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RECOMMENDATIONS

FOR TEMPORARY AND PERMANENT INSTALLATIONS

Of

BRIDGE NAVIGATION LIGHTS

AND REFLECTIVE MATERIALS

by

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RECOMMENDATIONS FOR TEMPORARY AND PERMANENT INSTALLATIONS
OF
BRIDGE NAVIGATION LIGHTS
AND
REFLECTIVE MATERIAL

When needed for the safety of navigation, the Coast Guard (District Commander) will require bridge lighting in accordance with Title 33, section 118, Code of Federal Regulations. The required bridge lighting must be installed at the locations and in the manner prescribed by the District Commander on Coast Guard approved bridge plans.

The following guidelines will assist in the selection and installation of the proper equipment needed to maintain marine navigation lights and reflective material on bridges:

I. Bascule Bridges.

1. The lift span of a bascule bridge must be lighted so that the free ends of a fully open span will be marked on each side by green lights during the passage of vessels and by red lights for all other positions of the lift span. Each red or green light shall show through a horizontal arc of 180 degrees. Further, the lights shall be securely mounted on the side of the span so as to show 90 degrees on either side of a line parallel to the channel axis in order to be visible from an approaching vessel.

2. The upstream and downstream sides of the main channel piers must be marked with red lights. Each red light shall show through a horizontal arc of 180 degrees and must be securely mounted on the pier as low as practicable but not lower than two feet above navigable high water to show 90 degrees on either side of a line parallel to the axis of the channel so as to be visible from an approaching vessel.

3. The channelward side of the pier protection cell must be marked with a red light. The red light must show through a horizontal arc of 180 degrees and must be securely mounted on top of the cell in the upstream channelward quadrant in order to show 90 degrees on either side of a line parallel to the channel axis so as to be visible from an approaching vessel.

4. In addition to the navigation lights prescribed, a red reflector should be installed in the channelward upstream quadrant of the cell and the upstream and downstream sides of each channel pier. The reflector must have a reflective area of not less than 36 square inches and not more than 144 square inches.

II. Fixed Bridges.

Upstream and downstream sides of channel piers and protection cells (if any) may be marked with red reflectors or red retroreflective material in addition to the lights prescribed. The material is normally affixed to the upstream channelward quadrant of each upstream channel pier and cell and to the downstream channelward quadrant of the downstream channel pier and cell in order to effectively reflect the light from an approaching vessel. The reflectors or retroreflective materials should cover about 0.5 square foot in each location and located at or above the high water line.

III. Swing Bridges.

1. Swing spans shall be marked with three lights so that when viewed from an approaching vessel, the closed swing span will display three red lights on top of the span structure (one at each end of the span on the same level and one at the center of the span, not less than 10 feet above the other two lights). The swing span, when open, will display three green lights on top of the span structure in a line parallel to and directly above the long axis of the span (one at each end of the span on the same level and one at the center of the span, no less than 10 feet above the other two lights). Each light shall show through alternate red and green horizontal arcs of 60 degrees each with the axis of adjacent arcs being 90 degrees from each other. Further, each light shall be securely mounted with the axis of the green arcs parallel to the long axis of the bridge.

2. Protection cells and light platforms located upstream from the right descending rest piers, the upstream and downstream pivot pier protection cells, and the downstream side of the right and both sides of left rest piers, must be marked with red lights. Each light must show through a horizontal arc of 180 degrees and must be mounted on top of the structures in order to show 90 degrees on either side of a line parallel to the axis of the channel so as to be visible from an approaching vessel.

IV. Vertical Lift Bridges.

1. Vertical lift spans which are open for navigation shall be lighted so that the center of the navigable channel under the span will be marked by a range of two green lights. For all other positions of the lift span, each side must be marked by one red light. Each green light must show through a horizontal arc of 360 degrees and must be securely mounted just below the outermost edge of the bridge span structure so as to be visible from an approaching vessel. Each red light must show through a horizontal arc of 180 degrees and must be securely mounted just below the outermost edge of the lift span in order to show 90 degrees on either side of a line parallel to the channel axis so that only one such light will be visible from an approaching vessel.

2. The upstream and downstream sides of the channel piers shall be marked with red lights. Each red light shall be visible through a horizontal arc of 180 degrees and shall be securely mounted on the pier as low as practicable but not lower than two feet above navigable high water to be visible from an approaching vessel for 90 degrees on either side of a line parallel to the channel axis.

3. The upstream and downstream sides of the channel piers should be marked with red retroreflective material. This material should be affixed near the top of the pier column and on the extreme channelward quadrant of the pier column so as to effectively reflect the searchlight from a vessel approaching from the usual direction. Such material should be affixed in one piece, when practicable, and should have a reflective area of not less than 36 square inches and not more than 144 square inches.

V. Other Guidelines:

1. Equipment used for general illumination of a bridge shall be so designed that the light distribution pattern will not permit high intensity light to spill over and blind or interfere with marine navigation. There are a number of street light luminaries manufactured to control the light distribution by lense, ray collectors, hoods or shields. Proper consideration of this matter while the bridge design is in progress will avoid difficulties in the future.

2. Fresnel lens lanterns should be used and installed, i.e., a service lamp with at least one standby lamp. Both lamps should be controlled by a lightout relay or lampchanger mechanism so as to exhibit the standby lamp upon burnout of the service lamp.

3. Lamps for fresnel equipment should be properly secured and properly focused in the lenses.

4. Prescribed bridge lights must be displayed from sunset to sunrise each night of the year and at other times when the visibility is less than one mile. The lights should be of sufficient candlepower so as to be visible against the background lighting at a distance of at least 2,000 yards for 90 percent of the nights of the year.

It is the responsibility of the bridge owner to maintain proper temporary navigational lighting and such other marking as may be prescribed on bridges during construction and permanent lighting on the bridge when it spans the river and falsework has been removed. Temporary lights and reflectors must be of the same color and characteristic and have a range of visibility equal to that prescribed for permanent lights.

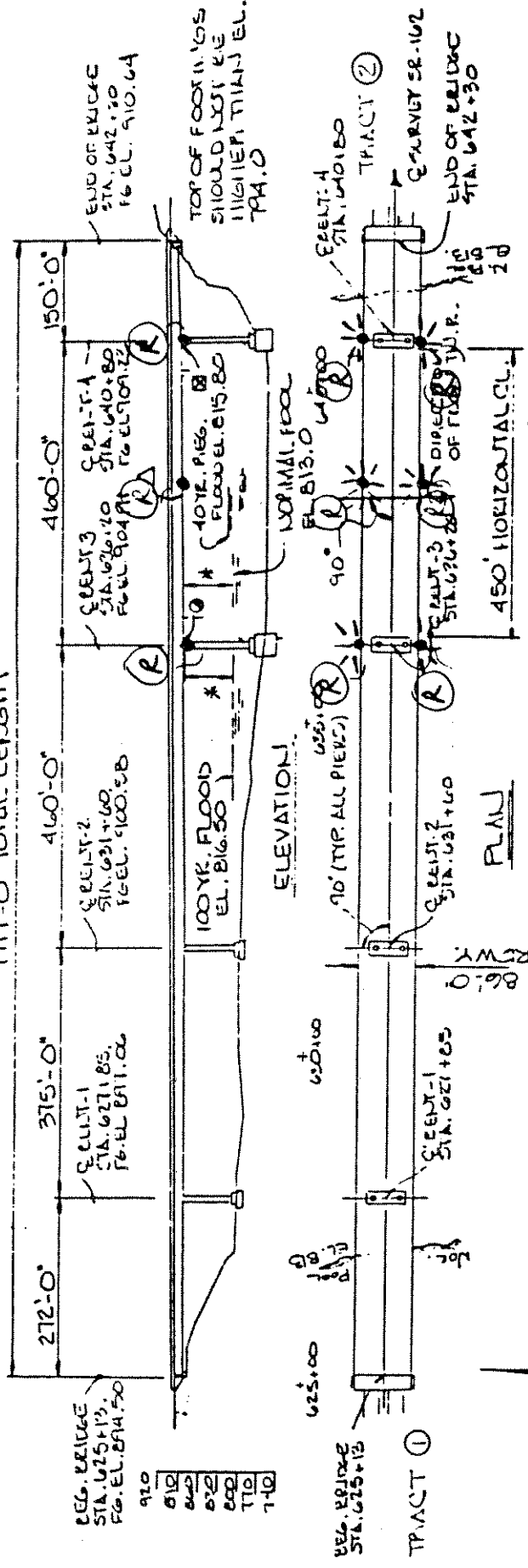
Responsibility of the owner does not cease upon installation of the prescribed lights. Provisions for maintaining all prescribed lights should be included in the planning for initial installation. A continuing program of inspection and maintenance is necessary to insure that the lights are properly displayed.

Enclosures 1, 2, and 3 provide additional detailed information with respect to bridge lighting requirements and examples of their proper installation on bridges and their appurtenances.

