Editorial: Marine Systems Excellence Underway Once Again – Feature: Navigation Lights

From the Masthead.

Marine Systems Excellence is Underway Once Again

Let me begin by apologizing for the unintended hiatus taken by the Marine Systems Excellence eMagazine. I'm writing this column while in flight, on the return from Taiwan, where I made an initial inspection for a build project. In the past 12 months I have taken 42 work-related trips, 14 of which were international, to Taiwan (x6), the Netherlands (x3), Argentina, Panama, Malaysia, China and Italy, while working on 10 new build projects and many more brokerage vessel inspections. In November of 2024 I achieved 3 million miler status on Delta. It's been a busy year.

3 million miles worth of boats.

In January I attended the American Boat and Yacht Council's annual Standards Week, in San Antonio, TX. I sit on several project technical committees, including Electrical, Hull Piping and Powertrain. While all of these are vitally important, the long-awaited completion of the review of

section E-13, Lithium-Ion Batteries, represents a milestone. This technology is evolving, and being adopted, so rapidly, it is critically important that the industry be given a clear set of up-to-date guidelines for its safe implementation. I'm pleased to report that, among other achievements, this goal was accomplished at the event.

I've probably used the word "tariff" more times in the last month, than I have in my entire life. At this stage, because they are "fluid", it's impossible to say what effect they will have on the boat building and service industry (next month's column will delve more deeply into this subject). Much of my livelihood is based on my involvement in overseas boat building, so I'm watching this closely to say the least. If more boat building does return to these shores, one thing is for certain, the demand for skilled tradespeople will only continue to go up. There's already a severe shortage of such folks in the marine industry, and that will be intensified as other manufacturing industries ramp up recruiting. The bottom line is, while that may not be good for the marine industry, it will be very good for folks who possess trades-related skills. I'm a strong advocate for those who do the 'wrench turning' in this business (I started my career as a marine mechanic and electrician), and so I'm gratified to see any enhanced opportunities for these individuals. If you are looking to enter the marine trades, this Mike Rowe scholarship program (which includes marine technology) may be of interest to you.

Foreign flagging is yet another phrase I've used quite often in recent weeks. While buyers have taken advantage of this purchase option for decades, there is now a predictably enhanced interest in this approach towards lawful tariff avoidance. If you are considering utilizing this feature, you should contact one of the handful of maritime attorneys who specialize in this aspect of maritime law, so they can brief you on the most relevant details. If you are an SDMC client,

feel free to contact me and I will refer you to one of the firms I work with, and trust.

This month's Marine Systems Excellence eMagazine feature covers the all too important subject of navigation lights. I hope you find it both useful and interesting. (Shortly before publishing the below article, a tragic nighttime collision occurred between a high speed pleasure craft and a ferry in Florida. *At this time*, it appears that improper navigation lights on the ferry may have been a causal factor in this horrific event. More on this story here).

Navigation Lights

It is important that navigation lights be mounted on vertical surfaces. If they are not vertical, a shim must be used to bring the light's mounting base into a 90 degree orientation.

It comes as a surprise to many boat buyers, and owners, that

boat builders are not obligated to install navigation lights, they are technically optional. However, if lights are installed by a builder (or a yard or individual), and the vessel is sold or operated within the United States, regardless of where it is manufactured, then those lights must comply with established standards, which are detailed below. Ultimately, the responsibility for showing certified and properly configured navigation lights rests entirely with the operator of the vessel.

Navigation lights should be marked with their range, and "USCG". Many are also marked to indicate the required installation orientation.

From the US Code of Federal Regulations…

> Per 183.810: Boat manufacturers must install navigation lights that meet all technical standards (as proven by testing at a USCG approved laboratory) and bear a permanent and indelible marking "USCG" followed by the certified range in nautical miles (ex: USCG 2nm). The marking must be visible without removing or disassembling the light.

There's one sure way to avoid a nighttime collision or being run down; be seen, and being seen is easily accomplished if your running lights are in good working order, and compliant with United Stares Coast Guard (USCG) regulations, and American Boat and Yacht Council (ABYC) guidelines, which are

essentially one in the same. If you are involved in a collision, or worse you are run down, if your lights are not compliant, *you may be found at fault, or assigned partial blame, even if you otherwise have the right of way.*

In addition to range, this navigation light manufacturer includes information related to application and vessel size.

In spite of the dire importance of being seen, I remain both surprised and disappointed at the number of vessels I inspect, whose running lights are inoperative, in a poor state of repair, obstructed, or improperly installed. Surprisingly, in many cases, incorrect navigation light placement is the result of errors committed by boat builders. Therefore, don't assume a vessel's navigation lights are correct just because the vessel is new, or because nav lights are original equipment installations. On a recent inspection of a new vessel, at the builder's yard, I encountered a steaming (also known as "masthead") light whose range was insufficient for

the vessel's length; it was a 3nm light, however, the vessel was over 65 feet, and therefore required to utilize a 5nm light.

Don't assume navigation lights are correctly installed. Inexplicably, this vessel's port side light is upside down; it is unknown how long it had been like this.

Navigation light requirements, including configuration, placement, and intensity or range, are driven by vessel length, with the following ranges.

Up to 23 feet or 7 meters

To 39.4 feet or 12 meters

To 65.6 feet or 20 meters

To 164 feet or 50 meters

Basic Requirements and Common Defects

The most common installation defects are placement and mounting-related. Look closely at each navigation light fixture, including those on, and at the top of, the mast for sailing vessels. Depending on the size of the vessel, and sail/power configuration, there may be as many as six, port, starboard, stern, steaming/masthead, tricolor (for sail) and

anchor or all-round (an all-round light may be an anchor light, however it may also be present as a running light on smaller vessels, more on this below).

This vessel’s recessed transom, and off-center stern light installation, have resulted in an obstructed stern light arc.

Ensure that none are obstructed; common obstructions include davit-hung tenders, and other stern-mounted gear, as well as mast-mounted radomes, antennas, solar panels and even flags. In some cases, the transom itself may block a portion of a stern light’s arc if the fixture is off center or located in a recess.

Navigation light obstruction is both common and insidious,

make certain your arcs aren’t blocked.

Most navigation light manufacturers specify, either in the installation instructions, or with an “UP” or “TOP” marking, the orientation in which a fixture may be installed. Specifically, most lights cannot be installed upside down, as water may accumulate within.

Water on the *inside* of a navigation light often leads to corrosion and reduction of light transmission. Leaking fixtures should be replaced.

Make certain that side lights are mounted on surfaces that are vertical, *parallel with centerline, and level,* when the vessel is at rest, while stern and masthead lights should be vertical and mounted perpendicular to the vessel's centerline. Navigation lights must be mounted on vertical surfaces, and if not then they must be equipped with shims to bring them into a vertical position.

