Historical buildings in Turkey are one of the most important ones in all over the country. Therefore, they need to be preserved appropriately for new generations. Hence, seismic behavior of historical buildings are important to define for accurate applications of structural strengthening of the buildings. In the present study, Van Akdamar historical church which was located in Van, Turkey is investigated. Van is one of the provinces in Turkey laid on the earthquake zone with high risk. The historical church was modelled with SAP2000 finite element program. The model was investigated with Van earthquake data from 23.10.2011 Van earthquake. In the investigation, linear time history analysis was carried out. As a result of the analyses, maximum stress, displacement and base shear values were calculated.