

# Dynamics response of the orthotropic bridge plate with uncertain parameters under stochastic moving load

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The problem of a dynamic response of a structure subjected to moving loads occurs in dynamics of bridges, roadways, railways and runways as well as missiles and aircrafts. Different types of structures and girders like beams, plates, shells, frames have been considered and also different models of moving loads have been assumed. The problem of dynamic response under moving load is particularly important in mechanics of bridges. Very often as the theoretical model for beams-plate bridges the orthotropic plate is assumed. The dynamics response of the plate under moving load has been considered by many authors but in most of their works the parameters of the plate have been assumed to be deterministic. In real situation not only the load process has stochastic nature but also the parameters of the structure are uncertain. In the paper the problem of vibration of an orthotropic plate with uncertain parameters under a moving random load is considered. The aim of the paper is to find the solution for the probabilistic characteristic of the response of the plate. The probabilistic characteristic of the response of the plate are sought in the form of the first two probabilistic moments, i.e. the expected value and the correlation (covariance) function. The solution of the problem was found thanks to use the random dynamic moving influence function which allows to apply the perturbation method. Two types of the random moving load are considered, namely a normal stationary or non-stationary process – continuous load model (CLM) and a random train of moving forces - discrete load model (DLM). The main difficulties are connected with the fact that the coefficients and the right hand side of the equation of motion are random. Some numerical tests have been done and the results have been shown.

## References

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