Side lights that are mounted on bow rails, which are not parallel with the vessel's centerline (this is common), have the effect of overlapping red and green arcs other than when dead ahead, making it seem to others who are forward of the offending vessel, as if it is bearing down on them, when in fact it may not be. I frequently encounter this scenario on tenders whose side lights are mounted on the curved sides of

center consoles; note also that tenders whose side lights are mounted on the console, may have those lights obstructed by passengers. To reiterate, the only time other vessels should see red and green side lights simultaneously, is when that vessel is headed directly for them.

These navigation lights, mounted in recesses in this vessel's center console, will have non-compliant overlapping arcs. Additionally, they are not vertical, they are prone to obstruction by passengers, and they will reflect off the inside of this inflatable's tubes. Where tenders are concerned, in most cases, bow mounted side lights are preferable.


PROFURL

A common scenario on sailing vessels, side lights that are parallel with the rail, rather than the vessel's centerline, or the mounts are bent from contact with lines or head sails.

Sidebar: Definitions and Light Details

- *Length Overall (LOA) – the straight-line measurement from the foremost part of the vessel to the aftermost part of the boat, measured parallel to the centerline and to the design waterline. Integrally formed, molded, or welded components and appendages, such as bow pulpits, swim platforms, attachment structures for the propulsion systems, and structural rub rails installed by the builder are included in the length (author's emphasis). Attached bowsprits, pulpits, boomkins (bumpkins), rudders, sails, outboard brackets, handles, railings, and other similar attached extensions are not included in*

the measurement.

Brackets used to mount light fixtures must be rugged and resistant to damage or deformation if kicked or stepped on.

- *All-Round Light – unbroken light over an arc of the horizon of 360°.*
- *Combination Sidelight – navigation light fixture*

in which sidelights are combined into one lantern

- *Masthead Light (often called "steaming light") – white light placed over the fore and aft centerline showing an unbroken light over an arc of the horizon of 225°, fixed to show the light from dead ahead to 22.5° abaft the beam (90° + 22.5° = 112.5°) on both sides of the vessel.*
- *Sidelight – starboard navigation light showing green, and the port navigation light showing red, from straight ahead to 22.5° abaft the beam (90° + 22.5° = 112.5°) on their respective sides.*
- *Stern Light – white light placed as close as practicable to the stern showing an unbroken light over an arc of the horizon of 135° and fixed to show the light 67.5° from directly aft on each side of the vessel.*
- *Tricolor Light – single navigation light fixture in which sidelights and stern light are combined in one lantern.*

As fixtures age, lens crazing is common. Such a condition degrades the light's range and chromaticity, making replacement necessary.

Requirements

In order to comply with the International Regulations for Preventing Collisions at Sea (72 COLREGS) and the Inland Navigation Rules, and their Annexes, found in the US Code of Federal Regulations 33 CFR Subchapter E., side lights must be installed *above* the sheer line (this is the top edge of the hull side, or the toe rail on many vessels). Even if this were not a regulation, I would strongly recommend avoiding installation of sidelights in or on the hull as they are less visible, particularly when heeled and they are exposed to more spray and immersion, reducing their reliability, and when in this location it's difficult to install them so they are parallel with the centerline. Remember as well, for sailing vessels, tricolor lights can only be used when under sail (not motor-sailing). While under power, conventional deck-level lights must be used and at no time can both sets of lights shine simultaneously. In order to avoid this navigation light error, consider installing a two-position switch (with power supplied by a navigation light circuit breaker) that will activate *either* the steaming *or* sailing configuration, but not both.

For vessels registered or operating in the United States, when selecting, inspecting or replacing navigation lights, make certain they carry a United States Coast Guard (USCG) approval, which must be permanently stamped, printed, embossed or debossed on the fixture (it cannot be a decal), and ensure it's appropriate for the vessel length, and for incandescent fixtures, which are admittedly becoming less and less common, make certain the correct wattage bulb has been used; this is an error I frequently encounter. Where incandescent fixtures are concerned, I prefer those that can be serviced without the use of tools (think about disassembling a fixture housing

using a small screw driver, while hanging over a bow rail or sitting in a bo’s’n’s chair).

Incandescent bulb bases are prone to corrosion. These should be periodically inspected, and if corrosion is found it should be cleaned, or the bulb replaced, and a light coat of dielectric grease applied.

While LED lights are virtually immune from bulb failure, they are no less prone to wiring and connection issues. Make certain all navigation light wiring is fully waterproofed using either heat shrink tubing and/or sealant. Most non-bulb related navigation light failures are related to corroded or stressed connections. Mast-mounted lights are especially prone to the latter; the weight of the wire should *not* be supported by the light fixture or connection/splice.

Sidebar: LED Lights and Radio Frequency (RF) “Noise”

ABYC’s position on radio frequency interference from LED

navigation lights follows.

“Navigation lights and other deck and mast-mounted lighting equipped with light emitting diodes (LEDs), including those certified to recognized Electromagnetic Compatibility (EMC) standards, have been found to cause debilitating interference to very high frequency (VHF) radiotelephones and automatic identification systems (AIS) without operator awareness. Degradation of radio communication and the AIS signal may compromise vessel safety if the problem is not corrected.

Interference to GPS receivers is also possible. Periodic EMC checks are therefore essential, especially after installation of LED-equipped lighting or other systems mounted near antennas susceptible to unintentional interference.”

On the subject of LED navigation lights; there is no doubt that these have been a boon to the industry; while LED light failures are not unheard of, they are extremely rare, and they have obviously eliminated the need to replace incandescent bulbs.


WARNING

LED bulbs that are retrofit, to what were designed and approved as incandescent navigation light fixtures, lack USCG approval.

However, with some manufacturer's products being more sensitive than others, LED navigation lights can be damaged, and made inoperable, by high voltage. In some cases this voltage may otherwise be normal for sophisticated, high output charging systems. Make certain the lights you are using or selecting are capable of being exposed to the highest normally anticipated charging system voltage found on your electrical system. In recent years, many, but not all, LED light manufacturers, navigation and otherwise, have broadened the acceptable voltage range to combat this specific issue.

While LEDs have revolutionized navigation lights, make certain yours are capable of withstanding the range of voltage found on your vessel's DC electrical system.

Aftermarket replacement bulbs have become popular for converting cabin and other lighting from halogen and incandescent to cooler and more efficient LEDs. However, replacing a conventional navigation light's incandescent bulb with anything other than what has been specified by the fixture original equipment manufacturer will, regardless of improved efficiency and lifespan, result in a non-USCG compliant navigation light. The testing that is carried out by the Coast Guard on navigation lights yields a certification that is valid for the complete fixture, *with its original equipment bulb*, using anything other than this, regardless of advertised claims of USCG compliance, will result in a non-compliant navigation light fixture. If you are using such an

arrangement, and you are involved in a collision, you may be found at fault, or partially at fault, because you, or a previous owner, modified your navigation lights, and as a result they are no longer USCG compliant.

Where conventional incandescent navigation light fixtures are concerned, ease of access for inspection and bulb replacement,

i.e. no tools required, is a valuable feature.

Relevant ABYC Standards from Section A-16 “Installation of Electric Navigation Lights” (with highlighted author’s notes)

TABLE 1 – Minimum Range Requirements in Nautical Miles (NM)

VESSEL	APPLICATION	LIGHTS	< 12 m (< 39 ft) NM (km)	12 m to < 20 m (39 ft to < 65 ft) NM (km)	20 m to < 50 m (65 ft to < 164 ft) NM (km)	≥ 50 m (≥ 164 ft) NM (km)
POWER	This includes sailing vessels under power and motor sailing	White masthead light	2 (3.7) *(see NOTES)*	3 (5.6)	5 (9.3)	6 (11)
		Sidelights or combination lights	1 (1.9)	2 (3.7)	2 (3.7)	3 (5.6)
		Stern light	2 (3.7) *(see NOTES)*	2 (3.7)	2 (3.7)	3 (5.6)
SAIL	Sailing vessels under sail alone	Sidelights or combination light	1 (1.9)	2 (3.7)	2 (3.7)	3 (5.6)
		Stern light	2 (3.7) *(see NOTES)*	2 (3.7)	2 (3.7)	3 (5.6)
ANCHOR	This includes both sail and power vessels	All-round white light	2 (3.7) *(see NOTES)*	2 (3.7)	2 (3.7)	3 (5.6)

Navigation light requirements from ABYC section A-16.

NOTES:

1. *For vessels of 12 m (39 ft) or less in length overall (LOA), both sail and power, an all-round light can be used in lieu of masthead and stern lights and may also be used as an anchor light.*
2. *Lights designed for a vessel 12 to 20 m (39 to < 65 ft) in length overall (LOA) may be used on a vessel that is less than 12 m (39 ft) in length overall (LOA)*
3. *Vessels under 12 m (39 ft) may use 2 NM sidelights to improve the range of visibility.*
4. *A sailing vessel underway may, in addition to the lights prescribed in TABLE 1, exhibit at or near the top of the mast, where they can best be seen, two 2 NM all-round lights in a vertical line, the upper being red and the lower green, but these lights shall not be exhibited in conjunction with the combined lantern.*
5. *For a sailing vessel under 20 m (65 ft), a tricolor light should have the same range as sidelights and stern light.*

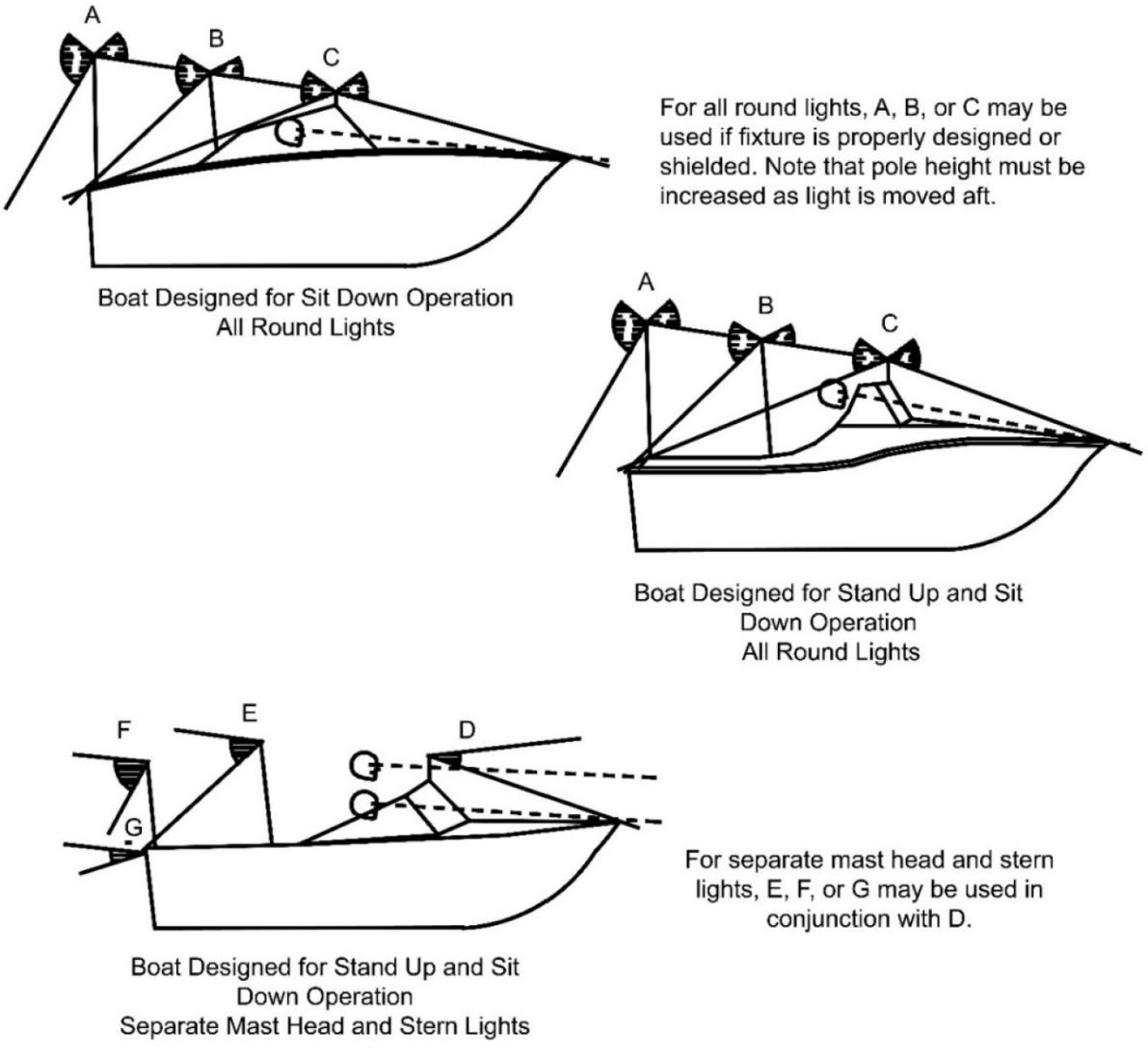
16.6.4 Navigation lights shall be visible under trim conditions in which the vessel is intended to be operated and shall not be obscured by the hull, deck, fixed structures, optional equipment, or designated occupant positions.

EXCEPTIONS:

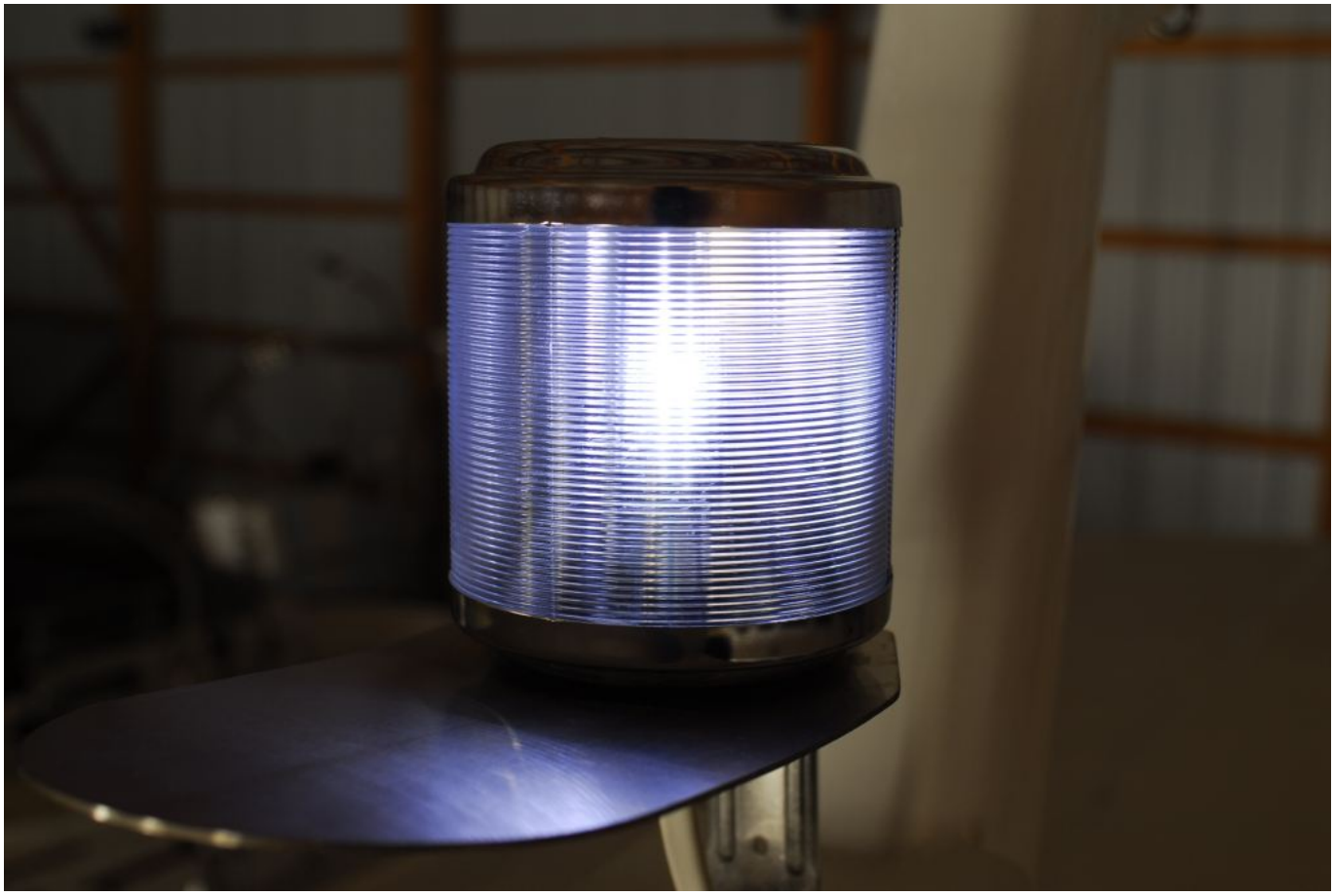
1. *In accordance with the 72 COLREGS and Inland Rules, all-round lights may not be obscured by masts, topmasts, or structures within angular sectors of more than six degrees.*
2. *Anchor lights, which need not be placed at an impracticable height above the hull.*

16.6.5 Navigation lights shall be installed to prevent the lights from shining into the operator's eyes when the operator is in the normal operating position (see FIGURE 2), and to prevent reflection off a vessel's structure within the operator's field of vision (see FIGURE 2):

FIGURE 2 – Examples of White Light Placement to Reduce Glare



[Author’s note: Masthead or steaming lights, while typically not shining directly into the operator’s eyes, often reflect off of the foredeck, thereby ruining night vision. Shades can be added below steaming light fixtures to prevent this from happening.]

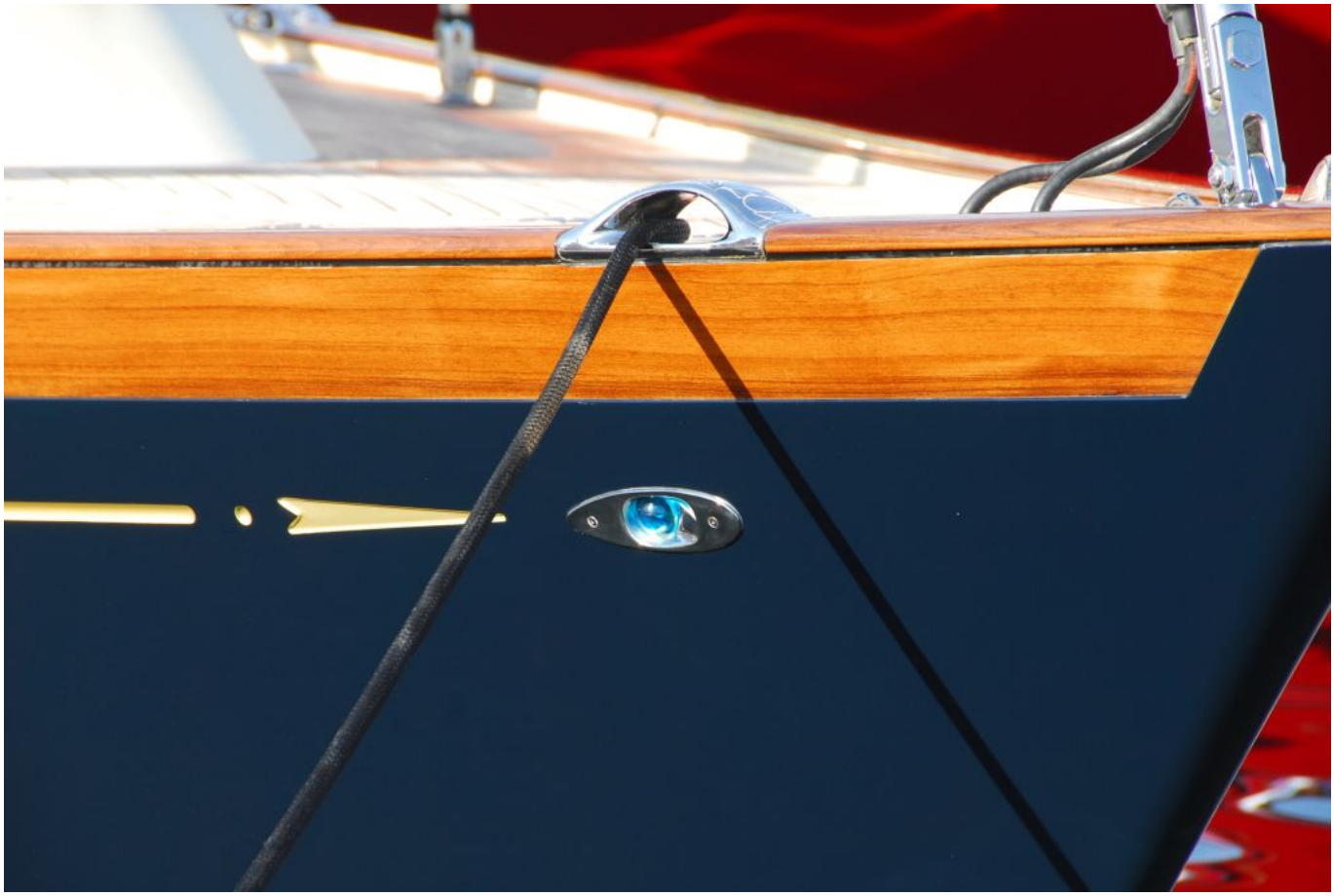


These masthead lights are equipped with a shade, to prevent reflection off the foredeck, and the resultant degradation of the operator's night vision.

16.6.7 The all-round light output shall not be directly visible from the operator's position. [Author's note: This is often a problem on tenders. Once again, a shade can be added to the all-round light fixture to alleviate this problem.]

16.6.15 Under 72 COLREGS, the sidelights shall be carried above the sheerline.

NOTE: Under the Federal Inland Navigation Rules, the sidelights may be carried either above or below the sheerline. [Author's note: Sidelights carried below the sheerline are less visible, especially in the case of a sailing vessel when heeled, therefore it is recommended that all sidelights be mounted above the sheerline, even when it is legal to place them below.]



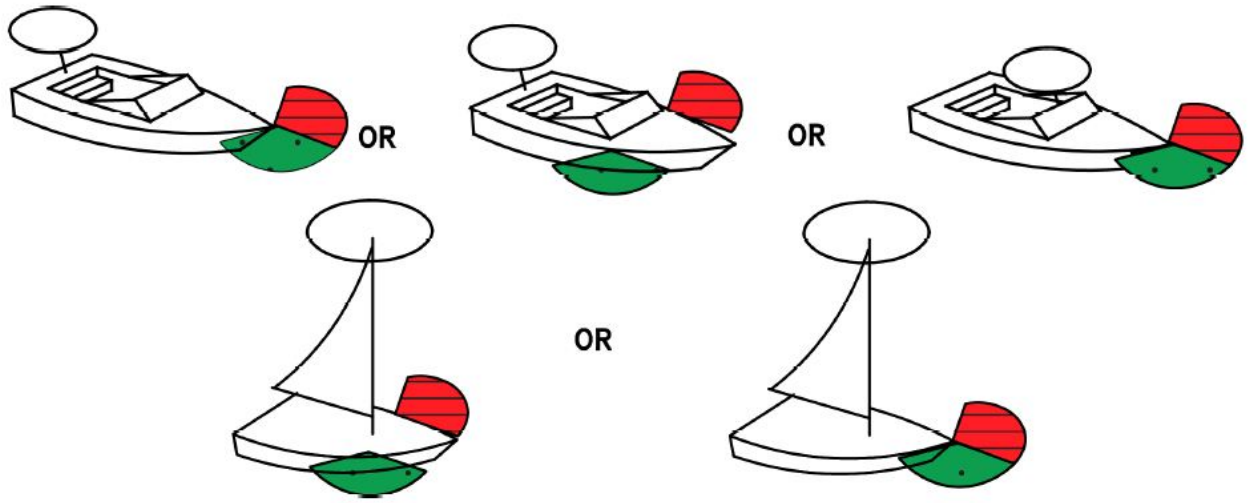
Side lights mounted below the sheerline may look sleeker, but

their visibility when heeled is poor, and they are non-compliant for international navigation rules.

Power Driven Vessel Underway

16.7.2.2 Power driven vessels less than 12 m (39 ft) in length overall (LOA) shall display navigation lights in one of the following configurations (see FIGURE 3):

FIGURE 3 – Power Driven and Sailing Vessel Under Sail and Power: Less Than 12 M (39 Ft) in Length Overall (LOA)



16.7.2.2.1 separate sidelights, visible for at least one nautical mile and a masthead light as far forward as practicable, visible for at least two nautical miles, one meter (39 in) minimum above the sidelights; and stern light, visible for at least two nautical miles; or

16.7.2.2.2 a combination sidelight, visible for at least one nautical mile, over the fore and aft centerline, and a masthead light as far forward as practicable, visible for at least two nautical miles, one meter (39 in) minimum above the combination sidelight; and stern light, visible for at least two nautical miles; or

16.7.2.2.3 a combination sidelight, visible for at least one nautical mile, over the fore and aft centerline; and a white,

all-round light over the fore and aft centerline, visible for at least two nautical miles, one meter (39 in) minimum above the combination sidelight; or

16.7.2.2.4 separate sidelights, visible for at least one nautical mile; and a white, all-round light over the fore and aft centerline, visible for at least two nautical miles, one meter (39 in) minimum above the sidelights.

This masthead and stern light configuration, used on a 60-foot power vessel, is non-compliant. Masthead lights must be installed, "as far forward as practicable"; this example is installed roughly amidships, on the vessel's mast, collocated with the stern light.

[Author's note: I commonly encounter vessels larger than 12 m (39 ft) in length, whose builders have installed a single white all-round light, rather than separate masthead and stern lights. This is a clear violation of the navigation rules.]

One of the most common navigation light faux pas, mounting the white all-round light on top of an outboard cowling. This light must be no less than 3 feet, or 1 meter, above side lights.

EXCEPTIONS to A-16.7.2.2:

1. A vessel less than seven meters (23 ft) in length overall (LOA) and whose maximum speed does not exceed seven knots may exhibit an all-round white light.
2. The masthead light or the all-round white light on a power driven vessel of less than 12 m (39 ft) in length overall (LOA) may be displaced from the fore and aft centerline of the vessel if centerline fitting is not practicable, provided the sidelights are combined in one lantern located on the fore and aft centerline of the vessel or nearly as practicable in the same fore and aft line as the masthead light or the all-round light.
3. Under the Federal Inland Navigation Rules, the masthead

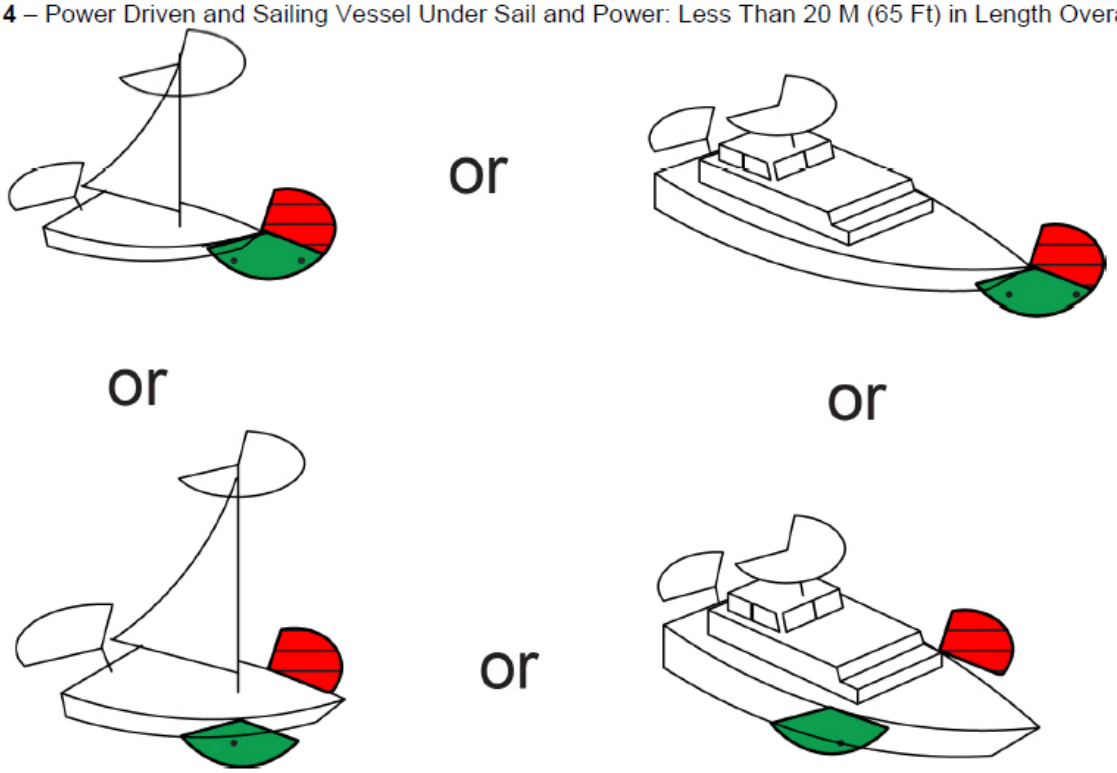
light or the all-round white light on a power-driven vessel of less than 12 m (39 ft) in length overall (LOA) may be displaced from the fore and aft centerline of the vessel if centerline fitting is not practicable. The sidelights may be either:

- combined in one lantern located on the fore and aft centerline of the vessel or as nearly as practicable to the fore and aft centerline of the vessel, or
- the sidelights may be kept separate (red lantern to port, green lantern to starboard).

NOTE to A-16.7.2.2: Lights designed for a vessel 12 to 20 m (39 to < 65 ft) in length overall (LOA) may be used on a vessel that is less than 12 m (39 ft) in length overall (LOA).

16.7.2.3 Power driven vessels of 12 to < 20 m (39 to < 65 ft) in length overall (LOA) shall display navigation lights in one of the following configurations (see FIGURE 4):

FIGURE 4 – Power Driven and Sailing Vessel Under Sail and Power: Less Than 20 M (65 Ft) in Length Overall (LOA)



16.7.2.3.1 separate sidelights visible for at least two

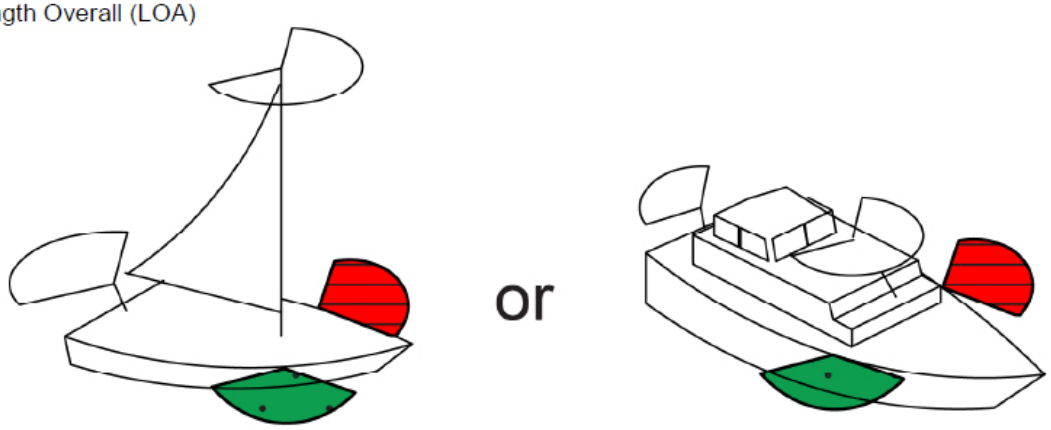
nautical miles, not higher than three quarters of the height that the masthead light is above the gunwale; [Author's note: Builders of power vessels who install masthead and side lights on the same mast structure are often in violation of this vertical separation rule] and a masthead light as far forward as practicable, visible for at least three nautical miles, placed over the fore and aft centerline of the vessel at a minimum height of 2.5 m (98 in) above the gunwale; and a stern light visible for at least two nautical miles; or

16.7.2.3.2 a combination sidelight visible for at least two nautical miles, over the fore and aft centerline, not less than one meter (39 in) below the masthead light [Author's note: Again, this vertical separation requirement is frequently violated]; and a masthead light as far forward as practicable, visible for at least three nautical miles, placed over the fore and aft centerline of the vessel, 2.5 m (98 in) minimum above the gunwale; and a stern light visible for at least two nautical miles.

NOTE: Lights designed for a vessel 12 to 20 m (39 to < 65 ft) in length overall (LOA) may be used on a vessel that is less than 12 m (39 ft) in length overall (LOA).

16.7.2.4 Power driven vessels of 20 m (65 ft) or more in length overall (LOA) shall display navigation lights in the following configuration (see FIGURE 5):

FIGURE 5 – Power Driven and Sailing Vessel Under Sail and Power: From 20 M (65 Ft) to Less Than 50 M (164 Ft) in Length Overall (LOA)



16.7.2.4.1 separate sidelights visible for at least two nautical miles placed at or near the side of the vessel not in front of the forward masthead light and a masthead light visible for at least five nautical miles [author's note, this range requirement is frequently violated by using a 3nm fixture, which is designed for a smaller vessel] carried forward of amidships at a height above the hull of not less than six meters (20 ft), and, if the breadth of the vessel exceeds six meters (20 ft), then at a height above the hull not less than such breadth, although this need not be placed at a height above the hull greater than 12 m (39 ft), and a stern light visible for at least two nautical miles.

16.7.2.4.1.1 Sidelights shall be fitted with inboard screens (light boards) to reach the practical cutoff between 1° and 3° outside the prescribed sector requirements, the screens shall be matte black. [Author's note: Screens are often omitted, and when present they are frequently not matte black, as required, many are gloss black, varnished, or the same color as the cabin.]

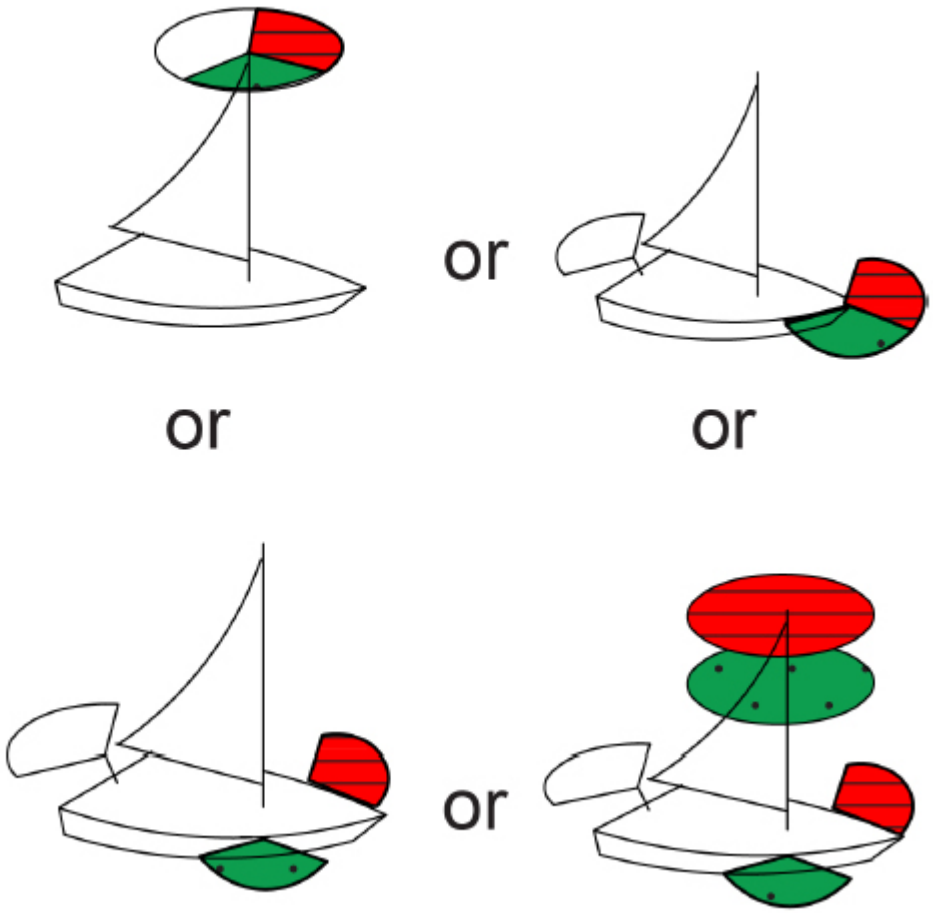
Inboard screen or “light boards”, when used, must be matte, rather than gloss, black.

Sailing Vessel (Under Sail Only)

NOTE: Sailing vessels under sail alone may exhibit, where they can best be seen, two all-round lights in a vertical line, the upper being red and the lower green, in addition to the prescribed sidelights and stern light but not with a tricolor light.

16.7.3.1 Sailing vessels less than 12 m (39 ft) in length overall (LOA) shall display navigation lights in one of the following configurations (see FIGURE 6):

FIGURE 6 – Sailing Vessel Less Than 20 M (65 Ft) in Length Overall (LOA)



16.7.3.1.1 separate sidelights visible for at least one nautical mile and a stern light visible for at least two nautical miles; or

16.7.3.1.2 a combination sidelight visible for at least one nautical mile, placed over the fore and aft centerline; and a stern light visible for at least two nautical miles; or

16.7.3.1.3 a tricolor light, the port and starboard sectors visible for at least one nautical mile, the stern sector visible for at least two nautical miles; or

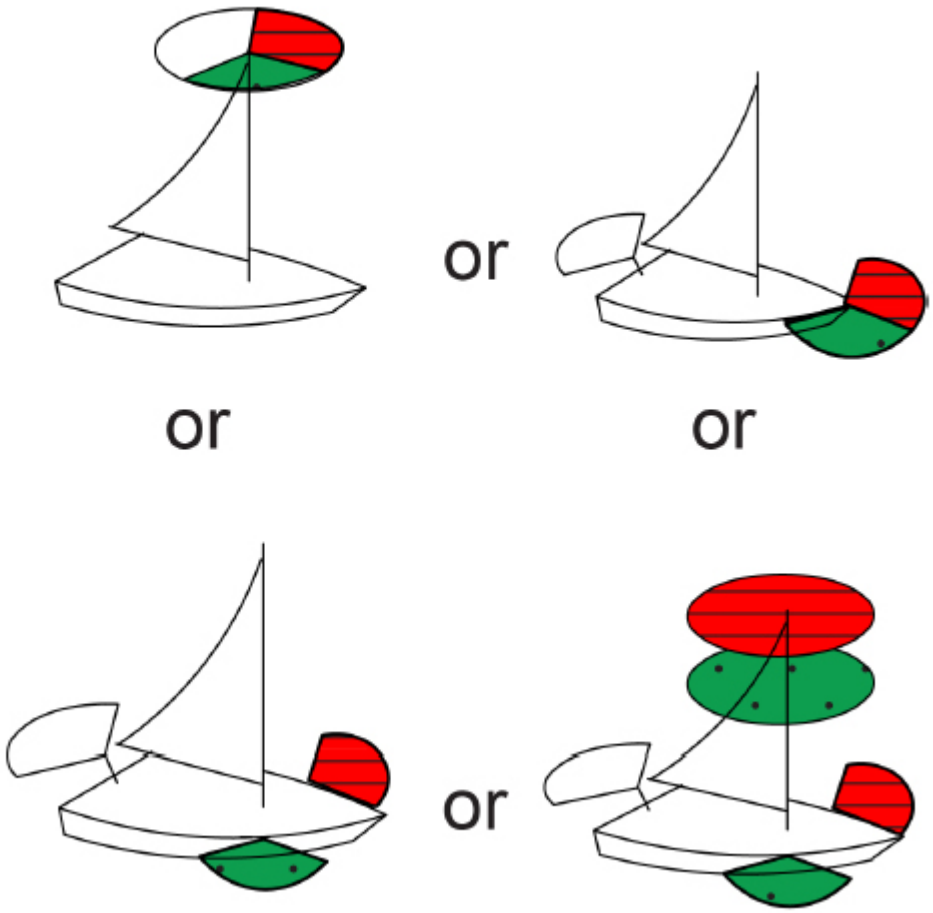
16.7.3.1.4 separate sidelights visible for at least one nautical mile and a stern light visible for at least two nautical miles, two all-round lights in a vertical line, the upper being red and the lower green separated by at least 1 m, each visible for 2 nm.

