

Job Task Analysis for Interlocking Concrete Pavement Construction

Recipient: Nocti Business Solutions, Inc.

Grant: \$19,500 plus travel expenses for subject matter experts

Completion: 2021

Project Summary: 21



Background and Need

In 1995, the Interlocking Concrete Pavement Institute debuted a two-day certificate course for installers of interlocking concrete pavement. Since that time over 30,000 installers and industry-related personnel have taken the course. The course and certification process has passed through several versions and refinements. At this writing, about 2,500 installers maintain certification where ICPI certifies installation experience as well as passing the course.

In 1999, the U.S. Department of Labor, Division of Labor Statistics recognized paver installation as in its system of Standard Occupational Classification as SOC Code 47-4091 - Segmental Pavers. This occupation is defined as workers who “lay out, cut, and place segmental paving units. Includes installers of bedding and restraining materials for the paving units.” This classification initiated ongoing collection of employment and wage data for those who install concrete, clay, and stone pavements. Moreover, the United States government recognized this work as a distinct construction occupation trade.

Unlike other construction trades, there is no nationally recognized apprenticeship curriculum for paver installers beyond the ICPI installer certification program. This lack pointed to the need to review and refine the existing ICPI program by applying nationally recognized standards and methods used by other trades apprenticeship programs in defining the knowledge and skills required to install segmental concrete pavements. The skills required are unique to unit paving and do not relate to masonry wall or cast-in-place concrete pavement construction.



The JTA identified critical knowledge & skills required for successful paver installations.

Objectives

These were as follows:

- Conduct a job task analysis (JTA) with subject matter experts.
- Based on weighting the importance of a substantial list of tasks, develop an exam to assess knowledge.
- Test a pilot of the exam with a range of installers and industry personnel.
- Analyze the results with a view toward eliminating biased or faulty questions. This involves statistical analyses of scores, and reliability indices, as well as the standard error of measurement.

- Determine a “cut score” at which one does not pass the assessment due to inadequate knowledge based on psychometric analyses.

The project began with a three-day workshop in March 2021 to list, analyze and critique tasks essential to installing segmental concrete pavements. The session also included drafting an exam to accurately assess knowledge gained from the course using multiple choice questions. Besides the consultant facilitator and ICPI staff, the eight subject matter experts each had well over the required minimum three years of installation experience from eight regions around the U.S.

Another session developed the cut score where the experts make judgments on each individual item on the exam, determining the percent of items minimally competent examinees should be able to answer correctly. The experts must adopt a criterion question to serve as the basis for making judgments on the criticality of the questions on the test. The criterion question used for this assessment as "What percentage of minimally competent candidates would pass each item on the ICPI Installer Assessment?"

In addition to reviewing the exam items, the experts were presented with data from a sample group of test takers. This data provides the panel with information on the difficulty of the question i.e., how many examinees answered the item correctly, and how commonly the other distractors in the multiple choice questions were selected. The experts then review and rate the importance of the exam questions. After the first round of reviews, the preliminary cut score is computed and the information is presented to the panel. If a second round is needed, the panel reviews the preliminary information and is given an opportunity to re-assess based on that information. A minimal passing score of 80% correct was determined from this analysis.

Outcomes

Deliverables included a lengthy list of skills and knowledge required for field personnel to successfully install segmental concrete pavements. In addition, a refined, course-relevant exam was created with 121 questions of which 100 will be on the exam with questions rotating on and off the exam. The list of skills will be used to update the existing ICPI Installer Certification Course. The intent is to make the exam plus documented installation experience the basis of certification with review of the student manual and taking the course as optional. This provides a more flexible approach to those who are in the industry and wish to use certification as a credential for establishing and maintaining credibility in the marketplace.

The JTA identified best practices for interlocking concrete pavement construction resulting in an updated course and exam revisions. This analysis provides a credible and legally defensible basis for establishing paver installation as a unique trade. It positions segmental paving installation to become an apprenticed construction trade resulting in recognition by state contractor licensing agencies, the insurance industry, and by the U.S. Department of Labor.

[The JTA is available online.](#)