LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

Office of Engineering
Project Development Division
Bridge Design Section
PO Box 94245 | Baton Rouge, LA 70804-9245
Phone: 225-379-1302

Bobby Jindal, Governor
Sherri H. LeBas, P.E., Secretary

MEMORANDUM

TO: ALL CONSULTANTS
ALL BRIDGE DESIGNERS

FROM: PAUL FOSSIER, P.E.
BRIDGE DESIGN ENGINEER ADMINISTRATOR

SUBJECT: BRIDGE DESIGN TECHNICAL MEMORANDUM NO. 48 (BDTM.48)
USCG WHITE PAPER ON GUIDELINES TO PERFORM NAVIGATIONAL STUDIES

DATE: June 13, 2014

Effective immediately, in situations where a bridge needs a USCG Bridge Permit and the bridge was not previously permitted, a USCG navigational study is required. Attached USCG white paper provides general guidance to perform the navigational study. Depending on the bridge type and its location, the study may not have to be as extensive as indicated in the attachment, bridge designers should consult USCG on specific requirements for each bridge site.

This technical memorandum is posted on the Bridge Design Website under Technical Memoranda. http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Bridge_Design/Pages/Technical-Memoranda.aspx

Please contact Ms. Zhengzheng "Jenny" Fu (225-379-1321, zhengzheng.fu@la.gov) if you have questions or comments.

PF/zzf/sz

Cc: Janice Williams (Chief Engineer)
Chad Winchester (Chief, Project Development Division)
Vacant (Assistant Secretary of Operations)
Kirk Gallien (Deputy Assistant Secretary of Operations)
David Miller (Bridge Maintenance Administrator)
Michael Vosburg (Chief Construction Division Engineer)
Alden Allen (Fabrication Engineer)
Edward Wedge (Project Management Director)
Jeff Lambert (Pavement and Geotechnical Engineer Administrator)
Vacant (Road Design Engineer Administrator)
Art Aguirre (FHWA)
District Administrators (02, 03, 04, 05, 07, 08, 58, 61, 62)
Noel Ardoin (Environmental Engineer Administrator)
Traci Johnson (Environmental Section - LADOTD Federal Permit Coordinator)

Executive Summary

The Coast Guard Bridge Program ensures Marine Safety, Security, and Stewardship and contributes to the freedom of navigation and the nations Marine Transportation System through its authority to approve the location and plans of all new bridges, modifications of existing bridges, international bridges, and causeways in or over navigable waterways of the United States.

In accordance with 33 CFR 116.01, "[a]ll bridges are obstructions to navigation and are tolerated only as long as they serve the needs of land transportation while allowing for the reasonable needs of navigation." Authority for the permitting process is found in 33 U.S.C. 401, 491, 525-533, the International Bridge Act of 1972 and various acts of Congress. Pursuant to the Rivers and Harbors Act, "No bridge shall at any time unreasonably obstruct the free navigation of any navigable waterway of the Unites States." In addition, per the Bridge Act, "No bridge erected or maintained under the provisions of sections 491 to 498 of this title, shall at any time unreasonably obstruct the free navigation of the waterway over which it is constructed."

It is important to note that initial determinations of reasonable needs are based on facts and circumstances at the time of the proposal and may later be unreasonable if facts and circumstances surrounding the proposal change over time, or are discovered during the permit application and public notice process.

The Bridge Program Manual (COMDTINST M16590.5) and the Bridge Permit Application Guide (COMDTPUB P16591.3C) provide an overview of the requirements to determine the reasonable needs of navigation. This paper identifies the detailed elements, to include guide clearances on waterways, that are considered on a case-by-case basis when making a determination based on the reasonable needs of navigation.

Introduction to Navigational Clearance Determinations

Determining the vertical clearance (the vertical distance between the lowest part (e.g., member, chord, or steel) of the superstructure spanning the navigation channel and the recognized datum at the bridge site and horizontal clearance (the horizontal distance, measured normal to the axis of the channel, through which the stated vertical clearance is available) for the navigational opening of a bridge project is the focal point of the Coast Guard permitting process.

In determining reasonable navigational clearances for bridges, the Coast Guard Bridge Administrators bring their expertise to bear in subjectively determining the case specific circumstances and factors, because each navigable waterway presents its own unique set of challenges. When analyzing technical documents, studies, and other relevant scientific information, courts "defer to the informed discretion of the responsible federal agencies." Marsh v Or. Natural Res. Council, 490 U.S. 360, 377 (1989). Since the Coast Guard is the permitting authority for bridges, Coast Guard analysis of the technical documents and studies relating to navigation, will be given deference in the court of law.

