Bar Pilot

Job Analysis Report

Board of Pilot Commissioners

Project Conducted by:
Test Validation and Construction Program
California Department of Human Resources
November 2016

Job Analysis Report

For the position of

BAR PILOT

Board of Pilot Commissioners

November 2016

Kendra Carrion
Consultant

Ashley Le
Consultant

California Department of Human Resources
Test Validation and Construction Program
1515 S Street, Suite 500N
Sacramento, CA 95811

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TEST VALIDATION AND CONSTRUCTION PROGRAM

The California Department of Human Resources (CalHR) Test Validation and Construction (TV&C) Program provides professional expertise on a reimbursable basis to decentralized departments in the development and validation of job-related selection procedures in accordance with the Federal *Uniform Guidelines on Employee Selection Procedures,* the Civil Rights Acts of 1964 and 1991, California Government Code, the Americans with Disabilities Act and the professionally accepted standards of the American Psychological Association.

The TV&C Program provides State departments with the highest quality examination-related materials and a demonstrated commitment to excellence and innovation with respect to developing the highest level of valid and defensible selection procedures. TV&C also offers a wide variety of selection-related products and services such as job analyses, cognitive assessment procedures (e.g., written exams) as well as structured interviews, performance exams, and job simulation exercises. TV&C also provides technical training and selection consulting services.

For more information about TV&C and how we can help you meet your personnel selection needs, please contact us at: (916) 323-0867 or email us at myron.kraus@calhr.ca.gov.

INTRODUCTION

CalHR has contracted with the Board of Pilot Commissioners (BOPC) to conduct a job analysis for the San Francisco Bar Pilot position in order to ensure the establishment of associated job-related and content-valid selection procedures. Any reference herein to Bar Pilot pertains only to this San Francisco Bar Pilot position as utilized by BOPC.

The Board of Pilot Commissioners for the Bays of San Francisco, San Pablo, and Suisun is the oversight body that licenses and regulates up to 60 pilots who make up the San Francisco Bar Pilots. The Board is the only state-level pilot commission in California limited to the "pilotage grounds" of its licensees, which includes the various bays in the San Francisco Bay Area, the tributaries all the way to Stockton and Sacramento, and Monterey Bay, with 70 separate terminals in ten counties.

This document, in its entirety, reports the methodology and findings of this job analysis conducted by the TV&C Program and has been developed to demonstrate a content valid strategy in accordance with the requirements set forth by the Federal *Uniform Guidelines on Employee Selection Procedures* (1978). These guidelines provide uniform standards for the proper use of employment testing and the documentation of the validity of selection procedures,[1] and are intended to be consistent with the generally-accepted professional standards, *Principles for the Validation and Use of Personnel Selection Procedures* (Society for Industrial and Organizational Psychology, 2003) and *Standards for Educational & Psychological Testing* (American Educational Research Association, American Psychological Association, and the National Council on Measurement in Education, 1999).

(See APPENDIX A: CalHR Summary of *Uniform Guidelines*)

The *Uniform Guidelines* specify that a selection procedure can be supported by a content valid strategy to the extent that it is a representative sample of the content of the job, demonstrated through the establishment of a clear relationship between the selection procedure and the requirements for successful job performance in the position the procedure is used. The resultant documentation of this study reflects the current requirements for successful job performance in the Bar Pilot position, identifying the essential work behaviors[2] (tasks performed) and the requisite important knowledge, skills, abilities and personal characteristics (KSAPCs) used in the successful performance of those tasks. The results of this study provide the

[1] *Selection procedures* have been defined by the *Uniform Guidelines* as any measure, combination of measures, or procedure used as a basis for any employment decision, and include the full range of assessment techniques, from traditional paper and pencil tests, performance tests, training programs, or probationary periods and physical, educational, and work experience requirements, through informal or casual interviews and unscored application forms.

[2] *Work behaviors*, as defined by the *Uniform Guidelines*, are activities performed to achieve the objectives of a job. These behaviors involve observable (physical) and unobservable (mental) components, and consist of the performance of one or more tasks. Knowledge, skills, and abilities are not behaviors, although they may be applied in work behaviors. The *Uniform Guidelines* define (1) a *task* as a basic unit of work that is performed in a job, (2) *knowledge* as a body of information applied directly to the performance of a function, (3) *skill* as a present, observable competence to perform a learned psychomotor act, and (4) *ability* as a present competence to perform an observable behavior or a behavior which results in an observable product.

necessary basis to (1) establish content-valid selection procedures, (2) distinguish qualified candidates, (3) identify required revisions to the minimum qualifications, and (4) address issues within the position. All documentation derived from this study is intended for use by BOPC, in accordance with the *Uniform Guidelines*, as the basis for establishing job-associated, content-valid selection procedures for this position.

Analysts received technical training from the CalHR on conducting and documenting job analyses. Training courses were based on professionally accepted methods (American Psychological Association's Standards and the Society for Industrial/Organizational Psychology's Principles). These methods were founded on a model of content validation and comply with the *Uniform Guidelines,* the 1990 *Americans with Disabilities Act (ADA),* and the California Code of Regulations, Title 2, § 250, requiring that selection procedures be based on merit and fitness.

USER, DATES, and LOCATION of STUDY

USER of STUDY

The Bar Pilot is used by BOPC. All documentation derived from this study is intended for use by BOPC.

DATES of STUDY

This study commenced September 2016 and was completed November 2016.

LOCATION of STUDY

Preliminary Planning Meetings:
Test Validation and Construction Program (TV&C)
California Department of Human Resources
1515 S Street, Suite 500N
Sacramento, CA 95811

Meetings with Subject Matter Expert Panels:
Pier 9 – San Francisco Bar Pilots
Board of Pilot Commissioners
660 Davis St.
San Francisco, CA 94111

Data Analysis:
Test Validation and Construction Program (TV&C)
California Department of Human Resources
1515 S Street, Suite 500N
Sacramento, CA 95811

POSITION BACKGROUND

POSITION CONCEPT

Bar Pilot

The Pilots are organized for business operational purposes as the "San Francisco Bar Pilots," also known as Bar Pilots. The Bar Pilots are on call 24 hours a day, 365 days a year to safely deliver cargo and passengers. Sixty Pilots serve the Bay, and their work schedule is similar to the United States Merchant Marine and many public safety officials – one week on, one week off. The pilots guide ships of 750 gross tons or greater in the Bays of San Francisco and Monterey and tributaries to the ports in Oakland, Richmond, Stockton, and Sacramento, facilitating over 8,000 ship movements annually. The Bar Pilots partner closely with the United States Department of Homeland Security, the U.S. Coast Guard and other law enforcement agencies to ensure maritime security, in which the boarding of a Bar Pilot is often the first contact a foreign ship will have in the United States.

The Bar Pilot position is not a State classification, hence there is no Classification Specification. Furthermore, a probationary period is not required upon appointment to this position.

A comprehensive job analysis was last completed in 2004. However, table top job analyses were conducted in September 2010 and July 2014 to update data taken from the 2004 job analysis and to validate the Bar Pilot examination.

POSITION COMPOSITION

As of September 21, 2016, BOPC had 57 out of 60 positions filled on a permanent, full-time basis, with 3 positions vacant.

INITIAL PLANNING

Initial planning for this detailed study entailed the development and/or assessment of the (1) methodology, (2) project timelines, (3) participation of subject matter experts (SME), (4) staff responsibilities, and (5) meeting locations.

(See APPENDIX B: Project Plan)

METHODOLOGY of STUDY

The methodology developed to analyze this position utilizes a task-inventory-analysis approach. This methodology includes (1) a review of literature relevant to the position; (2) meetings with SMEs to develop respective task and KSAPC inventories reflecting current requirements for successful job performance; (3) meetings with SMEs to establish the respective relationship between essential tasks and important and required KSAPCs; (4) administering a job analysis survey to assess and identify essential tasks and important and required KSAPCs; and (5)

meeting with SMEs to discuss the Job Analysis Survey results and verify the list of retained and dropped KSAPC statements.

LITERATURE REVIEW

Literature relevant to this job analysis was reviewed to familiarize project staff with the duties and responsibilities of the Bar Pilot. Literature reviewed included, but was not limited to, (a) previous job analyses, (b) studies that have been conducted on the job related to reclassification or compensation, (c) departmental webpages and (f) other general sources such as the Occupational Network Online (O*NET). These documents were used to develop a basic understanding of the nature and requirements of the job in question. A preliminary list of task statements as well as KSAPC statements was generated based on the review of these documents.

JOB AUDITS/INTERVIEWS

Due to the availability of archival materials, including previous job analysis and validation reports, TV&C determined that job audits/interviews were not appropriate for the study, and that the relevant information might more effectively be developed in the Job Analysis meeting. In this meeting, the previously developed list of tasks and KSAPCs were refined and enhanced to reflect the job as it is currently used.

(See APPENDIX C: Subject Matter Expert Participants)

JOB ANALYSIS PANEL MEETING

A critical step in the content validation process is establishing that the tasks and KSAPCs identified during archival review and/or job audits are truly representative of the position. The process used by TV&C to ensure that the relative list of tasks/KSAPCs are thorough and complete is to conduct Job Analysis panel meetings in which a group of SMEs (which includes current job incumbents) review and edit the tasks/KSAPCs, as well as add additional tasks/KSAPCs that were not identified in the initial phases of the process. The meetings should include representation from all different units/programs/areas of the position to ensure that the tasks/KSAPCs represent the job as a whole. For this study, a Job Analysis panel meeting was conducted on September 19, 20, and 21, 2016.

(See APPENDIX C: Subject Matter Expert Participants)

JOB ANALYSIS SURVEY

The resulting list of job tasks and KSAPCs from the panel meeting were compiled into a Job Analysis Survey (JAS) using SurveyMonkey, an online survey software. The JAS was then administered to the incumbents who were asked to individually rate the job tasks and KSAPCs. The object of the survey is to identify the essential tasks/KSAPCs required for the position. The survey must be administered to a demographically representative sample of SMEs to ensure that the tasks/KSAPCs represent the job as a whole.

(See APPENDIX D: Job Analysis Survey)

TASK STATEMENTS

For each task, current job incumbents were asked to rate (1) how important the task is to successful job performance, and (2) how frequently the task is performed.

Task Rating Scales

IMPORTANCE: How important is this task to successful job
0 = Does Not Apply
1 = Moderately Important
2 = Important
3 = Very Important
4 = Critical

FREQUENCY: How often is this job task performed?
0 = Does Not Apply
1 = Less than Once a Month (includes quarterly)
2 = Monthly
3 = Weekly
4 = Daily

KSAPC STATEMENTS

For each KSAPC, current job incumbents were asked to rate (1) how important the KSAPC is to successful job performance, (2) whether the KSAPC is required at entry (i.e., on the first day of the job and prior to receiving any additional training) or if it is typically learned during the course of the job, and (3) how strongly the possession of the KSAPC in question is related to actual job performance.

