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CLOSE-RANGE PHOTOGRAMMETRY FOR GEOTECHNICAL PURPOSES IN THE PROTECTED AREA MORAVIAN KARST

The Moravian Karst, the biggest system of caves in the Czech Republic, lies 10-35 km north from Brno. There is. The main rock type is the Devonian limestone, its karstification is irregular. Effect of water, wind and frost brings erosion of rock walls. Loosed stones and parts of rock blocks can endanger visitors of the karst area.

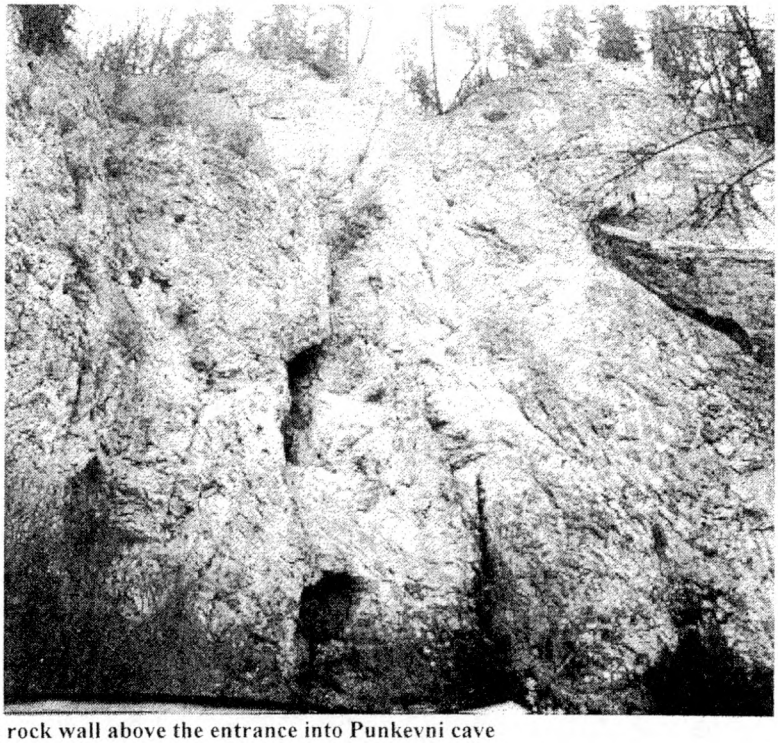

Fig. 1: The rock wall above the entrance into Punkevni cave

Detailed mapping of the rock wall is usually required for geotechnical purposes. The close-range photogrammetry was used in two cases during last years. The smaller rock wall is situated near to Holstejn over the ponore of Bila voda brook. In 1965 the sudden fall of the big part of the rock wall occured. In 1993 several boulders fell out of the rock wall very near to the road that runs above. Continuing of erosion could endanger safety of traffic.

