Understanding and Using Railroad Signal Aspects

By Michael J. Burgett
Summary of Clinic

1: Definitions

2: Signal Aspects and Indications
   (Speed Signaling)

3: Signal Aspects and Indications
   (Route Signaling)
WHAT SYSTEM DO I USE ???
Speed Signaled Railroads

1: NYC
2: C&O
3: FEC
4: GTW
5: NKP
6: L&N
7: N&W
8: PRR
9: B&O
10: CONRAIL / NORAC
11: DT&I
12: CN / Canada
13: Erie
14: WM
Route Signaled Railroads

- 1: UP
- 2: SP
- 3: C&NW
- 4: AT&SF
- 5: IC
- 6: WP
- 7: SOO
- 8: WC
- 9: EJ&E
- 10: BNSF
- 11: MILW
- 12: SP&S
Part 1 - Definitions

• Fixed Signal
• Signal Aspect
• Signal Indication
Fixed Signal

A signal of permanent location indicating a condition affecting the movement of a train.
Signal Aspect

The appearance of a fixed signal conveying an indication by one or more of the following methods.

1: The color of lights.
2: The flashing of lights.
3: The position of lights.
4: The position of semaphore arms.
5: The shape, color or lettering of signs.
Signal Indication

The required action to be taken by a crew in the operation of their train as conveyed by an aspect of a fixed signal.
Part 2

Signal Aspects and Indications
“Speed Signaling”
### AREMA SPEED CLASSES

<table>
<thead>
<tr>
<th>ARMEA SPEED CLASS</th>
<th>SPEED IN M.P.H. FREIGHT</th>
<th>SPEED IN M.P.H. PASSENGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Authorized Speed</td>
<td>50/60</td>
<td>79</td>
</tr>
<tr>
<td>Limited Speed</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Medium Speed</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Slow Speed</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Restricted Speed</td>
<td>15 or less</td>
<td>15 or less</td>
</tr>
</tbody>
</table>

**NOTE:** Restricted speed requires that the engineer proceed prepared to stop one half the range of vision and to be looking out for a train, obstruction, switch improperly lined, broken rail or anything that may require the speed to be reduced, but never to exceed 15 MPH.
### AREMA TRUNOUT SPEED CHART

**AREMA SECTION 3.4**

<table>
<thead>
<tr>
<th>No.</th>
<th>Speed</th>
<th>Switch Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12 MPH</td>
<td>11'-0&quot;</td>
</tr>
<tr>
<td>6</td>
<td>14 MPH</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>16 MPH</td>
<td>16'-6&quot;</td>
</tr>
<tr>
<td>8</td>
<td>19 MPH</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>21 MPH</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>21 MPH</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>27 MPH</td>
<td>22'-0&quot;</td>
</tr>
<tr>
<td>12</td>
<td>28 MPH</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>28 MPH</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>37 MPH</td>
<td>30'-0&quot;</td>
</tr>
<tr>
<td>16</td>
<td>38 MPH</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>38 MPH</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>46 MPH</td>
<td>39'-0&quot;</td>
</tr>
</tbody>
</table>

**NOTE:** Passenger trains completely equipped with cars that have a roll angle of less than 1 degree 30 minutes, trains may operate comfortably through at 12% higher speeds than those indicated.
# Simplified Turnout Speed Chart & Uses

<table>
<thead>
<tr>
<th>Typical AREMA Turnout Size</th>
<th>HO Scale Turnout Size I Like to Use</th>
<th>Typical Prototype Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 8</td>
<td>No. 4</td>
<td>Yards and Industrial Tracks</td>
</tr>
<tr>
<td>No. 10</td>
<td>No. 5</td>
<td>Yards and Branch lines</td>
</tr>
<tr>
<td>No. 12</td>
<td>No. 6</td>
<td>Main track, Slow Speed Turnout</td>
</tr>
<tr>
<td>No. 16</td>
<td>No. 8</td>
<td>Main track, Medium Speed Turnout</td>
</tr>
<tr>
<td>No. 20</td>
<td>No. 10</td>
<td>Main track, Limited Speed Turnout</td>
</tr>
</tbody>
</table>
**Name:** Clear
**Indication:** Proceed at authorized speed.