N. E. MPRAS
U. S. Coast Guard

Encl: (1) Bridge Lighting and Other Signals
(2) Sheet 1 of 2 (example of bridge lights installation)
(3) Sheet 2 of 2 (example of bridge lights installation)

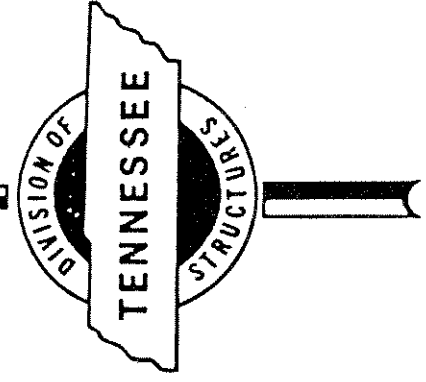
1717'-0" TOTAL LENGTH



END OF BRIDGE STA. 642+30
 TOP OF FOOTINGS SHOULD NOT BE HIGHER THAN EL. 794.0
 END OF BRIDGE STA. 642+30
 END OF BRIDGE STA. 642+30
 END OF BRIDGE STA. 642+30
 END OF BRIDGE STA. 642+30

TRACT 1 RIVERSIDE ASSOC. H.W. 7001 SHEPWOOD LP. KNOXVILLE, TN 37917
 TRACT 2 GEORGE S. HARRIS HILLTOP ROAD KNOXVILLE, TN 37920

Datum: mean sea level



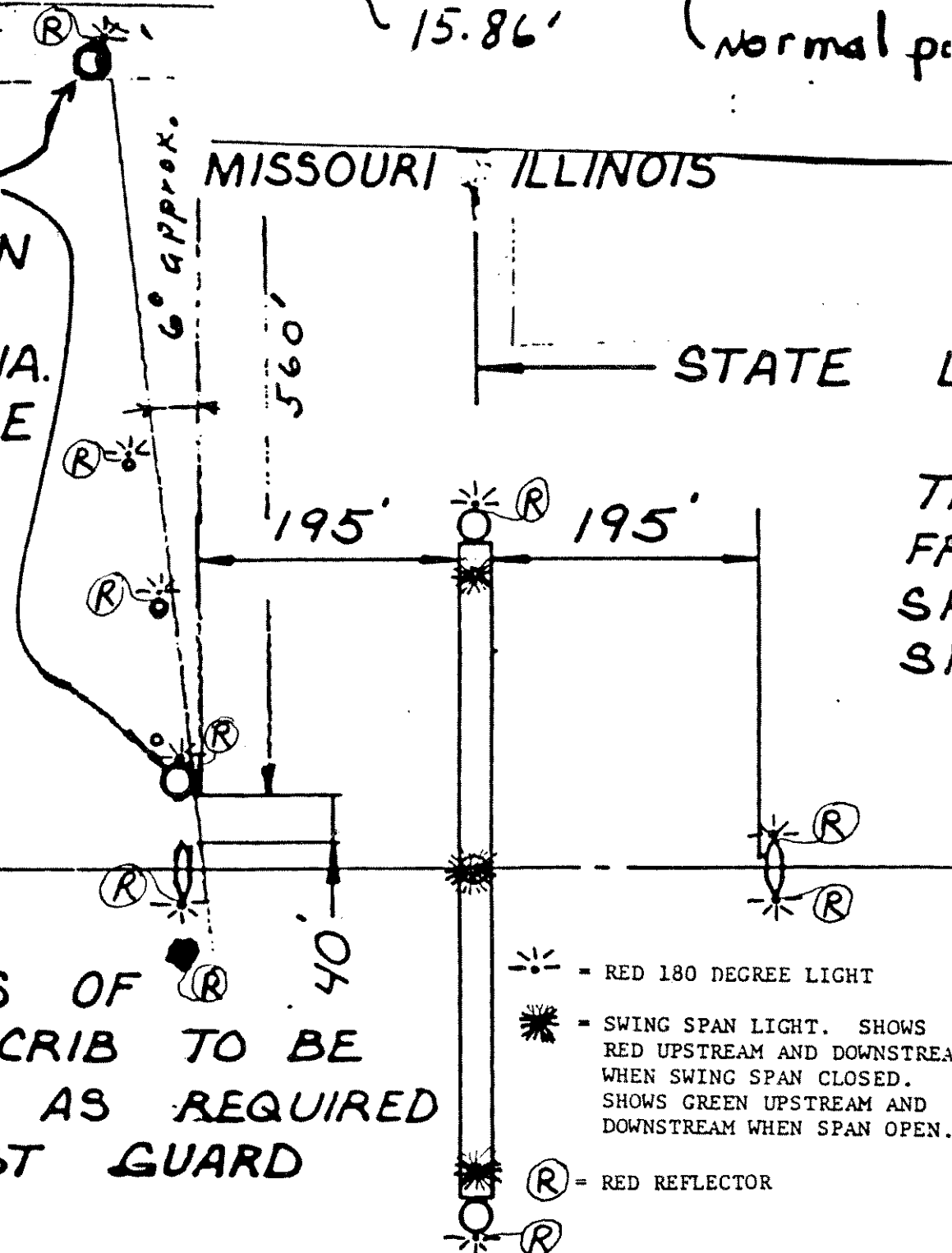
STATE OF TENNESSEE
 PROPOSED BRIDGE
 STATE ROUTE 162 (PELLISSIPPI PARKWAY) OVER
 TENNESSEE RIVER
 KNOX AND BLOUNT COUNTIES
 RIVER MILE 620.1
 DATE: 1-3-86
 REV: 7-22-86
 SHEET 1 OF 3

○ DENOTES: FACE OF PIER
 LOW STEEL EL. 870.15
 △ DENOTES: LOW STEEL EL. 872.57
 ⊠ DENOTES: FACE OF PIER
 LOW STEEL 874.74
 * DENOTES: ACTUAL VERTICAL CLEARANCE = 74.65' ABOVE 40 YR. REGULATED FLOOD, 77.45' ABOVE NORMAL FLOOD.
 (R) = Red reflector
 (G) = Green reflector



PROPOSED PROTECTION CELLS "25'-5 9/16" DIA. SHEET PILE CONCRETE FILLED Top FL. 462.5 (TYP)

Note: PORTIONS OF EXISTING CRIB TO BE REMOVED AS REQUIRED BY COAST GUARD



- RED 180 DEGREE LIGHT
- SWING SPAN LIGHT. SHOWS RED UPSTREAM AND DOWNSTREAM WHEN SWING SPAN CLOSED. SHOWS GREEN UPSTREAM AND DOWNSTREAM WHEN SPAN OPEN.
- RED REFLECTOR

SHEET 2 OF 2

PROPOSED PROTECTION CELLS BRIDGE AD 274-4 OVER MISSISSIPPI RIVER AT MILE 282.1 LOUISIANA, MO.	
ENGINEER	DATE
DESIGNED BY	NO.
CHECKED BY	DATE
APPROVED BY	NO.

U.S. Department
of Transportation

**United States
Coast Guard**



BRIDGE LIGHTING AND OTHER SIGNALS

COMDTINST M16590.5
BRIDGE ADMINISTRATION MANUAL

FEDERAL REGISTER, VOL. 51
NO. 85 - FRIDAY
MAY 2, 1986

PART 118 - LIGHTING OF BRIDGES

Sec.	
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118.160	Vertical clearance gauges.

AUTHORITY: Sec. 4, 34 Stat. 85, as amended, secs. 84, 85, 92, 633, 63 Stat. 500, 501, 503, 545; 33 U.S.C. 494, 14 U.S.C. 84, 85, 92, 633, unless otherwise noted.

§ 118.1 General requirements.

All persons owning or operating bridges over the navigable waters of the United States or any international bridges constructed after March 23, 1906, shall maintain at their own expense the lights and other signals required by this part.

Encl. (6) to COMDTINST M16590.5

§ 118.3 Incorporation by reference.

(a) In this part, portions or the entire text of certain standards and specifications are incorporated by reference as the governing requirements for materials, equipment, tests, or procedures to be followed. These standards and specification requirements specifically referred to in this part are the governing requirements for the subject matters covered, unless specifically limited, modified, or replaced by the regulations.

(b) These materials are incorporated by reference into this part under 5 U.S.C. 552(a) with the approval of the Director of the Federal Register. The Office of the Federal Register publishes a table, "Material Approved for Incorporation by Reference," which appears in the Finding Aids section of this volume. In that table are found citations to the particular sections of this part where the material is incorporated. To enforce any edition other than the one listed in paragraph (c) of this section, notice of the change must be published in the FEDERAL REGISTER and the material made available. All approved material is on file at the Office of the Federal Register, Washington, D. C. 20408 and at U. S. Coast Guard, Room 1410, 2100 Second Street, S.W., Washington, D. C. 20593. Copies may be obtained from the sources indicated in paragraph (c) of this section.

(c) The materials approved for incorporation by reference in this part are:

Federal Highway Administration (FHWA), 400 Seventh Street, S.W.,
Washington, D. C. 20590

Standard Alphabets for Highways Signs, 1966. (Reprinted April 1984).

§ 118.5 Penalty for failure to maintain.

Any person required to maintain lights and other signals upon any bridge or abutment over or in the navigable waters of the United States who fails or refuses to maintain such lights and other signals, or to obey any of the lawful rules and regulations relating to the same is subject to a penalty as provided in 14 U.S.C. 85.

§ 118.10 Interference or obstruction prohibited.

No person shall obstruct or interfere with any lights or signals maintained in accordance with the regulations prescribed in this part.

§ 118.15 Penalty for interference or obstruction.

Any person violating the provisions of § 68.01-10 of this chapter shall be deemed guilty of a misdemeanor and be subject to a fine not exceeding \$500 for each offense. Each day during which such violation shall continue shall be considered a new offense.

§ 118.20 Obtaining information.

Persons desiring information concerning the marking of bridges shall address their inquiry to the District Commander having jurisdiction over the area concerned, or to the Commandant.

§ 118.25 Application procedure.

Approval of lights and other signals required shall be obtained, prior to construction, from the District Commander of the area in which the structure will be situated. Application shall be by letter accompanied by duplicate sets of drawings showing (a) plan and elevation of the structure showing lights and signals proposed, and (b) small scale vicinity chart showing proposed bridge and all other bridges within 1,000 feet above or below the proposed bridge.

§ 118.30 Action by Coast Guard.

