77-4.05 Signal Display

The traffic-signal display consists of parts including the signal head, signal face, optical unit, visors, etc. The criteria set forth in the MUTCD Part IV, the INDOT Standard Specifications, and ITE's Equipment and Material Standards of the Institute of Transportation Engineers should be followed in determining appropriate signal-display arrangements and equipment. The following provides additional guidance for the selection of the signal display equipment.

1. Signal-Head Housing. This is made of polycarbonate (plastic). For new traffic signal installations on the State highway system, the signal-head housing should have a black color. For traffic signal modernization projects on the state highway system, the existing yellow signal heads may be reused if approved by the District Traffic Engineer.

2 Signal Faces. Section 77-5.01 provides INDOT's preferred signal-face arrangements for use on a State highway. The signal lenses should be placed in a vertical line rather than horizontally except where overhead obstructions may limit visibility. Where protected left turns are followed by permissive left turns, the five-section signal head is the recommended arrangement choice. The MUTCD Part IV provides additional information on the arrangement of signal heads.

3. Lens Size. INDOT's preferred practice is to use only 12-in. diameter lenses. INDOT *Standard Specifications* require the use of plastic lenses in its signal displays.

4. Signal Illumination. Only Light-Emitting Diodes (LED) should be used.

5. Visors. A visor should be used with each lens. A visor is used to direct the signal indication to the appropriate approaching traffic and to reduce sun phantom. A tunnel visor provides a complete circle around the lens. A cutaway visor is a partial visor, with the bottom cut away. A partial visor reduces water and snow accumulation and does not let birds build nests within the visor. The decision on which visor type should be used is determined on a site-by-site basis. For a Department installation, partial visors are normally used. Visors are made of the same material as the housing.

6. Louvers. Louvers are sometimes used to direct the signal indication to a specific lane. Louvers are used where several signal heads may cause confusion for the approaching driver. One example of this problem is where an intersection has its approaches at angles less than 90 deg and the signal indications can be seen from

both approaches. The decision on whether to use louvers depends on site conditions and will be determined for each site.

7. Optically-Programmable Signal. Like louvers, an optically-programmable signal is designed to direct the signal indication to specific approach lanes and for specific distances. An advantage is that they can be narrowly aligned so that motorists from other approaches cannot see the indications. Applications include closely-spaced intersections or an intersection where the approaches have acute angles. An optically-programmable signal requires rigid mountings to keep the indicator properly directed. The cost is higher than for louvers but the improved visibility often makes it a better choice. The decision on whether to use an optically-programmable signal depends on site conditions and will be determined for each site.

8. Backplate. A signal indication loses some of its contrast value if viewed against a bright sky or other intensive background lighting such as advertising lighting. A backplate placed around a signal assembly enhance the signal's visibility and have been shown to provide a benefit in reducing crashes. However, a backplate adds weight to the signal head and can increase the effect of wind loading on the signal. A backplate should be used on overhead 3-section signal heads for through lanes and on other signal heads as determined by the District Traffic Engineer. Use on other signal heads should be identified on the plans.

   INDOT *Standard Specifications* require backplates to include a 2-in. yellow retroreflective strip around the perimeter of the backplate to enhance the conspicuity of the signal head at night. For non-INDOT projects where the reflectorized surface is not desired, the plans or special provisions should so indicate.

   Traffic signal head retrofits may be specified instead of new signal heads when the existing LED's have some service life remaining but backplates are needed. Currently LED indicators have a service life of about 6 years. The INDOT *Standard Specifications* require a retrofit to include a new housing along with the backplate. Retrofits should be indicated on the plans.