

**STRUCTURAL ANALYSIS AND DESIGN OF PRATT TRUSS
BRIDGE AT ALINGARO, GEN. TRIAS, CAVITE**

Design Project

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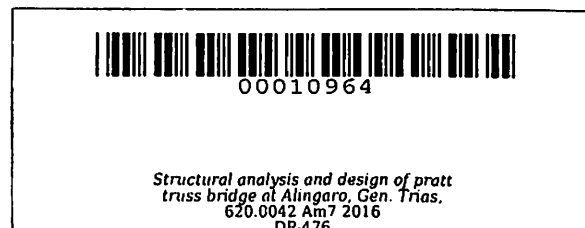
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Undergraduate Design Project
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ABSTRACT

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The structural analysis and structural design of the Pratt Truss Bridge was conducted from June 2015 to February 2016 at Cavite State University.

The objective of the study was to provide an analysis and design of pratt truss bridge at Alingaro, Gen. Trias, Cavite using engineering procedures, as well as to prepare architectural and structural plans of the bridge, to provide the types and sizes of materials that will be used in the construction, and to provide a detailed cost estimate of the project.

The Engineering Software STAAD (Structural Aided Analysis and Design) was used in the analysis of truss. The guidelines set by the National Structural Code of the Philippines (NSCP) and DPWH Specifications for Bridges were followed in the design computation. The maximum moment, shear and axial loads were the basis for the design.

In the design and computation of the superstructure, the stringers and floor beams supports the entire highway. MS 18 moving load was used in the design to make sure that the bridge will be able to carry the heaviest possible truck load. The floor beams will transfer the loads to the truss. The truss members were distinguished whether if it is in tension or compression. STAAD was used to obtain accurate truss member forces. The entire weight of the bridge is carried down through the abutment, which in turn rest on the Earth.

CADD was used in the preparation of architectural and structural plans of the bridge.

The estimated total project cost is PhP 12,533,442.81. It can also be concluded that the design project will be useful enough and will produce a bridge that meets NSCP and DPWH standards.

Based on the analysis, the configuration of the members of the pratt truss bridge eliminates the presence of bending and shear forces on the structural members considering that the load from the roadway are directly transmitted by the floor beam on the joints of the panel. The members composing the truss are only subjected to axial forces, either tension or compression. Hence, it is very suitable and recommended for bridges with longer spans.

The authors also suggest the use of high strength tension bolts because of the likelihood of accumulation of rust, wearing and overall deterioration on connections.

The use of the truss allows easy construction and the computed efficiency proves the sections to be economical making the study recommendable for actual implementation.

Future researchers and users of this study are advised to investigate the mechanical behaviour of gusset plates subjected to compression and also to make a parametric analysis on the thickness of gusset plates.

Furthermore, a study should be conducted for tension and shear failure in the connection of tension members.

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STRUCTURAL ANALYSIS AND DESIGN OF PRATT TRUSS BRIDGE AT ALINGARO, GEN. TRIAS, CAVITE

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INTRODUCTION

Bridges are built to give access to people and moving vehicles between two places. Its basic idea is to reduce the distance between two pieces of lands that are separated by an obstacle and it can be anything from a piece of log to a highly modified man made structure.

There are many types of bridge that are being constructed today. During the World War II (WWII), the Bailey bridge was one of the most significant types of bridge that were constructed at that time. A Bailey bridge is a through-type bridge. It is characterized by the two main girders that carry the roadway. . The trusses in each girder are formed by 10-foot panels pinned end to end. It was named after civil servant Donald Bailey who had the idea for a radical new bridge while working in the British War Office during the war. The design of a modular, light but strong and very versatile steel bridge system proved to be one of the greatest inventions of WWII.