Board of Pilot Commissioners

Study Guide Blueprint and Bibliography

2026

Board of Pilot Commissioners (BOPC) Study Guide Blueprint 2026

The Study Guide Blueprint expands upon the Task statements found in the Exam Blueprint by including related Knowledge statements aligned with each content area. These Knowledge statements are intended as a study aid to help candidates prepare for the Pilot Trainee Training Examination process.

Domain 1: Planning and Pilot Safety (12%)

Subdomain 1.1: Planning and Preparation (5 Items)

Tasks

T1.1.1: Determine if environmental conditions are safe for movement of ship
T1.1.2: Plan voyage based on logistics parameters (e.g., timeframe) set forth in job orders and the local Notice to Mariners
T1.1.3: Plan voyage based on predicted weather, including sea conditions and visibility
T1.1.4: Plan voyage considering logistical and environmental conditions specific to docking and undocking
T1.1.5: Plan voyage based on current and tide
T1.1.6: Plan voyage based on potential congestion and other traffic
T1.1.7: Plan voyage based on anticipated vessel characteristics, under keel clearance, and air draft
T1.1.8: Plan voyage based on safety considerations and regulatory requirements and guidelines
T1.1.9: Evaluate traffic conditions in boarding area prior to embarking and disembarking
T1.1.10: Assess intended anchorage location for potential hazards
T1.1.11: Evaluate suitability of assigned tugs prior to departure
T1.1.12: Assess safety (of navigation) of waters based on chart data and Notice to Mariners
T1.1.13: Comply with fatigue-related regulations for routine operations

Knowledge

K1.1.1: Of effect of current and predicted environmental conditions on safe voyage and protocols for decision-making regarding suspension of operations (see Subdomain "Suspension of Operations")
K1.1.2: Of methods to acquire any logistical information necessary information to plan Voyage
K1.1.3: Of effect of wind, sea state, visibility on intended route
K1.1.4: Of weather modeling/resources and their reliability and potential flaws
K1.1.5: Of effect of wind, sea state, visibility, tide, and current on intended docking/undocking procedure
K1.1.6: Of effects of hydrodynamics on docking / undocking
K1.1.7: Of docking / undocking maneuvers
K1.1.8: Of mooring arrangements (number, position of lines, sequence, dock position, hatches to be loaded)
K1.1.9: Of methods (or sources) to determine tides and currents
K1.1.10: Of effect of height tide and speed and direction of current on intended route
K1.1.11: Of researching potential leisure congestion and scheduled shipping traffic
K1.1.12: Of planning considerations effected by ship particulars
K1.1.13: Of regulatory requirements and guidelines applicable to the specific job
K1.1.14: Of routing and expected traffic
K1.1.15: Of natural hazards of anchorages
K1.1.16: Of different types of tugs (e.g., conventional, Z-drive, voith), their capabilities and their limitations
K1.1.17: Of the bollard pull / horsepower of available tugs
K1.1.18: Of differences between horsepower and bollard pull as applied to tugs
K1.1.19: Of how to interpret chart data to assess safety of waters
K1.1.20: Of effects of fatigue on performance and decision-making of pilot and crew

Subdomain 1.2: Scheduling (2 Items)

Tasks

T1.2.1: Communicate pertinent information regarding scheduling to on-duty pilots
T1.2.2: Communicate with dispatch and transport operators/dispatch
T1.2.3: Calculate Estimated Times of Arrival (ETAs) for multiple vessels and pilots commuting to grounds
T1.2.4: Communicate changes in voyage plans to other on-duty pilots
T1.2.5: Calculate meeting times during transit

Knowledge

K1.2.1: Of communication protocol for operations
K1.2.2: Of factors that affect estimated time of arrival (ETA) calculations
K1.2.3: Of communication protocol for operations
K1.2.4: Of factors that affect estimated meeting times during transit

Subdomain 1.4: Transfer Regulations and Procedures (2 Items)

Tasks

T1.4.1: Identify, evaluate, and confirm type of pilot transfer and pilot transfer specifications
T1.4.2: Adhere to guidelines/best practices regarding human factor hinderances to operation (i.e., fatigue, physical limitations)
T1.4.3: Maintain safety and communication standards to prevent injury and a meaningful transfer of information in a timely manner
T1.4.4: Use personal safety equipment (PPE) effectively
T1.4.5: Assist in the event of another pilot overboard

