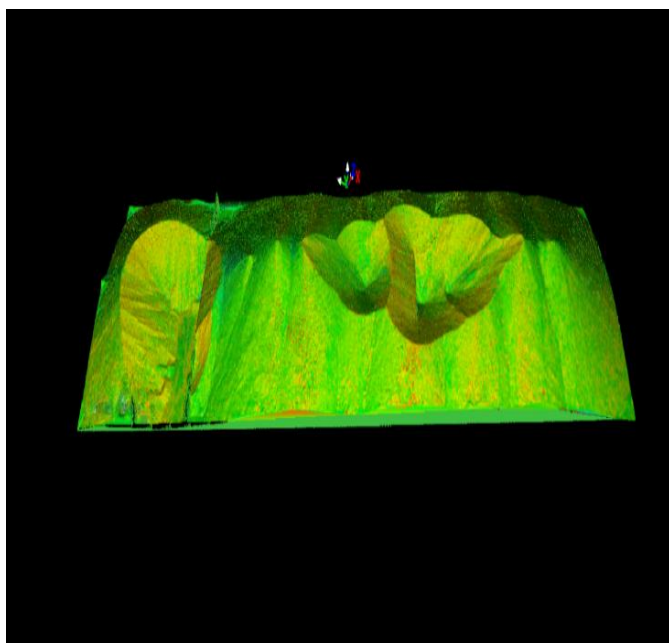
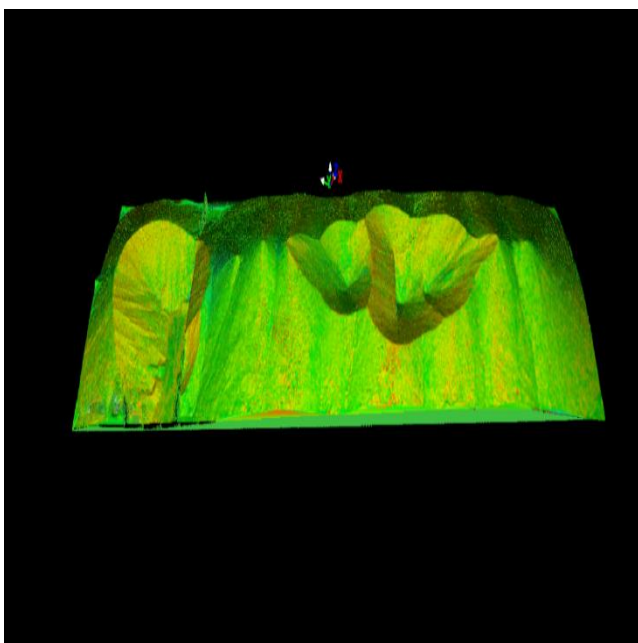
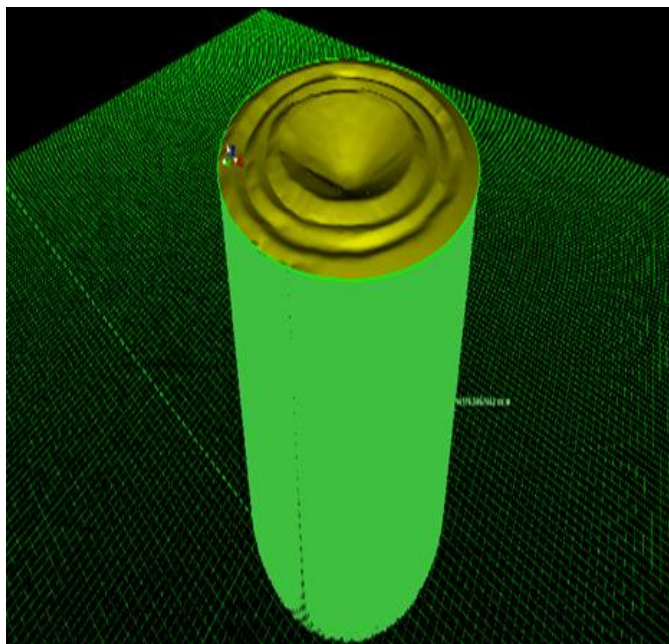
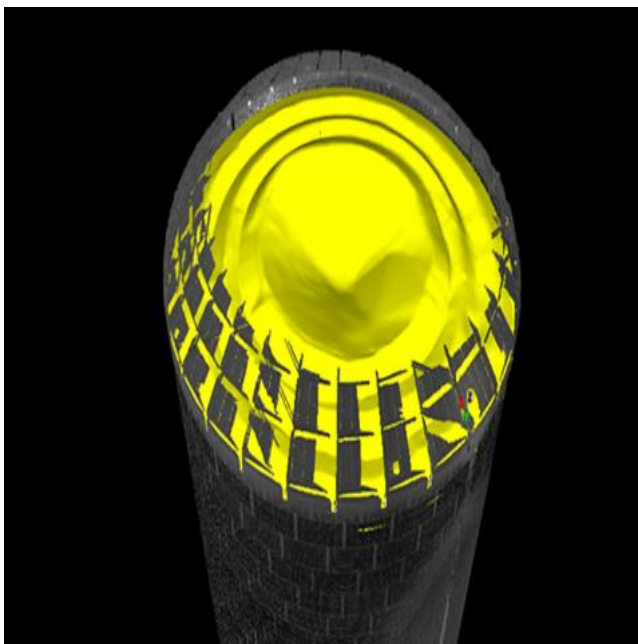
warehouse



