بسم الله الرحمن الرحيم

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تم عمل المسح الضوئي لهذة الرسالة بواسطة / سامية زكى يوسف

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات:

- **بالرسالة صفحات لم ترد بالأصل**
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USE OF COMPOSITE PRESTRESSED PRECAST CONCRETE WAVE-LIKE SLABS IN SHORT AND MEDIUM SPAN BRIDGES

BY

GHADA THABET MOHAMMED ATWA

A Thesis Submitted to the
Faculty of Engineering, Cairo University,
Fayoum Branch in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF SCIENCE

In

Civil Engineering (Structural Engineering)

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
FAYOUM BRANCH, EGYPT

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ABSTRACT

In the present study a composite corrugated precast prestressed concrete deck slab bridge is introduced. The slab consists of a precast prestresed corrugated layer topped by a cast–in situ layer.

In this research, this slab is extended to be used, for simply supported short and medium span bridges.

Comparison is conducted with conventional flat slab bridges to assess the merit of using the new proposed slab.

Mathematical modeling is employed in the analysis where a nonlinear finite element program was utilized in order to predict the behavior of the composite slab. Preliminary numerical examples are solved, by using this program to confirm its validity for the parametric study. The prestressed concrete composite section is modeled as successive layers, each layer with different properties. Loading followed the standard roadway bridge loading according to the Egyptian code of practice, which allows for unsymmetrical lane loads. The parameters that affect on the behavior of this slab are studied under cases of loading at both construction stage and service stage. These parameters are "geometry, prestressing force, material strength, additional non prestressing steel, and jacking position". The study shows that the overall behavior of the composite corrugated prestressed slab is better than the behavior of the equivalent flat slab, regarding deflection and stresses in top and bottom fibers of this slab. The study also shows that the additional reinforcement is important to reduce high stresses at critical sections and to reduce camber and deflection.

Key words: "Composite corrugated concrete slabs, prestressing, short and medium span bridges".

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