

ABSTRACT

The present dissertation deals with the analysis of an Egnatia Street bridge, at 25+725 km of the part Kleidi – Koyloyra (6). The bridge's overall length is 135.8 m with three spans (45,1+45,5+45,1) m length. It is a box-girder bridge, with a box that has 2,20 m height. The piers have only one column and they are connected integrally with the bridge's deck. The piers has a circular section with a diameter of 2 m and it is founded on piles. The abutments are not vertical to the bridge axis. The bridge's conveyor is supported by pot bearings on the abutment.

At the beginning, the characteristics of such a bridge are given in detail and the way it is being constructed is described also. While visiting the construction area , several photos of the bridge were taken as well as photos of the structural parts. These photos are presented in order.

The analysis has been performed with the help of the static program SAP2000. Initially the modeling of the construction is described in order to form the static system and then the discretization of the system with linear finite elements. The geometrical elements of the cross-sections that have been used are analytically presented, as well as the way they have been introduced to the program. Moreover all the load cases and combinations are calculated and presented (dead loads, live loads, prestress loads). Analysis with the Response Spectrum Method has been carried out to estimate seismic action towards all three directions and results are given for the inertial forces at the piers' edges and at the conveyor 's support joints over the piers.

In another chapter, the design of the piers is presented for the seismic action, as well as the prestressed conveyor at its supports above the piers. The foundation of the piers is also designed by calculating its stress when it is loaded with the capacity moments and shear forces of the pier.

After that there is a calculation of the bridge's displacements using a reduced stiffness for the piers. This is used for choosing the suitable pot bearings that are able to withstand the displacements as well as the reaction forces that are developed.

At the last section, there are some segments of the input files of the model and output files of the analysis by the static program SAP 2000.