#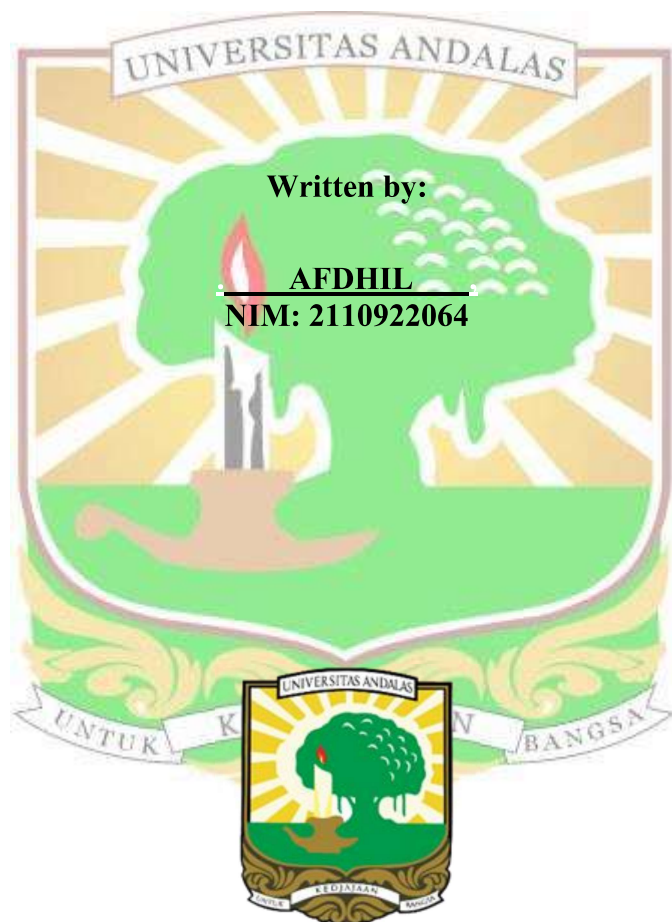 DESIGN OF PRESTRESSED CONCRETE BRIDGE USING PCI-GIRDER BY IMPLEMENTING THE CONCEPT OF BUILDING INFORMATION MODELING (BIM)

UNDERGRADUATE THESIS

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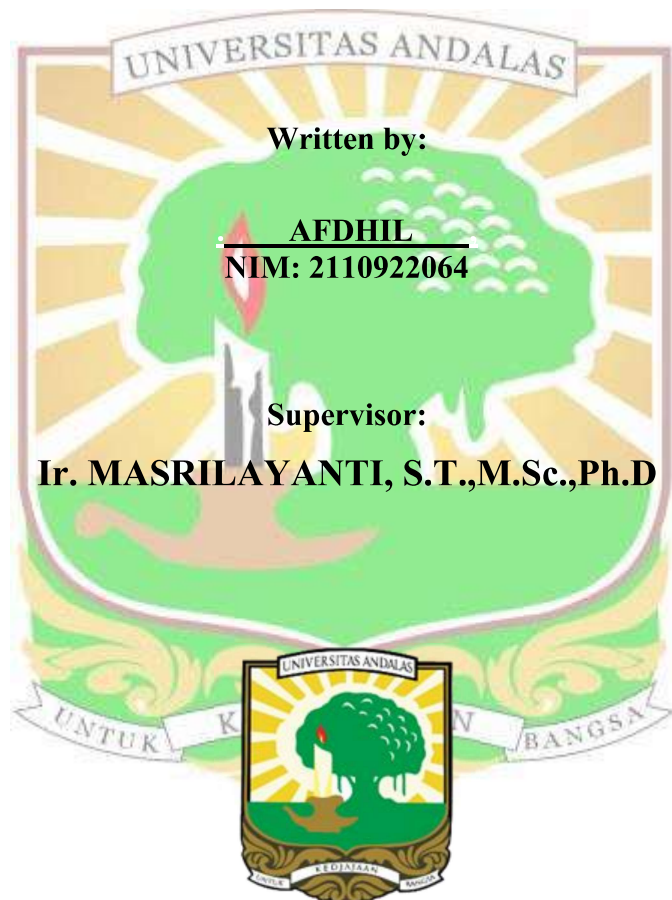**FACULTY OF ENGINEERING**

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DESIGN OF PRESTRESSED CONCRETE BRIDGE USING PCI-GIRDER BY IMPLEMENTING THE CONCEPT OF BUILDING INFORMATION MODELING (BIM)

UNDERGRADUATE THESIS

Submitted as a requirement for completing the Undergraduate Program in the Department of Civil Engineering, Faculty of Engineering, Andalas University

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ABSTRACT

This research focuses on designing prestressed concrete bridges using PCI-Girder (Precast Concrete I-girder) by implementing the Building Information Modeling (BIM) concept to improve the calculation, planning, and design processes. The main purpose of this research is to develop a comprehensive design of prestressed concrete bridges that can withstand various loads, such as dead loads, live loads, and environmental factors, by using PCI girders for efficient structural performance. The study also investigates the application of BIM to aid in structural modeling, load calculation, and structural detailing, which ensures accuracy and optimizes the design process. Through the application of BIM, this research shows how integrating digital modeling and data management can streamline design workflows and improve the accuracy of structural analysis. In addition, the research evaluates the advantages and challenges associated with using BIM in the context of prestressed concrete bridge design, as well as identifies potential improvements in design accuracy, error reduction, and interdisciplinary communication. A detailed engineering design (DED) for the prestressed concrete bridge was developed, covering all the important structural elements and specifications, guided by the results of BIM-based 3D modeling. This study highlights the potential of BIM in modern infrastructure projects, especially in the design and construction of prestressed concrete bridges, and provides recommendations for its future application in similar projects. In this design process, Midas Civil 2022 and Autodesk Revit 2023 software are used to optimize the analysis as well as design and model the bridge structure. Midas Civil 2022 is a structural design and analysis software used for the calculation of bridge loads, deformations, and structural stability. This software allows for more in-depth and accurate analysis, which is crucial in the design of prestressed concrete bridges. Meanwhile, Revit is used to build 3D modeling of bridges, enabling clearer visualization and better coordination between disciplines, as well as supporting BIM in accelerating the planning and design process.

Keywords: Prestressed Concrete Bridge, Building Information Modeling (BIM), Structural Design, Detailed Engineering Design (DED), Midas Civil 2022, Autodesk Revit 2023.