



Review of approval of flexible rockfall protection systems according to ETAG 027

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In 2009, the European Guideline for Flexible Rockfall Protection Kits ETAG 027 became valid. The aim of the guideline is to certify steel barriers available on the market according to a common standard. In 2018, ETAG 027 was replaced by a so-called European Assessment Document (EAD). Numerical simulations are not foreseen within the framework of ETAG 027 and its successor but only the results of field tests contribute to a successful assessment of a product. This contribution summarizes results and experiences that were obtained through the type testing and approval procedures of 66 protection systems evaluated between 2009 and 2018. Apart from the common main task of the barriers to successfully stop falling blocks, the different test conditions and constructions of barriers result in different performance characteristics. Some of these characteristics follow certain trends whereas others show a wide range without any trend. In such a case, the contribution helps to classify a single system compared to the others.

One drawback of following an existing guideline is that it is difficult to include new measurement procedures into the evaluation and to incorporate their results into the ETA of a system. For example, determining the deceleration of the block within the net is standard today.

Certainly, any standardization of construction product testing neglects the variability in product loading under (natural) field conditions, owing to differences in block shape, rotational movements, impact speed or impact location. In particular, certain impact locations have the potential to harm a barrier more than the tested standard load cases or even cause failure of a barrier. Further, if small blocks with high impact velocities are expected, the mesh might suffer from puncturing loads.

ETAG 027 defines reasonable boundary conditions for type testing. For example, the block's density is limited. Setting a maximum density results in a minimum block size, and this in turn causes a minimum barrier nominal height within a certain energy class. Defining a minimum density prevents situations where very large blocks avoid the inverse of the 'bullet effect' with smaller loads in the mesh.