Knowledge

K1.4.1: Of risk management strategies with regard to transfers
K1.4.2: Of transfer procedures in heavy weather conditions
K1.4.3: Of embarking and disembarking safety procedures
K1.4.4: Of IMO/SOLAS pilot transfer regulations/standards
K1.4.5: Of communication protocols during all transfer processes
K1.4.6: Of guidelines/best practices regarding PPE
K1.4.7: Of man-overboard safety procedures
K1.4.8: Of equipment for detection and recovery of a pilot in the water
K1.4.9: Of safety drill procedures

Subdomain 1.5: Pilot Transfers (1 Item)

Tasks

T1.5.1 Confirm that the ladder is rigged appropriately
T1.5.2 Recognize traffic conditions for embarking and disembarking
T1.5.3 Evaluate environmental conditions prior to transfer

Knowledge

K1.5.1: Of rigging for combination arrangements for ships with a freeboard of more than 9 meters
K1.5.2: Of non-compliant ladder rigging and common safety violations
K1.5.3: Of traffic conditions that are unfavorable to embarking and disembarking

Domain 2: Bridge Resource Management (7%)

Subdomain 2.1: Planning and Preparation (2 Items)

Tasks

T2.1.1: Complete necessary portions of MPX prior to taking the conn
T2.1.2: Establish communication protocol and terminology with master and bridge team
T2.1.3: Establish communication protocol and terminology with tug captains
T2.1.4: Monitor and amend the voyage plan as safety, scheduling, and changing environmental conditions require
T2.1.5: Evaluate and monitor capabilities of bridge team and ship equipment with regard to completing a safe transit
T2.1.6: Recognize and mitigate (when possible) human factors that may impact execution of piloting, e.g., language

Knowledge

K2.1.1: Of MPX tasks and knowledge that are required prior to the start of the voyage
K2.1.2: Of closed loop communication protocols to prevent misunderstandings between pilot and bridge team
K2.1.3: Of closed loop communication protocols to prevent misunderstandings between pilot and tug captains
K2.1.4: Of protocol for voyage plan changes, including communication with master and bridge team
K2.1.5: Of bridge team responsibilities and procedures specific to that vessel type and assigned voyage
K2.1.6: Of human factors that may impact communication and hierarchical processes and how to mitigate those factors

Subdomain 2.2: Communication (1 Item)

Tasks

T2.2.1: Maintain effective communication with bridge team
T2.2.2: Maintain effective communication with tugs
T2.2.3: Verify commands by visual confirmation and by audible confirmation
T2.2.4: Maintain effective communication with USCG VTS

Knowledge

K2.2.1: Of engine order and rudder commands for US merchant / naval vessels and foreign vessels
K2.2.2: Of standard marine vocabulary and hand signals
K2.2.3: Of standard marine vocabulary
K2.2.4: Of bridge resource management principles

Subdomain 2.3: Situational Awareness (1 Item)

Tasks

T2.3.1: Continuously and proactively minimize distractions on the bridge

T2.3.2: Monitor for and effectively manage situations in which actual responses of ship may vary from commands or vessel displayed responses

T2.3.3: Monitor for and effectively manage situations in which personnel actions may vary from expectations or commands

T2.3.4: Utilize checklists to manage situational awareness and support decision-making processes

T2.3.5: Perform a risk assessment of the vessel (e.g., condition of ladder, condition of engine, etc.)

Knowledge

K2.3.1: Of distractions that may cause lack of situational awareness

K2.3.2: Of how to quickly and effectively adapt when the ship response varies from the expectation

K2.3.3: Of how to constructively address bridge team personnel while maintaining effective working relationships

K2.3.4: Of effects of situational awareness on decision-making

K2.3.5: Of risk management strategies and their application to maritime pilotage

Subdomain 2.4: Error Chains (2 Items)

Tasks

T2.4.1: Proactively implement practices to prevent error chains while on the bridge

T2.4.2: Identify conditions and/or components that may result in or contribute to an error chain

T2.4.3: Break an error chain that has already begun

T2.4.4: Trap an error within a chain that has already begun

T2.4.5: Utilize visualization techniques to anticipate where errors may occur and develop responses for quick action

Knowledge

K2.4.1: Of management practices that prevent error chains

K2.4.2: Of procedures for identifying potential error chain components

K2.4.3: Of keys to successful error chain breaking in a timely manner

K2.4.4: Of error trapping methods and how to implement them

K2.4.5: Of error trapping methods and how to implement them

Domain 3: Master-Pilot Exchange (MPX) (7%)

