MASTER'S DISSERTATION AT STRUCTURAL MECHANICS

DEPARTMENT OF CONSTRUCTION SCIENCES | FACULTY OF ENGINEERING LTH | LUND UNIVERSITY

DENIZ AHADI
denizahadi@gmail.com

PHILIP LEWIS
a.philip.lewis@gmail.com

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SUPERVISORS

KENT PERSSON *Professor*
Div. of Structural Mechanics, LTH

SEBASTIAN OKRAJNI *Consultant*
AFRY

KENT KEMPENGREN *Consultant*
AFRY

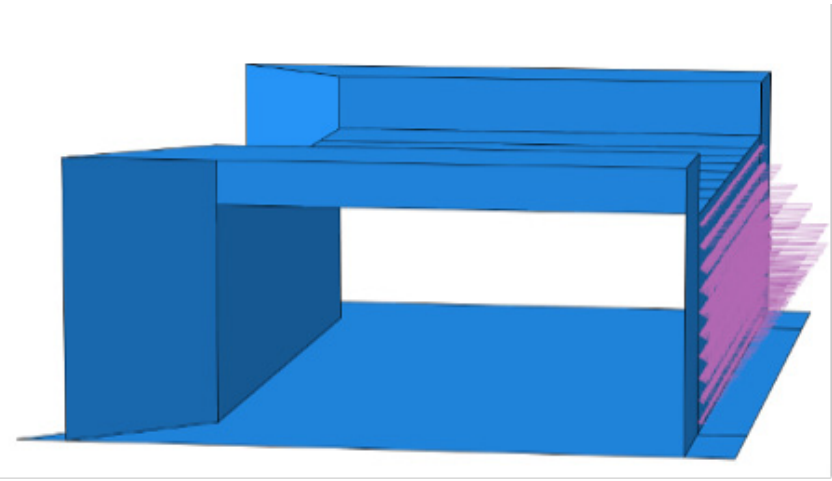
EXAMINER

SUSANNE HEYDEN
Associate Professor
Div. of Structural Mechanics, LTH

THE WORK IS PERFORMED AT

DIVISION OF STRUCTURAL MECHANICS, LTH

A STUDY ON EARTH PRESSURE ON ABUTMENT WALLS OF PORTAL FRAME BRIDGES



BACKGROUND

Integral bridges are commonly used because of their construction and lack of bearing supports and expansion joints. However, when vertical surfaces such as abutment walls move in the horizontal direction an increased earth pressure is created which needs to be considered. When calculating the increased earth pressure from the horizontal movement, the abutment walls are subjected to pressures that vary from zero to an apex in the centre of the wall height down to zero again at the base. This method and regulation according to "TRVINFRA-00331", Trafikverket, assumes that the construction has no movement in the base which does not represent a realistic translation of loads through the structure to the surrounding soil, and does not take the stiffness of the walls into account.

AIM

The aim of this master thesis is to study the distribution of earth pressure caused by horizontal movement of an integral bridge to suggest a more adequate distribution that represents real world application compared to the method used today.

RESEARCH QUESTIONS

Through a parameter study of integral bridges with various geometries and foundations, examine and study the distribution of increased earth pressure caused by movement and compare the results with "Trafikverkets" regulation and methods, and try to find a more adequate distribution of the earth pressure.

METHOD

The bridge structure will be modelled through finite element analysis with an assumed subgrade modulus. Through a study conducted with various backfill material and stiffnesses of the retaining wall (i.e. various thicknesses, heights) and an open or closed frame derive an analysis and compare the pressure distribution with the current regulations in use today.

DIVISION OF STRUCTURAL MECHANICS
Faculty of Engineering LTH, Lund University, Box 118, SE-221 00 Lund, Sweden
• Tel: + 46 (0)46-222 73 70 • Fax: + 46 (0)46-222 44 20 • www.byggmek.lth.se

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