(a) The District Commander receiving the application will review it and approve the lights and other signals proposed, or mark on the drawings, the lights and other signals required, and in the case of lights, cite the applicable section of this chapter which prescribes the lights required for the particular type bridge.

(b) Upon approval, one set of drawings will be returned to the applicant with the notation "navigational lights and/or other signals approved as shown" date, name and title of the District Commander.

§ 118.35 Signals pertaining to the operation of bridges.

Lights and signals necessary for the execution of rules and regulations pertaining to the operation of bridges issued by the Secretary of the Army will be prescribed by the District Engineer.

§ 118.40 Modification of requirements.

(a) The District Commander may modify the requirements for the display of lights and other signals on any bridge when a change in local conditions warrants the modification.

(b) The District Commander may exempt bridges over waterways with no significant nighttime navigation from the lighting or other signal requirements in this part.

(c) The District Commander may prescribe special lighting or other signals in specific cases when the lighting or other signals in this part may not provide adequately for the safe passage of vessels.

(d) While a bridge is under construction, the District Commander prescribes the temporary lights and other signals to be displayed for the protection of navigation.

Encl. (6) to COMDTINST M16590.5

§ 118.45 Lighting for the protection of aerial navigation.

The owner of a bridge which constitutes a hazard to aerial navigation should maintain, in addition to the lights prescribed in this part, such lights as may be prescribed by the Administrator, Federal Aviation Administration.

§ 118.50 Inspection.

Lights and other signals required or authorized under this part are subject to inspection at any time by Coast Guard personnel or authorized agents.

§ 118.55 Periods of operation.

(a) Lights shall be displayed from sunset to sunrise and at other times when the visibility is less than one mile.

(b) Operators shall not be required to exhibit the prescribed lights during seasons when vessels are unable to navigate in the vicinity of the bridge.

(c) The operation of signals other than lights shall be as prescribed by the District Commander. Each case shall be considered individually.

§ 118.60 Characteristics of lights.

All lights required or authorized under this part must be securely attached to the structure and of sufficient candlepower as to be visible against the background lighting at a distance of a least 2,000 yards 90 percent of the nights of the year. Lights must meet the requirements of this part. Lights shall be fixed lights excepting as provided in §§118.95, 118.110 and 118.150 of this part. Color specifications are not prescribed for bridge lights, however, the chromaticity standards for navigation lights in Annex I, Appendix A of 33 CFR Part 81 are recommended.

§ 118.65 Lights on fixed bridges.

(a) Each fixed bridge span over a navigable channel shall be lighted so that the center of the navigable channel under each span will be marked by a range of two green lights, and each margin of each navigable channel will be marked by a red light: Provided, That when a margin of a channel is limited by a pier, only those lights prescribed in paragraph (b) of this section shall be required to mark such channel margin. The green lights shall each show through a horizontal arc of 360°, they shall be securely mounted just below the outermost edge of the bridge span structure so as to be visible from an approaching vessel. Each red light shall show through a horizontal arc of 180°, and shall be securely mounted just below the outermost edge of the bridge span structure to show 90° on either side of a line parallel to the axis of the channel so as to be visible from an approaching vessel.

NOTE-Until such time that major repairs to or replacements of existing fixed span navigation lights colored green are made, it is permitted that only one of these lights marking the centerline of the same channel under a span shall be visible to an approaching vessel. When major repairs to or replacement of such existing green lights are made they shall conform with this paragraph.

(b) Pier lights. When the navigable channel extends from pier to pier or when piers are located within the navigable channel, each end of such piers shall be lighted with a red light. Each such light shall show through a horizontal arc of 180°, and shall be securely fastened at the end of the pier as low as practicable but not lower than 2 feet above navigable high water to show 90° on either side of a line parallel to the axis of the channel so as to be visible from an approaching vessel.

(c) Main channel. When necessary, the District Commander may prescribe that fixed bridges having two or more spans over a navigable channel shall have the main channel span marked with a set of three white lights arranged in a vertical line directly above each green light on the main channel span. Each white light shall show through a horizontal arc of 180°, and shall be mounted so that $\frac{1}{2}$ of the horizontal arc will show on either side of a line parallel to the axis of the channel. These three white lights shall be securely mounted on the bridge structure and spaced as nearly 15 feet apart as the structure of the bridge will permit, with a minimum spacing of 7 feet. The lowest white light in the line of three lights shall be placed not less than 10 nor more than 15 feet above each green light on the main channel span.

NOTE: Until such time that major repairs to or replacements of existing main channel lights showing white are made, it is permitted that these lights show through a horizontal arc of not less than 60° nor more than 180° with $\frac{1}{2}$ of such arc showing either side of a line parallel to the axis of the main channel. When major repairs or replacement of such existing white lights are made, they shall conform with this paragraph.

§ 118.70 Lights on swing bridges.

(a) Swing span lights on through bridges. Each swing span of every through swing bridge shall be lighted with three lanterns so that when viewed from an approaching vessel the swing span when closed will display three red lights on top of the span structure, one at each end of the span on the same level and one at the center of the span no less than 10 feet above the other two lights, and when open for navigation will display three green lights on top of the span structure in a line parallel to and directly above the long axis of the span, one at each end of the span on the same level, and one at the center of the span no less than 10 feet above the other two lights. Each lantern shall show through alternate red and green horizontal arcs of 60° each, the axis of adjacent arcs to be 90° from each other; each light shall be securely mounted with the axis of the green arcs parallel to the long axis of the swing span.

Encl. (6) to COMDTINST M16590.5

(b) Swing span lights on deck and half-through bridges. Each swing span of every deck, half-through, girder, or similar type swing bridge shall be lighted with four lanterns so that when viewed from an approaching vessel the swing span when closed will display one red light at each end, and when open to navigation will display two green lights from each end. Each lantern shall show through one red and two green horizontal arcs of 60° each, the axis of each green arc to be 90° from the axis of the red arc; each light shall be securely mounted at the floor level of the span as near to the side of the span as practicable with the axis of the red light normal to the long axis of the swing span and so that the red light will be visible from an approaching vessel when the span is closed.

(c) Pier lights. Every swing bridge shall be lighted so that each end of the piers adjacent to the navigable channel (draw piers) or each end of their protection piers, (draw pier protection piers) and each end of the piers protecting the pivot pier (pivot protection pier) will be marked by a red light. Each of these lights shall show through a horizontal arc of 180° and shall be mounted as low as practicable below the floor level of the swing span to show 90° on either side of a line parallel to the axis of the channel so as to be visible from an approaching vessel.

(d) Axis lights. Every swing bridge shall be lighted so that the intersection of the bridge axis with each side of the pivot pier and the channel side of each draw pier which has a protection pier will be marked by a red light: Provided, That if the draw and draw protection piers are straight along their channel faces these lights shall not be required. Each such light shall show through a horizontal arc of 180°, and shall be mounted on the navigable channel face of the pier as low as practicable below the floor level of the swing span to show 90° either side of a line normal to the axis of the navigable channel so as to be visible from an approaching vessel.

(e) Omission of lights. Where the permanent navigable channel passes on only one side of the pivot pier of any swing span, the District Commander may authorize the omission of lighting of the unused channel.

§ 118.75 Lights on single-opening drawbridges.

(a) Bridges in this class. Bridges of the folding, pontoon and similar type single opening drawbridges are included in this class.

(b) Draw span lights. Each draw span of every single opening drawbridge shall be lighted with two lanterns so that when viewed from an approaching vessel the draw span when closed will display two red lights, one at each end of the span and when open to navigation will display two green lights, one at each end of the span. Each lantern shall show alternate red and green horizontal arcs of 60° each, the axis of adjacent arcs to be located 90° from each other; each lantern shall be securely mounted 15 feet above the roadway with the axis of the green arcs parallel to the long axis of the swing span.

(c) Pier or abutment lights. Every swing bridge shall be lighted so that the end of each pier, abutment or fixed portion of the bridge adjacent to the navigable channel through the draw, or each end of the protection piers for such piers, abutments, or fixed portion of the bridge will be marked by a red light. Each red light shall show through an arc of 180°, and shall be securely mounted on the pier, abutment or fixed portion of the bridge as low as practicable to show 90° on either side of a line parallel to the axis of the channel so as to be visible from an approaching vessel.

§ 118.80 Lights on bascule bridges.

(a) Lift span lights. Each lift span of every bascule bridge shall be lighted so that the free end of the span will be marked on each side by a green light which shows only when the span is fully open for the passage of a vessel and by a red light which shows for all other positions of the lift span. Each red and each green light shall show through a horizontal arc of 180°. The lighting apparatus shall be securely mounted to the side of the span so that the light will show equally on either side of a line parallel to the axis of the channels, so that they will be visible from an approaching vessel.

NOTE: Until such time that major repairs to or replacement of lift span navigation lights are made, existing lights may show through a horizontal arc of less than 180°. When major repairs to or replacement of existing lights are made they shall conform with this paragraph.

(b) Multiple parallel lift span lights. The outermost side of each outer span of every bascule bridge with parallel multiple lifts shall be lighted as prescribed in paragraph (a) of this section; the lights shall be controlled so that green lights will be displayed only when all spans are open for navigation. The inner sides of each outer lift span and both sides of each inner lift span of such bascule bridge shall be lighted by red lights for all positions of the lift span. These lights shall have the same arcs of illumination and shall be mounted as described in paragraph (a) of this section.

(c) Pier lights. Every bascule bridge shall be lighted so that each end of every pier, or protection pier where provided, in or adjacent to the navigable channels under the lift span or spans will be marked by a red light. Each such red light shall show through a horizontal arc of 180°, and shall be securely mounted as low as practicable on the end of the pier, or protection pier, to show 90° either side of a line parallel to the axis of the navigable channel so as to be visible from an approaching vessel.

