ABSTRAK

PERENCANAAN GEDUNG HOTEL GRAND PAPUA SENTANI MENGGUNAKAN STRUKTUR BAJA *CASTELLATED BEAM* DAN KOLOM *CONCRETE FILLED STEEL TUBE*

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Perkembangan teknologi konstruksi di Indonesia terus mengalami peningkatan, mendorong inovasi dalam desain dan material struktur bangunan. Skripsi ini membahas perencanaan struktur Gedung Hotel Grand Papua Sentani, yang semula menggunakan sistem struktur konvensional, menjadi kombinasi struktur baja *Castellated Beam* dan kolom *Concrete Filled Steel Tube* (CFST). Tujuan penelitian ini adalah untuk mengevaluasi efisiensi dan kelayakan penggunaan kedua sistem struktur tersebut dalam menahan beban serta membandingkan performanya dengan struktur eksisting. *Castellated Beam* dipilih karena kemampuannya dalam meningkatkan momen inersia dan kekakuan tanpa menambah berat material secara signifikan, sehingga dapat mengoptimalkan penggunaan baja. Sementara itu, kolom CFST menawarkan keunggulan dalam peningkatan kapasitas aksial dan lentur akibat sinergi antara baja dan beton, serta memberikan daktilitas yang baik dan ketahanan terhadap api. Penelitian ini menggunakan metode analisis komparatif dengan permodelan struktur menggunakan perangkat lunak analisis struktural. Data yang digunakan meliputi dimensi eksisting gedung, sifat material baja dan beton, serta pembebanan sesuai standar SNI. Analisis meliputi perhitungan kekuatan, stabilitas, dan deformasi untuk kedua sistem struktur (eksisting dan rencana). Hasil analisis diharapkan menunjukkan bahwa perencanaan struktur dengan *Castellated Beam* dan kolom CFST mampu memenuhi persyaratan keamanan dan kinerja struktur yang berlaku, bahkan dapat menawarkan keuntungan ekonomis dan performa yang lebih baik dibandingkan struktur eksisting. Studi ini diharapkan dapat memberikan kontribusi dalam pengembangan aplikasi struktur baja komposit di Indonesia, khususnya untuk gedung bertingkat tinggi, serta menjadi referensi bagi perencana struktur dalam memilih sistem struktur yang optimal.

Kata Kunci: *Castellated Beam*, *Concrete Filled Steel Tube* (CFST), Struktur Baja, Perencanaan Struktur, Gedung Bertingkat.

ABSTRACT

PLANNING OF GRAND PAPUA SENTANI HOTEL BUILDING USING CASTELLATED BEAM AND CONCRETE FILLED STEEL TUBE COLUMN STRUCTURE

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The development of construction technology in Indonesia continues to increase, driving innovation in the design and materials of building structures. This thesis discusses the structural planning of the Grand Papua Sentani Hotel Building, which was originally designed with a conventional structural system, to a combination of Castellated Beam and Concrete Filled Steel Tube (CFST) column structures. The objective of this study is to evaluate the efficiency and feasibility of using both structural systems to withstand loads and to compare their performance with the existing structure. Castellated Beams were chosen for their ability to increase moment of inertia and stiffness without significantly adding material weight, thereby optimizing steel usage. Meanwhile, CFST columns offer advantages in increasing axial and flexural capacity due to the synergy between steel and concrete, as well as providing good ductility and fire resistance.

This research uses a comparative analysis method with structural modeling using structural analysis software. The data used includes existing building dimensions, the properties of steel and concrete materials, and loading in accordance with SNI standards. The analysis covers the calculation of strength, stability, and deformation for both structural systems (existing and planned). The results of the analysis are expected to show that the structural planning with Castellated Beams and CFST columns can meet the applicable structural safety and performance requirements, and may even offer economic and performance advantages compared to the existing structure. This study is expected to contribute to the development of composite steel structure applications in Indonesia, especially for high-rise buildings, and to serve as a reference for structural planners in selecting optimal structural systems.

Keywords: *Castellated Beam, Concrete Filled Steel Tube (CFST), Steel Structure, Structural Planning, High-Rise Building.*