٦

ٹ ڈ

چ ہ ہ ہ ھ ھ ے ے ئے ئے ڭ ڭ ڭ

ُ ُ ٗ ٗ ٰ ٰ ۥ ۥ ۥ ۥ ۦ ۦ

سورة الأنبياء الآيات (٧٩ - ٨٠) .

صدق الله العظيم .

Dedication

To …

My father and my mother . . .

To . . .

My brothers and my sister . . .

To . . .

All whom I love . . .

Nahed

Acknowledgements

*First of all thanks for **God** who help me to complete this work.*

I am in great debt for all those who have exert efforts or participate to complete this work in its present copy.

*I would like gratefully thanking my supervisor **Dr.Ali Hussein Mohammed Ali**, who has a major role to fulfill this work as it is in present form with his nice supervision and solving all problems , which I met .*

In particular, great thanks to staff of the SUDANUniversity of Science and Technology for the cooperation and providing a suitable environment for the study.

I also would like to thankKORDOFAN University which offered me the chance for study and its financial supports.

ABSTRACT

Bridges are often used to allow people and vehicles to across a natural obstacle such as a river , valleys, roads or pathways.

This research concluded a process of analysis andre-design of the superstructure of spanbridge which placedin the Northern KORDOFAN State. A bridge deck was analyzed by the method of Grillage analogy, this method consistency of converting the bridge deck structure into a network of rigidly connected beams or into a network of skeletal .

The studywas conductedon the modelby applying the design loads onthe superstructureof the bridgeaccordingto the British standard Code (BS5400), And thenanalyzing theseloads by using manualanalysisand sap2000 computerprogram. Three positions for HB vehicle loading have been studied.

The purpose of thestudyis to obtainthe worstcaseload that givesmaximuminternalforceeach of theshear forcesandbending momentsofthe superstructure of bridge and eventually, conclusions and recommendations have been drawn. Further studies are suggested for future researches.

الملخص

كثيراً ما تستخدم الجسور للسماح للناس والمركبات عبورالعائق الطبيعي مثل الانهار والوديان والطرق أو الممرات .

تم تحليل بلاطة الجسر ببرنامج الحاسوب استنادا علي طريقة التحليل (Grillage Analysis)

حيث تقوم هذه الطريقة علي تحويل البلاطة الي شبكة مرتبطة مع بعضها البعض .

تناولهذاالبحثعمليةاعادةالتصميملأجزاءالعلويةلجسر العارضاتبولايةشمالكردفان .

اجريتالدراسةعليالنموذجوذلكبتطبيقالاحمالعليالاجزاءالعلويةللجسر وفقاًللكودالبريطاني(BS5400)

ومنثمتحليلهذهالاحمالتحليل يدويا وحاسوبيا باستخدام برنامج التحليل (Sap2000) ومقارنتها بالخرط التصميمية .

تمعملدراسةلثلاثةمواقعتحميللمركبة غير الطبيعية التصميمية (HB) .

الغرضمندراسةهذهالحالاتهوالحصولعليأسوأحالةتحميلتعطي اكبرقوي داخليةلكلمنقويالقصوعزومالانحناءلعناصرالجسرالعلوية.

أخيراًتموضعخاتمةالبحث والتيتحتويعليخلاصةماتمالحصول عليهوايضاً وضعتالتوصياتوالمقترحات .

List of contents

Topic **Page (NO.)**

CHAPTER (1)

CHAPTER (2)

CHAPTER (3)

CHAPTER (4)

CHAPTER (5)

CHAPTER (6)

References

Appendices

Appendix (A) : Sap2000 Program output data

Appendix (B) : The original design sheets.

LIST OF NOTATION

Notation	Title	Page No
HA	Normal traffic	55
HB	Abnormal vehicle unit loading	55
UDL	Uniformly distributed load	55
KEL	Knife edge load combined	55
DL	Dead load	55
SIDL	Super imposed dead load	55
β_i	Lane factor	56
b_l	Notional lane width	56
U_D	Ultimate design load	57
M_{UD}	Moment design load	57
M_L	Maximum bending moment	57
M_{UL}	Ultimate maximum bending moment	57
M_U	Totalbending moment	57
f_{cu}	Compressive strength of concrete	58
f_y	Tensile strength of reinforcement.	58
A_s	Area of steal	58
b	Width of slab	58
d	Effective depth	58
P	Single wheel load	59
Z	Lever arm	74
ν_C	Critical shear	75
Le	Basic span	76
δ	Deflection	76

LIST OF TABLES

LIST OF FIGURES