Encl. (6) to COMDTINST M16590.5

(d) Axis lights. Every bascule bridge which has at least one pier provided with a protection pier shall be lighted so that the intersection of the long axis of the lift span with the channel side of each pier, or protection pier, will be marked by a red light: Provided, That if all such piers and protection piers are straight along their channel faces these lights shall not be required. Each such red light shall show through a horizontal arc of 180° and shall be securely mounted on the navigable channel face of the pier as low as practicable to show 90° on either side of a line normal to the axis of the navigable channel so as to be visible from an approaching vessel.

§ 118.85 Lights on vertical lift bridges.

(a) Lift span lights. The vertical lift span of every vertical lift bridge shall be lighted so that the center of the navigable channel under the span will be marked by a range of two green lights when the vertical lift span is open for navigation, and by one red light on each side of all other positions of the lift span. The green lights shall each show through a horizontal arc of 360°; they shall be securely mounted just below the outermost edge of the bridge span structure so as to be visible from an approaching vessel. Each red light shall show through a horizontal arc of 180°, and shall be securely mounted just below the outermost edge of the lift span to show 90° on either side of the line parallel to the axis of the channel so that only one such light will be visible from an approaching vessel.

NOTE.--Until such time that major repairs to or replacement of lift span navigation lights are made, it is permitted that these lights show through a horizontal arc of not more than 60°. When major repairs to or replacement of such existing lights are made they shall conform with this paragraph.

(b) Pier lights. Every vertical lift bridge shall be lighted so that each end of every pier in or adjacent to navigable channels under the lift span, or each end of every protection pier when provided, will be marked by a red light. Each such light shall show through a horizontal arc of 180°, and shall be securely mounted as low as practicable on the end of the pier, or the protection pier, to show 90° on either side of a line parallel to the axis of the navigable channel so as to be visible from an approaching vessel.

(c) Axis lights. Every lift bridge which has at least one pier provided with a protection pier shall be lighted so that the intersection of the lift span axis with the channel side of each pier adjacent to the navigable channel will be marked by a red light: Provided, That if every such pier, or protection pier, is straight along its channel face these lights shall not be required. Each such light shall show through a horizontal arc of 180°, and shall be securely mounted on the navigable channel face of the piers as low as practicable to show 90° on either side of a line normal to the axis of the navigable channel so as to be visible from an approaching vessel.

§ 118.90 Bridges crossing channel obliquely

Bridges crossing a body of water at an angle other than 90° with the axis of the channel shall be lighted in accordance with the regulations in this part with such modifications as are necessary in each particular case.

§ 118.95 Lights on structures not part of a bridge or approach structure.

Lights on sheer booms, isolated piers, obstructions, and other structures not part of a bridge or approach structure must meet the requirements for aids to navigation in Subpart 66.01 of Part 66 of this chapter.

§ 118.100 Retroreflective panels on bridge piers.

The District Commander may require or authorize the display of high intensity red or green retroreflective panels when the District Commander finds it necessary:

- (a) To better identify a hazardous pier.
- (b) To provide a backup for red pier lights, red channel margin lights, and green mid channel lights, which are subject to vandalism or otherwise difficult to properly maintain. If the District Commander determines that the nominal nighttime visibility required is less than one-half mile, the panels must be at least six inches square. If the visibility required is more than one-half mile, the panels must be at least 12 inches square.
- (c) To mark bridge piers or channel sides on bridges not required to have bridge lighting. Lateral significant red triangles and green square retroreflective panels shall be used. The panels shall be at least 36 square inches in area to provide a nominal nighttime visibility distance of at least one-half mile.

§ 118.110 Daymarks and lateral lighting on bridges.

(a) The District Commander may require or authorize the marking of the margins of navigation channels through bridges with U.S. aids to navigation system lateral marks and lights installed on the superstructure or on the channel piers. The District Commander may also require or authorize the use of quick flashing, flashing, isophase or occulting red and green lights to mark the main channels.

(b) If lateral system lights are required or authorized to mark the main navigation channels, fixed yellow lights shall be used to mark the adjacent piers and the centerline of the channel shall be marked with the standard lateral system safe water mark and occulting white light, instead of the lights prescribed in §118.65.

Encl. (6) to COMDTINST M16590.5

(c) The District Commander may require or authorize the marking of the centerline of the navigation channel drawspan of floating drawbridges with a special mark, diamond in shape, yellow in color, and with a high intensity retroreflective material border. The District Commander may require or authorize the mark to exhibit a flashing yellow light Morse Code "B" characteristic. The mark may not be visible when the drawspan is in the open position.

§ 118.120 Radar reflectors and racons.

The District Commander may require or authorize the installation of radar reflectors and racons on bridge structures, stakes, or buoys. Radars reflectors are used to mark the location of the edge of the navigation channel or bridge channel piers. Racons are used to mark the centerline of the channel.

§ 118.130 Fog signals.

On waterways where visibility is frequently reduced due to fog or other causes, the District Commander may require or authorize the installation of one or more fog signals to warn the navigator of the presence of the bridge. The fog signals must conform to the installation, range, and sound frequencies provisions in Subpart 67.10 of Part 67 of this chapter. If more than one fog signal is installed on a bridge or in the vicinity, their characteristics must be different to distinguish each signal. The fog signals must be directional to the fullest extent possible to minimize adverse impact on local residents.

§ 118.140 Painting bridge piers.

The District Commander may require painting the sides of bridge channel piers below the superstructure facing traffic white or yellow when they are significantly darkened by weathering or other causes so as to be poorly visible against a dark background.

§ 118.150 Traveller platforms.

The District Commander may require under deck traveller platforms which may significantly reduce the vertical clearance when operated over navigation channels at night to be lighted with quick flashing red lights on each of the four lower corners.

§ 118.160 Vertical clearance gauges.

(a) When necessary for reasons of safety of navigation, the District Commander may require or authorize the installation of clearance gauges. Except as specified in § 117.47(b) of this chapter for certain drawbridges, clearance gauges must meet the requirements of this section.

(b) Clearance gauges must indicate the vertical distance between "low steel" of the bridge channel span and the level of the water, measured to the bottom of the foot marks, read from top to bottom. Each gauge must be installed on the end of the right channel pier or pier protection structure facing approaching vessels and extend to a reasonable height above high water so as to be meaningful to the viewer. Other or additional locations may be prescribed by the District Commander if particular conditions of circumstances warrant.

(c) Construction. Each gauge must be permanently fixed to the bridge pier or pier protection structure and made of a durable material of sufficient strength to provide resistance to weather, tide, and current. Gauges may be painted directly on the bridge channel pier or pier protection structure if the surface is suitable and has sufficient width to accommodate the foot marks (graduations) and numerals.

(d) Numerals. (1) Each gauge must be marked by black numerals and foot marks on a white background. Paint, if used, must be of good exterior quality, resistant to excessive chalking or bleeding. Manufactured numerals and background material may be used.

(2) The size, type, and spacing of numerals must conform to the Standard Alphabets for Highway Signs and the following table. The nominal day visibility distance is the distance at which the clearance information needs to be ascertained by approaching vessel operators. The District Commander determines this distance for each bridge.

Nominal day visibility distance (feet)	Height of numeral (inches)	Type of numeral	Vertical spacing of numerals (feet)
Less than 500	12	Series C	2
500 to 750	18	Series C	2
750 to 1,000	24	Series D	5
1,000 to 2,000	36	Series E	5
More than 2,000	36	Series E	10

(3) The length of the foot marks must be no less than the width of a single numeral used (except numerals 1 and 4), be the same thickness as the width of stroke of the numeral, and extend to the nearest margin of the white background. Foot marks must be spaced every foot for nominal day visibility of less than 500 feet, every two feet for a nominal day visibility of more than 500 feet but less than 1,000 feet, and every five feet for nominal day visibility of more than 1,000 feet.

Encl. (6) to COMDTINST M16590.5

(4) Intermediate foot marks may be used when a more precise determination of actual clearance is necessary. Such intermediate foot marks must have a width of stroke one-half the width of the stroke required for the numeral and shall be three-quarters as long as the primary foot marks.

(5) The horizontal distance between the numeral and nearest edge of the white background shall be no less than one-half the width of a single numeral (excepting numerals 1 and 4).

(6) The minimum width of the white background shall be no less than three times the width of a single numeral (excepting numerals 1 and 4) plus the widths of each additional numeral (when multiple numerals are used plus numeral spacing).

(e) Maintenance. The owner or operator of the bridge shall maintain each gauge in good repair and legible condition. The bridge owner or operator is responsible for the accuracy of the gauge and shall remeasure the vertical distance of the numerals and foot marks below "low steel" of the bridge whenever the gauge is repainted or the structure is repaired.