KSAPC Rating Scales

IMPORTANCE: How important is this KSAPC to successful job
0 = Does Not Apply 1 = Moderately Important 2 = Important 3 = Very Important 4 = Critical

EXPECTED AT ENTRY: When is a person expected to have
0 = Not Needed 1 = Needed 2 = Essential

RELATIONSHIP TO JOB PERFORMANCE: Does possession
0 = NO 1 = YES

(See APPENDIX E: Task and KSAPC Rating Scales)

DATA ANALYSIS

The JAS was administered to 43 Bar Pilot SMEs. CalHR received 37 completed surveys from incumbents of the Bar Pilot position.

All returned surveys were screened to ensure adequacy and appropriateness for inclusion in the final job analysis results. Surveys may be deleted from the final data analysis process for a variety of reasons, including failure to meet SME qualifications, biased or skewed data, repeat respondents, or incomplete surveys. Of the 43 surveys, six (6) were deleted due to incompleteness. Overall, a total of 37 surveys were included in the final job analysis.

The mean (i.e., average) rating for each scale was computed. The results were used to determine the critical work behaviors and job requirements for the position, and are summarized below.

TASK RATING RESULTS

In accordance with the *Uniform Guidelines*, only those tasks that were identified as IMPORTANT were retained in the final job analysis. FREQUENCY of performance is also considered when developing valid selection procedures. If a task statement receives a frequency rating of 0 (Does not apply) it should be eliminated from the final job analysis.

For this study, tasks that received an average IMPORTANCE rating of **1.70** (important to successful performance on the job) or higher were retained in the final job analysis.

(See APPENDIX F: Task Rating Results)

KSAPC RATING RESULTS

In accordance with the *Uniform Guidelines*, only KSAPC statements that were identified as IMPORTANT and EXPECTED AT ENTRY were retained in the final job analysis. The final scale, RELATIONSHIP TO JOB PERFORMANCE, determines the appropriateness of rank ordering candidates on a selection procedure, though there is no cutoff implemented with this scale.

For this study, KSAPCs that received a minimum average IMPORTANCE rating of **1.70** (important to successful performance on the job) and a minimum average EXPECTED AT ENTRY rating of **0.70** (needed) were retained in the final job analysis.

With the established cutoff of **1.70** and **0.70** for the IMPORTANCE rating and EXPECTED AT ENTRY rating, respectively, 33 KSAPCs were initially not retained. An additional meeting occurred on November 14, 2016 to discuss if any of these KSAPC items needed to be retained, despite the low survey rating. Through consensus, the Bar Pilot SMEs decided that 14 additional KSAPC items were to be retained without lowering the pass point, as SMEs confirmed that only the chosen 14

additional KSAPC items were deemed critical and expected at entry. Therefore, the final total of KSAPCs not retained is 19.

(See APPENDIX G: KSAPC Rating Results)

TASK/KSAPC LINKAGE

Every KSAPC included in a job analysis must link directly to an essential function (task) of the job, and be essential for the successful performance of the task. Any KSAPC which cannot be linked to a task should be eliminated from the KSAPC inventory and not considered an essential component of the job.

A SME panel meeting was conducted in which SMEs were instructed to link retained KSAPCs back to essential tasks. SMEs were instructed to, for each KSAPC, read through the list of retained tasks and identify those which require or utilize the specific KSAPC. One KSAPC may be linked to several tasks.

Four (4) SMEs participated in the linking process. The SMEs used a consensus method to determine the linkages.

(See APPENDIX H: KSAPC Linkage Data)

REVIEW of SELECTION OPTIONS

Each KSAPC statement was reviewed to determine which assessment modality would be the most effective method of measurement. After reviewing the final task and KSAPC results, TV&C staff developed a Selection Options Matrix detailing examination options for all retained KSAPCs. The intent and purpose is to examine and review all possible examination options to ensure the development of a valid and reliable testing process that identifies the most qualified candidates while minimizing potential bias in accordance with the provisions of the *Uniform Guidelines.*

It is not uncommon for a KSAPC to be measurable using a variety of methods. For example, a person's ability to review information and take appropriate action may be measured using a written exam (e.g., a multiple choice exam), a structured interview, or a job simulation activity, among other methods.

Subsequent selection procedures are to be developed in accordance with the provisions of the *Uniform Guidelines* and based upon the results of this study, provided that the job-analytic data remains current and reflective of the position's work behaviors (tasks performed), and the requisite important and required KSAPCs used in the work behaviors to successfully perform these tasks.

(See APPENDIX I: Selection Options Matrix)

ACCURACY and COMPLETENESS

This job analysis was conducted and documented by Kendra Carrion and Ashley Le, with the CalHR, in conformance with the *Uniform Guidelines* and professionally accepted standards. All documentation derived from this study has been included in this report or can be found in the Bar Pilot project file.

This report is considered valid and current for five years from November 2016. Prior to examination development activities the job analysis data should be reviewed by SMEs and qualified selection analysts to ensure that the information is a current and accurate representation of the position as utilized by BOPC. Some jobs may require job analysis updates with even greater frequency, for reasons that may include, but are not limited to, changes in technology, legislation, policies or procedures. If there is an indication that the job has changed in any matter, the job analysis should be updated.

To ensure the accuracy and completeness of this study, the following steps were taken:

- This job analysis was conducted and documented by staff possessing the requisite knowledge and expertise in job analysis procedures.
- Job analysis data was developed and assessed by a panel of experts on the position.

Requests for information regarding this job analysis should be directed to:

Myron Kraus
Selection Services Program
California Department of Human Resources
1515 S Street, Suite 500N
Sacramento, CA 95811
(916) 323-0867

APPENDIX A: CalHR Summary of *Uniform Guidelines*

The following excerpt is from a summary of the *Uniform Guidelines on Employee Selection Procedures (Uniform Guidelines)* prepared by the California Department of Human Resource's Test Validation and Construction Program. The *Uniform Guidelines*, in its entirety, is available for review at www.uniformguidelines.com.

Introduction

This summary of the *Uniform Guidelines for Employee Selection Procedures* is intended to provide a brief overview of the provisions contained in the *Uniform Guidelines*. This summary should be used in conjunction with the full text of the *Uniform Guidelines* to address specific selection-related queries.

History of the *Uniform Guidelines on Employee Selection Procedures*

The Civil Rights Act of 1964 established that employment decisions based on race, color, religion, sex, or national origin are discriminatory and illegal. In 1978, the U.S. Civil Service Commission, the Department of Labor, the Department of Justice, and the Equal Employment Opportunity Commission jointly adopted the *Uniform Guidelines on Employee Selection Procedures* to establish uniform standards for employers for the use of selection procedures and to address adverse impact, validation, and record-keeping requirements. The *Uniform Guidelines* document a uniform federal position in the area of prohibiting discrimination in employment practices on the basis of race, color, religion, sex, or national origin. The *Uniform Guidelines* outline the requirements necessary for employers to legally defend employment decisions based upon overall selection processes and specific selection procedures.

The *Uniform Guidelines* are not in and of themselves legislation or law; however, through their reference in a number of judicial decisions, they have been identified by the courts as a source of technical information and have been given deference in litigation concerning employment issues.

In addition to the *Uniform Guidelines* themselves, a separate document entitled *Questions and Answers on the Uniform Guidelines on Employee Selection Procedures* was released in 1979 to provide further clarification and a common interpretation of the *Uniform Guidelines*.

APPENDIX B: Project Plan

JOB ANALYSIS
WORK PLAN
for
San Francisco Bar Pilot Trainee Program

California Board of Pilot Commissioners
For the Bays of San Francisco, San Pablo, and Suisun

Project Objectives:

For the San Francisco Bar Pilot Trainee Program

- Conduct a comprehensive job analysis to identify essential tasks and knowledge, skills, and abilities.
- Develop a job analysis report to document all processes and support legal defense of exam materials.

Proposed Completion Date: December 2, 2016

Department Contacts:

Roma Cristia-Plant	(415) 397-2253
Allen Garfinkle	(415) 397-2253

TV&C Contacts:

Test Validation & Construction Program (TV&C)

Christina Lopez (Manager)	(916) 323-0860
Ashley Le	(916) 322-4446
Kendra Carrion	(916) 323-0960
Steve Shriver	(916) 323-0866
Myron Kraus	(916) 323-0867
FAX	(916) 322-9227

Tasks/Events	Responsible Party	Target Completion Date
Conduct Initial Planning • Determine project scope, procedures, anticipated involvement, tentative timelines, etc. • Identify departmental project contacts	TV&C	Week of 7/11/16
Develop Project Work Plan • Develop and obtain approval for final work plan • Send Project Work Plan to department(s)	TV&C	Week of 7/18/16

Tasks/Events	Responsible Party	Target Completion Date
Research Job Content and Structure • Review background information, archival data, and other literature pertaining to the classification(s) • Research current literature to determine if there are recent changes to piloting • Research CA statutes and regulations to ascertain if there are changes to piloting • Develop preliminary list of job task and knowledge, skill, ability, and personal characteristic (KSAPC) statements	TV&C	July – August 2016
Conduct Job Audits • Schedule job audits/interviews/observations • Conduct job audits/interviews/observations • Revise list of job task and KSAPC statements **SME Requirement: 4** *(Participants should have a minimum of one year of experience working at or above the level of the position being studied)*	TV&C/ BOPC	Week of 9/5/16
Job Analysis and Linkage Workshop • Review and revise list of job task and KSAPC statements with subject matter experts (SMEs) • Develop Job Analysis Survey • Link job tasks to essential KSAPCs with SMEs • Link KSAPCs to knowledge and ability statements listed on the classification specification • Enter linkage data into final reporting document Workshop to be completed **September 19-21, 2016** **SME Requirement:** 4 – 6 *(Participants should have a minimum of one year of experience working at or above the level of the position being studied)* **Meeting Information:** Meetings will be held from 9:00am – 4:30pm Location San Francisco, CA When a meeting request is sent to your department, please notify your departmental SMEs of these meeting dates, and confirm their availability to attend prior to sending their contact information to CalHR.	TV&C/ BOPC	September 2016
Preview of Simulator – September 23, 2016 • TV&C previews Simulator Location: Maritime Academy, Vallejo, CA	TV&C/ BOPC	September 2016

Tasks/Events	Responsible Party	Target Completion Date
Job Analysis Survey • Administer Job Analysis Survey to SMEs • Collect ratings of job tasks and KSAPCs **SME Requirements: TBD** *(Participants should have a minimum of one year of experience working at or above the level of the position being studied and Survey respondent requirements are based on number of incumbents in the classification. Supervisor respondents should not exceed 15% of total survey responses.)*	TV&C/ BOPC	Week of 10/10/16
Analyze Job Analysis Data • Analyze survey demographics • Analyze task and KSAPC ratings, and apply appropriate cut-offs • Create finalized list of tasks and KSAPCs • Identify job content areas	TV&C	Week of 10/31/16
Review Final Job Analysis Results • Review job content areas • Conduct Quality Review of results • Receive final managerial approval of documents • Finalize Job Analysis Results	TV&C/ BOPC	Week of 11/14/16
Finalize Job Analysis Report • Document job analysis process • Demonstrate adherence to professional/legal guidelines • Conduct quality review of report(s)	TV&C	Week of 11/21/16
Deliver Job Analysis Report	TV&C	Week of 11/28/16