Subdomain 3.1: Personnel (1 Items)

Task

T3.1.1: Confer with master regarding pilot's procedural expectations of bridge team

Knowledge

K3.1.1: Of pilot and crew duties (including to fix position) and bridge procedures when assuming the conn

Subdomain 3.2: Vessel Characteristics (3 Items)

Tasks

T3.2.1: Discuss and confirm the accuracy of the ship's particulars (pilot card) with the master
T3.2.2: Discuss and confirm the ship's maneuvering characteristics with the master
T3.2.3: Discuss and plan anticipated speed along route and in narrow channels
T3.2.4: Discuss and confirm the condition of control and propulsion systems with the master
T3.2.5: Discuss and confirm the condition of navigational equipment with the master
T3.2.6: Discuss and confirm the condition of anchors (including windlass) with the master
T3.2.7: Discuss and confirm the procedures for dredging anchor with the master
T3.2.8: Discuss and confirm procedures for anchoring the vessel
T3.2.9: Discuss and confirm with master regarding any limitations or deficiencies
T3.2.10: Discuss and confirm the safe working load (SWL) of ship's deck gear with the master
T3.2.11: Discuss and confirm number, placement, and types of tugs needed with master

Knowledge

K3.2.1: Of required Pilot Card components (e.g. radio channels, posting of anchor watch, local navigation requirements, information about the vessel, crew to fix position of vessel)
K3.2.2: Of effect of different configurations on handling characteristics
K3.2.3: Of slowdown time and distance necessary for reducing speed
K3.2.4: Of propulsion and steering systems, including wheelhouse poster
K3.2.5: Of navigation systems
K3.2.6: Of the ship's anchoring equipment
K3.2.7: Of techniques for dredging the anchor
K3.2.8: Of techniques for walking out the anchor or letting go with the brakes
K3.2.9: Of ship limitations and deficiencies that may impede the objective of a safe and efficient voyage
K3.2.10: Of safe working load (SWL) parameters and considerations
K3.2.11: Of capabilities of escort and assist tugs

Subdomain 3.3: Plans and Regulations (2 Items)

Tasks

T3.3.1: Confer with master regarding contingency plan

T3.3.2: Communicate voyage plan and maneuvering plan with the master

T3.3.3: Communicate relevant regulatory requirements and guidelines

Knowledge

K3.3.1: Of protocol for voyage plan changes based on expected conditions

K3.3.2: Of routing and expected traffic

K3.3.3: Of expected environmental conditions on route

K3.3.4: Of Navigation Rules of the Road

K3.3.5: Of regulatory requirements related to equipment function and vessel visibility

K3.3.6: Of regulatory requirements regarding marine mammals

K3.3.7: Of state and federal pollution regulations

K3.3.8: Of regulatory requirements and guidelines

Domain 4: Undocking and Docking (19%)

Subdomain 4.1: Planning and Preparation (4 Items)

Tasks

T4.1.1: Evaluate suitability of assigned tugs prior to departure

T4.1.2: Plan number and placement of tugs by considering vessel, including thrusters and maneuverability

T4.1.3: Plan number and placement of tugs by considering tug capabilities

T4.1.4: Plan number and placement of tugs by considering environmental conditions and the berth

T4.1.5: Discuss and confirm tug position and lines, bollard pull, SWL of bitts and chocks with tug captain(s)

T4.1.6: Discuss and confirm maneuvering plans prior to arriving/departing berth with tug captain(s)

Knowledge

K4.1.1: Of type, limitations, and bollard pull / horsepower of available tugs

K4.1.2: Of effectiveness of thrusters relative to speed of the vessel

K4.1.3: Of vessel characteristics and their effects on maneuverability

K4.1.4: Of type, limitations, and bollard pull / horsepower of available tugs

K4.1.5: Of berth (e.g. azimuth, depth alongside, currents, fendering, crane position, tight quarters)

K4.1.6: Of type, limitations, and bollard pull / horsepower of available tugs

K4.1.7: Of docking / undocking maneuvers using tugs

Subdomain 4.2: Maneuvering/Execution (8 Items)

Tasks

T4.2.1: Adjust ship's heading (and/or speed) with regards to prevailing conditions, e.g. wind, current) while maneuvering

T4.2.2: Maneuver vessel to adjust angle and control of approach on arrival and/or departure considering vessel characteristics

T4.2.3: Maneuver vessel at port docks while accounting for depth, dock headings, and dock lengths

T4.2.4: Make adjustments for the effect of the dock structure, and fendering during undocking/docking

T4.2.5: Anticipate ship's response to propeller rotation when ordering an astern bell

T4.2.6: Determine actions regarding movement toward or away from berth, taking care for dock structures, fenders, safe use of lines, tugs, etc.

