論文要旨

東北地方太平洋沖地震では多くの橋梁が津波によって流出した。そして,橋梁の津波流出被害は復旧作業に大きな影響を与えた。これより、防災計画を考える上で橋梁の津波流出予測は重要であるといえる。

よって、本研究の目的は、橋梁台帳に基づく橋の津波流出予測手法を提案することである。

橋梁の津波流出予測は橋の抵抗力を津波の作用力で割った値を用いる。橋の抵抗力は浮力を考慮した摩擦力と既往の実験より提案した支承耐力を使用した。また、津波作用力は既往の波力評価式より求めた流体力と衝突波力を用いた。そして、既往の波力評価式を用いて陸上遡上津波の波力評価式を提案した。

本研究の提案式を用いて東北の被災橋梁の津波流出予測を行った結果、橋梁の安全照査の一次調査に有効であることが分かった。

次に、橋梁台帳情報に不足している上部構造重量と桁高の推定式を算定した。その後、橋梁台帳程度の情報を持つ東北の被災橋梁の津波流出予測を行った結果、橋梁の安全照査の一次調査が可能であることが分かった。

Abstract

Many bridges flowed by tsunami due to the Tohoku Region Pacific Offshore Earthquake. Then, the damage of the tsunami outflow of the bridge had a major impact on the restoration work. Accordingly, prediction of the bridge flowed by tsunami is important for the disaster prevention plan.

Therefore, the purpose of this study is the prediction method of bridge outflow by tsunami based on the bridge ledger data.

Prediction of the bridge flowed by tsunami uses the value obtained by dividing the resistance of the bridge by the action force of the tsunami. The resistance of the bridge used frictional force considering buoyancy and bearing resistance proposed from past experiments. Also, for the tsunami acting force, fluid force and collision wave force obtained from the past wave force evaluation formula were used. Then, using the past wave force evaluation formula, we propose the wave force evaluation formula of the run-up tsunami.

As a result of predicting the tsunami outflow of the damaged bridge in Tohoku by using the proposed method of this study, it was found that it is effective for the primary survey of safety check of bridge.

Next, an estimate formula of upper structure weight and digit height which is insufficient for bridge ledger information was calculated. After that, as a result of predicting the tsunami outflow of the damaged bridge in Tohoku with the data about the bridge ledger, it was found that the primary survey of the safety check of the bridge was possible.