

GLÖTZL Baumeßtechnik

DEBRIS ROCK BALL System BGR - Hannover

Type: BGR/GL-GS 300

Art. No.: 97....



Fig.: Debris rock ball

Application fields:

With the debris rock ball, the internal procedures of sand and stone avalanches, sludge streams and dust avalanches (dry sludge avalanches) can be examined. For doing this, the debris rock ball is equipped with 6 biaxial acceleration sensors, 1 three-axial vibration sensor, 6 pressure sensors and furthermore with 6 temperature sensors.

By the measuring data of the acceleration, it is possible to determine by a twofold mathematical integration the speed and the passed distances of the mobile measuring instrument during the test.

The pressure measurements are used for recording of the surrounding pressure of the debris rock ball. Furthermore, the pressure sensors can also be used for determination of the differential pressure in distance of the housing diameter.

Arrangement of sensors:

The figure is showing the arrangement of single sensors of the debris rock ball.

The accelerator sensors and also the vibration sensor are located in the interior of the ball.

The vibration sensor is placed in the centre of the probe. All the acceleration sensors are arranged with the same distance to the centre of the probe.

The pressure- and temperature sensors are integrated in the skin of the ball.

Designation	Function
# 1 till # 6	Acceleration
# 7	Vibration- resp. rotat. rate sensor
D1 till D6	Pressure
T1 till T6	Temperature

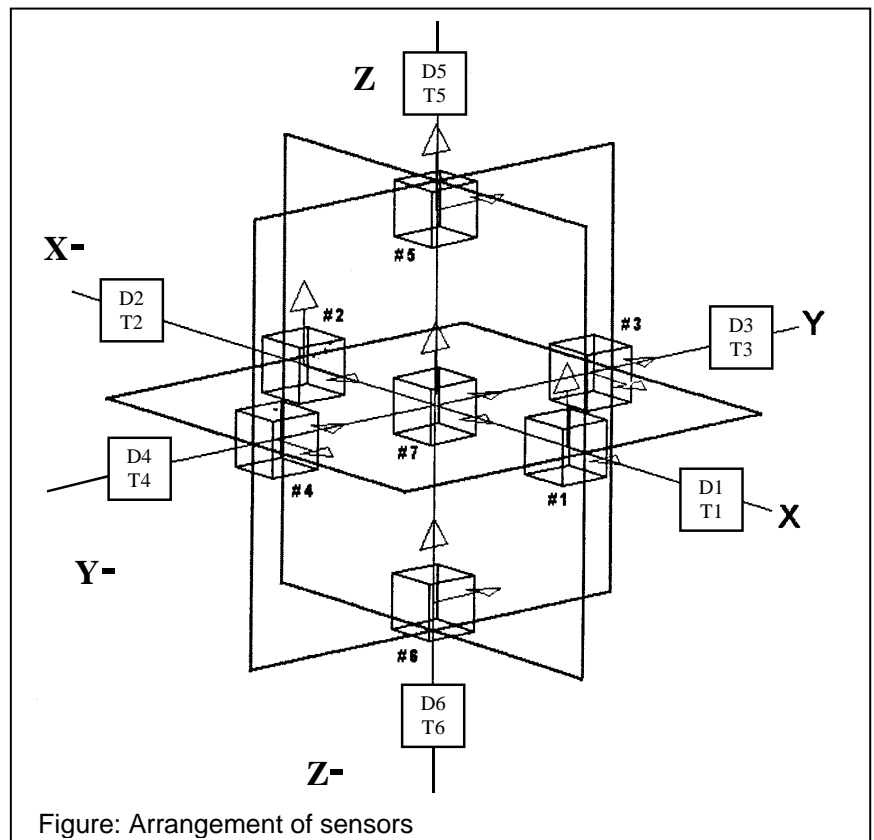


Figure: Arrangement of sensors

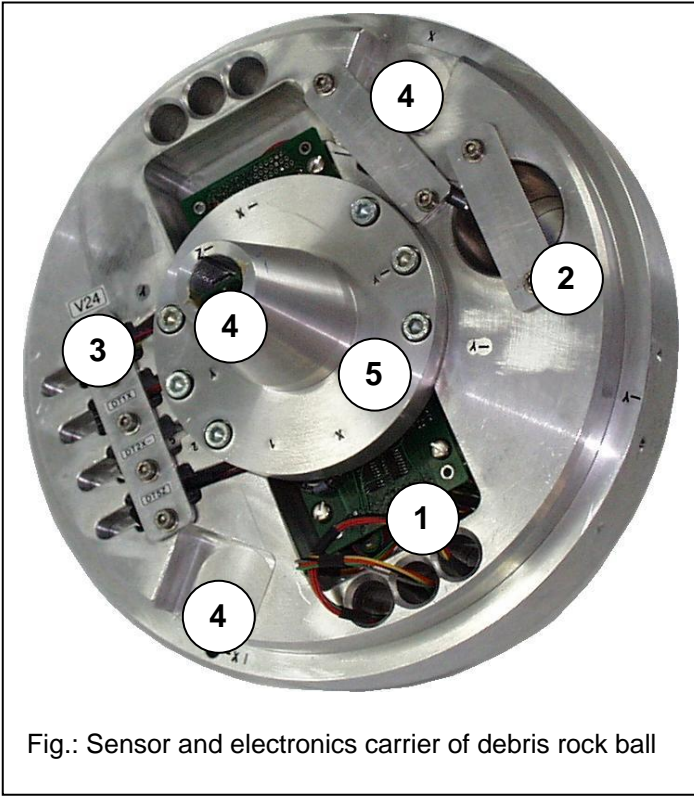


Fig.: Sensor and electronics carrier of debris rock ball

Inner structure:

Regarding the inner structure, the central point has been made to a robust, stable mechanics.

For all components (sensors, electronics, plug connectors etc.) „pouches“ have been routed which have been poured out after done installation with a permanently elastic jointing material.

By this procedure, a secured operation is granted under the rough conditions in which the debris rock ball plumb is used.

The construction on a common carrier enables the calibration of the sensors without outer skin of the ball.

1. Electronics
2. Battery attachment
3. Attachment of plug connectors to sensors in the outer skin
4. Attachment of accelerometer sensor
5. The three-axle vibration sensor is placed under the electronics directly in the centre of mass of the probe.



Fig.: Electronics

Electronics:

The complete electronics (supply and adaption of sensors, computer, memory etc.) are located on a single basic board.

Technical data:

- Quick single-cycle processor
- AD converter with 12 bit, 400 ksp/s, 8-channel
- Scanning rate up to 5 kHz (vibration sensor)
- Non-volatile memory up to 1-GBit
- Supply by one single 3.6 V lithium cell
- Low-power-consumption 3 V computer system
- Application of up-to-date amplifier in SMD technology
- Data transfer with 115 kbd

Technical data of sensors:

Acceleration:

- Meas. range +/-50 g
- Overload +/-500 g
- Shock capacity 2000 g
- Linearity 0.2 %

Vibration:

- Meas. range +/-500 g
- Overload +/-1000 g
- Shock capacity 5000 g
- Linearity +/-1 %

Pressure:

- Meas. range 10 bar
- Overload 30 bar
- Shock capacity 1000 g
- Linearity 0.25 %

Temperature:

- PT 1000

Rotation rate sensor:

- Meas. range 50-1000 °/s
- Linearity <2 °/s
- Shock capacity 200 g

Mechanics:

- Construction of two spherical shells
- Pressure watertight model
- The weight of the ball is adapted to the specific weight of the subsoil.

Further measuring ranges and sensor arrangements on request.