APPENDIX C: Subject Matter Expert Participants

BAR PILOT JOB ANALYSIS PANEL and LINKAGE MEETING

Date: September 19-21, 2016

SUBJECT MATTER EXPERT	POSITION	CONTACT
Thomas Burger	Bar Pilot	T.Burger@sfbarpilots.com
John Carlier	Bar Pilot	J.Carlier@sfbarpilots.com
Arnold Kelso	Bar Pilot	A.Kelso@sfbarpilots.com
William Lemke	Bar Pilot	W.Lemke@sfbarpilots.com

BAR PILOT JOB ANALYSIS DATA RESULTS MEETING (RETAINED KSAPCs DISCUSSION)

Date: November 14, 2016

SUBJECT MATTER EXPERT	POSITION	CONTACT
John Carlier	Bar Pilot	J.Carlier@sfbarpilots.com
Tony Coppo	Bar Pilot	T.Coppo@sfbarpilots.com
Erik Fawcett	Bar Pilot	E.Fawcett@sfbarpilots.com
Roger Kirk	Bar Pilot	R.Kirk@sfbarpilots.com
William Lemke	Bar Pilot	W.Lemke@sfbarpilots.com

JOB ANALYSIS SURVEY RESPONDENT DEMOGRAPHIC INFORMATION

GENDER

	Frequency	Percent
Male	32	86.5
Decline to State	5	13.5
Total	37	100.0

ETHNICITY

	Frequency	Percent
Hispanic	2	5.4
Native American	1	2.7
Pacific Islander	1	2.7
White/Caucasian	24	64.9
Decline to State	9	24.3
Total	37	100.0

AGE

	Frequency	Percent
30 – 39	4	10.8
40 - 49	9	24.3
50 - 59	15	40.5
60 or over	4	10.8
Decline to State	5	13.5
Total	37	100.0

APPENDIX D: Job Analysis Survey (JAS)

1. Introduction

Job Analysis Survey for San Francisco Bar Pilot

The California Department of Human Resources (CalHR) - Test Validation and Construction Program (TV&C) is conducting a Job Analysis survey for the California Board of Pilot Commissioners (BOPC) and the San Francisco Bar Pilot Association. The purpose of this survey is to rate the task statements, as well as the knowledge, skills, abilities, and personal characteristics (KSAPC) statements required for successful job performance. The data collected in this survey will be utilized to develop an entrance examination for the Bar Pilot Trainee Training Program. The information is necessary to ensure that selection procedures are appropriate, job-related, and in compliance with federal and State laws regarding employment testing.

Ratings of tasks and KSAPCs are being collected from individuals who have successfully completed the Bar Pilot Trainee Training program and have extensive knowledge of the Bar Pilot position (i.e., those individuals who currently perform the job). Only active Bar Pilots should complete this survey. Please complete the survey based on your assignment as a Bar Pilot.

When rating KSAPC statements using the "Expected at Entry" rating scale, Bar Pilots are asked, "When is a person expected to have this KSAPC: Is it required before being hired or do they learn it on the job?" For this survey, Bar Pilots should provide "Expected at Entry" ratings as though they were just admitted to (i.e. first day on the job as) the Bar Pilot Trainee program.

Please allow at least one (1) hour to complete the survey.We recommend completing the survey in one sitting as it is not guaranteed that information entered will be saved.

All statements must be rated before proceeding to the next page of the survey. Any information on partially completed pages will not be saved. After completing a page, select the "NEXT" button to save the information.

If you have any questions regarding the content of this survey, please contact the following staff: Ashley Le: 916-322-4446 or Ashley.Le@calhr.ca.gov

This job analysis survey must be completed by Friday, October 21, 2016. Thank you for your participation in this survey process.

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2. Demographic Information - Page 1

Demographic Information and Subject Matter Expert Qualifications.

* Please enter your first and last name
(This information will help us to track responses, and possibly verify that you are qualified to complete this survey.)

The following three questions are voluntary. This information is being collected to document the representativeness of the respondents to this survey. Individual responses will remain confidential.

What is your gender?

- ◯ Female
- ◯ Male
- ◯ Decline to State

Of which ethnic group do you consider yourself a member?

- ◯ Asian
- ◯ Black/African American
- ◯ Filipino
- ◯ Hispanic
- ◯ Native American
- ◯ Pacific Islander
- ◯ White/Caucasian
- ◯ Decline to State

2

What is your age?

- ◯ Under 21
- ◯ 21 - 29
- ◯ 30 - 39
- ◯ 40 - 49
- ◯ 50 - 59
- ◯ 60 or over
- ◯ Decline to State

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3. Task Ratings

Rate each of the tasks using the two scales provided below (Importance and Frequency). Please use your own first-hand knowledge of the job to rate each of the tasks based upon the tasks you actually perform in your current assignment.

* Environment and Geographic Conditions Tasks

	Importance	Frequency
1. Determine factors (e.g., weather, traffic, underkeel clearances, tugboat availability) affecting the desired route or alternative route to plan safe transit routes accordingly.		
2. Evaluate environmental conditions to determine, and adjust accordingly, appropriate vessel operations (e.g., transit, maneuvering) in compliance with Vessel Traffic Service safety regulations.		
3. Review timely navigational information to evaluate risks posed by unusual factors and/or special circumstances that may affect vessel movement.		
4. Calculate underkeel clearances by reviewing channel sounding charts and local area data for vessel safety.		
5. Calculate overhead clearances based on height of tide at locations along route to ensure safe and uneventful transit.		
6. Adjust to bridge environment and layout in order to carry out safe transit operations.		
7. Monitor environmental and traffic conditions to appropriately update estimated arrival times.		
8. Assess immediate navigation and traffic conditions to identify potential hazards to vessel.		
9. Assess dock and berth characteristics to avoid potential obstructions.		

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4. Task Ratings

Rate each of the tasks using the two scales provided below (Importance and Frequency). Please use your own first-hand knowledge of the job to rate each of the tasks based upon the tasks you actually perform in your current assignment.

* Transit Planning Tasks

	Importance	Frequency
10. Identify constraints on vessel maneuverability based on vessel factors (e.g., type, draft, air draft, vessel particulars) to plan efficient transit routes.		
11. Modify transit plan due to vessel responsiveness, traffic/berth conflicts, or environmental conditions for efficient transit operations.		
12. Plan transit routes by evaluating traffic conditions to ensure vessel safety.		
13. Determine current at locations (e.g., along planned route, at berth) to develop plans for maneuvering vessel.		

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5. Task Ratings

Rate each of the tasks using the two scales provided below (Importance and Frequency). Please use your own first-hand knowledge of the job to rate each of the tasks based upon the tasks you actually perform in your current assignment.

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* Communication Tasks

	Importance	Frequency
14. Develop a personal, standardized conference practice with Master to effectively execute Master-Pilot exchange.		
15. Exchange information (e.g., pilot card, tug escort form) with Master to determine vessels' handling characteristics and readiness for emergency situations.		
16. Communicate with Master regarding existing underkeel clearance, traffic, and environmental conditions to ensure departure/arrival times are feasible.		
17. Maintain communication with Bridge Resource Team to ensure free flow of information.		
18. Communicate with Marine Exchange when checking in with escorted vessels to comply with California State regulations.		
19. Establish radio communication with Vessel Traffic Service to report vessel location and destination, and to receive information about other vessel movements.		
20. Communicate with other vessels in a timely manner to make passing arrangements and ensure the safety of vessels.		
21. Communicate time of arrival with Lift Bridge Operator to arrange safe and timely transits.		
22. Coordinate with Master and Bridge Resource Team to ensure timely availability of crew for anchoring, mooring or other evolutions.		
23. Establish working radio communication frequencies to facilitate communication with other vessels and/or tugboats.		
24. Communicate with Master regarding line handling and docking plan to ensure appropriate actions are being taken.		
25. Monitor Vessel Traffic Service and radio communications to determine traffic conditions and ensure vessel safety.		

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6. Task Ratings

Rate each of the tasks using the two scales provided below (Importance and Frequency). Please use your own first-hand knowledge of the job to rate each of the tasks based upon the tasks you actually perform in your current assignment.

* Shiphandling Tasks

	Importance	Frequency
26. Determine the vessel's responsiveness to changes in course/speed and environmental conditions to ensure safe and effective maneuvering.		
27. Observe vessel's response to helm and engine orders to ensure safe and timely maneuvering.		
28. Take corrective actions (e.g., rerouting, speed adjustment) to ensure vessel arrives at predetermined points in an appropriate manner.		
29. Position vessel for approach to berth to ensure vessel docks safely.		
30. Maneuver vessel while ensuring safety of tugboats, vessel, and terminal facilities during transit and undocking/docking operations.		
31. Control vessel at an appropriate speed when in transit and/or approach to berth or anchorage to ensure vessel safety.		

8

7. Task Ratings

Rate each of the tasks using the two scales provided below (Importance and Frequency). Please use your own first-hand knowledge of the job to rate each of the tasks based upon the tasks you actually perform in your current assignment.

* Vessel Safety and Management Tasks

	Importance	Frequency
32. Determine the relative motion of other craft on the water to assess the risk of collision.		
33. Utilize navigational equipment (e.g., radar, Electronic Chart Display) to determine information regarding vessels' transit (e.g., position, course, speed).		
34. Assess potential risk caused by vessel transit to minimize harm to property, persons, and the environment.		
35. Determine vessels' clearance from objects in close proximity through all available means to avoid collisions/allisions.		
36. Position vessel alongside berth to ensure safe cargo operations.		
37. Monitor line handling that may affect ship personnel, equipment, or facility to ensure effective mooring and unmooring.		
38. Anchor vessel in appropriate locations to ensure safety and compliance with vessel traffic regulations.		
39. Ensure final mooring arrangement is sufficient for prevailing conditions to ensure vessel is safely moored.		

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8. Task Ratings

Rate each of the tasks using the two scales provided below (Importance and Frequency). Please use your own first-hand knowledge of the job to rate each of the tasks based upon the tasks you actually perform in your current assignment.

* Situational Awareness Tasks

	Importance	Frequency
40. Prioritize actions during transit to ensure essential operations are carried out in a timely manner.		
41. Perform multiple tasks simultaneously when responding to unfolding events to ensure a safe transit.		
42. Adapt to sudden changing conditions (e.g., environmental, mechanical) in order to ensure vessel safety.		
43. Observe actions and/or response of others to ensure compliance with orders.		
44. Follow up with others (e.g., personnel, vessels) to ensure predetermined arrangements are carried out.		
45. Choose and take the appropriate course of action to mitigate an unforeseen event or hazard.		
46. Maintain awareness of current situation when interrupted by events to ensure vessel safety and necessary actions are completed.		

