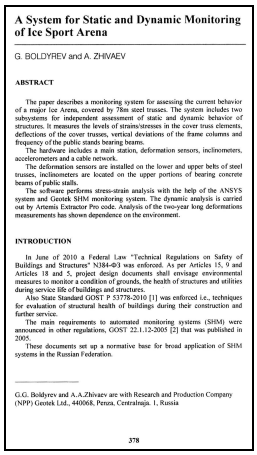

A System for Static and Dynamic Monitoring of Ice Sport Arena

G. BOLDYREV and A. ZHIVAEV

ABSTRACT

The paper describes a monitoring system for assessing the current behavior of a major Ice Arena, covered by 78m steel trusses. The system includes two subsystems for independent assessment of static and dynamic behavior of structures. It measures the levels of strains/stresses in the cover truss elements, deflections of the cover trusses, vertical deviations of the frame columns and frequency of the public stands bearing beams.

The hardware includes a main station, deformation sensors, inclinometers, accelerometers and a cable network.

The deformation sensors are installed on the lower and upper belts of steel trusses, inclinometers are located on the upper portions of bearing concrete beams of public stalls.

The software performs stress-strain analysis with the help of the ANSYS system and Geotek SHM monitoring system. The dynamic analysis is carried out by Artemis Extractor Pro code. Analysis of the two-year long deformations measurements has shown dependence on the environment.

INTRODUCTION

In June of 2010 a Federal Law "Technical Regulations on Safety of Buildings and Structures" N384-ФЗ was enforced. As per Articles 15, 9 and Articles 18 and 5, project design documents shall envisage environmental measures to monitor a condition of grounds, the health of structures and utilities during service life of buildings and structures.

Also State Standard GOST P 53778-2010 [1] was enforced i.e., techniques for evaluation of structural health of buildings during their construction and further service.

The main requirements to automated monitoring systems (SHM) were announced in other regulations, GOST 22.1.12-2005 [2] that was published in 2005.

These documents set up a normative base for broad application of SHM systems in the Russian Federation.

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Ключевые слова:

Содержание.