CHAPTER 16: LIGHT SIGNALS AND POSTS

16.1 INTRODUCTION

1 The traffic light signal is the means by which a traffic signal communicates with the driver, and is therefore one of the most important components of a traffic signal installation.

2 The light signal is the green, yellow or red signal displayed by illuminating a signal aspect. The various components involved with ensuring the effective display of the light signal are discussed in this chapter. This includes the background screen (backboard) as well as the posts used to support the light signal.

16.2 SIGNAL ASPECTS

16.2.1 General

1 The signal aspect is the unit that displays a light signal when illuminated. An example of a signal aspect is shown in Figure 16.1. It consists of various components, such as a lens, a reflector, lamp, louvres and a visor.

2 Traffic light signals should be manufactured and installed in a disciplined and standardised manner. The use of the South African standard specification SANS 1459: *Traffic lights* is prescribed. These specifications specify all components of the light signal, including the lamp that may be used.

3 According to the National Road Traffic Regulations, ***"every flashing light signal shall operate at a cycle frequency of between one and two flashes per second"***. The luminous intensity shall be zero for 30% - 50% of the period and not less than the specified minimum for 30% - 50% of the period.

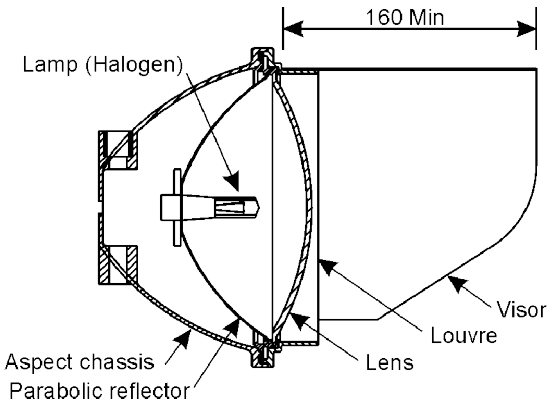

Figure 16.1: Components of a signal aspect

16.2.2 Luminous intensity

1 The luminous intensity level of a signal aspect defines the brightness of a light. Two intensity levels may be specified, namely NORMAL or HIGH.

2 Normal intensity lights should always be specified for pedestrian signals. Normal or high intensity lights may be used for vehicular signals, depending upon the operating conditions.

3 Conditions where high intensity lights should be used, include any one or more of the following:

(a) Where the speed limit on a road is 70 km/h or higher.

(b) Where increased visibility is necessary due to a confusing background of bright lights or other traffic lights or signs.

(c) Where visibility is affected by a rising or setting sun in the east/west direction.

(d) Where drivers would not normally expect to encounter a signal, such as in rural areas or on the edges of a town or city.

4 High intensity traffic lights may cause "discomfort glare" or "disability glare" at night, especially in dark surroundings and in the absence of street lighting. It is recommended that, in such situations, a facility for automatically dimming signal lamps at night should be provided. Such dimming can be operated by a photo-electric cell.

16.2.3 Aspect size

1 Two sizes of signal aspects may be used for pedestrian and vehicular signals, namely 210 mm and 300 mm nominal diameter.

2 The larger aspect is not often used because it does not contribute significantly to visibility as much as luminous intensity, particularly when used to display DISC light signals. It may assist to enhance recognition of a symbolic light aspect, such as the arrow signals. These arrow signals, however, are generally recognisable by their location relative to other light signals. The flashing green arrow light signal, in particular, is readily recognised because it is the only flashing green signal permitted.

3 Pedestrian aspects of 210 mm diameter should be adequate for normally-sighted people up to a distance of 35 m. The larger aspect may be considered for crossings wider than 35 m, but then it would be preferable to provide a staggered crossing. The larger aspect can be used at a crossing that is regularly used by people with impaired vision.

16.3 SIGNAL LOUVRES AND VISORS

16.3.1 General

1 Louvres and visors are provided to modify the angular visual coverage of the light signal and/or to shield the optical system from incidental light that may cause sun-phantom effects.

2 Sun-phantom is the phenomenon whereby a signal aspect that is not illuminated by its lamp, emits light due to the reflection of the rays of the sun when they strike the aspect. The aspect thereby gives the appearance of being illuminated and of giving a light signal.

3 Sun-phantom effects can be minimised by installing visors and, where possible, aligning a signal aspect so that it does not reflect the direct rays of the sun (although this is not always possible).

16.3.2 Signal louvres

1 Louvres are installed as either horizontal or vertical plates. Horizontal louvres can be used to minimise sun-phantom effects. Vertical louvres are used to provide additional shielding when visors are inadequate, such as at skew intersections.