(14 U.S.C. 633; 33 U.S.C. 499, 521, 49 U.S.C. 1655(g), 33 CFR 1.05-1(c)(4); 49 CFR 1.46 (b) , 1.46(c)(5)(6))

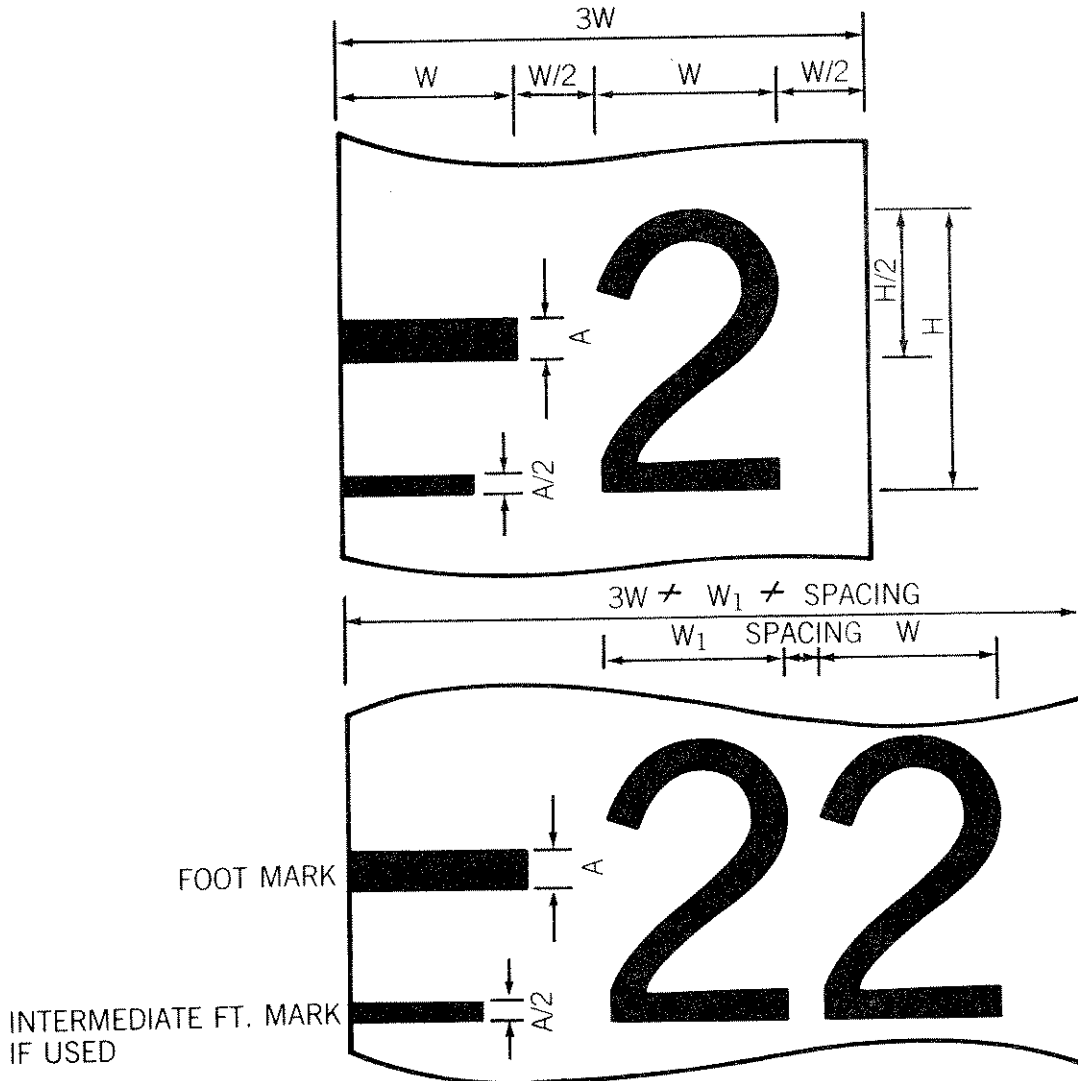
Effective date. These amendments shall become effective June 2, 1986.

Dated: April 14, 1986



DEPARTMENT OF TRANSPORTATION

UNITED STATES COAST GUARD BRIDGE ADMINISTRATION DIVISION STANDARD BRIDGE CLEARANCE GAUGE 33 CFR 118.160



LEGEND

NOTE: SIZE, TYPE, AND SPACING OF NUMERALS SHALL CONFORM TO THE FEDERAL HIGHWAY ADMINISTRATION "STANDARD ALPHABET FOR HIGHWAY SIGNS"

- W WIDTH OF WIDEST SINGLE NUMERAL EXCLUDING NUMERAL 4
- H HEIGHT OF NUMERAL PRESCRIBED FOR DISTANCE VISIBILITY
- A WIDTH OF STROKE



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
BRIDGE ADMINISTRATION DIVISION
HEIGHT AND VERTICAL SPACING
FOR CLEARANCE GAUGE NUMERALS
33 CFR 118.160

NUMERAL HEIGHT (INCHES)

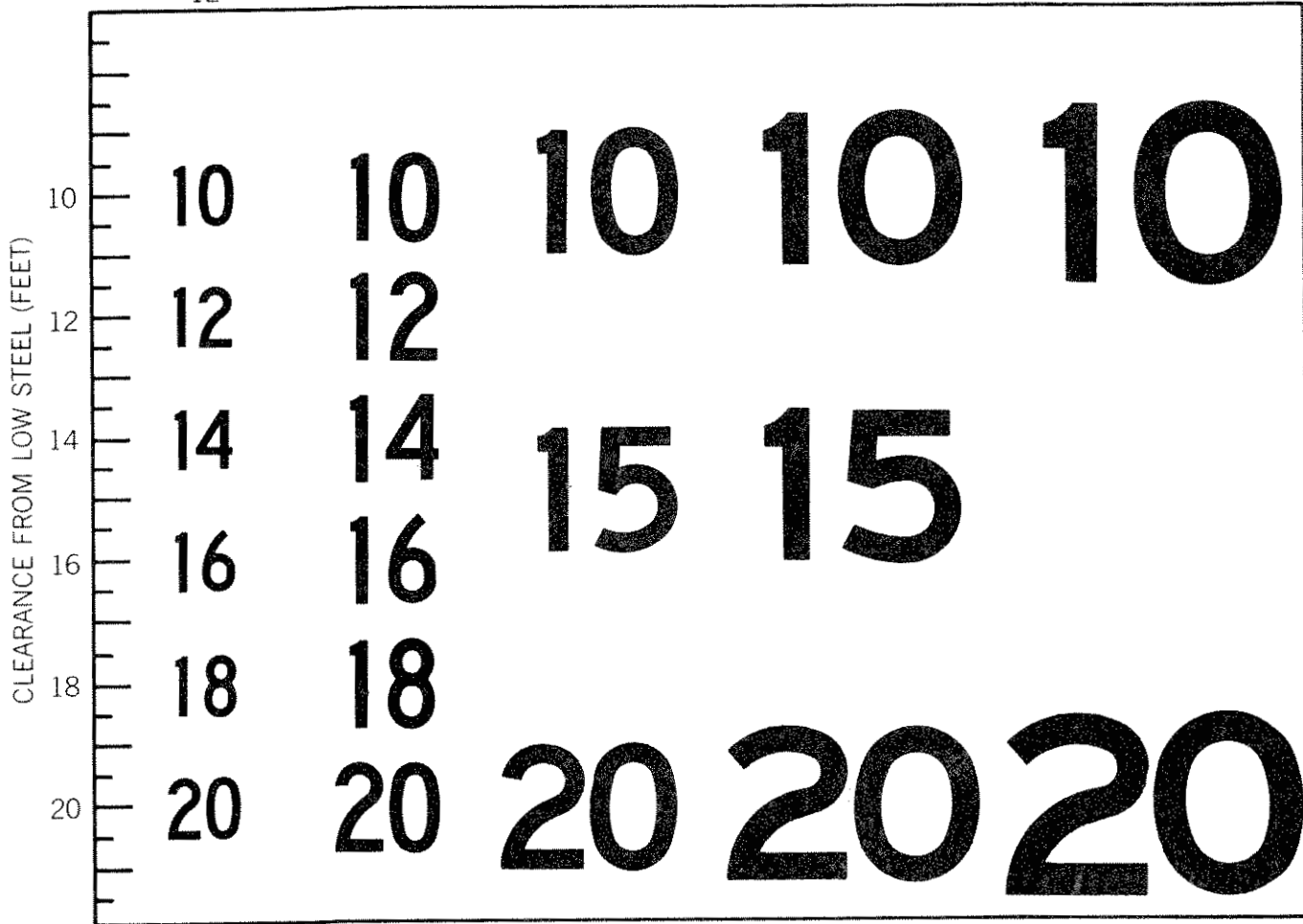
12

18

24

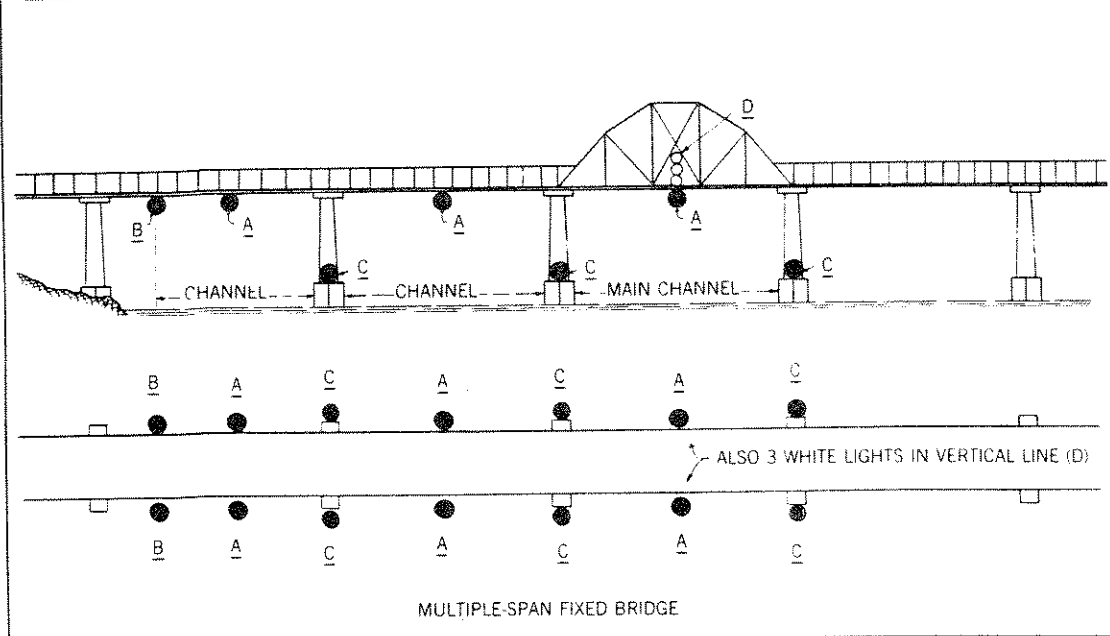
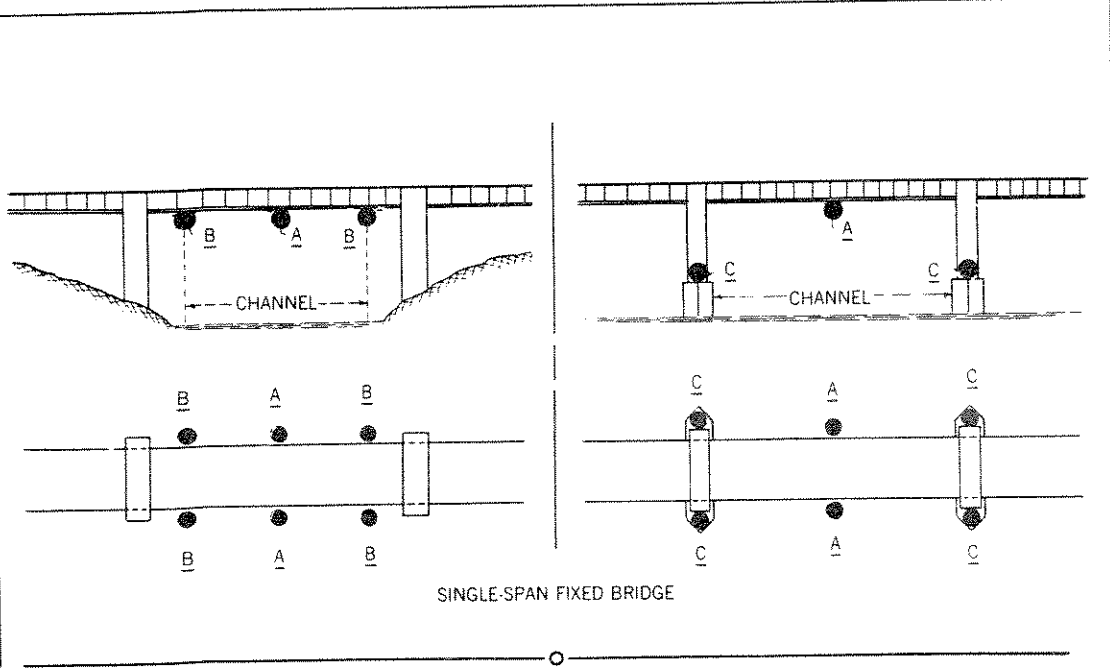
30

36







DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
BRIDGE ADMINISTRATION DIVISION
MINIMUM LIGHTING FOR FIXED BRIDGES
33 CFR 118.65




LIGHT COLORS AND HORIZONTAL ARCS OF VISIBILITY

A  CHANNEL CENTER—360° GREEN (180° GREEN ON BRIDGES LIGHTED PRIOR TO JAN 1, 1947. UNTIL LIGHTS ARE REPAIRED OR REPLACED).

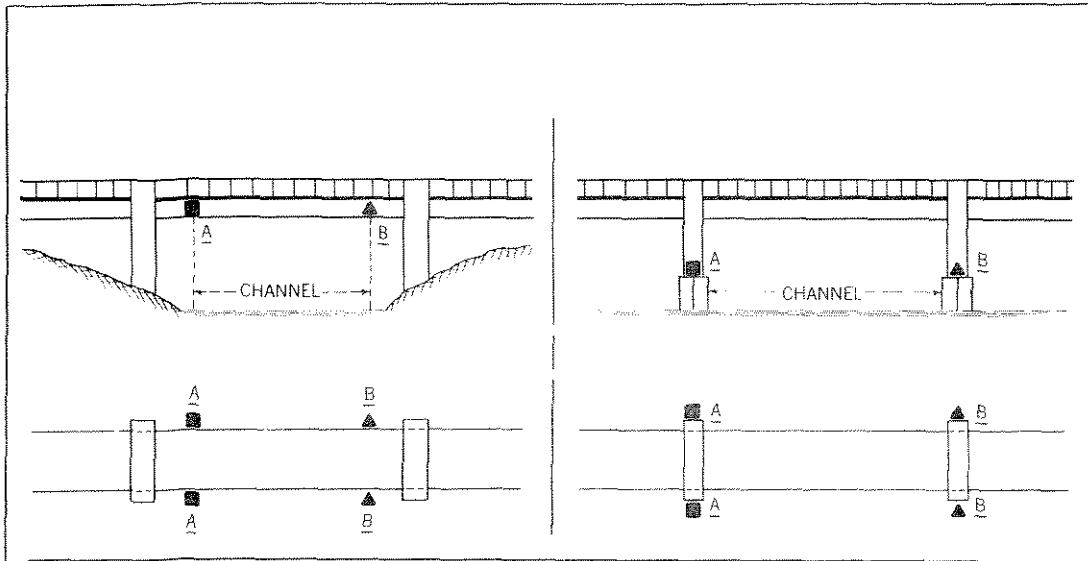
B  CHANNEL MARGIN—180° RED

C  PIER—180° RED

D  MAIN CHANNEL—180° WHITE, 3 LIGHTS IN VERTICAL LINE (60°—180° ON BRIDGES LIGHTED PRIOR TO JAN. 1, 1953. UNTIL LIGHTS ARE REPAIRED OR REPLACED).



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
BRIDGE ADMINISTRATION DIVISION
RETROREFLECTIVE PANELS ON BRIDGE PIERS
33 CFR 118.100



PANEL SIZE AND COLORS

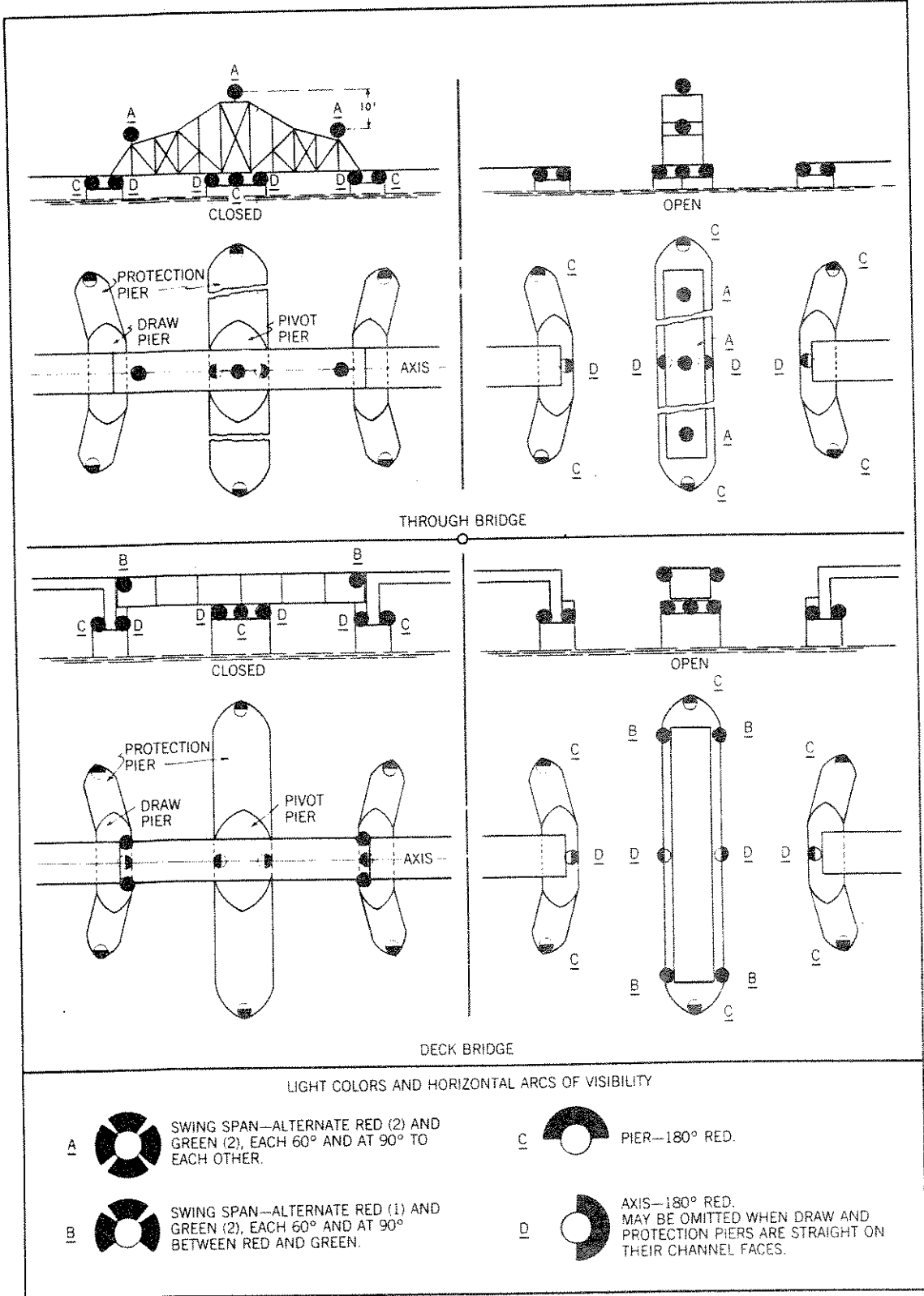
A GREEN SQUARE RETROREFLECTIVE PANELS SHALL BE USED. THE PANELS SHALL BE AT LEAST 36 SQUARE INCHES IN AREA TO PROVIDE A NOMINAL NIGHTTIME VISIBILITY DISTANCE OF AT LEAST ONE-HALF MILE.

B RED TRIANGULAR RETROREFLECTIVE PANELS SHALL BE USED. THE PANELS SHALL BE AT LEAST 36 SQUARE INCHES IN AREA TO PROVIDE A NOMINAL NIGHTTIME VISIBILITY DISTANCE OF AT LEAST ONE-HALF MILE.

NOTE: RETROREFLECTIVE PANELS MAY ALSO BE REQUIRED OR AUTHORIZED AS A BACK UP FOR BRIDGE LIGHTING (SEE 33 CFR 118.95(a)(2)).

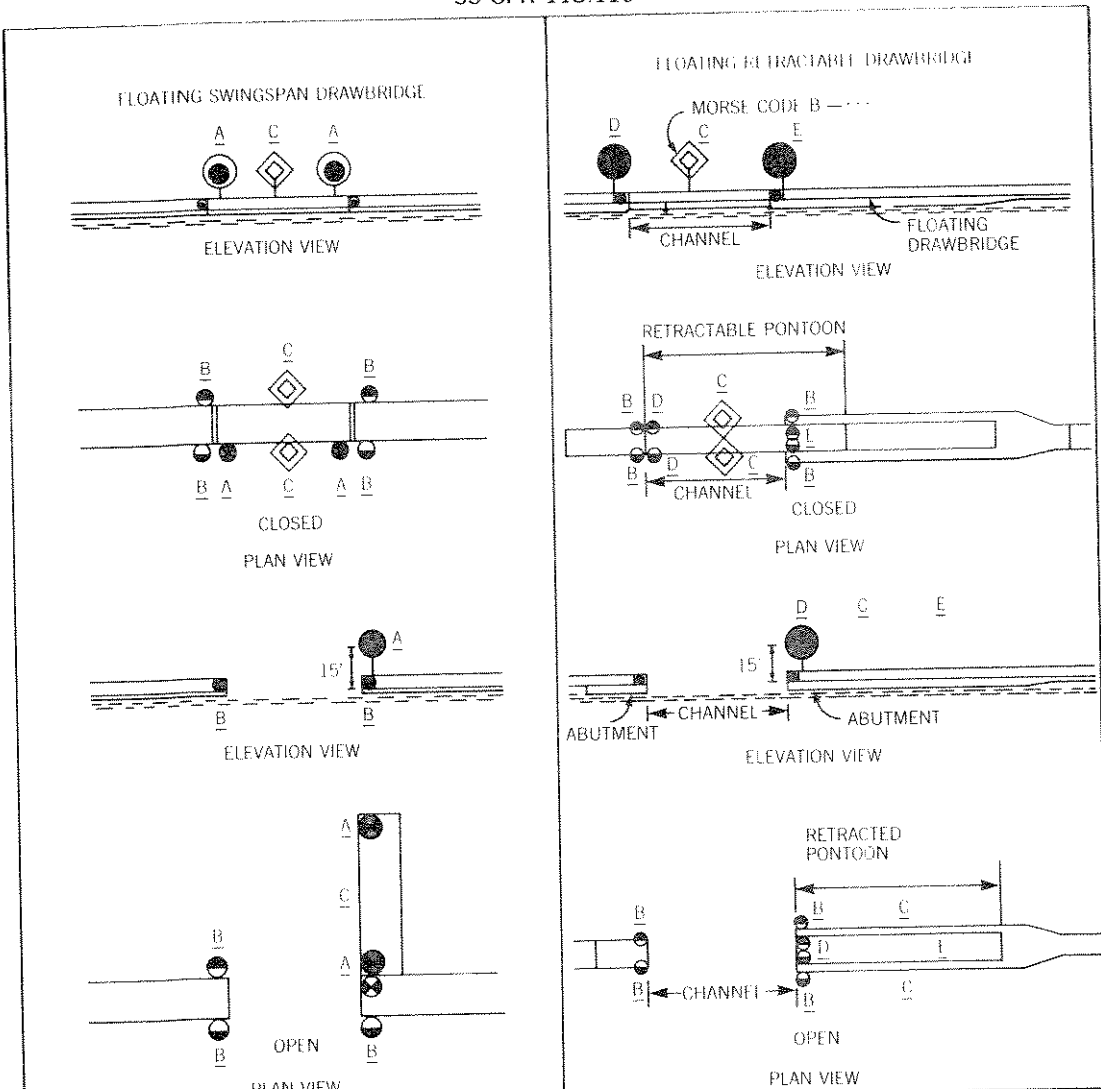


DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
BRIDGE ADMINISTRATION DIVISION
MINIMUM LIGHTING FOR DOUBLE-OPENING SWING BRIDGES
33 CFR 118.70





DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
BRIDGE ADMINISTRATION DIVISION
MINIMUM LIGHTING FOR SINGLE-OPENING DRAWBRIDGES
33 CFR 118.110

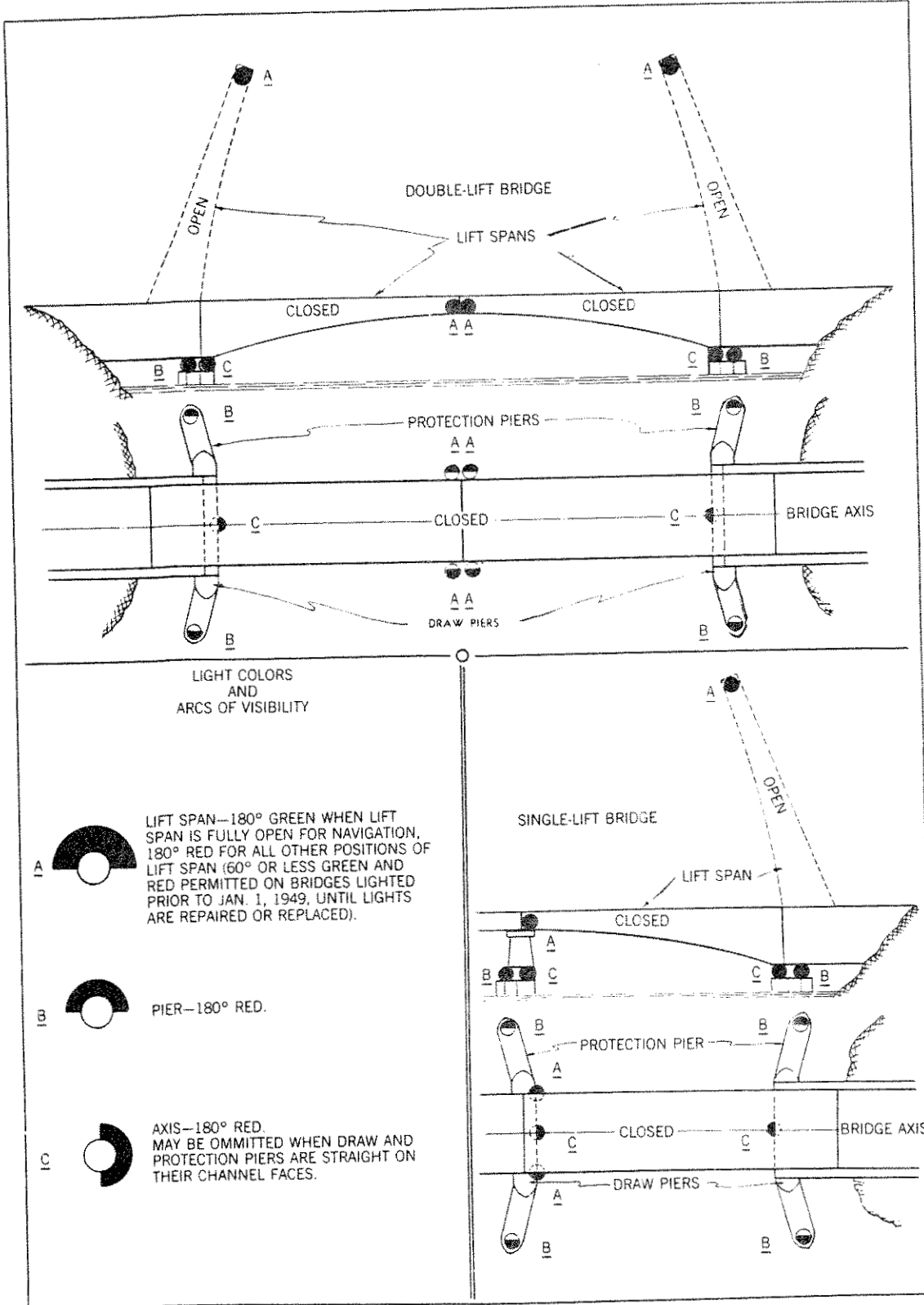


LIGHT COLORS AND HORIZONTAL ARCS OF VISIBILITY

- | | |
|--|--|
| <p>A </p> <p>AT CENTERLINE OF THE NAVIGATION CHANNEL DRAWSPAN OF FLOATING DRAWBRIDGES. DIAMOND IN SHAPE. YELLOW IN COLOR WITH HIGH INTENSITY RETROREFLECTIVE MATERIAL BORDER AND MAY EXHIBIT A MORSE CODE B YELLOW LIGHT. THE MARK SHALL NOT BE VISIBLE WHEN THE DRAWSPAN IS IN THE OPEN POSITION.</p> | <p>B </p> <p>PIER OR ABUTMENT--180° RED.</p> |
| <p>C </p> | <p>D </p> <p>RETRACTABLE PONTOON
 ---DRAWSPAN CLOSED---180° RED
 ---DRAWSPAN OPEN---180° GREEN</p> <p>E </p> <p>RETRACTABLE PONTOON
 . DRAWSPAN CLOSED- 180° RED
 . DRAWSPAN LIGHT OFF</p> |

