BIOGRAPHICAL SKETCH

Kalie Poston is from Livingston, TN. She obtained a Bachelor of Science in Civil and Environmental Engineering from Tennessee Technological University in May 2016, and began pursuing her M.S. in Civil Engineering at Tennessee Tech in August 2016. During the summers of 2016 and 2017, she worked as a student trainee with the U.S. Army Corps of Engineers, Nashville District, in the Hydrology and Hydraulics branch.

In 2017, she received a scholarship from United States Society on Dams (USSD) for her research as a graduate student and attended the annual conference in Anaheim, CA, where she presented her research during a poster session. She recently co-authored a paper for the 2018 USSD Annual Conference and will present her research at the conference in Miami, FL in May 2018.

EDUCATION

B.S. Civil and Environmental Engineering

Tennessee Technological University

2012 – 2016

College of Engineering

TENNESSEE TECH

The Department of

Civil and Environmental Engineering

Announces the Thesis Defense

of

Kalie B. Poston

In Partial Fulfillment of the Requirements

For the degree of

Master of Science in Civil Engineering

Thursday, April 5, 2018

11:00 AM

Held in

Prescott Hall Room 325

Tennessee Tech University

FIELD OF STUDY

Civil and Environmental Engineering

THESIS TOPIC

Parametric Study of Levee Saturation for Undrained Rapid Drawdown Analysis

EXAMINING COMMITTEE

Dr. Daniel VandenBerge – Chairperson

Dr. Alfred Kalyanapu

Dr. Joseph Asante

ABSTRACT

As infrastructure continues to age and natural disasters highlight weaknesses in this infrastructure, there has been an increased focus to analyze levees for rapid drawdown (RDD) failure; however, practitioners are lacking the guidance to do so. Geotechnical engineers have typically used multistage undrained methods to analyze the RDD condition in dams. In order to analyze the RDD condition for a levee with multistage undrained methods, the likely saturated zone within the levee must be determined, followed by the shear strength for both the saturated and unsaturated zones. The saturated zone can be estimated using transient seepage analysis. However, as there are more than 100,000 miles of levees in the United States alone, it is impractical to perform transient seepage analyses for multiple flood scenarios along every levee reach. Taking into account the considerable extent of levee reaches and the variance in material properties, levee geometry, and flood scenarios that may be experienced, it would be beneficial to have a quick and simple method to determine the approximate extent of the saturated zone within a levee at the end of a flood (i.e., the start of drawdown). In support of this broader goal, a chart-based method is presented that can be used to quickly estimate the saturated zone in a levee following a flood based on the soil properties, flood hydrograph, and levee geometry. This saturated zone can then be used as a starting point for undrained RDD analysis.