T4.2.7: Monitor or control mooring line operations during docking/undocking

T4.2.8: Use tugs to place ship in final position for docking, under normal and emergency conditions

T4.2.9: Use tugs to assist with control when undocking

T4.2.10: Adjust angle of ship's heading in prevailing conditions due to calculated sail area

Knowledge

K4.2.1: Of effects of sail area on maneuverability of ship

K4.2.2: Of approach and departure maneuvers

K4.2.3: Of vessel characteristics and their effects on maneuverability

K4.2.4: Of approach and departure maneuvers

K4.2.5: Of maneuvering techniques that allow control of depth, dock headings, and dock lengths while at port docks

K4.2.6: Of techniques to make adjustments required due to cushion effect, dock condition, and fendering

K4.2.7: Of effects of propeller forces when going ahead or astern

K4.2.8: Of effects of inertia / momentum when coming alongside

K4.2.9: Of configuration of line placement, line type, and their function

K4.2.10: Of sequence of taking lines in or out (e.g. proximity to thruster and propeller)

K4.2.11: Of maneuvering techniques using tugs while docking

K4.2.12: Of amount of bollard pull / horsepower / kW to overcome effects of windloading

Subdomain 4.3: Speed Management (4 Items)

Tasks

T4.3.1: Manage safe speed during docking/undocking by considering weather conditions

T4.3.2: Manage safe speed during docking/undocking by considering under keel clearance

T4.3.3: Manage safe speed during docking/undocking by considering proximity to other vessels

T4.3.4: Manage safe speed by considering capabilities of tugs

T4.3.5: Manage safe speed in narrow channels by considering under keel clearance

Knowledge

K4.3.1: Of the effects of weather conditions on vessel speed when docking and undocking

K4.3.2: Of the relationship between UKC and vessel speed

K4.3.3: Of effects of speed in confined and shallow waters

K4.3.4: Of type, limitations, and bollard pull / horsepower of available tugs

Domain 5: Navigation (16%)

Subdomain 5.1: Maneuvering/Execution (8 Items)

Tasks

T5.1.1: Navigate ship in accordance with applicable Navigation Rules and Regulations
T5.1.2: Navigate ship up/down river, around points/bends
T5.1.3: Assess information for collision avoidance by using all available means
T5.1.4: Verify accuracy of tide and current predictions through observation
T5.1.5: Develop radar ranges and parallel index lines to determine vessel's position
T5.1.6: Establish parallel index lines off points and/or fixed aids to navigation
T5.1.7: Verify vessel's position by comparing data from electronic navigational aids (e.g. track lines) with visual observations
T5.1.8: Verify commands by monitoring ship's equipment to ensure command has been executed
T5.1.9: Monitor ship's position by appropriately balancing available means to determine ship position (ranges, bearings from fixed objects, etc.)
T5.1.10: Prepare for and react to rapid changes in environmental conditions (e.g., restricted visibility, wind), including decisions to suspend the job
T5.1.11: Post a lookout or crew member to stand by anchors as per Navigation Rules and Regulations, navigation requirements, or restrictions
T5.1.12: Use engine slowdown procedures safely and efficiently
T5.1.13: Assess fore and aft motion
T5.1.14: Assess set and drift using natural ranges and other means
T5.1.15: Consider marine mammals while navigating the vessel

Knowledge

K5.1.1: Of Navigation Rules and Regulation (COLREGS)
K5.1.2: Of navigating rivers, points, and bends
K5.1.3: Of different methods to assess risk of collision
K5.1.4: Of navigational hazards
K5.1.5: Of using visual cues to assess tide and current
K5.1.6: Of radar tools to keep safe distances from navigational hazards
K5.1.7: Of radar tools and the use of aids to navigation
K5.1.8: Of aids to navigation and techniques to use visual landmarks to determine location of vessel
K5.1.9: Of buoyage systems and conventions
K5.1.10: Of navigational equipment during idling and maneuvering situations , including the capabilities, limitations, discrepancies, and means of adaptation if failures occur
K5.1.11: Of techniques to determine location of vessel
K5.1.12: Of weather or environmental conditions that will affect safe navigation of the vessel
K5.1.13: Of Navigation Rules and Regulation (COLREGS)
K5.1.14: Of engine slowdown procedures
K5.1.15: Of visual cues to assess fore and aft motion
K5.1.16: Of calculations for set and drift and using natural ranges to determine set and drift motion of vessel
K5.1.17: Of regulations, requirements, and techniques regarding the protection of marine mammals