This paper identifies the factors that the Coast Guard considers when making a determination based on the reasonable needs of navigation. Factors are by nature dependent on objective circumstance, and because the objective circumstances of each waterway is different, the content of the standard in a bridge permitting decision will vary greatly from case to case. If the Coast Guard considers all these factors, then the court must give due deference to Coast Guard interpretations of the Bridge Act and other laws it administers. *Western Pioneer v US*, 709 F.2d 1331, 1335(9th Cir 1983). Though the determination may seem subjective, courts rely on Coast Guard experts to make such a determination based on objective, fact based criteria. Courts will defer to agency practice so long as the agency brings the expertise to bear in making a decision. *Citizens to Pres. Overton Park, Inc. v. Volpe*, 401 U.S. 402, 417 (1971).

Navigational Evaluations

Navigational evaluations should be conducted to compose the most accurate picture of current and prospective navigation on a waterway. A Navigational Evaluation should be conducted by the project sponsor or potential permit applicant early in project planning and updated periodally during project development because waterways and waterway usage are dynamic and may change over time.

Such evaluations should identify and/or consider:

- Existing commercial users (marine industrial, passenger cruise and excursion, etc.);
- Existing recreational users;
- Vessel trip frequency;
- Various waterway stages;
- Projected changes in waterway usage based upon anticipated waterway improvement projects;
- Impacts to vessel owners that would be precluded from transiting the waterway if a proposed bridge project is authorized;
- Impacts from bridge approaches based on associated navigational clearances;
- All bridges upstream and downstream of the proposed bridge site to determine existing minimum horizontal and vertical clearances (including overhead transmission line clearances);
- Guide clearances for the waterway, if established;
- Waterway layout and geometry;
- Waterway depth and elevation fluctuations *(range of tides, average high water elevation etc)*;
- River hydrology;
- Channel and waterway alignment;

- Natural flow of the waterway including currents, water velocity, water direction and velocity fluctuations (seasonal, daily, hourly etc), that might affect navigation.
- Current speed and direction;
- Type and size of vessels utilizing the waterway (or expected to utilize the waterway during the proposed bridge lifespan) to include:
    - Vessel name and registration/documentation numbers
    - Vessel type
    - Vessel owner contact information (company/individual name, address, contact info)
    - Primary vessel mooring location (include waterway mile point, if known)
    - Vessel length overall
    - Vessel beam
    - Vessel draft (depth of hull below waterline at full load)
    - Vessel air draft (height of the highest fixed point of the vessel above the waterline, when empty)
    - Specialized vessels that use the waterway. Example – vessels which have limited maneuverability due to inherent design or mode of operation.
    - Safety margin required by vessel to navigate through the bridge
    - Vessel transit frequencies under proposed bridge, transit speeds and load configurations;
    - Vessel traffic characteristics (to include if tug assist is required for transit through the bridge due to limited horizontal clearance);
- Review of annual cargo movements (cargo types and quantities);
- Whether there is a federally authorized navigation channel on this waterway and whether it is maintained and to what depth;
- Whether there was a "design vessel" used in planning the channel? What is/was the design vessel? Was the design vessel reviewed by the Coast Guard?
- Does levee maintenance, bridge work (other bridges), channel maintenance and emergency operations upstream of bridge require certain vessels to transit the waterway?
- What is the current "governing limitation" for navigation on the waterway? This means:
    - What is the most restrictive vertical clearance on the waterway? This may be a fixed bridge downstream of the proposed structure or it may be a low hanging power line downstream of the bridge, or it may be some other structure which limits vertical clearance. Sometimes the existing to-be-replaced bridge is the most restrictive structure.
    - What is the most restrictive horizontal clearance on the waterway? This may be bridge piers on another bridge downstream, it may be a

navigational lock, it may be a man-made channel, it may be the actual width of the narrowest portion of the waterway.