10

9. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Technical KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
1. Knowledge of applicable guidelines or standards (e.g., Regulated Navigation Areas, speed limits, Rules of the Road, escort regulations) as they relate to maritime operations safety.			
2. Knowledge of shiphandling principles and methods to carry out safe and efficient transit operations.			
3. Knowledge of vessel movement operational guidelines to ensure compliance and safe piloting.			
4. Knowledge of the basic principles of physics (e.g., hydrodynamics) to assess the effect of external conditions on vessels and the vessels' effect on surroundings.			
5. Ability to operate specialized global positioning and tracking technology (e.g., Electronic Chart Display, Automatic Radar Plotting Aid) to ensure safe transit.			
6. Ability to read and interpret charts/soundings in order to determine conditions and navigate waterways safely.			
7. Ability to perform mathematical calculations (e.g., basic algebra) to effectively navigate vessels safely in various geographic and environmental conditions.			

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10. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Leadership/Supervision and Management KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
8. Ability to coordinate and cooperate with Bridge Team to ensure effective transit operations.			
9. Knowledge of crew responsibilities on various vessels to carry out timely transit operations.			
10. Ability to coordinate passing arrangements with other vessels with regards to your own vessel limitations.			

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11. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Environment KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
11. Knowledge of local waterways and weather condition patterns to navigate and provide safe passage.			
12. Knowledge of the effects of salinity on vessels' draft to allow for safe underkeel clearance.			
13. Knowledge of available resources (e.g., Army Corps charts, Local Notice to Mariners) to obtain latest channel depths and characteristics to ensure safe passage of vessels.			
14. Knowledge of available resources to determine predicted tides and currents to ensure timely transit.			
15. Knowledge of the effect of environmental factors on tide and current predictions to efficiently carry out transit operations.			
16. Knowledge of available meteorological resources to determine visibility and wind direction/velocity en route.			
17. Knowledge of the effect of various environmental conditions on vessels' ability to ensure timely transit.			
18. Knowledge of local waterway special events that influence traffic conditions to ensure safe transit.			

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12. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Geographic Conditions KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
19. Knowledge of bridge clearances and configurations to avoid allision.			
20. Ability to identify and interpret information from charts to ensure safe transit.			
21. Knowledge of various types of port configurations and channels (e.g., turning basins, overhead structures) to ensure safe passage.			
22. Knowledge of special circumstances (e.g., dredging operations, maintenance, other vessels, minimum wake) en route that would affect transit.			
23. Knowledge of local current/wind patterns in various locations along route (e.g., channels, docks, basins) to ensure safe passage.			

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13. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Vessel Capabilities KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
24. Knowledge of the effect of vessel speed on squat, heel, and sinkage to determine safe and efficient transit.			
25. Knowledge of the effect of vessel's draft and trim on its handling to safely navigate through various water conditions.			
26. Knowledge of tugboat characteristics and bollard pull to determine tug effectiveness.			
27. Knowledge of the effect of environmental conditions on handling techniques of different classes of vessels to ensure safe transit.			
28. Knowledge of the effect of interactions between vessels in close quarters to prevent damage.			
29. Knowledge of various types of vessel maneuvering characteristics for effective shiphandling.			

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14. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Transit Planning KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
30. Knowledge of geography and configurations of specific ports and waterways in order to navigate the vessel to the destination safely.			
31. Knowledge of marine facilities, including their location and characteristics, to safely transit a specific area.			
32. Ability to identify potential conflicts (e.g., vessel traffic, debris, current change, tide levels) on transit routes to ensure safe passage.			
33. Knowledge of regulated areas (e.g., Regulated Navigation Areas, escort zones) on transit planning to ensure compliance with U.S. Coast Guard and/or State regulations.			
34. Ability to coordinate meeting locations, availability, et cetera with assigned tugboats for effective use.			
35. Knowledge of underkeel clearance, and its effect on the vessel in various locations along route, to ensure safe passage.			
36. Knowledge of factors (e.g., environment, traffic, geographic conditions) that affect reliability of estimated times of arrival when meeting other vessels.			

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15. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Bridge and Vessel Equipment and Communication KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
37. Knowledge of various types of equipment (e.g., rudder, bitt [strength], thruster) necessary to ensure safe transit operations.			
38. Knowledge of use and limitations of various shipboard navigational equipment and radar systems for vessel maneuvering and collision avoidance.			
39. Ability to communicate in standard nautical terminology with shore-based support systems, bridge-to-bridge, and working channels to comply with protocols and procedures.			
40. Ability to communicate with Vessel Traffic Service to ensure safe navigation.			
41. Knowledge of customary Master-Pilot exchange items to establish an effective working relationship.			
42. Ability to effectively communicate with tugboat operators to determine available resources.			
43. Ability to read written documents of varying complexity including departmental policy, manuals, and guides to comprehend and communicate information to others.			
44. Ability to independently write simple documents (e.g., letters) to communicate with staff, agencies, or the general public using correct grammar, spelling, and syntax.			

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16. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Vessel Characteristics KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
45. Knowledge of different tugboat characteristics to determine their suitability for specific tasks.			
46. Knowledge of protocols and procedures for pilot embarking and disembarking vessels to avoid bodily injuries and damage.			
47. Ability to interpret and interpolate draft mark readings to adjust shiphandling techniques accordingly.			
48. Knowledge of shipboard resources to obtain information on vessel particulars to successfully carry out a safe transit.			
49. Ability to determine information about vessel maneuvering limitations, special requirements, and unusual characteristics to ensure effective shiphandling.			

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17. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Shiphandling KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
50. Ability to adjust maneuvering techniques based on vessel's type and size to ensure efficient shiphandling.			
51. Ability to effectively maneuver vessel with various propulsion and steering systems to ensure safe passage.			
52. Knowledge of hydrodynamic forces in narrow channels and shallow water to appropriately maneuver vessel in challenging conditions.			
53. Knowledge of vessel's wake effect to reduce negative effects on surrounding environments.			
54. Ability to properly maneuver the vessel under changing channel configurations to ensure safe passage.			
55. Ability to safely handle the vessel depending on changing vessel factors (e.g., underkeel clearance, heel) for effective maneuvering.			
56. Knowledge of the implications caused by vessels' speed relative to engine speed for effective shiphandling.			
57. Knowledge of factors that affect pivot point to adjust shiphandling.			

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18. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Traffic Management KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
58. Knowledge of factors that affect reliability of Vessel Traffic Service information to plan alternatives accordingly.			
59. Knowledge of factors (e.g., weather, traffic, geographic conditions) constraining other vessels' transit to plan transit operations accordingly.			
60. Knowledge of possible bridge operating constraints that may affect bridge opening requests to appropriately adjust transit planning.			
61. Knowledge of water depths and configurations in bays, channels, rivers, harbors, and anchorages, and their effects on navigation to manage transit planning accordingly.			
62. Ability to properly apply Rules of the Road and/or Vessel Traffic Service regulations to ensure safe transit.			

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19. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Anchorage KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
63. Knowledge of factors that affect anchoring of a vessel to ensure its safety.			
64. Knowledge of anchorage regulations as they relate to the vessel.			
65. Ability to assess potential hazards at local anchorages to ensure safety of vessel.			
66. Ability to carry out anchoring procedures while vessel is moving, mooring, or in emergency situations to ensure vessel safety.			
67. Knowledge of various navigation techniques to precisely anchor a vessel under various conditions.			

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20. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Docking and Undocking KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
68. Knowledge of acceptable protocol and etiquette for radio communication to ensure proper docking and undocking of vessel.			
69. Knowledge of the effect of existing traffic conditions on departure/arrival times to ensure safe transit.			
70. Knowledge of capabilities and limitations of different types of tugboats to safely dock and undock the vessel.			
71. Knowledge of hull configurations of various types of vessels to ensure correct tugboat placement.			
72. Knowledge of different docking requirements for specific facilities to ensure safety compliance.			
73. Knowledge of various methods to determine distances, speed, and position of own vessel and of vessels in close proximity.			
74. Knowledge of environmental conditions (e.g., current, wind) for approach to berth in order to safely dock and undock vessel.			

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21. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Situational Awareness KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
75. Ability to strategize and prioritize information from multiple sources to carry out transit operations in a timely manner.			
76. Ability to perform multiple tasks simultaneously when responding to unfolding events to ensure a safe transit.			
77. Ability to adapt to sudden changing conditions (e.g., environmental, mechanical) in order to ensure vessel safety.			
78. Ability to observe actions and/or response of others to ensure compliance with orders.			
79. Ability to follow up with others (e.g., personnel, vessels) to ensure predetermined arrangements are carried out.			
80. Ability to choose and take the appropriate course of action to mitigate an unforeseen event or hazard.			
81. Ability to apply past experiences to present or future circumstances to ensure mistakes are not repeated.			
82. Ability to assess crew's effectiveness in responding to pilot's orders to ensure safe vessel transit.			

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22. Knowledge, Skill, and Ability Ratings

Rate each of the knowledge, skills, abilities, and personal characteristics (KSAPCs) using the three scales provided below. Please use your own first-hand knowledge of the job to rate each of the KSAPCs based upon the requirements and qualifications of your current assignment.

* Personal Characteristic KSAPCs

	Importance	Expected At Entry	Relationship to Job Performance
83. Ability to safely embark/disembark a pilot ladder to prevent injuries.			
84. Ability to work in a team environment in order to facilitate transits.			
85. Willingness to stand for long periods of time.			
86. Willingness to work a flexible schedule (i.e., on call for 24 hours a day, 365 days a year).			
87. Willingness to work in adverse weather conditions (e.g., rough sea conditions, wind, sun, heat, rain) to complete assigned job tasks.			

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23. Thank You!

Clicking submit will finalize your survey. Please keep in mind that you will not be able to complete the survey again after hitting submit, so make sure that all your answers are marked appropriately. Thank you for completing our job analysis survey!

If you have any questions or concerns, please contact **Ashley Le** at **Ashley.Le@calhr.ca.gov** or **(916) 322-4446**.

If you have any comments regarding the survey or the classification being surveyed, please place them in the text box below. We appreciate your feedback!

NOTE: After you click "Submit" your data will be saved and the window will close automatically.

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APPENDIX E: Task and KSAPC Rating Scales

Task Rating Scales

IMPORTANCE: How important is this task to successful job performance?

(0) Does Not Apply
An inability to perform this task has **no effect** on job performance.

(1) Moderately Important
An inability to perform this task **will affect** job performance however **it will not lead to failure on the job.**

(2) Important
An inability to perform this task **will have a noticeable effect** on job performance.

(3) Very Important
An inability to perform this task **is likely to result in failure** on the job and **may result in negative consequences.**

(4) Critical
An inability to perform this task **will lead to significant failure** on the job and **will lead to serious negative consequences.**

FREQUENCY How often is this job task performed?