Subdomain 5.2: Traffic Management (4 Items)

Tasks

T5.2.1: Identify vessels by their light characteristics at night or day shapes by day

T5.2.2: Obtain names of vessels by using Automatic Information Systems (AIS), Vessel Traffic Service (VTS), Electronic Chart Display and Information System (ECDIS)

T5.2.3: Monitor appropriate radio channels

T5.2.4: Maintain appropriate communication with other vessels

T5.2.5: Communicate and establish passing arrangements with meeting/overtaking vessels

T5.2.6: Assess ship speed/location and other vessels' locations to prevent/minimize interaction

T5.2.7: Implement precautions due to commercial and recreational fishing seasons

Knowledge

K5.2.1: Of Chart One

K5.2.2: Of electronic navigation equipment used in piloting, and collision avoidance (e.g., radar, AIS, ECDIS safety contour settings and chart symbols)

K5.2.3: Of VHF radio protocols and bridge-to-bridge communication

K5.2.4: Of radio communication protocols and channels

K5.2.5: Of radio communication protocols and COLREGS

K5.2.6: Of traffic requiring minimum wake

K5.2.7: Of expected commercial and recreational fishing traffic level

Subdomain 5.3: Speed Management (2 Items)

Tasks

T5.3.1: Determine and monitor speed over ground

T5.3.2: Determine and monitor speed through the water

T5.3.3: Assess ship speed and proximity to shoreline and/or ships at berth in order to prevent interaction and wake damage

T5.3.4: Evaluate effects of environmental, traffic conditions and wake effects when establishing safe speed

Knowledge

K5.3.1: Of the definition of speed over ground and the difference between it and speed through water

K5.3.2: Of ranges and bearings to estimate speed

K5.3.3: Of the definition of speed through water and the difference between it and speed over ground

K5.3.4: Of factors affecting interaction and wake damage

K5.3.5: Of traffic, weather, or environmental conditions that will affect safe navigation of the vessel

Domain 6: Use of Anchors (9%)

Subdomain 6.1: Planning and Preparation (3 Items)

Tasks

T6.1.1 Determine safe and effective approach angle considering configuration of ship, environmental conditions, water depth, holding ground, and maneuvering room

T6.1.2 Determine and maintain safe speed considering configuration of ship, environmental conditions, water depth, holding ground, and maneuvering room

T6.1.3 Determine amount of anchor chain needed considering configuration of ship, environmental conditions, water depth, holding ground, and maneuvering room

T6.1.4 Determine intended placement of anchor by considering range, bearing, and other available means

Knowledge

K6.1.1: Of factors impacting safe and effective approach angle when anchoring

K6.1.2: Of factors impacting safe speed when anchoring

K6.1.3: Of factors impacting scope of chain when anchoring

K6.1.4: Of navigational practices for determining location and chart information relative to anchoring

K6.1.5: Of regulated or designated anchorages

Subdomain 6.2: Maneuvering/Execution (5 Items)

Tasks

T6.2.1: Drop anchor, lay out the scope, set the anchor, and determine final location of vessel

T6.2.2: Calculate swing radius among area of other anchored vessels hazards, considering environmental conditions

T6.2.3: Walk out the anchor when it is the most efficient and effective action

T6.2.4: Dredge anchor when it is the most efficient and effective action

T6.2.5: Let go with the brake when it is the most efficient and effective action

T6.2.6: Anchor in narrow channels

T6.2.7: Verify ship's anchored position by using ranges and bearings and other means

T6.2.8: Effectively use anchors for emergency maneuvers

T6.2.9: Safely anchor during extreme weather conditions

Knowledge

K6.2.1: Of anchoring techniques to drop anchor, lay out the scope, set the anchor, and determine location

K6.2.2: Of components and procedures for calculating swing radius

K6.2.3: Of techniques for walking out the anchor

K6.2.4: Of techniques for dredging the anchor

K6.2.5: Of techniques for letting go with the brake

K6.2.6: Of anchoring in narrow channels

K6.2.7: Of navigational practices for verifying location and chart information relative to anchoring