**Name:** Approach
**Indication:** Proceed, preparing to stop at the next signal.

**Name:** Approach Medium
**Indication:** Proceed, approaching next signal at Medium Speed (30 MPH).

**Name:** Approach Limited
**Indication:** Proceed, approaching next signal at Limited speed (40 MPH).
**Name:** Medium Clear  
**Indication:** Proceed, at Medium speed (30 MPH) within interlocking limits or through turnouts.

**Name:** Limited Clear  
**Indication:** Proceed, at Limited speed (40 MPH) within interlocking limits or through turnouts.

**Name:** Approach Slow  
**Indication:** Proceed, approaching the next signal at Slow speed (15 MPH).

**Name:** Medium Approach  
**Indication:** Proceed, at Medium speed (30 MPH) within interlocking limits or through turnouts; then proceed prepared to stop at next signal.
Name: Limited Approach
Indication: Proceed, at Limited speed (40 MPH) within interlocking limits or through turnouts; then proceed prepared to stop at the next signal.

Name: Slow Clear
Indication: Proceed, at Slow speed (15 MPH) within interlocking limits or through turnouts.

Name: Slow Approach
Indication: Proceed, at Slow speed (15 MPH) within interlocking limits or through turnouts; then proceed prepared to stop at the next signal.
**Name:** Restricting  
**Indication:** Proceed at restricted speed.

**Name:** Stop  
**Indication:** Stop before any part of train or engine passes signal.
Typical End of Siding Location
(Speed Signaling with # 16 Turnout)

*System in its normal state*
Typical End of Siding Location
(Speed Signaling with # 16 Turnout)

A westbound route is established at the East End only!
Typical End of Siding Location
(Speed Signaling with # 16 Turnout)

A westbound route is established at both East and West Ends of the siding!
Typical End of Siding Location
(Speed Signaling with # 16 Turnout)

A westbound route is established into the siding at the East End!
Part 3

Signal Aspects and Indications

“Route Signaling”
**Route type Aspects and Indications**

**Name:** Clear  
**Indication:** Proceed at authorized speed.

**Name:** Approach  
**Indication:** Proceed, preparing to stop at the next signal.

**Name:** Approach Diverging  
**Indication:** Proceed approaching next signal prepared to enter diverging route at prescribed speed.

**Name:** Diverging Clear  
**Indication:** Proceed on diverging route, not exceeding prescribed speed through turnouts.
Route type Aspects and Indications Page #2

**Name:** Diverging Approach  
**Indication:** Proceed on diverging route through turnouts at prescribed speed, preparing to stop at the next signal.

**Name:** Restricting  
**Indication:** Proceed at restricted speed.

**Name:** Stop  
**Indication:** Stop before any part of train or engine passes stop signal.
Example of turnout speed, listed in Employees Timetable for Route type Signaling System
Typical End of Siding Location
(Route Signaling with # 16 Turnout)

System in its normal state
Typical End of Siding Location
(Route Signaling with # 16 Turnout)

A westbound route is established at the East End only!
Typical End of Siding Location
(Route Signaling with # 16 Turnout)

A westbound route is established at both East and West Ends of the siding!
Typical End of Siding Location
(Route Signaling with # 16 Turnout)

A westbound route is established into the siding at the East End!
Interlocking with multiple size turnouts in a route type signal system.

Turnout #79 is a #12 and crossover #77 is a #20.

*System in its normal state*
Interlocking with multiple size turnouts in a route type signal system

Turnout #79 is a #12 and crossover #77 is a #20

A westbound route is established into the siding through crossover #77!
Interlocking with multiple size turnouts in a route type signal system

Turnout #79 is a #12 and crossover #77 is a #20

A westbound route is established through crossover #77 only!
Refer to your prototype’s Employees Timetable!
www.CTCParts.com

Go to the “All About CTC” Tab, click on “Signal Aspects and Indications”