

GLÖTZL Baumeßtechnik

CONVERGENCE MEASUREMENT with PLASTIC REFLECTORS in TUNNELLING

Type: GKR 8 / GPR 1
Art. No.: 90.20

By modern equipment like electronic tachymeters with high accuracies concerning direction and displacement measurements with integrated coaxial distance meters, surveying engineers are able to apply modern measurement methods.

In tunnelling and caverns, the instruments allow more and more convergency measurements with sufficient accuracy instead of the mechanical procedure with measuring tapes used up to now.

Main characteristics of the target point measurement:

- Use on standard convergence measuring bolts
- Exchange of the triple prisms against plastic reflectors possible without any problems
- Repeated use is lowering the costs
- Short installation times
- No disturbance of the construction works



As fixing device, standard measuring bolts with a thread 3/8" are used which are either conventionally injected or subsequently drilled and solidified or are welded on the arch.

By use of a special adapter, universal-mounted triple prisms, e. g. Wild GPR1 and the plastic reflectors, type GKR 8, which have been developed by us, can be applied.

The measuring center of the triple prism is identical with that of the plastic reflector.

The visualization is done by reflexion with existing spot light resp. hand lamp or pocket torch.

Economic efficiency!

Target marks of plastic reflectors and also triple prisms are removable and can be reassembled precisely centered. By this, it can be removed in case of demolition.

The plastic reflectors can be used again for subsequent projects.

For control purposes, the convergence bolt with thread G 3/8" can also be used for measurement with a conventional convergence tape.

The target point equipment can be used by everybody which has a theodolite with integrated coaxial distance meter. Accuracy which can be achieved is approx. +/-1 mm.



Triple prisms are used for first measurement and determination of real three-dimensional movements.

Type	Weight kg	Art. No.
GPR1	0.2	90.20.01

Manufactured by company Wild

Adapter for screwing on convergence bolts and attachment of a triple prism.

Type	Weight kg	Art. No.
APH1	0.1	90.20.11

Plastic reflector with thread G 3/4" on convergence bolt, reflector twistable by longitudinal axis and rated breaking point. Material: Plastics

Type	Weight kg	Art. No.
GKR8	0.1	90.20.12

Our standard program offers a large range of convergence bolts.



Type	Ø /Length mm	Weight kg	Art. No.
KV	20 / 50	0,100	90.01.01.01
KV	20 / 100	0,200	90.01.01.02
KV	20 / 250	0,600	90.01.01.03
KV	20 / 350	0,800	90.01.01.04

Further models see our standard program

Convergence measurements

For determination of convergence data both target point markings with triple prisms and plastic reflectors are used.

For zero measurements resp. for determination of real three-dimensional movements, the triple prisms are attached which can be observed from all directions.

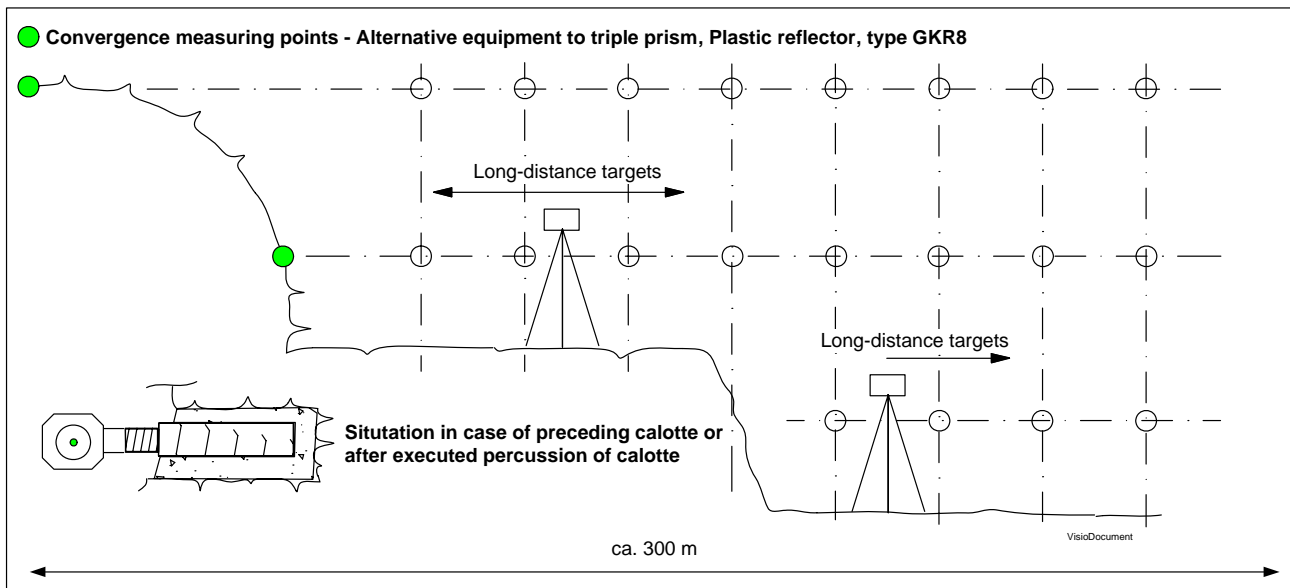
For subsequent measurements, when only direction observations are necessary for determination of two-dimensional deformation components, the triple prisms are exchanged against plastic reflectors. With some distance meters, also a distance measurement is possible. By consideration of an addition constant, it will also be executed three-dimensional

The bolts with the plastic reflectors will permanently remain on the convergence bolts as far as no danger is given by the construction works.

The bolt, type GKR8 is twistable by its longitudinal axis and thus can be observed from two sides.

By this presupposition, it is possible, for example, to carry out the precedent settlement observations in the spherical cap during a subsequent disassembling of benches starting from a secured and stable place in the spherical cap.

The available target point equipment allows an observation of fixed consoles (the classical optical convergence measurement) as well as a measurement starting from free-selectable stations. Therefore, the location of the theodolite can be selected according to the actual sight conditions. Furthermore, convergence measuring points at the reverse side which will no more feature a deformation in a comparative period, can be used as long-distance objectives. This solution has been created as a very economical method by the exchangeability of the plastic reflectors against the tripl prisms, also if a lot of them is needed.



Subject to technical alternations