(0) Does Not Apply

(1) Less than Once a Month

(2) Monthly

(3) Weekly

(4) Daily

KSAPC Rating Scales

IMPORTANCE: How important is this KSAPC to successful job performance?

(0) Does Not Apply
A lack of this KSAPC has **no effect** on job performance.

(1) Moderately Important
A lack of this KSAPC **will affect** job performance however **it will not lead to failure on the job.**

(2) Important
A lack of this KSAPC **will have a noticeable effect** on job performance.

(3) Very Important
A lack of this KSAPC **is likely to result in failure** on the job and **may result in negative consequences.**

(4) Critical
A lack of this KSAPC **will lead to significant failure** on the job and **will lead to serious negative consequences.**

EXPECTED AT ENTRY: When is a person expected to have this KSAPC: Is it required before being hired or do they learn it on the job?

(0) Not Needed
This KSAPC is not needed on the first day of the job.

(1) Needed
Possession of this KSAPC is needed and expected on the first day of the job.

(2) Essential
Possession of this KSAPC at entry to the job is essential.

RELATIONSHIP TO JOB PERFORMANCE: Does possession of this KSAPC lead to better job performance?

(0) NO
Possession of this KSAPC does not result in better job performance.

(1) YES
Possession of this KSAPC does result in better job performance.

APPENDIX F: Task Rating Results

Retained Tasks

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Scale A Importance (Mean Rating)		Scale B Frequency (Mean Rating)		Task Statements	
					Environment and Geographic Conditions
3.86		4.00		1	Determine factors (e.g., weather, traffic, underkeel clearances, tugboat availability) affecting the desired route or alternative route to plan safe transit routes accordingly.
3.51		3.95		2	Evaluate environmental conditions to determine, and adjust accordingly, appropriate vessel operations (e.g., transit, maneuvering) in compliance with Vessel Traffic Service safety regulations.
3.22		3.76		3	Review timely navigational information to evaluate risks posed by unusual factors and/or special circumstances that may affect vessel movement.
3.76		3.97		4	Calculate underkeel clearances by reviewing channel sounding charts and local area data for vessel safety.
3.73		3.97		5	Calculate overhead clearances based on height of tide at locations along route to ensure safe and uneventful transit.
2.86		3.89		6	Adjust to bridge environment and layout in order to carry out safe transit operations.
2.86		3.89		7	Monitor environmental and traffic conditions to appropriately update estimated arrival times.
3.73		3.97		8	Assess immediate navigation and traffic conditions to identify potential hazards to vessel.
3.00		3.62		9	Assess dock and berth characteristics to avoid potential obstructions.
					Transit Planning
3.41		3.92		10	Identify constraints on vessel maneuverability based on vessel factors (e.g., type, draft, air draft, vessel particulars) to plan efficient transit routes.
3.03		3.73		11	Modify transit plan due to vessel responsiveness, traffic/berth conflicts, or environmental conditions for efficient transit operations.
3.14		3.92		12	Plan transit routes by evaluating traffic conditions to ensure vessel safety.
3.43		3.97		13	Determine current at locations (e.g., along planned route, at berth) to develop plans for maneuvering vessel.
					Communication
2.49		3.76		14	Develop a personal, standardized conference practice with Master to effectively execute Master-Pilot exchange.

Scale A Importance (Mean Rating)		Scale B Frequency (Mean Rating)		Task Statements	
2.84		3.92		15	Exchange information (e.g., pilot card, tug escort form) with Master to determine vessels' handling characteristics and readiness for emergency situations.
2.62		3.89		16	Communicate with Master regarding existing underkeel clearance, traffic, and environmental conditions to ensure departure/arrival times are feasible.
2.38		3.89		17	Maintain communication with Bridge Resource Team to ensure free flow of information.
2.62		3.46		18	Communicate with Marine Exchange when checking in with escorted vessels to comply with California State regulations.
3.08		4.00		19	Establish radio communication with Vessel Traffic Service to report vessel location and destination, and to receive information about other vessel movements.
3.32		3.92		20	Communicate with other vessels in a timely manner to make passing arrangements and ensure the safety of vessels.
3.65		3.51		21	Communicate time of arrival with Lift Bridge Operator to arrange safe and timely transits.
2.76		3.84		22	Coordinate with Master and Bridge Resource Team to ensure timely availability of crew for anchoring, mooring or other evolutions.
2.92		3.86		23	Establish working radio communication frequencies to facilitate communication with other vessels and/or tugboats.
2.43		3.84		24	Communicate with Master regarding line handling and docking plan to ensure appropriate actions are being taken.
2.92		3.95		25	Monitor Vessel Traffic Service and radio communications to determine traffic conditions and ensure vessel safety.
					Shiphandling
3.11		4.00		26	Determine the vessel's responsiveness to changes in course/speed and environmental conditions to ensure safe and effective maneuvering.
3.35		4.00		27	Observe vessel's response to helm and engine orders to ensure safe and timely maneuvering.
3.16		3.84		28	Take corrective actions (e.g., rerouting, speed adjustment) to ensure vessel arrives at predetermined points in an appropriate manner.
3.41		4.00		29	Position vessel for approach to berth to ensure vessel docks safely.
3.68		3.97		30	Maneuver vessel while ensuring safety of tugboats, vessel, and terminal facilities during transit and undocking/docking operations.

Scale A Importance (Mean Rating)		Scale B Frequency (Mean Rating)		Task Statements	
3.57		3.97		31	Control vessel at an appropriate speed when in transit and/or approach to berth or anchorage to ensure vessel safety.
					Vessel Safety and Management
3.43		3.97		32	Determine the relative motion of other craft on the water to assess the risk of collision.
3.27		3.95		33	Utilize navigational equipment (e.g., radar, Electronic Chart Display) to determine information regarding vessels' transit (e.g., position, course, speed).
3.32		3.89		34	Assess potential risk caused by vessel transit to minimize harm to property, persons, and the environment.
3.43		3.97		35	Determine vessels' clearance from objects in close proximity through all available means to avoid collisions/allisions.
2.78		3.89		36	Position vessel alongside berth to ensure safe cargo operations.
2.27		3.81		37	Monitor line handling that may affect ship personnel, equipment, or facility to ensure effective mooring and unmooring.
2.81		3.59		38	Anchor vessel in appropriate locations to ensure safety and compliance with vessel traffic regulations.
2.70		3.68		39	Ensure final mooring arrangement is sufficient for prevailing conditions to ensure vessel is safely moored.
					Situational Awareness
2.89		3.92		40	Prioritize actions during transit to ensure essential operations are carried out in a timely manner.
3.19		3.84		41	Perform multiple tasks simultaneously when responding to unfolding events to ensure a safe transit.
3.57		3.65		42	Adapt to sudden changing conditions (e.g., environmental, mechanical) in order to ensure vessel safety.
3.16		3.95		43	Observe actions and/or response of others to ensure compliance with orders.
2.86		3.86		44	Follow up with others (e.g., personnel, vessels) to ensure predetermined arrangements are carried out.
3.43		3.51		45	Choose and take the appropriate course of action to mitigate an unforeseen event or hazard.
3.51		3.70		46	Maintain awareness of current situation when interrupted by events to ensure vessel safety and necessary actions are completed.

APPENDIX G: KSAPC Rating Results

Retained KSAPCs

The following KSAPC statements include KSAPC statements that met the cutoff criteria of having BOTH an importance rating of **1.70** or greater and an Expected at Entry rating of **0.70** or greater. This list also includes KSAPC statements (*italicized*) that did not meet the cutoff criteria but were determined by SMEs to be critical and expected at entry, and thus were retained.

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Scale A Importance (Mean Rating)	Scale B Expected at Entry (Mean Rating)	Scale C Relationship (Mean Rating)		KSAPC Statements
				Technical
2.97	1.08	0.92	1	Knowledge of applicable guidelines or standards (e.g., Regulated Navigation Areas, speed limits, Rules of the Road, escort regulations) as they relate to maritime operations safety.
3.24	1.22	0.97	2	Knowledge of shiphandling principles and methods to carry out safe and efficient transit operations.
2.51	0.78	0.89	3	Knowledge of vessel movement operational guidelines to ensure compliance and safe piloting.
2.70	1.00	0.95	4	Knowledge of the basic principles of physics (e.g., hydrodynamics) to assess the effect of external conditions on vessels and the vessels' effect on surroundings.
2.41	0.92	0.97	5	Ability to operate specialized global positioning and tracking technology (e.g., Electronic Chart Display, Automatic Radar Plotting Aid) to ensure safe transit.
3.16	1.41	0.95	6	Ability to read and interpret charts/soundings in order to determine conditions and navigate waterways safely.
2.46	1.19	0.89	7	Ability to perform mathematical calculations (e.g., basic algebra) to effectively navigate vessels safely in various geographic and environmental conditions.

Scale A Importance (Mean Rating)	Scale B Expected at Entry (Mean Rating)	Scale C Relationship (Mean Rating)		KSAPC Statements
				Leadership/Supervision and
2.51	0.81	0.97	8	Ability to coordinate and cooperate with Bridge Team to ensure effective transit operations.
2.03	*0.62*	*0.84*	*9*	*Knowledge of crew responsibilities on various vessels to carry out timely transit operations.*
3.30	1.19	1.00	10	Ability to coordinate passing arrangements with other vessels with regards to your own vessel limitations.
				Environment
2.41	0.84	0.95	12	Knowledge of the effects of salinity on vessels' draft to allow for safe underkeel clearance.
2.78	0.81	0.97	13	Knowledge of available resources (e.g., Army Corps charts, Local Notice to Mariners) to obtain latest channel depths and characteristics to ensure safe passage of vessels.
3.11	1.05	0.97	14	Knowledge of available resources to determine predicted tides and currents to ensure timely transit.
2.57	*0.68*	*0.92*	*15*	*Knowledge of the effect of environmental factors on tide and current predictions to efficiently carry out transit operations.*
2.54	0.78	0.95	17	Knowledge of the effect of various environmental conditions on vessels' ability to ensure timely transit.
				Geographic Conditions
3.38	0.78	1.00	19	Knowledge of bridge clearances and configurations to avoid allision.
3.14	1.38	0.97	20	Ability to identify and interpret information from charts to ensure safe transit.
3.05	0.73	1.00	21	Knowledge of various types of port configurations and channels (e.g., turning basins, overhead structures) to ensure safe passage.
				Vessel Capabilities
3.03	0.95	0.97	24	Knowledge of the effect of vessel speed on squat, heel, and sinkage to determine safe and efficient transit.

Scale A Importance (Mean Rating)	Scale B Expected at Entry (Mean Rating)	Scale C Relationship (Mean Rating)	KSAPC Statements	
2.89	0.86	1.00	25	Knowledge of the effect of vessel's draft and trim on its handling to safely navigate through various water conditions.
2.95	0.73	1.00	26	Knowledge of tugboat characteristics and bollard pull to determine tug effectiveness.
2.81	*0.68*	*0.97*	*27*	*Knowledge of the effect of environmental conditions on handling techniques of different classes of vessels to ensure safe transit.*
3.05	0.95	0.97	28	Knowledge of the effect of interactions between vessels in close quarters to prevent damage.
2.84	0.78	0.97	29	Knowledge of various types of vessel maneuvering characteristics for effective shiphandling.
				Transit Planning
3.11	0.84	1.00	32	Ability to identify potential conflicts (e.g., vessel traffic, debris, current change, tide levels) on transit routes to ensure safe passage.
3.03	0.76	1.00	34	Ability to coordinate meeting location, availability, et cetera with assigned tugboats for effective use.
3.30	0.89	1.00	35	Knowledge of underkeel clearance, and its effect on the vessel in various locations along route, to ensure safe passage.
2.84	*0.68*	*0.97*	*36*	*Knowledge of factors (e.g., environment, traffic, geographic conditions) that affect reliability of estimated times of arrival when meeting other vessels.*
				(Bridge and Vessel) Equipment
2.89	0.84	0.97	37	Knowledge of various types of equipment (e.g., rudder, bitt [strength], thruster) necessary to ensure safe transit operations.
2.97	1.03	0.97	38	Knowledge of use and limitations of various shipboard navigational equipment and radar systems for vessel maneuvering and collision avoidance.

Scale A Importance (Mean Rating)	Scale B Expected at Entry (Mean Rating)	Scale C Relationship (Mean Rating)		KSAPC Statements
				Communication
2.86	1.14	0.97	39	Ability to communicate in standard nautical terminology with shore-based support systems, bridge-to-bridge, and working channels to comply with protocols and procedures.
2.84	0.84	0.95	40	Ability to communicate with Vessel Traffic Service to ensure safe navigation.
2.14	0.97	0.81	43	Ability to read written documents of varying complexity including departmental policy, manuals, and guides to comprehend and communicate information to others.
				Vessel Characteristics
2.92	0.76	1.00	45	Knowledge of different tugboat characteristics to determine their suitability for specific tasks.
2.46	0.95	0.97	47	Ability to interpret and interpolate draft mark readings to adjust shiphandling techniques accordingly.
2.57	*0.65*	*0.95*	*49*	*Ability to determine information about vessel maneuvering limitations, special requirements, and unusual characteristics to ensure effective shiphandling.*
				Shiphandling
2.95	*0.62*	*1.00*	*50*	*Ability to adjust maneuvering techniques based on vessel's type and size to ensure efficient shiphandling.*
3.08	0.92	1.00	52	Knowledge of hydrodynamic forces in narrow channels and shallow water to appropriately maneuver vessel in challenging conditions.
2.68	0.89	0.95	53	Knowledge of vessel's wake effect to reduce negative effects on surrounding environments.
3.03	*0.68*	*0.97*	*54*	*Ability to properly maneuver the vessel under changing channel configurations to ensure safe passage.*
2.89	*0.68*	*0.97*	*55*	*Ability to safely handle the vessel depending on changing vessel factors (e.g., underkeel clearance, heel) for effective maneuvering.*

Scale A Importance (Mean Rating)	Scale B Expected at Entry (Mean Rating)	Scale C Relationship (Mean Rating)		KSAPC Statements
3.05	0.84	1.00	56	Knowledge of the implications caused by vessels' speed relative to engine speed for effective shiphandling.
3.05	0.92	1.00	57	Knowledge of factors that affect pivot point to adjust shiphandling.
				Traffic Management
2.59	*0.59*	*0.95*	*59*	*Knowledge of factors (e.g., weather, traffic, geographic conditions) constraining other vessels' transit to plan transit operations accordingly.*
3.30	*0.57*	*0.97*	*61*	*Knowledge of water depths and configurations in bays, channels, rivers, harbors, and anchorages, and their effects on navigation to manage transit planning accordingly.*
3.08	1.27	1.00	62	Ability to properly apply Rules of the Road and/or Vessel Traffic Service regulations to ensure safe transit.
				Anchorage
2.81	0.73	0.97	63	Knowledge of factors that affect anchoring of a vessel to ensure its safety.
2.73	*0.65*	*0.92*	*65*	*Ability to assess potential hazards at local anchorages to ensure safety of vessel.*
3.24	*0.65*	*1.00*	*66*	*Ability to carry out anchoring procedures while vessel is moving, mooring, or in emergency situations to ensure vessel safety.*
2.86	0.73	1.00	67	Knowledge of various navigation techniques to precisely anchor a vessel under various conditions.
				Docking and Undocking
2.49	0.70	0.97	68	Knowledge of acceptable protocol and etiquette for radio communication to ensure proper docking and undocking of vessel.
2.81	*0.62*	*0.97*	*69*	*Knowledge of the effect of existing traffic conditions on departure/arrival times to ensure safe transit.*
3.00	*0.62*	*1.00*	*70*	*Knowledge of capabilities and limitations of different types of tugboats to safely dock and undock the vessel.*

Scale A Importance (Mean Rating)	Scale B Expected at Entry (Mean Rating)	Scale C Relationship (Mean Rating)		KSAPC Statements
3.11	1.11	0.97	73	Knowledge of various methods to determine distances, speed, and position of own vessel and of vessels in close proximity.
3.30	0.86	1.00	74	Knowledge of environmental conditions (e.g., current, wind) for approach to berth in order to safely dock and undock vessel.
				Situational Awareness
3.11	1.08	1.00	75	Ability to strategize and prioritize information from multiple sources to carry out transit operations in a timely manner.
3.35	1.32	1.00	76	Ability to perform multiple tasks simultaneously when responding to unfolding events to ensure a safe transit.
3.49	1.22	0.97	77	Ability to adapt to sudden changing conditions (e.g., environmental, mechanical) in order to ensure vessel safety.
3.03	1.19	0.95	78	Ability to observe actions and/or response of others to ensure compliance with orders.
2.76	1.11	0.97	79	Ability to follow up with others (e.g., personnel, vessels) to ensure predetermined arrangements are carried out.
3.32	1.11	0.95	80	Ability to choose and take the appropriate course of action to mitigate an unforeseen event or hazard.
3.19	1.46	1.00	81	Ability to apply past experiences to present or future circumstances to ensure mistakes are not repeated.
3.05	1.05	0.92	82	Ability to assess crew's effectiveness in responding to pilot's orders to ensure safe vessel transit.
				Personal Characteristics
3.49	0.73	0.86	83	Ability to safely embark/disembark a pilot ladder to prevent injuries.
2.54	0.97	0.92	84	Ability to work in a team environment in order to facilitate transits.
2.86	1.41	0.84	85	Willingness to stand for long periods of time.
3.03	1.54	0.84	86	Willingness to work a flexible schedule (i.e., on call for 24 hours a day, 365 days a year).

Scale A Importance (Mean Rating)	Scale B Expected at Entry (Mean Rating)	Scale C Relationship (Mean Rating)	KSAPC Statements	
3.46	1.65	0.92	87	Willingness to work in adverse weather conditions (e.g., rough sea conditions, wind, sun, heat, rain) to complete assigned job tasks.

KSAPCs Not Retained

The following KSAPC statements have been dropped from the final job analysis because they did not meet the cutoff criteria of having BOTH an importance rating of **1.70** or greater and an Expected at Entry rating of **0.70** or greater. When a KSAPC is dropped from further consideration (i.e. selection etc.), it does not necessarily imply that the KSAPC is unimportant to individual job incumbents or specialized job assignments. Rather, it implies that the KSAPC does not generalize well enough to be considered as representative of the job class overall. Typically, there are core KSAPCs that all incumbents share, and these are most appropriate for representing the work performed by the position.

Scale A Importance (Mean Rating)	**Scale B Expected at Entry** (Mean Rating)	**Scale C Relationship** (Mean Rating)	**KSAPC Statements**	
2.76	~~0.49~~	0.95	11	Knowledge of local waterways and weather condition patterns to navigate and provide safe passage.
2.46	~~0.62~~	0.92	16	Knowledge of available meteorological resources to determine visibility and wind direction/velocity en route.
1.97	~~0.43~~	0.81	18	Knowledge of local waterway special events that influence traffic conditions to ensure safe transit.
2.62	~~0.62~~	1.00	22	Knowledge of special circumstances (e.g., dredging operations, maintenance, other vessels, minimum wake) en route that would affect transit.
2.97	~~0.51~~	1.00	23	Knowledge of local current/wind patterns in various locations along route (e.g., channels, docks, basins) to ensure safe passage.
3.11	~~0.43~~	0.97	30	Knowledge of geography and configurations of specific ports and waterways in order to navigate the vessel to the destination safely.
2.49	~~0.41~~	0.92	31	Knowledge of marine facilities, including their location and characteristics, to safely transit a specific area.
2.70	~~0.51~~	0.97	33	Knowledge of regulated areas (e.g., Regulated Navigation Areas, escort zones) on transit planning to ensure compliance with U.S. Coast Guard and/or State regulations.

Scale A Importance (Mean Rating)	Scale B Expected at Entry (Mean Rating)	Scale C Relationship (Mean Rating)	KSAPC Statements	
2.27	~~0.59~~	0.92	41	Knowledge of customary Master-Pilot exchange items to establish an effective working relationship.
2.54	~~0.62~~	0.97	42	Ability to effectively communicate with tugboat operators to determine available resources.
~~1.65~~	0.81	0.68	44	Ability to independently write simple documents (e.g., letters) to communicate with staff, agencies, or the general public using correct grammar, spelling, and syntax.
2.89	~~0.57~~	0.95	46	Knowledge of protocols and procedures for pilot embarking and disembarking vessels to avoid bodily injuries and damage.
2.57	~~0.62~~	0.97	48	Knowledge of shipboard resources to obtain information on vessel particulars to successfully carry out a safe transit.
2.97	~~0.59~~	0.95	51	Ability to effectively maneuver vessel with various propulsion and steering systems to ensure safe passage.
2.05	~~0.46~~	0.84	58	Knowledge of factors that affect reliability of Vessel Traffic Service information to plan alternatives accordingly.
2.68	~~0.46~~	0.86	60	Knowledge of possible bridge operating constraints that may affect bridge opening requests to appropriately adjust transit planning.
2.46	~~0.46~~	0.92	64	Knowledge of anchorage regulations as they relate to the vessel.
2.68	~~0.62~~	1.00	71	Knowledge of hull configurations of various types of vessels to ensure correct tugboat placement.
2.38	~~0.41~~	0.92	72	Knowledge of different docking requirements for specific facilities to ensure safety compliance.