- Other natural or man-made conditions that affect navigation (atmospherics, exclusion zones, etc);
- Site-specific information such as historical data on vessel allisions/collisions, rammings and groundings in the waterway, bridge/waterway geometry, sailing path, stream speed, and wind speed;
- All vessels and cargoes that will need to be partially disassembled/dismantled or require multiple trips (barges) in order to transit the proposed bridge and whether the vessels currently possess that capability. The Coast Guard must take into consideration a vessel's ability to adjust its operations without significant economic loss. Adjustment or mitigation techniques may include using other routes, lowering electronics (GPS, radar, communication antennae, etc.), lowering crane booms, etc;
- Proposed bridge clearance impact on present and prospective upstream commercial activity, e.g. jobs, and economic growth and development. Must address any existing or planned commercial/industrial developments negatively affected by the proposed clearances and discuss the economic impacts the proposed clearances will have on these businesses;
    - The foreseeable needs to the future navigation:
    - existing and historic navigational use and waterway conditions.
    - Input from waterway dependant facilities concerning future use.
    - Land use zoning along the waterway (particularly within the riparian zone)
    - Future vessel size and traffic trends
    - Input from states based on state development plans
    - Input from facilities based on business plans
    - Note that the next opportunity to adjust clearances for navigation is usually 50-100 years unless interim waterway improvement projects include the cost of bridge alterations.
    - Projected changes in waterway usage based upon anticipated waterway improvement projects, future waterways, i.e. USACE channel improvements and residential/commercial facility development. Waterway system maintenance should be considered due to changes in channel width and depth and in some cases channel alignment.
- Any existing facilities on the waterway that are or could be considered critical infrastructure, key resources, or important/unique US industrial capability i.e. are these facilities unique or one of only a few of the type in the area. Must address whether the proposed clearances negatively affect those facilities and their customers; and
- Mitigation proposed/completed for impacted waterway users and a list of those impacts that cannot be mitigated.

Determining the Reasonable Needs of Navigation

The factors outlined above serve as guidance in order to assist the Coast Guard with determining bridge clearances that provide for the reasonable needs of navigation.

Reasonable Needs of Navigation are looked at through the lens provided for in 33 CFR 116.01. This article (33 CFR § 116.01) actually refers to bridges which exist today as legally permitted structures that have become unreasonably obstructive because waterway use has changed. Waterway usage changes are primarily due to vessels being built larger because of "efficiency of scale" or because of development along the waterway which depends on the waterway as a transportation corridor; riparian dependant economic growth. Therefore in "Permitting" new or replacement bridges the Coast Guard will ensure that proposed structure(s) provide for the "Reasonable Needs of Navigation"; current, and reasonably foreseeable future navigation. The Coast Guard cannot allow a structure to be built over "Navigable Waters of the United States" which does not provide for the reasonable needs of current and foreseeable future navigation.

The Coast Guard uses its expertise to objectively evaluate the plans and location of a proposed bridge juxtaposed to the factors outlined above. If a proposed bridge (structure) has the potential to impact identified navigational needs (waterway usage) in anyway, Coast Guard Bridge Administrator will evaluate the potential impacts taking into consideration the above factors, as well as the following factors, to determine if the proposed project will meet the reasonable needs of existing and potential navigation:

- Does the proposed bridge completely obstruct the passage of any existing waterway users or the access to waterborne facilities?
- Does the proposed bridge establish a new navigational limiting factor, i.e. will the proposed bridge be the most restrictive/obstructive structure across the waterway? Does the proposed bridge match the navigational clearance of existing structures on the waterway?
- Does the proposed bridge impact present and prospective commercial activity on the waterway, e.g. jobs, and economic growth and development?
- Does the proposed bridge impact existing or planned commercial/industrial developments? What are economic impacts on these businesses?;
- Does the proposed bridge impact existing facilities on the waterway that are or could be considered critical infrastructure, key resources, or important/unique US industrial capability i.e. are these facilities unique or one of only a few of the type in the area?
- Does the proposed bridge impact USACE ability to transit the bridge in a federal project channel?
- Does the proposed bridge impact USCG and other government vessels' ability to transit bridge to conduct mission essential functions (icebreakers, patrols, etc)?

- Does the proposed bridge impact existing and future cruiseship ports-of-call/terminals?
- Does the proposed bridge impact commercial freighters.
- Does the proposed bridge impact ports supporting post-panamax vessels?
- Does the proposed bridge impact vessels that produce unique products for region?
- Does the proposed bridge impact vessels that require helper boats/tugs (note the combined clearance requirement of the vessel and the helper boat/tug)?
- Does the proposed bridge impact proposed commercial vessels as a result of proposed development on waterway?
- If a proposed bridge partially blocks or obstructs navigation, the following factors must be examined:
    - Can vessels and cargoes be partially disassembled/dismantled in order to transit the proposed bridge, and if so, is it economically reasonable? The Coast Guard must take into consideration a vessel's ability to adjust its operations without significant economic loss. Adjustment or mitigation techniques may include using other routes, lowering electronics (GPS, radar, communication antennae, etc.), lowering crane booms, etc.
    - Are alternative routes available for vessel passage?
    - Can vessels transit at typical lower water stages (mean low water, mean pool level, etc.)?

Balancing the Competing Needs of Land and Waterborne Modes of Transportation

The CG Bridge Manual requires that we accommodate, to the greatest practical extent, the needs of all the surface transportation modes. However, it is the duty of the CG to ensure the public right of navigation is preserved while maintaining a reasonable balance between the competing needs of land and waterborne modes of transportation. The reasonable balance is attained by ensuring land and water modes can travel unencumbered with minimal delay to both modes.

