

# DESIGN A TWO-HINGED ARCH BRIDGE FOR LIGHT TRAFFIC

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## ABSTRACT

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The main objective of the project is to design a two-hinged arch bridge for light traffic. The arch bridge understudy is used to cater two carriageways for one direction only. The bridge consists of arch rib, steel column, bridge deck, and bridge foundation. The bridge deck is consisted of concrete slab, steel girders and floor beams. Steel is used to construct to arch rib, girders, floor beams and bridge column. Concrete is used to make the bridge foundation and slab of the bridge deck. The arch type used is an open spandrel arch. Two- hinged arch is used for the design of the arch rib which has two supports only. It is a statically indeterminate structure which consists of vertical and horizontal components at each support. The concrete foundation will support the arch.

First, a brief introduction about arch bridge which includes the definition of arch, history background of arch, arch system, types of arch and analysis of two-hinged arch will be described. The parabolic shape of arch will also be analyzed to obtain the best position for the placing of the steel columns.

The bridge will be built across a deep valley in a mountain area for low traffic volume. The bridge span is 100, and the rise of the arch rib is 20m. light traffic in this study is defined as low traffic volume. Since the bridge deck is designed for light traffic, influence lines for both forces and moment acting in the deck will be shown. It will give a clearer picture of the magnitude for all the reactions of the supports. Further than that, the flexible pavement on the concrete slab will also be designed. The specifications used in this design are referred to the British Code and arahan JKR Teknik.

Method of analyzing two-hinged arch will be shown in details. This method emphasis on analyzing the moment, horizontal thrusts and vertical shear that generated by the arch rib when it is loaded. The vertical and horizontal components at each support of the arch rib will also be calculated.

In this study, a complete design for a two-hinged arch bridge has been achieved.