The properties of fibre-reinforced sprayed concrete concerning energy absorption are mainly assessed according the standard of EFNARC, EN14488-5 and ASTM C 1550. Energy absorption will be measured after 28 days up to a deflection of 25 or 40 mm (depending on the applied standard).

Fibre-reinforced concrete is often used for rock support and as a first safety layer. When covering the tunnel face with fibre-reinforced sprayed concrete, the concrete will be removed after approx. 6 to 12 hours. Taking into account the situation in modern tunnel headings, the performance of fibre-reinforced sprayed concrete within the first hours is essential to provide a sufficient safety level, while accelerating work progress. For those applications the 28-day-properties have no relevance.

Even for durable sprayed concrete applications the early support function of reinforced sprayed concrete will be decisively for the loading bearing behaviour of the rock support system.

Currently, there is no test procedure available to assess the properties – specially load bearing - of fibre-reinforced concrete within the first hours. At early age only the early strength is determined, e. g. penetration needle acc. EN 14488-2 ("HILTI"-method).

Hagerbach Test Gallery (VSH, Switzerland) has been operating an underground facility for research and development activities for more than 40 years. Based on the above mentioned considerations a test method has been developed to assess the capability of energy absorption of young sprayed concrete.

The test method is named HyEA-TestTM. (HyEA-Test = Hagerbach young Early Age-Test)

Based on the experience with production, application and testing of shotcrete, VSH did evaluate during research projects with different mix-designs and fibre contents the test method. As a result of the research projects a mobile testing equipment for in-situ use at construction sites faces was developed and designed.

The results from these research projects will show, that it is possible to test the energy absorption according to ASTM C1550 in a very early age, meaning during the first hours after the application. Furthermore it is possible to achieve results in such a quality to get information about best dosage of fibres, performance of fibres and mix optimization in general.

The presentation is showing, that the test method should be used for quality control during tunnel excavation. The test method is very helpful to increase the safety level during excavation and installing of additional rock support.