

ABSTRACT

The bridge is one of the vital infrastructure of the transportation system which is expected to operate for a long time and mostly affect the activities of the citizen. Bridges need to be monitored in the condition of the structure to determine the maintenance schedule during the life of plan because the bridge experiences degradability of the skeletal structure. Camber deflection exceeds the limit of the plan is very dangerous for the construction of the bridge, in addition to the frequency that occurs on the bridge can also affect the natural frequency of the bridge that can reduce the ability of service. Therefore, the bridge structure monitoring system monitored every second.

In this final project, the bridge model that used is a type of warren truss (steel frame) bridge model that will be designed to detect a bearing shift using infrared sensors that interpret the camber deflection value. Meanwhile, to monitor the vibration of the bridge required the process of transformation from time domain to frequency domain using Fast Fourier transform algorithm. Unlike conventional bridge structure monitoring which is only done periodically so that the condition of the structure is directly unknown.

The results obtained from this study are the accuracy of joint displacement readings of 95.899% and the maximum displacement of the joints that occurs is 0.1 cm when the load is 395 Kg with a deflection of 2.012 cm. While the natural frequency in the three axes that occurred when the prototype was given a moving load of 150 Kg at $X = 2.330$; 1,523 Hz. $Y = 3,445$; 0.469 Hz. $Z = 6.921$; 1,406 Hz, while when given a moving load 230 Kg of $X = 63,054$; 0.352 Hz. $Y = 37,112$; 0.352 Hz. $Z = 10.343$; 1,289 Hz.

Keywords: Werren truss bridge, displacement bearing, camber deflection, fast fourier transform.