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Possible Use
of Voxler and MicroSation I/MINE Programs in Surveying

The use of computer programs has become an important part of survey work recently. Due to the increasing capabilities of computers arranging, recalculating and visualizations of various data is getting simpler every day. Also new programs are being published that allow automatic edition of data. Taking into account the technological advance, a wide knowledge of new programs and updates can be tremendously useful. It can also make the work easier, more effective, increase the accuracy and present the final results in a more attractive manner.

This article revolves around two new programs. One of them is Voxler published by Golden Software – a company which created such well-known programs as Surfer or Grapher. Not only were they user friendly, but also useful in drawing maps of izosurfaces. The other is an expansion to MicroSation published by Bentley. MicroStation in its various versions has been successfully used in surveying, engineering and architecture. The objective of this article is to evaluate potential use of those programs in survey.

Both discussed programs facilitate the analysis and visualization of large parts of data. But as it will be later proven, the final results and their approach to the problem differ considerably. The data used in the examples reflects the influence of the underground exploitation in coal mine "Jaworzno" upon the surface [1].

Basically, the first step would be to input the gathered data into the programs. The data consists of survey measurements of subsidence trough caused by "Jaworzno" coal mine [1]. I/MINE is using the same files as the standard version of MicroStation. It is possible to use standard ASCII files, Excel files or any other similar formats. With Voxler things get a little more complex because the basic entry data format is *.vdat which is not a commonly used format [2]. And converting files into this format proved to be difficult since there are no programs that make

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automatic conversion. It is also possible to use ASCII files. In order to get accurate results it is necessary to create a separate file for every type of data. It is possible to have them all in one file but Voxler (grid) can be unpredictable with data arranged in this manner. Besides, Voxler has no option of editing implemented data. There is no way of scaling in any direction. So to make the image more readable the user needs to edit the data in another program. There are no similar problems in I/MINE.

As it was stated before some of the data comes from "Jaworzno" coal mine. The expected visual result is subsidence trough. The result of attaching data is a "cluster of points". Discussed programs have a useful grid option. In I/MINE the user can choose the type of gridding [3]. It is possible to use triangle or square display of grid (Fig. 1). Triangle display proved itself useful for the visualization of open pit mines in coal mine "Turów". Unfortunately Voxler does not inform the user of the way it is making a grid (Fig. 1). There is no additional data in the Information File [2]. Moreover, the visual result of gridding the same data contained in a different file is not the same. Again, no information explaining this discrepancy was provided in the manual. The overall results of the discussed programs are similar (Fig. 2).
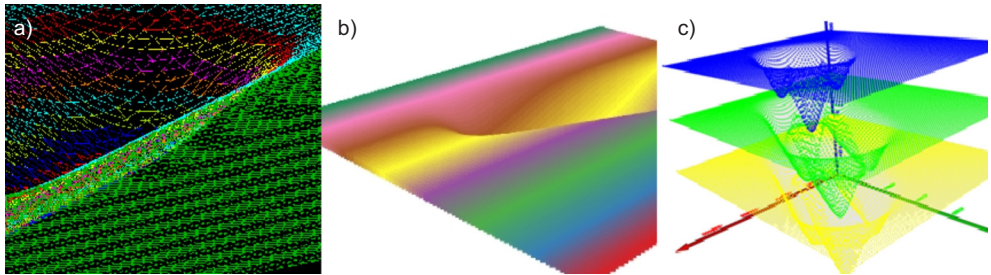

Fig. 1. I/MINE (a) and Voxler (b, c) after using grid module without view edition and with adjuting the size of points
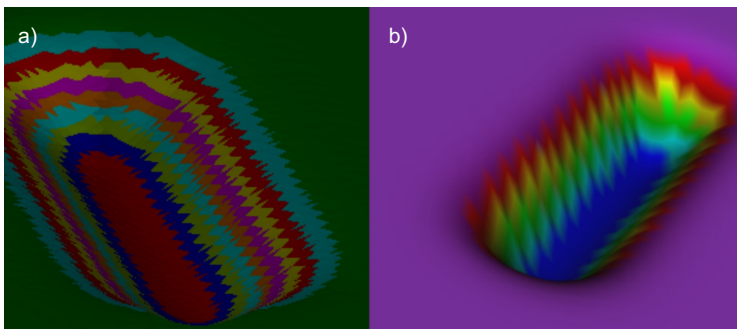

