

Adopting dynamic transient response analysis for sensors positioning to monitor cable stayed bridge

ABSTRACT

Periodically, long span bridges require constant structural assessment and continuous monitoring. Recently, existed bridges and vehicles loading mechanism have influenced many studies to predicate the dynamic bridge response and monitor damage occurrence. The objective of present study is set to monitor the Penang (I) Bridge using finite element model to verify the positioning of sensors. 3D model was developed to evaluate the modal parameter's momentous attitude alteration of the bridge selected grid points and elements. Discussion is focused upon the output parameters such as displacements and stresses generated by vehicles weights. Three types of vehicles were chosen for the purpose of crossing the bridge. In conclusion, from the six lanes of the bridge, high displacements were obtained at the lane 6 (the most left or right side lane) due to vehicles loads at the grid points while maximal stresses were enhanced at lane 6 and 4 (either of the two middle lanes) of the chosen girder beam at bridge spans and cable elements of the infrastructure. Subsequently, sensors were positioned at the grid points in lane 6 and elements located at both lanes due to the mixed loading events.

Keyword: Structural health monitoring; Cable stayed bridge