



Drillings in old mining areas with unknown galleries or not documented panels sometimes meet underground cavities, whose dimensions may be very important for the planning of a construction project. When drilling in rocks that tend to karstification, especially in sulphate- and chloride karst, underground cavities may be met, too, which result in sinkholes when breaking through to the surface. The dimensions of these cavities are just as important for a construction project.

We may offer you two methods to measure cavities out of drillings:

- In drillings above the groundwater level **laser distance measurements**
- In drillings underneath the groundwater level **acoustic log measurements**

In both methods the measuring instrument (Fig. 1) is - guided on a rod - lowered into the cased borehole and pushed through the drill bit into the uncased borehole section to be investigated. The inside diameter of the drill bit must be at least 101 mm. The maximum length that the measuring instrument can be extended from the casing until the lower center device of the rod meets the drill bit amounts to 2.74 m with the laser and 4.68 m with the acoustic log.

At the top end of the casing the installation rod is held from a center device, too. But this device allows at the same time a predetermined horizontal-sweep of the rod and thus of the probe through 360 °.

If the cavity to be investigated exceeds the above mentioned heights, in case of the acoustic log the casing must be lifted by a respective number of guide grooves, because with the acoustic log horizontal sections in different depths of the cavity are measured that, joined together, result in a spatial picture of the cavity.



The dimension of the laser in measuring direction is so big that it does not go through the bit of a wire line core barrel SK6L. Therefore the probe is swivelled when installed in the borehole axis and after having passed the drill bit it is turned to the borehole axis with the help of a servomotor in such a way as to measure a vertical section of the cavity and that by turning the rod any number of vertical sections of the cavity are measured which together result in a spatial picture of the cavity.

The diameter of the cavity to be measured must be at least of 70 cm. Smaller cavities are not suitable for our laser and acoustic log they are better to be measured with a calibre log. With the laser cavities of up to 20 m radius can be measured with an accuracy of  $\pm 1$  cm, with the acoustic log they are scanned with a measuring accuracy of  $\pm 10$  cm. The application depth of laser and acoustic log is limited to max. 100 m.



Fig. 1 Acoustic log sensor (left) and laser sensor (right)