EXCEPTION: Sailing vessels under seven meters (23 ft) in length overall (LOA) may have ready an electric torch or lantern showing a white light, which shall be displayed in time to prevent a collision in place of navigation lights described in A-16.7.3.1.

NOTE: The tricolor light indicates a sailing vessel that is under sail alone, and should not be displayed when the vessel is under power, or when under sail and power. Under these conditions, the configurations applicable to a power vessel apply. Provision shall be made to display the two configurations separately, not simultaneously. [Author's note: As noted in the body of the article, the switch used to activate tri-color and side lights/stern light/masthead light, should be an 'either-or' configuration, preventing both power and sail configurations from being illuminated simultaneously].

16.7.3.2 Sailing vessels of 12 to < 20 m (39 to < 65 ft) in length overall (LOA) shall display navigation lights in one of the following configurations (see FIGURE 6):

FIGURE 6 – Sailing Vessel Less Than 20 M (65 Ft) in Length Overall (LOA)



16.7.3.2.1 separate sidelights visible for at least two nautical miles and a stern light visible for at least two nautical miles; or

16.7.3.2.2 a combination sidelight visible for at least two nautical miles, placed over the fore and aft centerline; and a stern light visible for at least two nautical miles; or

16.7.3.2.3 a tricolor light with all sectors visible for at least two nautical miles.

NOTES:

1. The tricolor light indicates a sailing vessel that is under sail alone, and should not be displayed when the vessel is under power, or when under sail and power. Under these conditions, the configurations applicable to

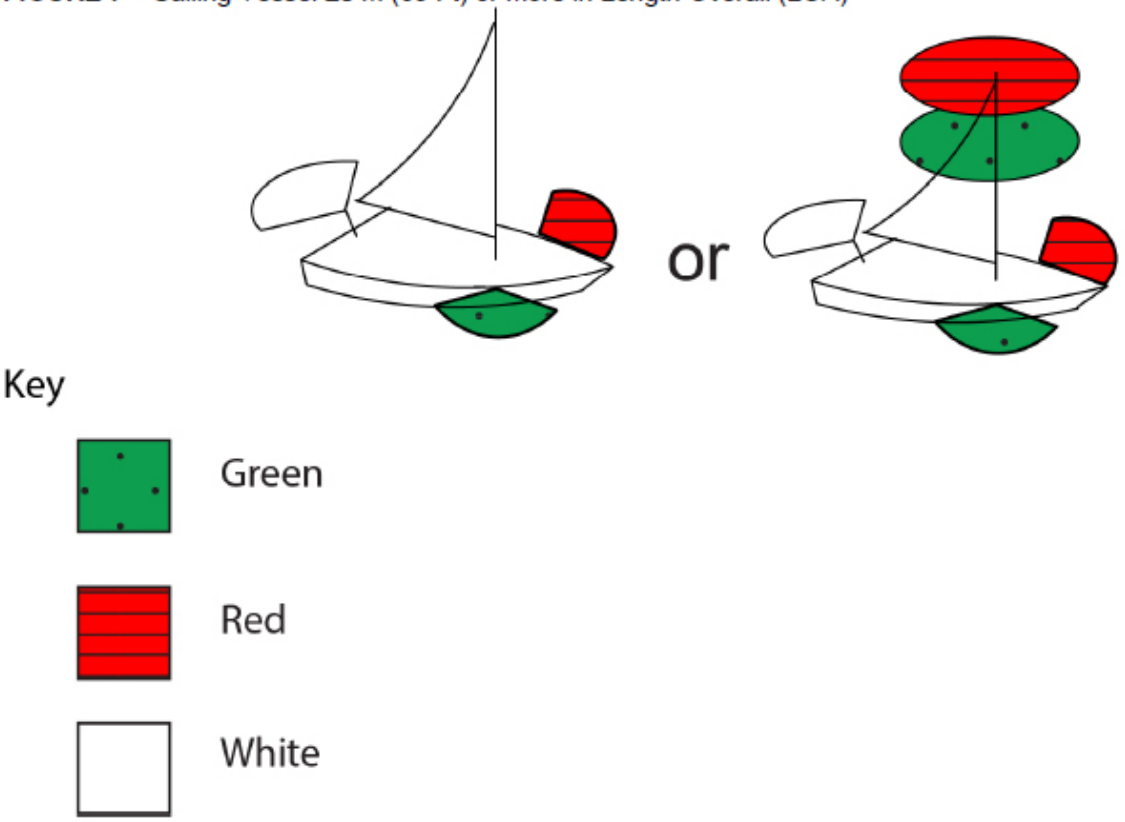
a power vessel apply. Provision shall be made to display the two configurations separately, not simultaneously. [Author's note: As noted in the body of the article, the switch used to activate tri-color and side lights/stern light/masthead light, should be an 'either-or' configuration, preventing both power and sail configurations from being illuminated simultaneously].

2. Lights designed for a vessel 12 to 20 m (39 to < 65 ft) in length overall (LOA) may be used on a vessel that is less than 12 m (39 ft) in length overall (LOA).

Navigation light design applications are are categorized by vessel length.

16.7.3.3 Sailing vessels of 20 m (65 ft) or more in length overall (LOA) shall display navigation lights in the following configuration (see FIGURE 7):

FIGURE 7 – Sailing Vessel 20 M (65 Ft) or More in Length Overall (LOA)



16.7.3.3.1 separate sidelights visible for at least two nautical miles and stern light visible for at least two nautical miles.

16.7.3.3.2 separate sidelights visible for at least one nautical mile and a stern light visible for at least two nautical miles, two all-round lights in a vertical line, the upper being red and the lower green separated by at least 2 m (7 ft), each visible for 2 nm.

16.7.4 Vessels at anchor shall display, where it can best be seen, an all-round white light visible for at least two nautical miles.

As noted earlier, it is the responsibility of the vessel operator to ensure navigation lights are properly configured for the application, unobstructed and in good working order. Don’t take chances with this vital aspect of nighttime operation, check your lights to make certain they comply for

your vessel’s design and size, and inspect them regularly to make certain they are properly illuminated.