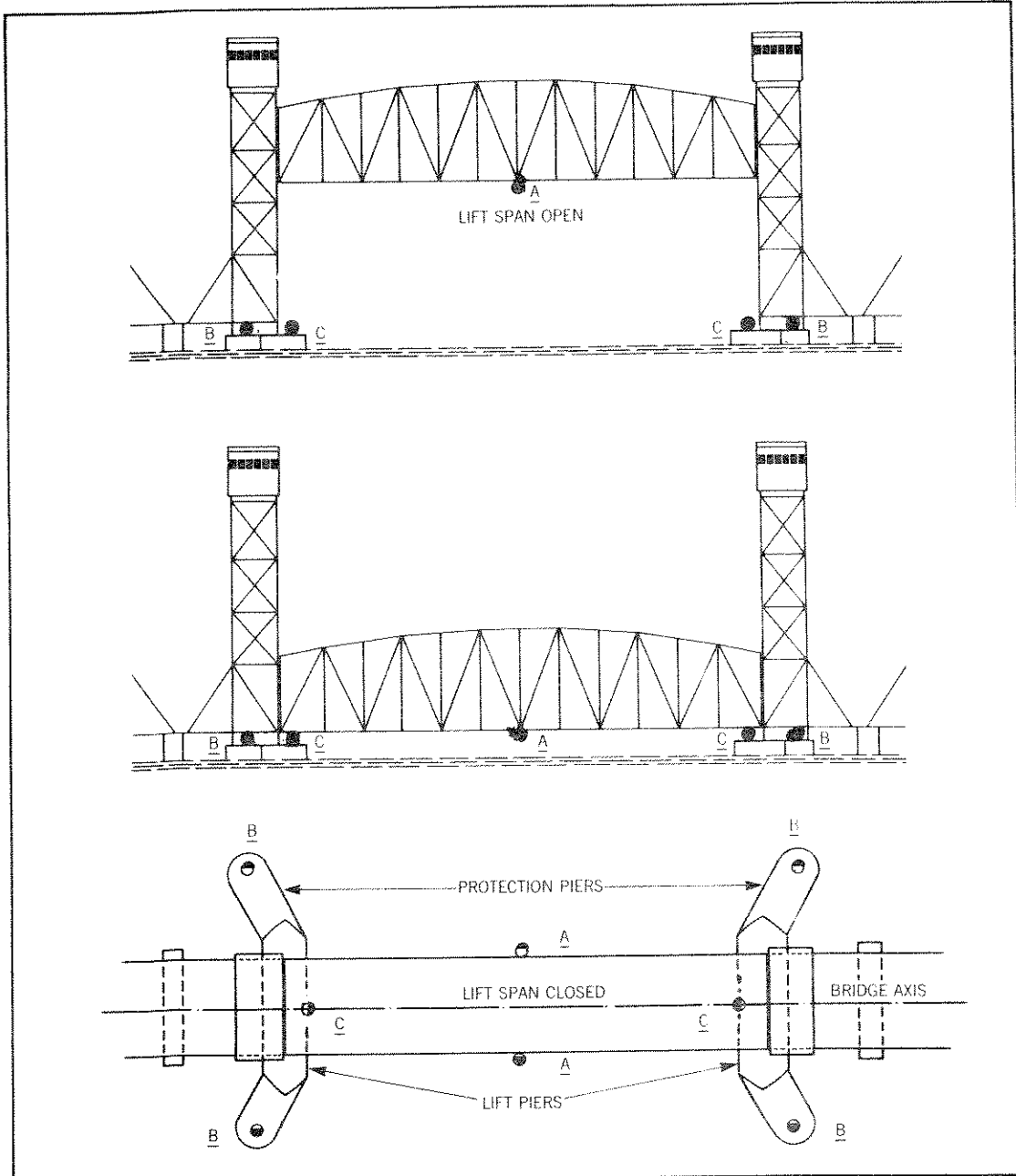


DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
BRIDGE ADMINISTRATION DIVISION
MINIMUM LIGHTING FOR BASCULE BRIDGES
 33 CFR 118.80








DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
BRIDGE ADMINISTRATION DIVISION
MINIMUM LIGHTING FOR VERTICAL LIFT BRIDGES
33 CFR 118.85

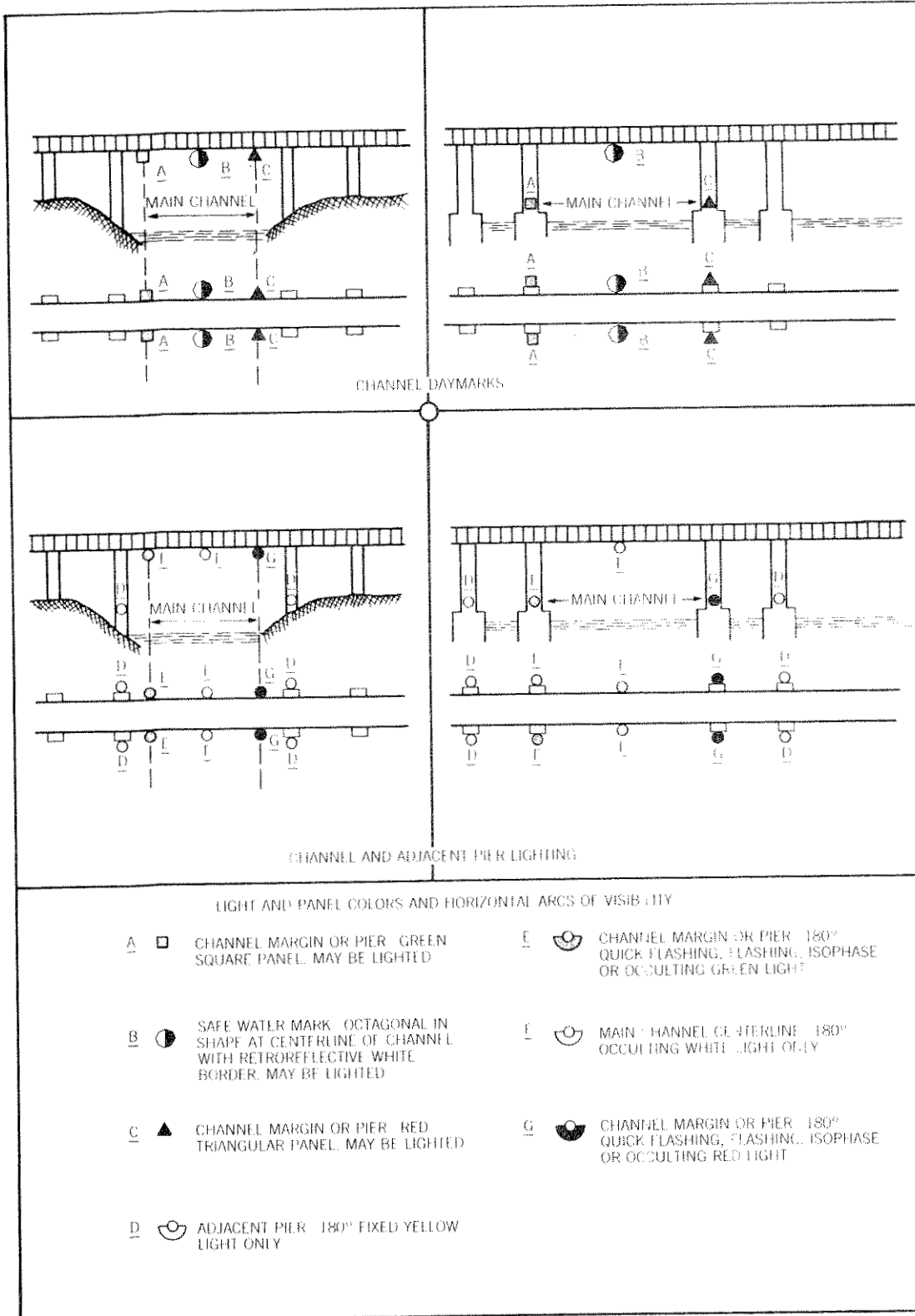


LIGHT COLORS AND HORIZONTAL ARCS OF VISIBILITY

- A**  LIFT SPAN—360° GREEN WHEN LIFT SPAN FULLY OPEN FOR NAVIGATION, 180° RED FOR ALL OTHER POSITIONS OF LIFT SPAN (180° GREEN AND RED PERMITTED ON BRIDGES LIGHTED PRIOR TO JAN. 1, 1949, UNTIL LIGHTS ARE REPAIRED OR REPLACED)
- B**  PIER—180° RED
- C**  AXIS—180° RED. MAY BE OMITTED WHEN LIFT AND PROTECTION PIERS ARE STRAIGHT ON THEIR CHANNEL FACES.



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
BRIDGE ADMINISTRATION DIVISION
DAYMARKS AND LATERAL LIGHTING ON BRIDGES
33 CFR 118.110





DEPARTMENT OF TRANSPORTATION

UNITED STATES COAST GUARD BRIDGE ADMINISTRATION DIVISION

RADAR REFLECTORS AND RACONS 33 CFR 118.120
TRAVELLER PLATFORMS 33 CFR 118.150
CLEARANCE GAUGES 33 CFR 118.160

