Construction Time-lapse Photography
Educating and Training
For Designers, Contractors, and Inspectors

Wayne Bunnell, Drake Krohn
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Introduction and Motivation

**EDUCATION & TRAINING**

- **Virtual Inspection**
  - Project Conception
  - Emphasis on Education

**Education in the Classroom**

- Visualization
- Big-Picture Understanding

**Training in the Field**

- Proper Construction Techniques
- Standards and Specifications Compliance
We’ve Been All Over the Map

• Construction Sites Monitored
  – Carmel, IN: US 31 Project
  – Lafayette, IN: Co. Rd. 800S Bridge
  – West Lafayette: Purdue University Airport
  – I-65 NB: Tree Removal and Deck Epoxy
  – Cedar Grove, IN: Bridge Demolition
  – Indianapolis, IN: South Split
  – Indianapolis, IN: I-70 Bridge

• 8,747 Miles Driven Since May 2015
• 5.3 Million Pictures Collected To Date
• 3.89 Terabytes of Data Storage
Methodology

How Time-Lapse Photography Works

• Images taken at specified interval
  – We use 1 picture/minute
• Camera Output: Images
  – 10,000 images/week
• Video Production
  – Standard Video: 30 frames/second
  – Alter video speed as necessary

How can we use Time-Lapse Photography?

<table>
<thead>
<tr>
<th>Individual Pictures</th>
<th>Detailed Video</th>
<th>Video Overview</th>
</tr>
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</table>
Methodology

How can we use time-lapse photography?

| Individual Pictures | Detailed Video | Video Overview |

[Image of individuals holding a picture, an aerial view of a city, and a map.]

[Image of surveillance cameras.]

[Image of construction site with equipment.]
Methodology

Detailed Video
Methodology

How can we use time-lapse photography?

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Methodology

Video Overview
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Improve Visualization Skills – From Plans to Product
In the Classroom

Improve Visualization Skills – From Plans to Product
Developing Big-Picture Understanding

- Process Involved in Constructing a Roundabout
  - Remove existing facilities
  - Earthwork
  - Soil Stabilization
  - Pavement Placement
  - Drainage Structure Installation
  - Concrete Medians and Truck Apron
  - Stripes and Signage

- Goal: Understand Constructability Implications of Designs
  - We don’t want to design something that can’t be constructed
  - Implies the need to know construction techniques
  - Communication is critical
In the Classroom

Developing Big-Picture Understanding: Remove Existing Facilities

Roundabout Construction
2015-06-25
In the Classroom

Developing Big-Picture Understanding: Earthwork

Roundabout Construction
2015-07-06
In the Classroom

Developing Big-Picture Understanding: Concrete Placement

Roundabout Construction
2015-08-26
In the Classroom

Developing Big-Picture Understanding: Striping and Signage

Roundabout Construction
2015-09-28
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- Visualization
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Training in the Field
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In the Field

Who Benefits, and How?

- Contractors and Inspectors
- Enforce Good Practice
- INDOT Standards and Specifications

Case Study: MSE Wall Construction

INDIANA
DEPARTMENT
OF
TRANSPORTATION
STANDARD
SPECIFICATIONS
2016
Backfill Should NOT be Pushed Against the Wall

WARNING: This will compromise the integrity of the wall.
Earthwork
Mechanically Stabilized Earth Walls

Panels could be pushed out of alignment, straps could break, and the structure will not last the minimum 75 year design life.
Earthwork
Mechanically Stabilized Earth Walls

3’ Minimum

Push Backfill Parallel with Wall – Keep a minimum of 3’ From Wall
Roller is too close to the wall. During compaction, roller must not get any closer than 3 feet to the wall. Damage to straps or wall is possible.
Backfill Compaction
Mechanically Stabilized Earth Walls

5/07/2015
11:45 AM

5 Passes of Plate Compactor within 3 Feet of Wall
This is proper compaction within 3 feet of the wall. A minimum of 5 passes should be made to make 95% compaction.

GOOD PRACTICE
BAD PRACTICE
Conclusion

How to Effectively Use Time-Lapse Images

Education in the Classroom

Training in the Field

Who Will Benefit?

- Engineers
- Designers
- State DOT & Inspectors
- Contractors
- General Public