

Abstract

Title:

Comparison of impact force values amongst improvised and traditional rope fixed installations.

Objectives:

The aim of this work is to measure the resultant impact forces acting on a climber during a fall from an improvised fixed installation, using an improvised ferrata set, by means of an experiment. Furthermore, to compare the measured impact force values with those already measured for traditional fixed installation using ferrata fall arresters.

Methods:

This paper describes an experiment in which the actual impact force acting on a climber during a fall from an improvised fixed installation using an improvised ferrata set was determined. The aim of the first experiment was to determine the values of the impact forces for a given length of fall. At the same time, to determine the maximum value of the impact force at which the reep cord forming the improvised ferrata set will not break. The second test aimed to determine the resultant values acting on the load when falling into the sag from the dynamic rope, which were then used to compare with the results of the first test. The purpose of the last test was to compare the resultant values of improvised and traditional fixed installations. Each fall length was tested for ten trials whereby after each fall the textile material was replaced with a new one.

Results:

It was found that when a 100 kg climber fell from an improvised ferrata route using an improvised ferrata set and a fall length of 4 m, the resulting impact forces reached an average value of 8.97 kN. Furthermore, it was confirmed that the improvised ferrata set is able to withstand a fall into a sag from a dynamic rope with a maximum fall length of 4 m. The actual measured values were significantly higher than the measurements made for traditional fixed installation.

Keywords:

Via ferrata, traditional fixed installation, fall, fall factor, impact force, fall arrest, fall damper, military climbing, improvised fixed installations.