PARASITIC MOMENT EFFECT FOR THE THREE SPANS CONTINUOUS PRESTRESSED CONCRETE BRIDGE

SITI SARAH SALIM

A project report submitted in partial fulfillment of the requirements for the award of the degree of Master of Engineering (Civil-Structure)

Faculty of Civil Engineering
Universiti Teknologi Malaysia

JANUARY 2014
To my beloved parents and family
ACKNOWLEDGEMENT

I wish to express my sincere appreciation to my project supervisor, Assoc. Prof. Dr. Arizu b. Sulaiman, for his encouragement, guidance, advices and critics. Without his continued support and interest, this project would not have been the same as presented here.

I also would like to give my special thanks to my Director, Mr Zainal, my supervisor, Mr S. Baskaran and fellow officemate at SMEC (M) Sdn. Bhd. for providing assistance and support. They have contributed towards my understanding, thoughts and useful information for finishing this project.

My fellow friends also are recognized for their support and thanks for their direct and indirect involvement. My sincere appreciation also extends to others who have provided assistance at various occasions.

Lastly but not least, I am grateful to my dearest family for their constant encouragement apart from providing their love and moral support. Words cannot express my gratitude. Thank you for everything.
ABSTRACT

In the analysis of a continuous prestressed concrete bridge, Dead Load (self-weight of bridge), Superimposed Dead Load (Surfacing and Parapet) and Live Load (HA, HB or combined) are considered as major loadings for bridge structure. However, there are other factors that should be considered in the analysis such as Parasitic Moment. The effect from parasitic moment can contribute a significant value in designing a continuous prestressed concrete bridge. This study focuses on the effect of parasitic moment for a three spans continuous prestressed concrete bridge. An analysis of a continuous bridge using Staad Pro software is carried out to determine the parasitic moments of the bridge. The parasitic moments obtained from Staad Pro are slightly higher compared to the parasitic moments from Adapt software with a difference less than 10 percent. The parasitic moment is sagging throughout the whole bridge and the maximum moment is at the second span. A positive value of the parasitic moment will increase the value of the sagging moment at the mid span but will reduce the hogging moment at the support. For the case when parasitic moment effect is considered, the stress at bottom of beam is lower than the stress at top of beam. Whereas, the situation is reverse for the case when parasitic moment effect is not considered. If the same dead load, superimposed dead load and live load proportions are to be considered, the resultant stress at bottom of the beam will exceed the tensile stress limit when the parasitic moment proportion is more than 55% of the total moment. Hence, the parasitic moment effect should be considered in the design of a continuous prestressed concrete bridge especially when it comes to the value of moment at the mid span of the bridge.
ABSTRAK