silo



3. Building 3D models of shooting objects and calculating the volumes of shooting objects;



After the measurements are completed, the customer is issued a measurement protocol of the established form

A short tour of three-dimensional laser scanning:



Three-dimensional laser scanning

A laser scanner is a technically complex device. The scanner generates a constant or high-frequency pulsed laser beam, while the device itself automatically rotates around its axis, at the same time a mirror that rotates or oscillates positions the beam in a vertical plane, as a result the beam covers the entire space around the scanner. When the beam hits an object, part of its energy is returned to the scanner and the device captures it. The signal arrival time is used to calculate the distance from the scanner to the object. However, the laser scanner has not only a laser rangefinder, for each measured distance, other measuring information is also recorded - the

horizontal angle of rotation of the scanner and the vertical angle of rotation of the mirror. The scanner automatically combines all measurement information and calculates x; y; z coordinate for each measured point, thus the resulting scan is a set of x; y; z measurements. This detailed three-dimensional representation of the surrounding space, usually called a point cloud, consists of a billion points, in order to add real color points to the scan, you can take panoramic pictures with cameras built into the scanner. Using the built-in cameras, you can automatically combine photo data with scan data.

Laser scanning is a method of high-precision digitization of structures, parts, mechanisms, terrain mapping or its digitization, however, unlike technologies that allow for sequential surveying of individual points, laser scanning allows you to quickly obtain detailed measurement data about the entire object as a whole. It is as if the camera takes a 360 ° panoramic photo, but at the same time receives the exact three-dimensional coordinates of each pixel. This is one of the main advantages of obtaining high-quality executive survey or measurement information about the current state of the object.

No other method can give such a complete picture of the object. At the same time, we work not just with an image, but with a model that preserves the full geometric correspondence of the shapes and sizes of the real object. This state of affairs provides the possibility of measuring real distances between any points or elements of the model.

The survey is so complete and detailed that we always, when we refer to the arrays of data, seem to return to the field to find any data or supplement the project. Scan data is measurement information and we can use it in applications for different types of tasks.

Laser scanning technology works as follows:

The first is the field stage: we scan objects.

At the field stage, if necessary, you can get panoramic pictures of the object and make the data even more realistic. To obtain a survey of the entire object, scanning is performed from various points and the required number of scans are obtained, which are then stitched and tied to the coordinate system during the scan or later.

The second is in-camera processing, where the field data is processed in software. Scan data can be accurately referenced to the desired coordinate system, as in standard topographical surveying. Data processing software allows you to create an infinite number of final projects, starting from the simplest results such as two-dimensional plans and elevations, clear and convenient panoramic images with the ability to obtain measurement information for each pixel, overall dimensions, point-to-point, point-to-surface measurements, higher and lower marks of nodal points, intersections and profiles, measurement of volumes. In addition, scanning technology allows for additional results, such as detailed topographic plans, triangulated spline surfaces, links to information assets, fully textured models, overview views, intelligent 3D models of industrial facilities, as well as BIM - building information models. It all depends on the software.