

ABSTRACT

There are many factors to consider when designing a foundation including the bearing capacity of the soil where it rests upon, the factored loads it will bear, and safety factors to consider, its strength to handle shear forces, and the standardized code to ensure its safety. Those factors require careful calculations and the method generally used is trial and error which would most likely consume a lot of time. This project is intended to lessen that time and provide easy access to information for future references to the user (consultant). Theories in this project include the geotechnical and structural aspects of a foundation design and analysis; and software and analysis design methods, using tools such as *Data Flow Diagrams*, according to R. Pressman. The program created uses Java programming language and MySQL to manage the database used. Finally, the result presented is in the form of a portable document file (pdf) that is viewed, saved, and printed using an external application.

Keywords: foundation, geotechnical aspect, structural aspect, bearing capacity, shear forces, information system, software analysis and design.

ABSTRAK

Banyak faktor yang perlu dipertimbangkan ketika merancang sebuah pondasi, diantaranya: daya dukung tanah dimana pondasi tersebut diletakkan, beban terfaktor yang membebani, pertimbangan faktor keamanan, kekuatan fondasi menahan gaya geser yang terjadi, dan kode standar untuk memastikan keamanannya. Faktor-faktor tersebut memerlukan perhitungan yang teliti dan metode yang umumnya digunakan adalah trial and error dimana menghabiskan banyak waktu. Program ini dimaksudkan untuk mengurangi kendala tersebut dan dengan mudah menyediakan informasi yang dapat dijadikan referensi untuk pengguna (konsultan) di masa yang akan datang. Teori-teori yang digunakan untuk menunjang program ini termasuk teori tentang aspek struktural dan geoteknikal dalam mendesain fondasi; dan untuk metode perangkat lunak dan analisis desain menggunakan tools, seperti Data Alir Diagram menurut R. Pressman. Program ini dibuat menggunakan bahasa pemrograman Java dan MySQL untuk mengelola basis data yang digunakan. Hasil yang disajikan dalam bentuk portable document file (pdf) yang dapat dilihat, disimpan, dan diprint dengan aplikasi eksternal.

Kata kunci: pondasi, aspek struktural, aspek geoteknikal, daya dukung tanah, gaya geser, sistem informasi, analisis dan desain perangkat lunak.

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TABLE OF NOTATIONS

The terms in the list are used in this report in the order of their appearance:

c	= the cohesion of soil
ϕ	= internal friction of soil
D_f	= depth of the ground where the foundation rests upon
q	= bearing capacity
q_{ult}	= ultimate net bearing capacity
q_a	= allowable bearing capacity
N_q, N_c, N_γ	= bearing capacity factors
s_c, s_γ	= shape factors
B	= least lateral base dimension
L	= greatest lateral base dimension
P_u	= factored normal load
P_n	= nominal normal load capacity
Φ	= 0.75; resistance factor
e	= eccentricity of load
V_u	= factored shear force on critical surface, N
V_c	= nominal shear capacity on the critical surface, N
V_n	= nominal shear strength, N
f'_c	= specified compressive strength of concrete, MPa

f_y	= specified yield strength of reinforcement, MPa
β_c	= the ratio of the column's longest length to the column's shorter
α_s	= constant used to compute V_c in slabs and footings (center = 40, edge = 30, corner = 20)
ρ	= reinforcement ratio
A	= area specified, mm^2
d	= diameter of reinforcement specified, mm
l	= length specified, mm