The extent of our jurisdiction, when determining this balance, is to ensure proposed clearances are sufficient enough to avoid and/or minimize impacts to navigation just as the US Fish and Wildlife Service and the Advisory Council on Historic Preservation are charged with determining impacts to species and historic properties, respectively.

These agencies do not take into account the cost of the project when determining the level of impact acceptable to those species or properties and neither does the Coast Guard regarding navigation. The applicant is charged with considering environmental and

economic impacts (project cost) associated with various alternatives in its NEPA document in order to make an informed decision on which alternative is most viable. The Coast Guard, as a cooperating agency in most cases, is responsible for commenting on these alternatives as they relate to the impact to navigation, to further assist the applicant with its decision.

The Coast Guard's administration of bridge related laws must not give preference to commercial use over recreational use; however, purpose and use of vessels are factors that must be taken into consideration when evaluating avoidance, minimization, and mitigation of navigational impacts.

SUPPORTING INFORMATION

Bridge Program Jurisdiction

The Coast Guard's duty and responsibility, under the delegated authorities, is to preserve the public right of navigation. The Coast Guard Bridge Program is tasked with ensuring the safe and unencumbered passage of navigation on the nation's waterways by promoting security, mobility and safety on our critical national transportation systems. This objective is accomplished by approving the location and plans of all new bridges, modification of existing bridges, international bridges, and causeways in or over navigable waterways of the United States.

Bridges across the navigable waters of the United States are considered obstructions to navigation, permitted only when they serve the needs of land transportation. While the public right of navigation is paramount to land transportation, it is not absolute. This right may be diminished to benefit land transportation, provided the reasonable needs of navigation are not impaired. The Coast Guard approves the location and plans of bridges and causeways and imposes any necessary conditions relating to the construction and maintenance of these bridges in the interest of public navigation.

Navigation shall mean commerce upon the waterway, in the customary sense, as applied by the courts and law. For Bridge Program purposes, recreational boating normally will be considered as falling within the term "commerce".

A finding of substantial interstate or foreign commerce may be based upon a waterway's economic impact or its utilitarian impact (e.g., the only practical method of moving a commodity is along a particular waterway, or a waterway provides the only trade link for a community, even though the economic impact might be relatively minor). Each factual setting shall be examined on its merits.

Once Coast Guard jurisdiction over the waterway has been established for the purpose of administering the Bridge Program, no distinction shall be made between commercial and recreational vessels in the administration and enforcement of those laws. Neither the use nor purpose of any vessel using the waterway provides a basis for making such distinctions.

Waterway Characteristics and Considerations

Common waterway types include Open-River, Federal Project, Canalized Streams, Land-Cut Canals, Intracoastal Waterways and Coastal Waterways. Additional information regarding these waterways can be found in the Bridge Program Manual, COMDTINST M16590.5 (series), Chapter 2.F.

MEANS OF NAVIGATION DATA COLLECTION

The Coast Guard and applicants use a variety of tools to gather information to assist in the determination of appropriate bridge navigational clearances, to include, but not limited to:

- Site visits and ride-alongs with qualified vessel operators on the waterway, to obtain first hand knowledge of navigational needs through the proposed bridge site;
- Issuing a Coast Guard Public Notice to solicit comments for navigational concerns;
- Advertising the bridge project in the Coast Guard Local Notice to Mariners;
- Conducting waterway user surveys;
- Conducting a waterways study (typically applicant-prepared);
- Reviewing navigational information in environmental documentation prepared by the applicant;
- Reviewing bridge tender logs;
- Conducting public meetings;
- Consulting with and conducting interagency meetings;
- Consulting guide clearances for the waterway;
- Contacting regional planning interests for current and future plans that will impact the waterway;
- Consulting USACE methodology in USACE Engineer Manuals EM-1110-2-1611 and EM-1110-2-1613 for determining horizontal and vertical clearance requirements (see Enclosure (2) for sample methodology);
- Consulting with local Coast Guard Sectors, Captains of the Port, Coast Guard Stations and Coast Guard Cutters prior to making navigation determinations since they offer a wealth of professional experience in navigational issues; and
- When available, waterborne commerce statistics (collected by the U.S. Department of Commerce) should be reviewed and incorporated into the waterway evaluation as they provide cargo volumes and vessel trips for commercial shipments by waterway reach.

It is imperative that every effort be made to involve members of the navigation community and other interested or affected parties early in the Coast Guard Bridge Program consideration of navigational needs. It is also imperative that dialogue is maintained with the navigational community all throughout project development and approval processes so that changes in waterway usage, particularly during lengthy project developments, are documented and included in design decision making.