



## Practice Analysis (2019)

## Technical Report Summary

Overhead Crane Certified Operator (OCCO) Program





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# Technical Report Summary

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## Background

The mission of the Carpenters International Training Fund (CITF) is to provide quality training for union members of the United Brotherhood of Carpenters and Joiners of America (UBC). The CITF has designated the Carpenters International Certification Council (CICC) as a strategic partner to develop and manage certification programs targeted to UBC members. The mission of the CICC is to improve performance, reduce workplace risk, and safeguard personnel by overseeing that only trained, skilled and qualified individuals complete the work. CPS HR worked with the CICC to conduct a practice analysis study to provide content validation for the Overhead Crane Certified Operator (OCCO) program.

## Methodology

A panel-based practice analysis strategy was originally implemented as it was thought to be the most appropriate approach considering research supports the use of SME panels because they provide the opportunity for fruitful discussion that simply is not possible with questionnaire responses and that results from a panel-based practice analysis tend to yield similar results to a more extensive practice analysis survey methodology (Ash, Levine, Higbee, & Sistrunk, 1982; O'Leary, Rheinstien, & McCauley, 1990; Tannenbaum & Wesley, 1993).

Therefore, in November 2018, a literature review was conducted, and a preliminary list of task statements, as well as knowledge and skill (KS) statements were developed. During in-person meetings in November 2018, a representative panel of overhead crane subject matter experts (SMEs) evaluated the draft list of task and KS statements, provided ratings for the list of finalized task and KS statements, and then participated in a linkage activity.

Later in November 2021 it was decided that it would be prudent to conduct a practice analysis survey after all. Accordingly, a practice analysis survey was distributed to job incumbents with the aim to confirm the SMEs' panel derived practice analysis results or identify potential issues and omissions from the panel-based discussions. The on-line survey consisted of three main parts. The first section contained demographic questions (e.g., location, age, tenure). In the second section, incumbents were asked to rate their job tasks on two scales (i.e., Importance and Frequency; see Figure 1 below).

Use of these scales were used to ensure that tasks that are highly important to the job but performed infrequently are not overlooked nor omitted. Similarly, in the third section, incumbents were asked to rate the KS statements on two scales (i.e., Importance and Needed for Certification; see Figure 1 below). As the on-line survey was designed to help assess the validity of Study 1, the statements from the SME group were utilized in sections two and three. Finally, at the end of both sections two and three, incumbents were provided with an open response box and asked to add any important tasks (or KSs, respectively) that were omitted. The survey results are discussed in more detail later of this report.

Importance	Frequency (in the last year)	Needed at time of Certification
<ul style="list-style-type: none"> <li>• 0 = Not Important</li> <li>• 1 = Somewhat Important</li> <li>• 2 = Important</li> <li>• 3 = Very Important</li> </ul>	<ul style="list-style-type: none"> <li>• 0 = Never</li> <li>• 1 = At least once</li> <li>• 2 = Monthly</li> <li>• 3 = Weekly</li> <li>• 4 = Daily</li> <li>• 5 = Hourly</li> </ul>	<ul style="list-style-type: none"> <li>• 0 = Not needed at time of certification</li> <li>• 1 = Needed at time of certification</li> </ul>

Figure 1. Practice Analysis Survey Rating Scales

The practice analysis study described in this report was designed to meet the requirements of all relevant professional and legal guidelines, i.e., the *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014), the *Principles for the Validation and Use of Personnel Selection Procedures* (Society for Industrial and Organizational Psychology, Inc., 2018), and the *Uniform Guidelines on Employee Selection Procedures* (Federal Register, 1978) and the *National Commission for Certifying Agencies (NCCA) Standards for the Accreditation of Certification Programs* (ICE, 2021).

## Task and KS Development

A comprehensive literature review was conducted to acquire information that would form the foundation for the practice analysis. Information was gathered from industry-recognized manuals, references, and handbooks to develop a preliminary list of task statements as well as knowledge and skill statements that were grouped according to similarity. The draft task and KS statements were presented on worksheets for the SMEs to review individually prior to group discussion. The SMEs individually and as a group reviewed task and KS statements for relevance, accuracy and clarity, appropriate terminology, completeness, inclusion of all general aspects of the job, inconsistencies, and redundancy. The review of task and KS statements activity continued until the participants felt that the list of statements represented an accurate and comprehensive list of the knowledge and skills that might be needed to perform the job tasks of an overhead crane operator.

## Knowledge and Skills to Job Dimension Linkage

SMEs linked KS statements to job dimensions, which corresponded to the lowest level of categorization of the behavioral job domains. The SMEs as a group evaluated a given KS statement in terms of its importance to a given job dimension using a linkage worksheet. For each of the 460 ratings, a CPS HR Consultant tallied the number of linkage ratings that SMEs rated as 1. All of the KS statements were linked to at least one of the job dimensions, and all of the job dimensions had at least one of the KS statements linked to it.

## Survey Results

In total, 47 individuals began the OCCO job analysis survey, and usable data for each task and KS rating was obtained from up to 39 respondents (minimum N due to listwise deletion = 36). The data were analyzed to discern the degree to which the survey results support the panel derived job analysis results. Responses were analyzed using the following inclusion/retention criteria, for a task to be retained, both of the following criteria had to be met: (1) at least 60% of the respondents had to indicate that the task is performed or is part of the job (i.e., assign a task Frequency rating of 1 or greater), and (2) the mean Importance rating had to be at least 1.50, which is the midpoint of the rating scale (see below for all scales used).