Fig. 2. I/MINE (a) and Voxler (b) after edition of grid surfece

One of the most important options is the capacity to create cross-sections of the area in question. This way of presenting data is useful in further analysis. In Voxler there is an option "ClipPlane" that makes it possible for the user to create cross-sections in three basic directions that go along axes X, Y and Z [2]. The section can be done in any distance from 0 on the axes. Unfortunately it is impossible to make it in any non sheer direction. I/MINE does not have a similar option but it is possible to move some points of the drawing on a different layer and thus archive similar effect. Also with the "CrossSection" option it is possible to create a 2D graph of the area in question (Fig. 3).
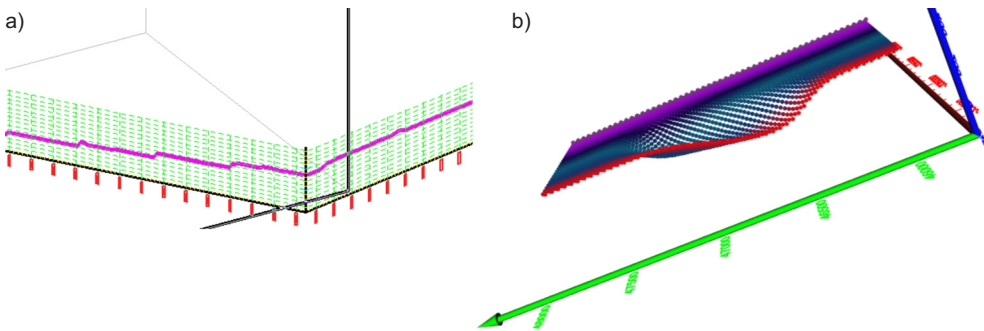

Fig. 3. 2D graph of aera made in I/MINE (a); crossSection made in Voxler (b)

Since the user is dealing with a 3D image it is prudent to have a possibility of animating the image. Voxler automatically generates an animation that can be seen during the whole process of working with the data. Unfortunately there is no way of saving this animation in *.amv file or any other file. When it comes to I/MINE it is easy to apply MicroStation's animation tool which can save a video file in a desired format. The process of creating it is exactly the same as with typical 3D MicroStation drawings.

Undoubtedly the most important element of every program used in surveying is the ability to perform an analysis. Unfortunately it is impossible to use Voxler for this purpose. Perhaps the original way of picture editing (in *.raw form) can be applied in photogrammetry in order to simplify 3D imaging [2]. That is yet to determine. On the other hand I/MINE was equipped with a range of basic analysis options. It is possible to measure the general angle of a profile between two selected points. What is more, we can calculate the difference between two models (Fig. 4). That last option is particularly useful in open pit mines and other areas where it is of great importance to monitor the movement of large blocks of ground.
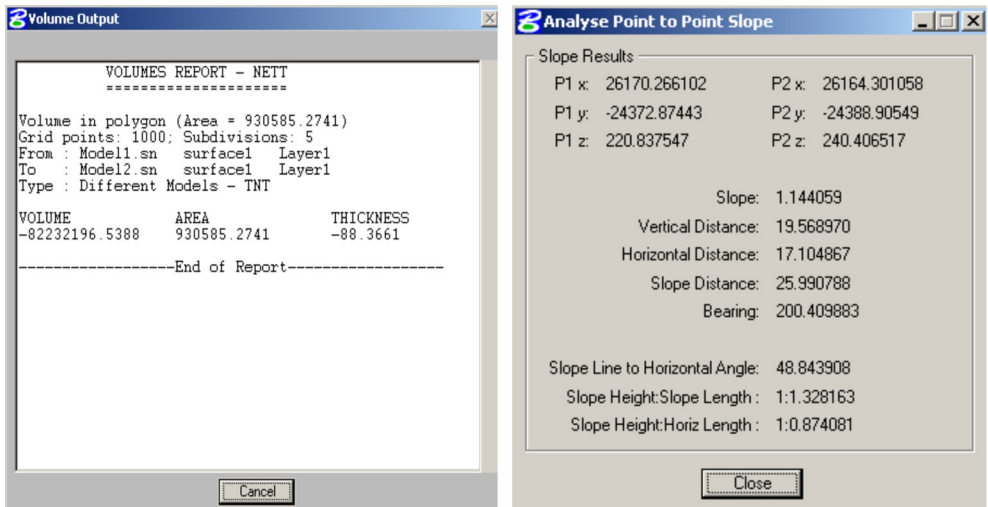
Fig. 4. The result windows in I/MINE for difference in areas and for slope

To sum up, it is possible to find a good use for discussed Voxler and I/MINE. Basically, Voxler presents gathered data in an interesting and easy way. It can be used as an addition to analysis or as a good illustration of effects of survey jobs. Due to the lack of information and literature on use of Voxler it might be difficult to learn a proper use of this program. Also the way functions are displayed may cause additional trouble with larger projects. On the other hand I/MINE has all the advantages of Voxler and also has an ability to perform analysis to a certain degree. Since it is working on basic MicroStation there is no problem with understanding the way it works for a typical user of CAD-like programs. As a result if such 3D modeler is needed the author's opinion would be to use I/MINE. It has proven so far to be more useful and more user friendly

Acknowledgments

References

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[2] Help for Voxler, [on-line:] http://www.goldensoftware.com/activekb.
[3] Help for I/MINE and Bentley MicroStation,
      [on-line:] http://www.graphicmining.com/node/201.