K6.2.8: Of techniques for emergency use of anchors

K6.2.9: Of the effects of heavy weather on anchoring techniques

Domain 7: Shiphandling (24%)

Subdomain 7.1: Planning and Preparation (2 Items)

Tasks

T7.1.1: Review anticipated vessel characteristics and related safety procedures

T7.1.2: Calculate UKC

T7.1.3: Calculate air draft

T7.1.4: Review configuration of ship, trim, and draft with regard to preventing interaction and wake damage

Knowledge

K7.1.1: Of effect of different configurations on handling characteristics

K7.1.2: Of vessel response under various loaded conditions and speeds

K7.1.3: Of the equation components and calculation procedures for UKC

K7.1.4: Of the equation components and calculation procedures for air draft and overhead clearance

K7.1.5: Of factors that contribute to interaction and wake damage and how to control them

K7.1.6: Of waterway dimensions and width of horizontal clearance when calculating available room to navigate vessel

Subdomain 7.2: Vessel Characteristics' Effects on Shiphandling (3 Items)

Tasks

T7.2.1: Monitor ship's performance by using visual and all other available means

T7.2.2: Evaluate the effects of vessel types and configurations on maneuvering

T7.2.3: Evaluate the effects of engine type, rudder, and propulsion system on maneuverability of ship

T7.2.4: Evaluate the effect of propeller transverse thrust going ahead and astern

T7.2.5: Evaluate ship's responsiveness when slowing down or speeding up

T7.2.6: Determine effectiveness of thrusters by considering speed, trim, and draft

T7.2.7: Evaluate effect of horsepower / tonnage ratio on maneuverability

Knowledge

K7.2.1: Of uses of navigational equipment during maneuvering situations

K7.2.2: Of different vessel types and configurations and their capabilities and limitations

K7.2.3: Of effect of engine types, propellers, and rudders on maneuverability of ship

K7.2.4: Of propulsion and automation limitations in heavy weather

K7.2.5: Of propeller thrust and rudder effectiveness while maneuvering ahead or astern

K7.2.6: Of slowdown time and distance necessary for reducing speed

K7.2.7: Of effects of speed, trim, and draft on thrusters

K7.2.8: Of relationship between horsepower / tonnage ratio and maneuverability

Subdomain 7.3: Maneuvering (4 Items)

Tasks

T7.3.1 Compensate for effects of currents and weather on maneuverability of ship
T7.3.2 Evaluate and compensate for effects of swell on maneuverability of ship
T7.3.3 Manage vessel speed to effectively control the ship
T7.3.4 Adjust amount of rudder as needed to account for pivot point and speed changes
T7.3.5 Monitor advance and transfer
T7.3.6 Assess effects of change in pivot point location
T7.3.7 Manage effects of pivot point changes with speed (e.g., wind, thrusters)
T7.3.8 Determine whether ship has positive, negative, or neutral directional stability
T7.3.9 Evaluate the effectiveness of specialized rudders and propulsion systems on vessel handling
T7.3.10 Effectively maneuver vessel with various load conditions
T7.3.11 Maneuver ship to avoid contact with marine mammals

Knowledge

K7.3.1: Of effect of environmental conditions on maneuverability and how to counteract those effects
K7.3.2: Of effect of swell on maneuverability and how to counteract those effects
K7.3.3: Of the relationship between speed and directional stability of the ship
K7.3.4: Of effects of water speed and engine speed on rudder control
K7.3.5: Of technique and effects of rudder cycling on ship's speed
K7.3.6: Of advance and transfer and the forces that affect it
K7.3.7: Of determining location of pivot point of a vessel underway
K7.3.8: Of effect of turning forces (rudder, transverse thrust, tug forces, etc.), interactive forces, and wind/tide on pivot point
K7.3.9: Of directional stability
K7.3.10: Of specialized rudders and propulsion systems and their effect on vessel handling
K7.3.11: Of effects of loading on vessel's handling
K7.3.12: Of techniques to proactively and reactively avoid contact with marine mammals

Subdomain 7.4: Turning (2 Items)

