Portable Signals: INDOT Design Guidance and Specifications

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Portable Signals

Presentation Overview

- Background
- Design Manual §83-5.0 and Design Memo 16-06
- Cost and Pay Item Info
- Recurring Special Provisions (801-T-211, 801-T-211d, and 801-T-212)
Portable Signals

Background

- Portable signals were not allowed in Indiana until 2014.
- Revision 2 to the 2011 MUTCD permits portable signals in limited situations.
- Revision 2 requires all portable signals in Indiana to be selected from the INDOT Approved Materials List.
IMUTCD Requirements

Under §4D.32, portable signals are allowed:

- To maintain two-way traffic on a one lane road in a work zone. The one lane road can have driveways or intersections that are also controlled by portable signals.

- To temporarily function for a permanent signal when the signal has been damaged or during a power outage.

- To temporarily provide access to a site where a permanent signal has been approved.
Portable Signals

IMUTCD Requirements (Cont’d)

Under §6F.84, portable signals shall not be used for:

- Mobile work zones.
- Short duration work zones (work at a location up to 1 hr).

Automated Flagger Assistance Device (AFAD)
Portable Signals

Indiana Test Method 956

- Establishes the testing procedures for portable signal manufacturers that would like to get on the INDOT Approved Materials List.
- Devices submitted for approval must meet a draft NEMA TS-5 Standard, survive a 21 day battery test between November and February, and be capable of being set-up within 20 minutes.
INDOT’s permanent and fixed temporary signals must meet the NEMA TS-2 standard.

The NEMA TS-5 standard has been in development for many years and will have the following requirements for portable signal systems:

- Portable signal trailers can withstand 80 mph wind loads
- The controller can support at least 6 phases
- A malfunction management system is present
The design procedure is as follows:

- Determine whether a fixed temporary signal or a portable signal is appropriate.
- Fixed temporary signals should be selected for projects that will last several months unless there are utility service issues (service cost or delay).
- Determine the portable signal placement and stop bar locations for the one lane road. A temporary landing area for the portable signal trailer may be constructed if necessary.
The design procedure is as follows:

- Develop the signal timing plan for the temporary signal (fixed or portable).
- Determine the vehicle detection method. For portable signals the default method is wireless vehicle detection from Sensys Networks, but other detection methods may be considered.
- Prepare the plan sheet(s) for the temporary signal. Specify if both signal faces must be mounted overhead.
Portable Signals

Design Manual Figure 83-5A

Note:
1. The contractor may select either inductive loops or wireless vehicle detection for temporary traffic signals. If another detection method is needed, the designer should specify it with a special provision.

VEHICLE DETECTION TYPICAL PLACEMENT AREAS

Figure 83-5A
Portable Signals

Design Memo 16-06

- Issued on 3/8/16 and became effective with the September 2016 lettings.
- Summarizes the design procedure changes for temporary signals (fixed and portable).
- Contains additional guidance on the pay item codes.
## Portable Signals

### Cost and Pay Item Info (Before)

#### 2015 Unit Price Averages for Fixed Temporary Signals

<table>
<thead>
<tr>
<th>Code</th>
<th>Pay Item Description</th>
<th>Unit</th>
<th>Avg. Cost</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>801-53072</td>
<td>Temporary Traffic Signal</td>
<td>LS</td>
<td>$37,326</td>
<td>11</td>
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<td>801-01851</td>
<td>Temporary Traffic Signal, with Detectors</td>
<td>LS</td>
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#### 2014 Unit Price Averages for Fixed Temporary Signals

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<thead>
<tr>
<th>Code</th>
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<th>Unit</th>
<th>Avg. Cost</th>
<th>Quantity</th>
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</thead>
<tbody>
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<td>801-53072</td>
<td>Temporary Traffic Signal</td>
<td>LS</td>
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<td>801-01851</td>
<td>Temporary Traffic Signal, with Detectors</td>
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<td>$49,905</td>
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### Portable Signals

#### Cost and Pay Item Info (After)

<table>
<thead>
<tr>
<th>Code</th>
<th>Pay Item Description</th>
<th>Unit</th>
<th>Avg. Cost</th>
<th>Contracts</th>
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</thead>
<tbody>
<tr>
<td>801-12081</td>
<td>Portable Signal</td>
<td>LS</td>
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<td>801-12082</td>
<td>Fixed Temporary Signal</td>
<td>LS</td>
<td>$33,520</td>
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</table>
Portable Signals

RSP 801-T-211

- Creates two types of temporary signals: fixed and portable.
- Vehicle detection is now required for fixed temporary signals unless the plans show otherwise.
- Specifies the default detection methods for temporary signals:
  - Fixed temporary = inductive loops or wireless (Sensys)
  - Portable signals = wireless (Sensys)
Portable Signals

RSP 801-T-211 (Cont’d)

 Portable signals must be equipped with remote monitoring.
 Drums must be placed in front of the portable signal trailer.
 The contractor must have a technician certified by the portable signal manufacturer to respond to any malfunctions.
Portable Signals

RPD 801-T-211d

- A completed inspection checklist must be provided to the PE/PS before any portable signals are activated.
- The inspection checklist (801-T-211d) has the following items:
  - Battery Components
  - Solar Components
  - Signal Indications
  - Operating System
  - Wireless Communications
  - Controller Cabinet
  - System Testing
Portable Signals

RSP 801-T-212

- The Temporary Signal Timing Plan (801-T-212) must be completed by the designer and included in the Contract Information Book.
- Any changes to the signal timing plan after the letting require the contractor to complete a new version of this form and provide a copy to the PE/PS.
Portable Signals

RSP 801-T-212

601-T-212 TEMPORARY SIGNAL TIMING PLAN
(Adopted 12-17-15)

Intersection: Contract No.: Official Action #:

Controller Type:  □ Temporary Traffic Signal  □ Portable Traffic Signal

Intersection Operation:  □ Pre-Timed  □ Semi-Actuated  □ Fully Actuated

Preemption:  □ None  □ Railroad  □ Emergency Vehicle

Interconnection:  □ None  □ Radio  □ Fiber-Optic  □ Other

Pedestrian Phasing:  □ Yes  □ No

Phase Diagram

□ Two Phase

1 □ 2 □

□ Four Phase

1 □ 2 □

3 □ 4 □

□ Eight Phase

1 □ 2 □ 3 □ 4 □

5 □ 6 □ 7 □ 8 □
## Portable Signals

**RSP 801-T-212 (Cont’d)**

<table>
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<tr>
<th>Signal Timing Parameters</th>
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<tbody>
<tr>
<td>Phase Number</td>
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<tr>
<td>Minimum Green</td>
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<tr>
<td>Yellow</td>
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<tr>
<td>All Red</td>
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<td>Max. Green 1</td>
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<tr>
<td>Max. Green 2</td>
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**Other Instructions:**
Portable Signals

Summary

- Designers should refer to §83-5.0 of the Design Manual if a temporary signal (fixed or portable) will be used to maintain traffic.
- Portable signals will have an increasing role on INDOT construction projects.
- Temporary signals involve some planning and attention to detail during both the design and construction stages.
Portable Signals

Questions?

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