Although fiber reinforced shotcrete (FRS) has been around for many years in the tunneling and mining industry, there are still difficulties in many areas to bring owners and specifiers to take full advantage of the properties of this material in their ground support programs. These difficulties are often associated with the fact that the technical information or material properties reported (such as energy absorption or cracking load) do not necessarily reflect the actual need of the ground support engineer. The paper first proposes an overview, and comparison, of the various methods used to characterize FRS. It then moves on and try to categorize ground support design methods used around the world. In an effort to address what is perceived as a gap between the material characteristics and solicitation requisites, a thorough discussion on combined experimental and modeling methods is presented with the focus of generating reliable data that will allow proper specification of FRS in replacement of conventional mesh and shotcrete approach. Emphasis is given in this exploration to the dynamic loading aspects, as they appear to be of critical importance in the further development and efficient use of FRS.