Bridge cranes are the most widely used hoisting machines in modern production, ensuring their reliable and uninterrupted operation is a very important task [1, 2].

The durability of the bridge crane depends largely on the durability of its metal structure, which receives quite significant variable loads [3, 4]. Cyclic operation of the crane causes rapidly changing processes of loads not only in time but also in magnitude [5]. This requires a very careful determination of all power factors that occur during the operation of the bridge crane, both static and dynamic [6].

The main loads that occur in the metal structure of the bridge crane, occur during lifting and operation of the mechanisms of movement of the truck and the bridge [7, 8]. Many works have been devoted to the assessment of the influence of structural parameters of movement mechanisms on dynamic loads in metal structures [9, 10].

We proposed a new design of the running crane wheel with an elastic insert [11, 12], which significantly reduced the dynamic loads during the operation of the movement mechanism [13].

The «Ultra-B-I» complex was used to measure the vibration accelerations that occur during field tests of the bridge crane trolley (Fig. 1).
The software that is part of the vibration measuring complex allows you to build in real time the dependence of vibration accelerations on the frequency, as well as to determine the spectral composition of the signal.

The research was conducted on an existing bridge crane. The vibration measuring complex was located directly on the object of research. The sensors were installed at the control points of the crane truck and were connected to the analog-to-digital converter by means of wires placed on the crane beam. The latter allowed for direct control over the modes of operation of the crane.

The study of the vibration state was carried out on the axis of the driven regular running wheel of the cargo crane of the bridge crane and on the axis of the driven modernized running wheel of the cargo crane of the bridge crane.

Vibration measurements were performed at different speeds of the trolley on the crane bridge, as well as at different operating modes.

References: