

Section 01. Innovations in Engineering

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Features of metrology when evaluating sports results

Many people believe that metrology is a science of narrow specialization, which is applicable only to factories and enterprises. However, metrology can be applied both in industrial areas and human life sectors such as medicine, sports etc.

Sport is an important component of human health. People who devote their lives to sports, training athletes, or deeply study the sport may encounter such a section as sports metrology. Sports metrology is based on measurements in physical education and sport. Accordingly, the object of study is a living system—a person. There are 4 main directions of applying metrology here: measuring physical quantities, measuring quality indicators, testing the condition and preparedness of an athlete, and evaluating sports results and tests.

The testing phase is rather important especially to determine the functional state of the body systems and the level of physical working capacity,. The precise definition of the purpose of testing will help to select the right tests. Accordingly, a set of tests should include indicators that characterize such qualities on which success in competitions depends. It is also necessary to take this into account when determining the number of tests for each of the physical qualities.

Testing corresponds to indirect measurements. Indirect measurements are measurements at which the desired value of a physical quantity is obtained on the basis of a known relationship between this quantity and quantities subjected to direct measurements. There are also certain requirements for tests known as reliability of tests: excellent, good, average, acceptable, low.

There are many tests to obtain quantitative information about the athlete. It should be emphasized that not all measurements can be used as tests, but only those that meet special requirements: standardization, the system of evaluation of results, reliability and informativeness. At the same time, evaluation of test results can be both qualitative and quantitative. The reliability of test characterizes the degree of coincidence of results with repeated testing of the same people under the same conditions, and is estimated by the correlation coefficient between the results of the first and repeated testing. To assess the reliability of tests, an analysis of variance should be made, and then an interclass correlation coefficient should be calculated. With the help of dispersion analysis, a quantitative test of the influence of external factors on the result is carried out.

Thus, we see that metrology is a science, the application of which can be found not only in the areas where metrological provision of measuring equipment is required, but also in such areas as sports. Therefore, metrology is applicable in all areas where there are dimensions, and it is required to give them an estimate qualitative or quantitative or both.