CHAPTER 2

VISIBILITY

2.1 GENERAL. Visibility is the greatest distance at which objects of suitable dimensions can be seen and identified.

2.1.1 The visibility to be reported is the prevailing visibility observed at eye level (eye level is internationally defined at 1.8 m above the ground).

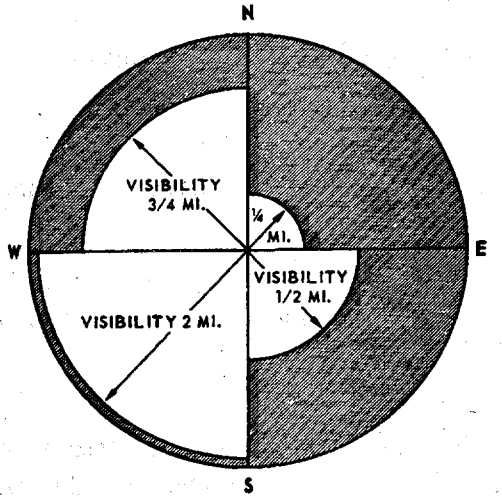
2.2 PREVAILING VISIBILITY. Is the maximum visibility value common to sectors comprising one–half or more of the horizon circle.

2.3 DETERMINATION OF PREVAILING VISIBILITY. For this purpose, the horizon circle shall be divided into as many sectors as there are different values of visibility. The highest visibility value that is common to sectors which cover one–half or more of the horizon circle shall be taken as the prevailing visibility.

2.3.1 When the observed visibility in one or more sectors differs significantly from the prevailing visibility, it is sometimes necessary to record and report, not only the prevailing visibility but the variations as well. Details in this regard are included with the procedures for reporting visibility in the Hourly Observations (Chapter 10).

Examples of How to Determine Prevailing Visibility:

EXAMPLE I



Note: Point of observation is centre of circle

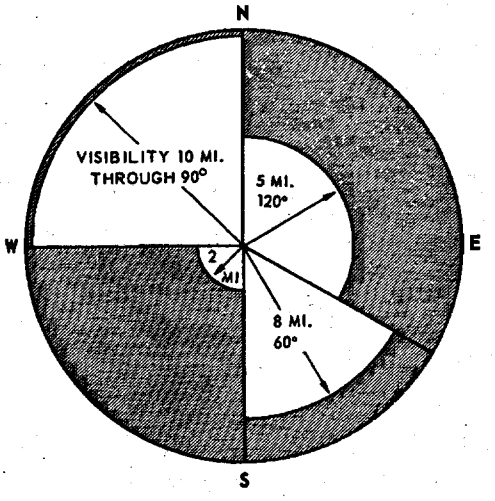
PREVAILING VISIBILITY = 3/4 mi.

Notes:

(i) The prevailing visibility is not 2 miles because 2 miles is common to only 90° of the horizon circle.

(ii) 3/4 of a mile is considered to be the prevailing visibility because this is the greatest value common to 1/2 or more (180°) of the horizon circle.

EXAMPLE II



PREVAILING VISIBILITY = 5 mi.

Notes:

(i) The prevailing visibility is not 10 miles because 10 miles is common to only 90° of the horizon circle.

(ii) The prevailing visibility is not 8 miles because 8 miles is common to only 150° of the horizon circle (90° + 60°).

(iii) The prevailing visibility is considered to be 5 miles because this is the maximum value common to 1/2 or more of the horizon circle, i.e., 90° + 60° + 120° .

2.4 UNITS OF MEASURE. Visibility shall be reported at land stations in statute miles, and at ocean stations in nautical miles.

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2.5 VARIABLE VISIBILITY. When the visibility is observed to be fluctuating rapidly and increasing and decreasing from a mean value by 1/4 or more of the mean value, the visibility is said to be "variable". Use the mean (average) of all observed values as the prevailing visibility. Example: if the observed visibility fluctuates rapidly between 3/4 mile and 1 1/4 miles the prevailing visibility would be reported as 1 mile, variable.

2.6 GUIDES IN DETERMINING VISIBILITY.

2.6.1 Point of Observation. A roof is convenient for enabling the observer to obtain a complete view of the horizon circle. However, if the observer has any reason to believe that the visibility near the ground is different, he shall make an observation from the ground and record it as the prevailing visibility. If the roof–top visibility is significantly different from the ground visibility, i.e., if it differs by a reportable value or more, remarks concerning the roof–top visibility shall be recorded.