Tasks

T7.4.1: Evaluate ship's responsiveness when turning to maintain a safe rate of turn
T7.4.2: Determine rate of turn from visual or electronic means
T7.4.3: Plan and execute appropriate turning maneuver in a turning basin, given vessel and geographic parameters
T7.4.4: Execute a back-and-fill maneuver when it is the most appropriate method of turning
T7.4.5: Observe the effect on headway/sternway of unequal rotational speeds of bow and stern

Knowledge

K7.4.1: Of effects of rudder actions on directional rotation
K7.4.2: Of rate of turn versus rudder commands
K7.4.3: Of maneuvering in turning basins
K7.4.4: Of techniques to execute an efficient and safe back-and-fill turn
K7.4.5: Of the effects of unequal rotational speeds of bow and stern on headway/sternway

Subdomain 7.5: Maneuvering with Tugs (3 Items)

Tasks

T7.5.1: Operate the vessel in compliance with Tug Escort Regulations
T7.5.2: Maintain safe positioning for tugs (e.g., proximity to anchors, mooring lines, obstructions)
T7.5.3: Adjust tug forces to account for change in pivot point
T7.5.4: Position tugs to maximize safety and effectiveness
T7.5.5: Maneuver vessel with tugs in a safe and effective manner
T7.5.6: Recognize the capabilities or limitations of different tug types
T7.5.7: Use tug forces to change vessel rate of turn

Knowledge

K7.5.1: Of regulations and guidelines regarding escorts
K7.5.2: Of basic tug positions for ship work
K7.5.3: Of tug-ship interaction, specific to pivot point
K7.5.4: Of tug maneuvering levers
K7.5.5: Of tug-ship interaction, specific to positioning of tugs
K7.5.6: Of tug escort techniques for tethered and untethered transit
K7.5.7: Of vessel speed and horsepower on tug effectiveness
K7.5.8: Of dead ship towing techniques
K7.5.9: Of the capabilities and limitations of tug types
K7.5.10: Of tug-ship interaction, specific to rate of turn

Subdomain 7.6: Restricted/Narrow Waterway (4 Items)

Tasks

T7.6.1: Consider sail area, swept path, and moored vessels during transit
T7.6.2: Communicate and establish passing arrangements with meeting/overtaking vessels
T7.6.3: Adjust vessel speed to achieve favorable meeting locations
T7.6.4: Maneuver outside channel limits to accommodate safe meeting while maintaining safe UKC
T7.6.5: Evaluate the effects of wind on maneuvering in a narrow waterway
T7.6.6: Assess effects of moored vessels in waterway by considering their blockage factor and wind shadow
T7.6.7: Assess the effects of hydrodynamic forces and water depth during waterway transit
T7.6.8: Implement effective use of tugs during narrow waterway transit
T7.6.9: Counter the effects of bank cushion, bank suction, and squat in shallow waterways
T7.6.10: Manage effects of speed on moored vessels
T7.6.11: Maneuver vessel under drawbridges or lift bridges

Knowledge

K7.6.1: Of techniques to maneuver ships in narrow channels
K7.6.2: Of radio communication protocols and COLREGS
K7.6.3: Of situations when meeting or overtaking should be avoided or adjusted
K7.6.4: Of evasive maneuvers to avoid collision
K7.6.5: Of maneuvering through high-density traffic
K7.6.6: Of effects of wind to maneuver in waterway
K7.6.7: Of visual cues to assess wind
K7.6.8: Of effects of blockage / visibility and windshadow on ability to maneuver in waterway
K7.6.9: Of visual cues to assess current
K7.6.10: Of effects of predicted depth vs. observed depth of water (e.g., barometric pressure, water level, river flow, reported shoaling)
K7.6.11: Of the effects of shallow water on vessel maneuverability
K7.6.12: Of the advantages and limitations of the use of tugs during waterway transit
K7.6.13: Of squat (i.e., location and cause)
K7.6.14: Of vessel's draft and squat and in relation to speed and depth of water
K7.6.15: Of managing turning forces (e.g., bank cushion, bank suction, wind forces) in shallow waterways
K7.6.16: Of safe speed to proceed through waterway
K7.6.17: Of bridge signaling methods and requirements for opening

Subdomain 7.7: Emergency Shiphandling (2 Items)

Tasks

T7.7.1: Respond effectively to a rudder or propulsion failure
T7.7.2: Respond effectively to a power failure
T7.7.3: Respond effectively to a collision or allision
T7.7.4: In response to an emergency, call and direct tugs to assist (if appropriate)
T7.7.5: Determine need for corrective action