2 The use of louvres should be restricted because of the loss of efficiency of the optical system. They should only be used when the visors alone are unable to provide the necessary cut-off.

3 Louvres SHALL not be used in association with symbolic displays such as arrows, pedestrian and pedal cyclist signals.

16.3.3 Signal visors

1 A suitably designed visor SHALL be fitted to each vehicular signal aspect. Pedestrian and pedal cyclist signal aspects may also be fitted with visors. The visor shall have a length of at least 160 mm at the top (see Figures 16.1 and 16.2).

2 The visor should not prevent required visibility standards from being achieved. Cut-away visors may be used to increase visibility from one side, as shown in Figure 16.3.

3 Visor compliance with SANS 1459: *Traffic lights* is prescribed. Visors shall have a matt black finish inside and outside.

16.4 SIGNAL HEADS AND BACKGROUND SCREENS

1 Signal heads are fixed to posts by means of brackets as shown in Figures 16.2 and 16.3. The brackets should facilitate adjustment of the alignment of a signal in both the vertical and horizontal planes. The brackets should operate with self-locking screw clamps, and crimping of straps should not be allowed.

2 According to the National Road Traffic Regulations ***"a background screen SHALL be provided for each vehicular signal face"*** while ***"background screens may be provided*** (but are not necessarily recommended) ***for pedestrian and pedal cyclist signal faces". "Background screens shall comply with standard specifications SANS 1459: Traffic lights".***

3 Background screens (or backboards) are normally 500 mm wide with a white border of 50 mm wide. According to the National Road Traffic Regulations, "***where it is necessary to increase the conspicuity of a traffic signal, the border of the*** white ***background screen provided for a signal face may be*** white ***retro-reflective".***

16.5 POSTS FOR SUPPORTING LIGHT SIGNALS

1 Traffic signal posts should have a diameter of at least 100 mm. Signal posts should preferably be protected against rust by galvanising, and be provided with a removable weatherproof cap that will facilitate wiring.

2 Signal posts can be mounted directly in the ground and a concrete foundation is not required. From a traffic safety viewpoint, it is safer not to provide a concrete foundation. Where heavy winds occur, a base plate can be provided for additional stability. Standard posts should be installed at least 900 mm deep, and extended posts at least 1200 mm deep.

3 Overhead cantilever and gantry supports will require concrete foundations. These foundations should be designed according to appropriate engineering principles, taking all superimposed loads, such as wind loads, into account. The size of these foundations should, however, be kept to a minimum subject to stability requirements.

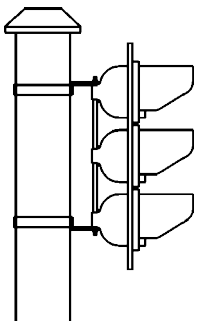

Figure 16.2: Signal head with standard visors

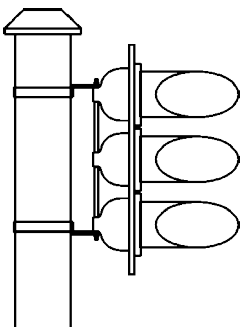

Figure 16.3: Signal head with cut-away visors

4 According to the National Road Traffic Regulations, ***"in the case of a road signal the standard, post or cantilever shall be golden yellow, portions of which may be retro-reflective".*** However, ***"this provision shall not be applicable to an overhead traffic signal mounted on a GANTRY".***

5 Retro-reflective strips may be provided on traffic signal posts to increase the conspicuity of the posts at night, particularly when there is a loss in the electricity supply. Three horizontal yellow retro-reflective strips can be fitted on ALL yellow signal posts, as shown in Figure 16.4. The width of the strips may be between 120 and 150 mm. The width of the openings should be about the same as that of the strips. The bottom strip should not be installed lower than 1,2 m and the top strip not higher than 2,1 m above the ground level.

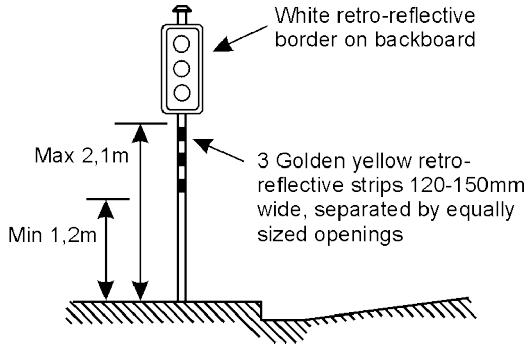

Figure 16.4: Improving conspicuity of signals