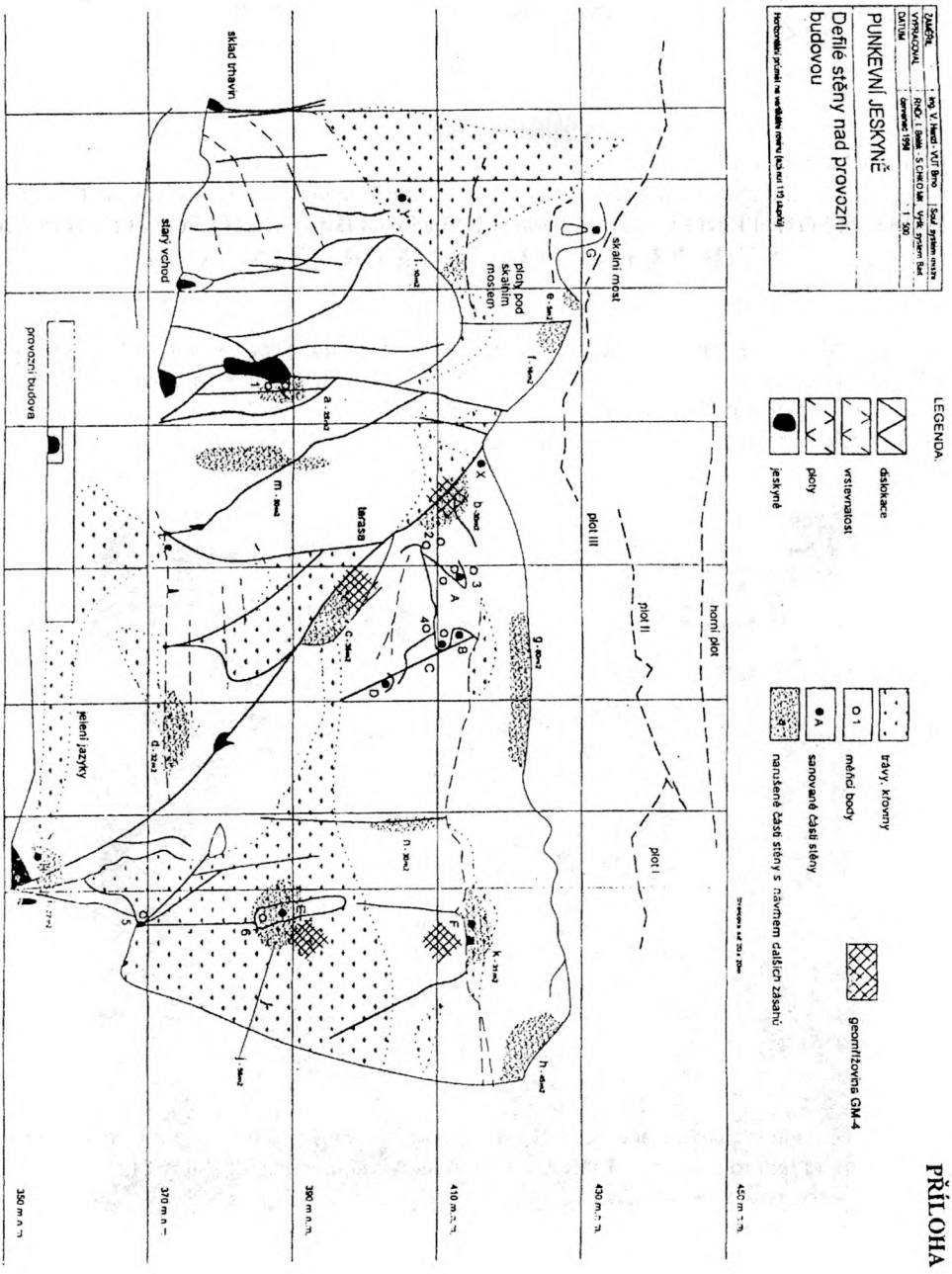

Fig. 2: Geotechnical sketch based on the photogrammetric measurement

Detailed mapping of the wall sorroudings has been carried out in the scale of 1:200. Speleologic measurements of underground spaces from seventies were placed on this map as well. The images were taken with the nonmetric camera Minolta Himatic F (f=38 mm). Its elements of interior orientation were approximately known from former project. Measured crevice system was used for geotechnical purposes. There are also 10 marks in the road running above the rock wall. Their heights are determined by precission leveling two times annually.

The second more important rock wall is near to an entrance and exit of well known Punkevni cave (fig. 1). Unstable blocks, which could endanger visitors were found in the rock wall. The main problem was to find suitable places for taking images in the forested slope opposite the rock wall. The images were taken with semimetric camera Pentacon Six (f=50mm) ***[Hanzl V., 1993]***. Many difficulties brought choice and measurement of control points. It was interesting to find out that spherical clumps of grass in crevice were very good control and tie points for image triangulation. One of the results is on fig. 2. The results were also used for purposes of environment protection. Image triangulations were carried out in both examples, then determination of measured points of the wall. The last step was transformation of coordinates into chosen coordinate system.

Both described examples show an area where only using photogrammetry provided results for geotechnical purposes.

References

1. Hanzl V., 1994, *Calibration of unprofessional semi-metric camera,* Zeszyty naukowe Akademii rolniczej we Wroclawiu, Nr 251.