Knowledge

K7.7.1: Of emergency procedures to implement immediately following a rudder or propulsion failure
K7.7.2: Of emergency procedures to implement immediately following a power failure
K7.7.3: Of emergency procedures to implement immediately following a collision or allision
K7.7.4: Of emergency maneuvering techniques using tugs
K7.7.5: Of techniques for emergency shiphandling

Domain 9: Local Knowledge (6%)

Subdomain 9.1: Regulations Specific to Piloting in the San Francisco Bay Area (5 Items)

Tasks

T9.1.1: Maneuver and transit vessels within the pilotage grounds, taking into account Regulated Navigational Areas (RNA) and Critical Maneuver Areas (CMA)
T9.1.2: Communicate effectively with the Union Pacific Railroad Bridge
T9.1.3: Communicate effectively while adhering to VTS regulations
T9.1.4: Utilize escorts effectively and efficiently while adhering to tank vessel escort regulations
T9.1.5: Maneuver and anchor vessels while meeting the requirements specific to the anchorage area

Knowledge

K9.1.1: Of Regulated Navigational Areas (RNA)
K9.1.2: Of Critical Maneuver Areas (CMA)
K9.1.3: Of efficient and effective bridge communications with the Union Pacific Railroad Bridge
K9.1.4: Of Vessel Traffic Service (VTS) regulations
K9.1.5: Of tank vessel escort regulations within the pilotage grounds
K9.1.6: Of requirements specific to the anchorage area of the pilotage grounds

2026 Pilot Trainee Training Exam Bibliography
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The references below were used in the development of the 2026 Pilot Trainee Training Exam. Local regulatory documents are available using the links provided.

Referenced Regulations:

1. *Navigation Rules and Regulations Handbook*, Department of Homeland Security, United States Coast Guard, August 8, 2024 ISBN 978 1 976794322
2. Regulated Navigation Areas for the San Francisco Bay Region, *33 CFR 165.1181*
3. *San Francisco Tank Vessel Escort Regulations Title 14 California Code of Regulations*
4. USCG-Sector San Francisco VTS Users Manual
5. *United States Coast Pilot 7 - Pacific Coast: California, Oregon, Washington, Hawaii, and Pacific Islands*, US Department of Commerce NOAA, 2025, 57th Edition, Chapters 1, 2, 3, 7
6. Harbor Safety Plan for the San Francisco Bay Region, 2025
7. NTSB report on the Allision of the *M/V Cosco Busan* with the Delta Tower of the Bay Bridge

Referenced Publications:

1. *The American Practical Navigator*, Nathaniel Bowditch, Pub. No. 9, 2024 Edition, Volume 1, National Geospatial-Intelligence Agency, ISBN 978 1 951116866
2. *Behavior and Handling of Ships*, Hooyer,1983, Cornell Maritime Press, ISBN 0-87033-306-2
3. *Bridge Procedures Guide*, International Chamber of Shipping, 6th Edition, 2022
4. *Formulae for the Mariner*, Richard M. Plant, 2nd Edition, 2009, Cornell Maritime Press ISBN 978-0-87033-361-3
5. *IMPA On Pilotage, IMPA 2014, Witherby Publishing Group LTD.,* ISBN 978-1-85609-635-5
6. *Shiphandling - The Beautiful Game*, Volume 1, The Nautical Institute, 2025, Livingstone and Livingstone, ISBN 978 1 91 5488 47 3
7. *Shiphandling for the Mariner*, Daniel H. MacElrevey and Daniel E. MacElrevey, Fifth Edition , 2018, Cornell Maritime Press, ISBN 978 0 76433 5458 8
8. *Ship Handling*, Hervé Baudu, 3rd Edition, 2022, DOKMAR Maritime Publishers, ISBN 978 90 71500 59 6
9. *Shiphandling with Tugs,* Jeff Slesinger, Second Edition, 2008, Cornell Maritime Press, ISBN 978 0 87033 598 3
10. *Shiphandling Theory and Practice*, David J. House, 2007, Butterworth - Heinemann, ISBN 978 0 75068 5306
11. *Ship Manoeuvering Principles,* 2nd Edition, 2023, Witherby Publishing Group LTD., ISBN 978 19149 9316 9
12. *The Shiphandler's Guide*, R.W. Rowe, 2nd Edition, 2004, The Nautical Institute, ISBN 1 870077 35 0
13. U.S. Chart No. 1, 13th Edition, 2019, NOAA Office of Coastal Survey