Analyzing Past and Ongoing Projects of the Panama Canal Expansion Program

A Major Qualifying Project Report:

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Abstract

Five projects related to the Panama Canal Expansion Program were completed over a three month period with the Panama Canal Authority. These projects focused on the ongoing Panama Canal Expansion Program by: designing ArcGIS maps of the annual survey and dredge work of the Canal; developing the Atlantic Bridge's maintenance plan; creating a hydraulic model and floodplain maps to predict downstream construction impacts; designing a BIM model for analysis of early stages of concrete construction; and designing simulations of concrete pours. The results of these projects were composed of recommendations to improve the workings of the Canal.

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Licensure Statement

Earning a professional license in the United States authorizes a licensee to design and certify engineering documents, own a firm, consult on projects, and bid for government contracts. A professional engineer is given a stamp to use to certify documents, which is assigned a number unique to each licensed engineer. This license allows for increased marketability of licensed individuals and the firms which employ them.

To obtain a professional engineering license one must first graduate from an Accreditation Board for Engineering and Technology (ABET) accredited four year college or university program. Next, the engineer must pass the Fundamentals of Engineering (FE) written examination to become an Engineer in Training (EIT). This exam is six hours long and covers many topics the engineer will likely face in their career. For a civil engineer, this includes topics such as hydraulics, soil mechanics, and engineering ethics. After earning the EIT certification, one must work under a licensed professional engineer for a minimum of four years. After this four year period, the EIT can apply to take the Principles and Practice in Engineering (PE) examination to test the applicant's knowledge and skills in their field.

Tests are administered by National Council of Examiners for Engineering and Surveying (NCEES). Each state in the US as well as Washington D.C. has an engineering board represented on NCEES that administer exams. Licensure is regulated at the state level, requiring an engineer to be registered and licensed in each state they work in. As of 2013, some states make it possible to bypass FE and PE exams by providing proof of experience.

The NCEES also has an international registry for professional engineers. This registry enables US based engineers to become recognized as professional engineers in both the Asian-Pacific Economic Cooperation (APEC) and International Engineering Alliance (IEA). This accreditation requires not only seven years of work and a PE and FE license, but an additional two years as an engineer responsible for significant engineering work. The International Professional Engineers Agreement (IPEA) has established a framework for international standard of competence for engineers. IPEA maintains a registry of engineers who have met these requirements are given the credentials as International Professional Engineers (IntPE).

Just as licensure requirements are different between states in the US, the requirements to become a licensed engineer vary by country. To become a professional engineer in Panama, the government entity called the Junta Técnica de Ingeniería y Arquitectura (Technical Board of Engineering and Architecture - JTIA) must accept a graduate's application. No test is necessary, but the application and review process can take several months. During those months it is recommended that the applicant work under a professional engineer to gain experience in the field that they are interested in. Once the review process has been completed and the application accepted, the applicant will receive a certificate and a stamp that they can then use as a professional engineer.

Licensure is a milestone in the career of an engineering design professional. A PE license gives an engineer the ability to stamp either their own designs or the design work of others. This creates potential for the engineer to advance in their career either through promotions or by opening their own firm. No matter the country of residence, licensure can advance the career of an engineer.

Confidentiality Statement

At the request of the ACP, the remainder of this report is confidential. Please contact Dr. Aaron Sakulich at arsakulich@wpi.edu with any questions or concerns.