

Master (Yachts)

Celestial Navigation

Lesson 1.7

Non-adjustable Errors of the Sextant



Note

Knowledge of the Non-adjustable errors of the sextant will be examined in the oral examination.

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Non-adjustable Errors of the Sextant

Collimation Error

The axis of the Prismatic Monocle (telescope) must be parallel to the plane of the instrument. Modern sextants do not permit any adjustments but older sextants were equipped with adjustment screws and cross wire viewers.

Collimation Error is not common in modern telescopes.



Always ensure that the Prismatic Monocle is securely reattached if removed for making the adjustment for Side Error.

Vernier Error

Older sextants used a Vernier scale to read the altitude. Modern sextants use a Vernier scale to determine the decimal places of a minute. Manufacturing and marking of the Vernier could produce errors causing readings to be slightly high or low.

This error can only be removed by the manufacturer and is not of concern in a modern sextant of good quality.

The following errors cannot be removed by the navigator or the sextant manufacturer and maybe classed as being the true non-adjustable errors of the instrument.

Centring Error

The pivot (centre of rotation) about which the Index Arm moves must be at the exact centre about which the arc has been constructed. If Centring Error exists it will affect the full range scale of readings of the instrument.

This error should only ever be present if the instrument were to be dropped and would otherwise normally be of no concern to the navigator.

Graduation/scale Error

Imprecise manufacture or wear and tear of the worm and rack mechanism may produce errors and distortions in the observed altitude. It cannot be remedied.

Micrometer Error

This is similar to Graduation Error.

Shade Error

The shades may not be perfectly manufactured and/or fitted; the face surfaces of the shades must be exactly parallel to each other. Such imperfection can result in refraction and/or blurring of the image, particularly if the surface of the shades become matted through abrasion from careless use and handling of the instrument.

Prismatic Error

The front and back surfaces of the Index and Horizon Mirrors must be ground exactly parallel. If this not the case Prismatic Error will be present which is similar in effect to Shade Error.