# Joint Transportation Research Program

**Principal Investigator:** Shirley J. Dyke, Purdue University, sdyke@purdue.edu, 765.494.0786
**Program Office:** jtrp@purdue.edu, 765.494.6508, www.purdue.edu/jtrp
**Sponsor:** Indiana Department of Transportation, 765.463.1521

SPR-4006 2017


# Image-Based Collection and Measurements for Construction Pay Items

## Introduction

Measuring the actual quantity of pay items placed at a site is an important step in the timely completion of a construction project. Prior to each payment to contractors and suppliers, measurements are made to document the amount of pay items placed at the site. This manual process has substantial risk for personnel, but it could be made more efficient and, as a result, be less prone to human errors. In this project, a customized software tool package was developed to address these concerns. The major benefits of the tool package include

1. cost savings through accelerated pay item measurements;
2. reduced risk to on-site personnel;
3. consistency in measurements leading to greater efficiency in the measurement process; and
4. automated documentation of measurements made for improved record keeping.

## Implementation

The Pay Item Measurement (PIM) tool package is provided as two complementary tools: the Orthophoto Generation Tool and the Graphical Measurement Tool. PIM has been developed in close cooperation with the advisory committee and field engineers from INDOT. It is specifically designed to incorporate the typical actions that INDOT personnel follow. INDOT will use this tool to identify features and make annotations, and to readily compute distances, perimeters, and areas for documenting and recording. The results are output in CSV and PDF format for archival purposes.

This customized tool package will be most useful and accurate when the user guidelines included in this report are followed. The tool is intended to generate orthophotos for measurements on a planar surface. User guidelines explain the process of collecting suitable high-quality images, which is critical for successful orthophoto construction. Photos can be collected with a compact or DSLR camera, iPhone 6s, or cameras mounted on light aerial vehicles. Several examples are tested to demonstrate the characteristics of high-quality image sets that will be successful and to provide examples of sets that would fail.

## Recommended Citation for Report


Yeum, C. M., Mohan, A., Dyke, S. J., Jahanshahi, M., Choi, J., Zhao, Z., Lenjani, A., & Ramirez, J. A. (2017). *Image-based collection and measurements for construction pay items* (Joint Transportation Research Program Publication No. FHWA/IN/JTRP-2017/10). West Lafayette, IN: Purdue University. https://doi.org/10.5703/1288284316510

View the full text of this publication here: https://doi.org/10.5703/1288284316510

Published reports of the Joint Transportation Research Program are available at http://docs.lib.purdue.edu/jtrp/.