APPENDIX H: KSAPC Linkage Data

BAR PILOT

KSAPC	KSAPC Statement	Linking Task #
	Technical	
1	Knowledge of applicable guidelines or standards (e.g., Regulated Navigation Areas, speed limits, Rules of the Road, escort regulations) as they relate to maritime operations safety.	2,18,19,25,28,38
2	Knowledge of shiphandling principles and methods to carry out safe and efficient transit operations.	26,27,28,29,30,31,34
3	Knowledge of vessel movement operational guidelines to ensure compliance and safe piloting.	1,4,18,19,25,38
4	Knowledge of the basic principles of physics (e.g., hydrodynamics) to assess the effect of external conditions on vessels and the vessels' effect on surroundings.	4,26,30,31,34,42
5	Ability to operate specialized global positioning and tracking technology (e.g., Electronic Chart Display, Automatic Radar Plotting Aid) to ensure safe transit.	3,6,33,38
6	Ability to read and interpret charts/soundings in order to determine conditions and navigate waterways safely.	3,4,5,10,16,33,38
7	Ability to perform mathematical calculations (e.g., basic algebra) to effectively navigate vessels safely in various geographic and environmental conditions.	1,4,5,10,13,16,21,35
	Leadership/Supervision and Management	
8	Ability to coordinate and cooperate with Bridge Team to ensure effective transit operations.	6,14,15,16,17,22,24,43
9	Knowledge of crew responsibilities on various vessels to carry out timely transit operations.	6,15,22,24,37,43,44
	Environment	
11	Knowledge of local waterways and weather condition patterns to navigate and provide safe passage.	1,2,4,5,7,38
12	Knowledge of the effects of salinity on vessels' draft to allow for safe underkeel clearance.	1,2,4,5,10,16,28
13	Knowledge of available resources (e.g., Army Corps charts, Local Notice to Mariners) to obtain latest channel depths and characteristics to ensure safe passage of vessels.	1,3,16,38
14	Knowledge of available resources to determine predicted tides and currents to ensure timely transit.	1,2,4,5,13
15	Knowledge of the effect of environmental factors on tide and current predictions to efficiently carry out transit operations.	1,3,4,5,13,16
17	Knowledge of the effect of various environmental conditions on vessels' ability to ensure timely transit.	1,2,7,11,13,26,42

KSAPC #	KSAPC Statement	Linking Task #
	Geographic Conditions	
19	Knowledge of bridge clearances and configurations to avoid allision.	5,10,11,15,35
20	Ability to identify and interpret information from charts to ensure safe transit.	4,5,9,16,33,38
21	Knowledge of various types of port configurations and channels (e.g., turning basins, overhead structures) to ensure safe passage.	1,3,5,7,9,10,11,12,16, 30,38
	Vessel Capabilities	
24	Knowledge of the effect of vessel speed on squat, heel, and sinkage to determine safe and efficient transit.	1,4,16,26,27,31
25	Knowledge of the effect of vessel's draft and trim on its handling to safely navigate through various water conditions.	10,26,31
26	Knowledge of tugboat characteristics and bollard pull to determine tug effectiveness.	30
27	Knowledge of the effect of environmental conditions on handling techniques of different classes of vessels to ensure safe transit.	1,3,26,34,42
28	Knowledge of the effect of interactions between vessels in close quarters to prevent damage.	8,34,35
29	Knowledge of various types of vessel maneuvering characteristics for effective shiphandling.	10,11,26,27
	Transit Planning	
32	Ability to identify potential conflicts (e.g., vessel traffic, debris, current change, tide levels) on transit routes to ensure safe passage.	1,2,3,4,5,7,10,11,12,13, 15,32,34,35,42,45
34	Ability to coordinate meeting location, availability, et cetera with assigned tugboats for effective use.	1,11,12,18,23,28,30
35	Knowledge of underkeel clearance, and its effect on the vessel in various locations along route, to ensure safe passage.	1,4,10,16,38
36	Knowledge of factors (e.g., environment, traffic, geographic conditions) that affect reliability of estimated times of arrival when meeting other vessels.	1,2,3,7,8,10,11,13,16, 21,25,26,28,31,33,42
	***(Bridge and Vessel)* Equipment**	
37	Knowledge of various types of equipment (e.g., rudder, bitt [strength], thruster) necessary to ensure safe transit operations.	6,10,15,22,37,39
38	Knowledge of use and limitations of various shipboard navigational equipment and radar systems for vessel maneuvering and collision avoidance.	6,32,33,34,35

KSAPC #	KSAPC Statement	Linking Task #
	Communication	
39	Ability to communicate in standard nautical terminology with shore-based support systems, bridge-to-bridge, and working channels to comply with protocols and procedures.	14,15,16,17,18,19,20, 21,22,23,25,44
40	Ability to communicate with Vessel Traffic Service to ensure safe navigation.	2,19,25,41
43	Ability to read written documents of varying complexity including departmental policy, manuals, and guides to comprehend and communicate information to others.	3,13,15,18,33
	Vessel Characteristics	
45	Knowledge of different tugboat characteristics to determine their suitability for specific tasks.	30
47	Ability to interpret and interpolate draft mark readings to adjust shiphandling techniques accordingly.	4,5,10,34
49	Ability to determine information about vessel maneuvering limitations, special requirements, and unusual characteristics to ensure effective shiphandling.	3,10,11,14,15,26,27, 28,30
	Shiphandling	
50	Ability to adjust maneuvering techniques based on vessel's type and size to ensure efficient shiphandling.	10,11,15,26,27,30
52	Knowledge of hydrodynamic forces in narrow channels and shallow water to appropriately maneuver vessel in challenging conditions.	1,2,4,5,10,11,16,26,27, 31,34
53	Knowledge of vessel's wake effect to reduce negative effects on surrounding environments.	2,10,11,31,34,40
54	Ability to properly maneuver the vessel under changing channel configurations to ensure safe passage.	1,2,3,7,8,10,11,26,28, 34,40
55	Ability to safely handle the vessel depending on changing vessel factors (e.g., underkeel clearance, heel) for effective maneuvering.	1,4,10,11,26,27,42,45
56	Knowledge of the implications caused by vessels' speed relative to engine speed for effective shiphandling.	10,11,26,27,28,31,34
57	Knowledge of factors that affect pivot point to adjust shiphandling.	10,15,26,27,29,31
	Traffic Management	
59	Knowledge of factors (e.g., weather, traffic, geographic conditions) constraining other vessels' transit to plan transit operations accordingly.	1,2,3,7,8,10,11,12,13, 20,25,32,33
61	Knowledge of water depths and configurations in bays, channels, rivers, harbors, and anchorages, and their effects on navigation to manage transit planning accordingly.	1,2,3,7,10,16
62	Ability to properly apply Rules of the Road and/or Vessel Traffic Service regulations to ensure safe transit.	8,10,11,12,20,32,41,42

KSAPC #	KSAPC Statement	Linking Task #
	Anchorage	
63	Knowledge of factors that affect anchoring of a vessel to ensure its safety.	1,2,3,4,8,10,13,16,17, 19,22,26,27,28,31,33, 38,42,43,46
65	Ability to assess potential hazards at local anchorages to ensure safety of vessel.	1,2,3,4,8,11,13,19,25, 28,32,34,35,38,39,42,45
66	Ability to carry out anchoring procedures while vessel is moving, mooring, or in emergency situations to ensure vessel safety.	3,8,10,11,15,22,26,27, 30,31,33,38,40,43,44
67	Knowledge of various navigation techniques to precisely anchor a vessel under various conditions.	2,10,13,15,27,31,33,38
	Docking and Undocking	
68	Knowledge of acceptable protocol and etiquette for radio communication to ensure proper docking and undocking of vessel.	1,20,23,24,37,46
69	Knowledge of the effect of existing traffic conditions on departure/arrival times to ensure safe transit.	1,3,7,8,11,12,16,19,20, 23,25,28
70	Knowledge of capabilities and limitations of different types of tugboats to safely dock and undock the vessel.	3,10,18,24,30,31
73	Knowledge of various methods to determine distances, speed, and position of own vessel and of vessels in close proximity.	1,8,19,20,32,33,34,42
74	Knowledge of environmental conditions (e.g., current, wind) for approach to berth in order to safely dock and undock vessel.	2,3,13,16,26,29,30,31, 39,42,45
	Situational Awareness	
75	Ability to strategize and prioritize information from multiple sources to carry out transit operations in a timely manner.	1,2,3,8,12,15,17,18,19, 20,21,22,23,24,25,26, 27,28,29,30,31,32,33, 34,35,36,37,38,39,40, 41,42,43,44,45,46
76	Ability to perform multiple tasks simultaneously when responding to unfolding events to ensure a safe transit.	1,2,3,7,8,9,10,11,12,13, 15,16,17,20,25,26,27, 28,30,32,33,34,35,36, 37,40,41,42,43,44,45,46
77	Ability to adapt to sudden changing conditions (e.g., environmental, mechanical) in order to ensure vessel safety.	1,2,3,4,5,6,7,8,9,11,12, 17,20,25,26,27,28,29, 30,31,32,34,35,40,41, 42,43,44,45,46
78	Ability to observe actions and/or response of others to ensure compliance with orders.	6,7,8,17,22,24,32,33,37, 40,41,42,43,44,45,46

KSAPC #	KSAPC Statement	Linking Task #
79	Ability to follow up with others (e.g., personnel, vessels) to ensure predetermined arrangements are carried out.	6,7,8,17,22,24,32,33,37, 40,41,42,43,44,45,46
80	Ability to choose and take the appropriate course of action to mitigate an unforeseen event or hazard.	1,2,6,8,10,11,16,17,19, 20,25,26,27,28,32,34, 35,40,41,42,43,44,45,46
81	Ability to apply past experiences to present or future circumstances to ensure mistakes are not repeated.	1,2,6,8,10,11,16,17,19, 20,25,26,27,28,32,34, 35,40,41,42,43,44,45,46
82	Ability to assess crew's effectiveness in responding to pilot's orders to ensure safe vessel transit.	6,16,17,22,24,26,27,33, 37,40,41,42,43,44,45,46
	Personal Characteristics	
83	Ability to safely embark/disembark a pilot ladder to prevent injuries.	8,22,23,26,32,34,40,43
84	Ability to work in a team environment in order to facilitate transits.	6,14,15,16,17,20,22,24, 37,43,44
85	Willingness to stand for long periods of time.	1,2,3,4,5,6,7,8,9,10,11, 12,13,14,15,16,17,18, 19,20,21,22,23,24,25, 26,27,28,29,30,31,32, 33,34,35,36,37,38,39, 40,41,42,43,44,45,46, 47,48,49,50,51,52,53, 54,55,56,57,58,59,60, 61,62,63,64,65,66,67, 68,69,70,71,72,73,74, 75,76,77,78,79,80,81, 82,83,84,85,86,87
86	Willingness to work a flexible schedule (i.e., on call for 24 hours a day, 365 days a year).	1,2,3,4,5,6,7,8,9,10,11, 12,13,14,15,16,17,18, 19,20,21,22,23,24,25, 26,27,28,29,30,31,32, 33,34,35,36,37,38,39, 40,41,42,43,44,45,46, 47,48,49,50,51,52,53, 54,55,56,57,58,59,60, 61,62,63,64,65,66,67, 68,69,70,71,72,73,74, 75,76,77,78,79,80,81, 82,83,84,85,86,87