2.6.2 Optical devices such as binoculars, etc., shall not be used by the observer when determining visibility.

2.6.3 Visibility markers shall be selected with a view to choosing prominent objects so located that they may be viewed against a background of the horizon sky. One must not, for example, select a building on the side of a hill, which would be viewed with the hill as background. The distance of markers such as hills and mountains may be determined with the aid of a large scale map of the vicinity. A suitable visibility marker should subtend an angle at the observer's eye of not less than 1/2 degree* vertically and horizontally above the horizon. Objects such as radio masts are therefore not desirable visibility markers for daytime use. During darkness unfocussed lights of moderate intensity at known distances should be used for visibility markers.

*NOTE: 1/2 degree is approximately the angle subtended at the eye by a hole 8 mm in diameter punched in a card and held at arms length.

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2.6.4 Visibility Charts*. Form 63–9046, Visibility Markers, shall be prepared for each observing station. It consists of charts marked in degrees of azimuth and in distances (statute miles), for three different ranges. On these charts, day and night visibility markers shall be indicated in their proper positions by means of the designated symbols listed on the chart.

2.6.5 Visibility at Night shall be determined with the aid of markers in the form of lights. Very powerful or focussed lights should be used with caution, as their great penetrating power tends to result in too high a value for the visibility. However, obstruction lights on towers and buildings and the various marker lights around an airport may be used for visibility markers.

2.6.5.1 At night, in the absence of visibility markers, the visibility may be estimated by studying the appearance of a ceiling projector beam. Under conditions of good visibility, the light source is visible, but the beam is not. As the visibility deteriorates the beam begins to show, and becomes increasingly evident as visibility decreases. When the visibility becomes quite low, the beam takes on a diffuse appearance, and the projector itself becomes blurred. Under conditions of very low visibility, beam and projector disappear completely. With practice, the observer will find that visibility may be judged with reasonable accuracy in this way. When the relative humidity is high the choke device (if so equipped) of the projector should be left on long enough to ensure that any condensation on the glass has evaporated.

2.6.5.2 Recorded visibility shall not be reduced on account of darkness alone.

2.6.5.3 The principal difficulty in determining visibility at night lies in the uncertainty as to the state of accommodation of the eyes of an observer who has recently left a brightly lighted office. Therefore, in order that the observer's eyes may become as well accommodated as possible, the visibility should be the last of the outdoor observations.

*Note: 1. Visibility charts are prepared and signed by a Regional Inspector. Observers should discuss any necessary changes or improvements to the visibility chart with their Officer–in–Charge, who in turn should bring these changes to the attention of the Regional Inspector.

Note: 2. The visibility chart may be augmented by other aids to determining visibility such as horizon photographs or topographic maps.

2.6.5.4 Although optical devices are not to be used when determining visibility, an observing aid "DARK ADAPTOR GOGGLES" is available from AES Downsview Stores 00, Stock 0024–0078, and may be worn IF THE OBSERVER WISHES for either of the following reasons:

(a) To enable the night–time observer to have his eyes practically dark adapted when he arrives at the outdoor observing site.

(b) To assist the day–time observer in cloud identification, especially during periods of bright sunshine, haze or snow glare.

2.6.5.4.1 How to Use Adaptor Goggles During Darkness:

When the goggles are used during darkness, it is suggested that the observer put them on in the office, about 10 minutes prior to going outside for the observation, and they should be worn until the observer is outside at the observation site.

Remove the goggles at the out–door observation site. The eyes should now be considerably adapted to darkness. Proceed wi

NOTES:(1) Goggles shall not be used when assessing prevailing visibility

(2) Previous testing has indicated that routine office duties can normally be performed while wearing goggles; however, testing has also indicated that some observers, wearing goggles, experienced difficulty walking along corridors, down or up stairs. Observers who experience these difficulties are instructed not to use dark adaptor goggles as an observing aid.

2.6.5.4.2 How to Use Dark Adaptor Goggles During Daylight:

During daylight many observers will find the Dark Adaptor Goggles to be an aid in observing the sky during periods of bright sunshine, especially during bright haze or snow glare.

NOTE: Goggles shall not be used when assessing prevailing visibility.

2.6.6 Estimating Visibility Beyond Farthest Marker. When the visibility is greater than the distance to the farthest marker, note the sharpness with which the object stands out. Sharp outlines in relief, with little or no blurring of co lour, indicate that the visibility is much greater than the distance of the reference object. A blurred or indistinct object indicates the presence of haze or some other obstruction to vision that has reduced the visibility to not much more than the distance to the object.