Analysis of the JA survey data shows that all 10 tasks were rated as being performed more frequently than weekly (mean = 3.45, average SD = 1.30; see below for all scales used), and all 10 tasks were reported as being Important to Very Important (mean = 2.79, average SD = .49). In like manner, all KS Statements were also endorsed as important (mean = 2.67, average SD = .52) and Needed at Time of Certification (mean = .85, average SD = .31). Given the overwhelming support afforded to the Panel based JA by these survey respondents, SMEs concluded that the practice analysis has sufficient validation evidence and is appropriate for use in certifying Overhead Crane Operators.

## Exam Plan Development

The practice analysis data was used to develop a test plan for the OCCO written exam. The CPS HR project consultant calculated the preliminary OCCO test plan, which consisted of estimated weights for each of the practice analysis job dimensions based on the practice analysis and linkage data. Specifically, the test plan weights were based on the number of linkages between the job dimension and knowledge and skill statement rated as important, needed upon completion of the certificate program, and appropriate to test in a multiple-choice format. The rationale for this is that the critical knowledge and skills from the practice analysis that are needed to perform the job dimensions should be more important to measure in the examination than those that are used less frequently in performing important job duties.

Next, during an in-person meeting, a CPS HR Consultant facilitated a discussion and review among a CICC representative and ten SMEs of the quantitatively-derived linkage weights in order to obtain rational feedback and judgments from the SMEs to guide the final decisions regarding the exam plan. This discussion was necessary to ensure the exam plan made sense and was appropriate to cover the content of the job of an OCCO. It is important to include enough items in each subscale to ensure adequate reliability and to make sure that important test content is being adequately addressed according to the structure of the test. With this in mind, the SMEs determined that 80 items were necessary for the OCCO exam. The participating SMEs slightly changed the number of items in each section to increase statistical reliability and improve content coverage. For example, as many general safety and operating practices are included in other aspects of the test (e.g., daily inspections, lift), the total number of items in Category D was limited to 15 items. The final weights assigned to the sub-dimensions for the OCCO exam is presented in Table 1.

**Table 1. Final OCCO Examination Plan**

Dimension	OCCO	
	Competency Weight	Number of Items
<b>A. Pre-Job Inspection</b>	<b>0.200</b>	<b>20</b>
A1. Daily Inspection	0.195	18
A2. Periodic Inspection	0.008	2
<b>B. Crane Operations</b>	<b>0.266</b>	<b>21</b>
B1. Lift	0.156	17
B2. Post-lift	0.109	4
<b>C. Crane Components</b>	<b>0.281</b>	<b>24</b>
C1. Crane Types	0.102	4
C2. Parts of Crane	0.109	15
C3. Hoist Assembly	0.070	5
<b>D. General Safety &amp; Operating Practices</b>	<b>0.250</b>	<b>15</b>
D1. Communication	0.086	5
D2. Site Conditions	0.070	2
D3. Stop & Shutdown	0.047	3
D4. Rules & Regulations	0.047	5
<b>Total</b>	<b>100</b>	<b>80</b>

## Exam Plan Revision

During a recent in-person meeting in December 2025, the OCCO SMEs engaged in a comprehensive discussion that the length and complexity of the OCCO examination should be proportionate to the role’s functional scope. Because the OCCO position involves routine tasks, standardized procedures, and limited independent judgment, it was determined that a reduced number of exam questions would more adequately evaluate job-related knowledge while also providing appropriate reliability and content coverage. As a result of this discussion, the SMEs decided the number of scored items on the OCCO exam should be reduced from 80 to 65, while maintaining the original competency weighting derived from the 2019 job analysis. In addition, the SMEs determined that there should be 15 total experimental items. The fifteen items were not specifically assigned to one of the four categories, allowing the items to be selected from any category. This results in total of 80 items on the OCCO test (65 scored and 15 non-scored), which remains aligned with the original thoughts from the 2019 job analysis panel that 80 questions are appropriate for content domain coverage. Table 2 on the following page displays the final weights assigned to each sub-dimension.

**Table 2. Revised OCCO Examination Plan**

Dimension	OCCO	
	Competency Weight	Number of Items
<b>A. Pre-Job Inspection</b>	<b>0.200</b>	<b>17</b>
A1. Daily Inspection	0.195	15
A2. Periodic Inspection	0.008	2
<b>B. Crane Operations</b>	<b>0.266</b>	<b>17</b>
B1. Lift	0.156	14
B2. Post-lift	0.109	3
<b>C. Crane Components</b>	<b>0.281</b>	<b>19</b>
C1. Crane Types	0.102	3
C2. Parts of Crane	0.109	12
C3. Hoist Assembly	0.070	4
<b>D. General Safety &amp; Operating Practices</b>	<b>0.250</b>	<b>12</b>
D1. Communication	0.086	4
D2. Site Conditions	0.070	2
D3. Stop & Shutdown	0.047	2
D4. Rules & Regulations	0.047	4
<b>Total</b>	<b>100</b>	<b>65</b>

## Conclusion

This technical report documents the practice analysis study, including the task and KS review, ratings, and linkage results and examination plan development for the OCCO examination. The practice analysis and test plan development process described in this report complies with all relevant professional and legal guidelines.

The practice analysis study included extensive SME involvement during all stages. CPS HR project staff reviewed relevant literature and worked comprehensively with SMEs to develop the tasks, knowledge, and skills required to perform the job duties of a building envelope professional. The linkage analysis was facilitated by a CPS HR Consultant and conducted by the participating SMEs. The OCCO written examination plan was assembled based on the weightings calculated by the linkages developed from the practice analysis and was then finalized based on SME input and judgments.