KSAPC #	KSAPC Statement	Linking Task #
87	Willingness to work in adverse weather conditions (e.g., rough sea conditions, wind, sun, heat, rain) to complete assigned job tasks.	1,2,3,4,5,6,7,8,9,10,11, 12,13,14,15,16,17,18, 19,20,21,22,23,24,25, 26,27,28,29,30,31,32, 33,34,35,36,37,38,39, 40,41,42,43,44,45,46, 47,48,49,50,51,52,53, 54,55,56,57,58,59,60, 61,62,63,64,65,66,67, 68,69,70,71,72,73,74, 75,76,77,78,79,80,81, 82,83,84,85,86,87

APPENDIX I: Selection Options Matrix

BAR PILOT

KSAPC #	Importance Rating	KSAPC Statement	Training & Experience Assessment	Written Test	Structured Interview	Work Sample/ Performance Test	Situational Judgment Test
		Technical					
1	2.97	Knowledge of applicable guidelines or standards (e.g., Regulated Navigation Areas, speed limits, Rules of the Road, escort regulations) as they relate to maritime operations safety.		X	X	X	
2	3.24	Knowledge of shiphandling principles and methods to carry out safe and efficient transit operations.	X	X	X	X	
3	2.51	Knowledge of vessel movement operational guidelines to ensure compliance and safe piloting.	X	X	X	X	
4	2.70	Knowledge of the basic principles of physics (e.g., hydrodynamics) to assess the effect of external conditions on vessels and the vessels' effect on surroundings.	X	X	X	X	
5	2.41	Ability to operate specialized global positioning and tracking technology (e.g., Electronic Chart Display, Automatic Radar Plotting Aid) to ensure safe transit.	X	X	X	X	
6	3.16	Ability to read and interpret charts/soundings in order to determine conditions and navigate waterways safely.		X	X	X	
7	2.46	Ability to perform mathematical calculations (e.g., basic algebra) to effectively navigate vessels safely in various geographic and environmental conditions.		X	X	X	
8	2.51	Ability to coordinate and cooperate with Bridge Team to ensure effective transit operations.	X	X	X	X	

KSAPC #	Importance Rating	KSAPC Statement	Training & Experience Assessment	Written Test	Structured Interview	Work Sample/ Performance Test	Situational Judgment Test
9	2.03	Knowledge of crew responsibilities on various vessels to carry out timely transit operations.		X	X	X	
10	3.30	Ability to coordinate passing arrangements with other vessels with regards to your own vessel limitations.	X	X	X	X	
		Environment					
12	2.41	Knowledge of the effects of salinity on vessels' draft to allow for safe underkeel clearance.		X	X	X	
13	2.78	Knowledge of available resources (e.g., Army Corps charts, Local Notice to Mariners) to obtain latest channel depths and characteristics to ensure safe passage of vessels.		X	X	X	
14	3.11	Knowledge of available resources to determine predicted tides and currents to ensure timely transit.		X	X	X	
15	2.57	Knowledge of the effect of environmental factors on tide and current predictions to efficiently carry out transit operations.		X	X	X	
17	2.54	Knowledge of the effect of various environmental conditions on vessels' ability to ensure timely transit.		X	X	X	
		Geographic Conditions					
19	3.38	Knowledge of bridge clearances and configurations to avoid allision.		X	X	X	
20	3.14	Ability to identify and interpret information from charts to ensure safe transit.	X	X	X	X	
21	3.05	Knowledge of various types of port configurations and channels (e.g., turning basins, overhead structures) to ensure safe passage.		X	X	X	
		Vessel Capabilities					
24	3.03	Knowledge of the effect of vessel speed on squat, heel, and sinkage to determine safe and efficient transit.		X	X	X	

KSAPC #	Importance Rating	KSAPC Statement	Training & Experience Assessment	Written Test	Structured Interview	Work Sample/ Performance Test	Situational Judgment Test
25	2.89	Knowledge of the effect of vessel's draft and trim on its handling to safely navigate through various water conditions.		X	X	X	
26	2.95	Knowledge of tugboat characteristics and bollard pull to determine tug effectiveness.	X	X	X	X	
27	2.81	Knowledge of the effect of environmental conditions on handling techniques of different classes of vessels to ensure safe transit.		X	X	X	
28	3.05	Knowledge of the effect of interactions between vessels in close quarters to prevent damage.		X	X	X	
29	2.84	Knowledge of various types of vessel maneuvering characteristics for effective shiphandling.	X	X	X	X	
		Transit Planning					
32	3.11	Ability to identify potential conflicts (e.g., vessel traffic, debris, current change, tide levels) on transit routes to ensure safe passage.	X	X	X	X	X
34	3.03	Ability to coordinate (i.e., meeting location, availability) with assigned tugs for effective use.	X	X	X	X	
35	3.30	Knowledge of underkeel clearance and its effect on the vessel in various locations along route to ensure safe passage.		X	X	X	
36	2.84	Knowledge of factors (e.g., environment, traffic, geographic conditions) that affect reliability of estimated times of arrival when meeting other vessels.		X	X	X	
		***(Bridge and Vessel)* Equipment**					
37	2.89	Knowledge of various types of equipment (e.g., rudder, bitt [strength], thruster) necessary to ensure safe transit operations.		X	X	X	
38	2.97	Knowledge of use and limitations of various shipboard navigational equipment and radar systems for vessel maneuvering and collision avoidance.	X	X	X	X	

KSAPC #	Importance Rating	KSAPC Statement	Training & Experience Assessment	Written Test	Structured Interview	Work Sample/ Performance Test	Situational Judgment Test
		Communication					
39	2.86	Ability to communicate in standard nautical terminology with shore-based support systems, bridge-to-bridge, and working channels to comply with protocols and procedures.	X	X	X	X	
40	2.84	Ability to communicate with Vessel Traffic Service to ensure safe navigation.	X	X	X	X	
43	2.14	Ability to read written documents of varying complexity including departmental policy, manuals, and guides to comprehend and communicate information to others.	X	X	X	X	
		Vessel Characteristics					
45	2.92	Knowledge of different tugboat characteristics to determine their suitability for specific tasks.		X	X	X	
47	2.46	Ability to interpret and interpolate draft mark readings to adjust shiphandling techniques accordingly.	X	X	X	X	
49	2.57	Ability to determine information about vessel maneuvering limitations, special requirements, and unusual characteristics to ensure effective shiphandling.		X	X	X	
		Shiphandling					
50	2.95	Ability to adjust maneuvering techniques based on vessel's type and size to ensure efficient shiphandling.	X	X	X	X	X
52	3.08	Knowledge of hydrodynamic forces in narrow channels and shallow water to appropriately maneuver vessel in challenging conditions.		X	X	X	
53	2.68	Knowledge of vessel's wake effect to reduce negative effects on surrounding environments.		X	X	X	
54	3.03	Ability to properly maneuver the vessel under changing channel configurations to ensure safe passage.	X	X	X	X	

KSAPC #	Importance Rating	KSAPC Statement	Training & Experience Assessment	Written Test	Structured Interview	Work Sample/ Performance Test	Situational Judgment Test
55	2.89	Ability to safely handle the vessel depending on changing vessel factors (e.g., underkeel clearance, heel) for effective maneuvering.	X	X	X	X	
56	3.05	Knowledge of the implications caused by vessels' speed relative to engine speed for effective shiphandling.		X	X	X	
57	3.05	Knowledge of factors that affect pivot point to adjust shiphandling.		X	X	X	
		Traffic Management					
59	2.59	Knowledge of factors (e.g., weather, traffic, geographic conditions) constraining other vessels' transit to plan transit operations accordingly.		X	X	X	X
61	3.30	Knowledge of water depths and configurations in bays, channels, rivers, harbors, and anchorages, and their effects on navigation to manage transit planning accordingly.		X	X	X	
62	3.08	Ability to properly apply Rules of the Road and/or Vessel Traffic Service regulations to ensure safe transit.		X	X	X	
		Anchorage					
63	2.81	Knowledge of factors that affect anchoring of a vessel to ensure its safety.		X	X	X	
65	2.73	Ability to assess potential hazards at local anchorages to ensure safety of vessel.		X	X	X	X
66	3.24	Ability to carry out anchoring procedures while vessel is moving, mooring, or in emergency situations to ensure vessel safety.	X	X	X	X	
67	2.86	Knowledge of various navigation techniques to precisely anchor a vessel under various conditions.	X	X	X	X	
		Docking and Undocking					
68	2.49	Knowledge of acceptable protocol and etiquette for radio communication to ensure proper docking and undocking of vessel.		X	X	X	

KSAPC #	Importance Rating	KSAPC Statement	Training & Experience Assessment	Written Test	Structured Interview	Work Sample/ Performance Test	Situational Judgment Test
69	2.81	Knowledge of the effect of existing traffic conditions on departure/arrival times to ensure safe transit.		X	X	X	
70	3.00	Knowledge of capabilities and limitations of different types of tugboats to safely dock and undock the vessel.		X	X	X	
73	3.11	Knowledge of various methods to determine distances, speed, and position of own vessel and of vessels in close proximity.		X	X	X	
74	3.30	Knowledge of environmental conditions (e.g., current, wind) for approach to berth in order to safely dock and undock vessel.		X	X	X	
		Situational Awareness					
75	3.11	Ability to strategize and prioritize information from multiple sources to carry out transit operations in a timely manner.	X	X	X	X	
76	3.35	Ability to perform multiple tasks simultaneously when responding to unfolding events to ensure a safe transit.	X	X	X	X	
77	3.49	Ability to adapt to sudden changing conditions (e.g., environmental, mechanical) in order to ensure vessel safety.	X	X	X	X	X
78	3.03	Ability to observe actions and/or response of others to ensure compliance with orders.	X	X	X	X	
79	2.76	Ability to follow up with others (e.g., personnel, vessels) to ensure predetermined arrangements are carried out.	X	X	X	X	
80	3.32	Ability to choose and take the appropriate course of action to mitigate an unforeseen event or hazard.	X	X	X	X	X
81	3.19	Ability to apply past experiences to present or future circumstances to ensure mistakes are not repeated.		X	X	X	X
82	3.05	Ability to assess crew's effectiveness in responding to pilot's orders to ensure safe vessel transit.	X	X	X	X	
		Personal Characteristics					
83	3.49	Ability to safely embark/disembark a pilot ladder to prevent injuries.	X		X	X	

KSAPC #	Importance Rating	KSAPC Statement	Training & Experience Assessment	Written Test	Structured Interview	Work Sample/ Performance Test	Situational Judgment Test
84	2.54	Ability to work in a team environment in order to facilitate transits.	X		X	X	
85	2.86	Willingness to stand for long periods of time.	X			X	
86	3.03	Willingness to work a flexible schedule (i.e., on call for 24 hours a day, 365 days a year).	X		X	X	
87	3.46	Willingness to work in adverse weather conditions (e.g., rough sea conditions, wind, sun, heat, rain) to complete assigned job tasks.	X			X	