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Desirable Characteristics of the Professional Constructor: The Results of the Constructor Certification Skills and Knowledge Survey

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The purpose of this paper is to identify those skills and knowledge that are vital to professional constructors. This was accomplished by means of a statistical review of the Constructor Certification Skills and Knowledge Survey, which was developed by the American Institute of Constructors and the Constructor Certification Commission. Research objectives were as follows: to identify whether the ten Duties outlined in the AIC Constructor Certification Skills and Knowledge Survey are important to professional constructors; and to identify which of the ten Duties are *most* important. Findings indicate that the array of skills and knowledge outlined on the survey are very comprehensive, and that the ten Duties are indeed important to professional constructors. Further, three particular Duties--problem solving, estimating/budgeting, and project management--were found to be the *most* important of all Duties outlined on the survey.

Key Words: American Institute of Constructors, Constructor Certification Commission, Constructor Certification Skills and Knowledge Survey, Professional Certification, Management Characteristics

Introduction

In recent decades, the construction industry has been impacted by constant, and often radical, changes. Rapidly advancing technologies, new forms of contractual relationships, and new methods of project delivery have all served to make construction projects more complex. Additionally, the industry is experiencing such trends as severe shortages in the availability of skilled labor, increases in claims and litigation, and increased competition from international and foreign organizations. At the same time, profit margins and return on investment are minimal. All of this is occurring in an environment where the image of the construction industry and its workers is on the decline.

The industry is highly resource intensive. Effective utilization of labor, material, and equipment are key to the entire construction process. Above all else, a capable management team--with the requisite skills and knowledge--is needed for successful performance and delivery of projects.

Considering this, one might be inclined to ask, what are these "requisite skills and knowledge"? What abilities are required of administrative and management level employees in the construction industry? Helping to address these questions is the purpose of the research reported here.

For nearly 25 years, the American Institute of Constructors (AIC) has promoted the management of the construction process as a professional discipline that complements the design professions of architecture and engineering. In 1993, along with ten other trade and professional associations, the AIC helped to form the Constructor Certification Commission (CCC) with the expressed purpose of developing and administering a valid set of professional certification examinations for professional constructors. Certification of practitioners--along with an identifiable body of knowledge, a code of professional ethics, and a learned society--are considered to be the central tenants of professionalism in any discipline.

How, then, might one go about identifying those skills and knowledge which professional constructors use to perform their work? This was the dilemma faced by the CCC at the start of the certification effort. To help address this question, a comprehensive survey instrument was developed and administered by the Commission. This survey was designed to measure the perception of practitioners relative to an extensive list of abilities that might be required of constructors. During the past year, over 200 respondents have completed this instrument.

Beyond the completion of the survey instrument, progress continues on other steps necessary to complete the examinations. At this point, the examination specifications have been written and are now being revised. Plans are in place for a two level exam with Level 1 designed for recent college graduates and Level 2 for practicing professionals with at least seven years experience. The test items for both sets of examinations are presently being written, with the first round of testing scheduled for November 1996. Proposals for pilot testing of early forms of the examinations are now being considered to ensure validity and consistency of the test items.

The purpose of paper is to report on the results of the comprehensive "Skills and Knowledge Survey" as tabulated by the authors at Colorado State University.

Research Objectives

Based upon the format of this survey instrument, the following research questions were developed:

1. Are the ten "DUTIES" outlined in the AIC Constructor Certification Skills and Knowledge Survey (see Appendix A) perceived as being important to construction professionals?
2. Which of these ten "DUTIES" are perceived to be the most important?

Procedures And Methodology

Instrument Development and Subject Selection

Development of the "Skills and Knowledge Survey" was performed by the American Institute of Constructors and the Constructor Certification Commission. Its form was adapted from surveys

developed by the Chartered Institute of Building in London which certifies managers of construction internationally wherever the British or European system of contracts are used.

The purpose of the survey was to measure the relative importance of ten sets of "Duties" or responsibilities performed by professional managers of the construction process. These ten Duties were comprised of 39 tasks that encompassed a comprehensive list of 257 Performance Criteria or individual skills of the discipline. (See Appendix A for an outline of the survey structure.)

Surveys were distributed to a broad cross-section of construction professionals. Effort was made to distribute the survey nationally. This paper and its findings represent an analysis of the survey data obtained from a usable pool of 206 respondents.

Demographics

The distribution of respondents is shown in Figure 1a &1b. In total, 36 states were represented, with 15 respondents not indicating their state of residence. Respondents were asked to indicate the area of the country in which they work. They were allowed to mark more than one answer, thus the cumulative percentage added up to greater than 100. From the choices provided, the resulting quantities were:

1. Northeast: 12.5%
2. Mid-Atlantic: 6.0%
3. Southeast: 28.3%
4. Midwest: 37.5%
5. South: 10.3%
6. Southwest: 14.1%
7. West: 13.0%
8. Northwest: 3.3%
9. International: 4.9%

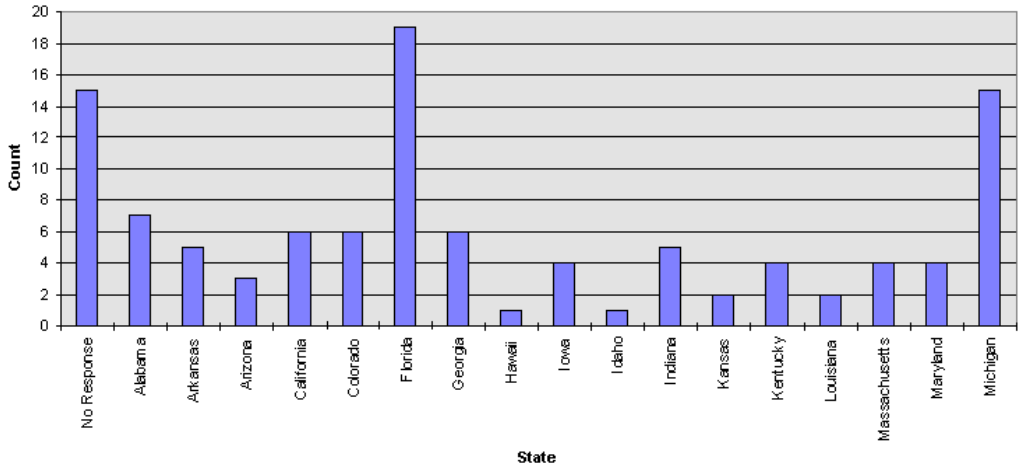

Figure 1a. *Distribution of Respondents by State*.

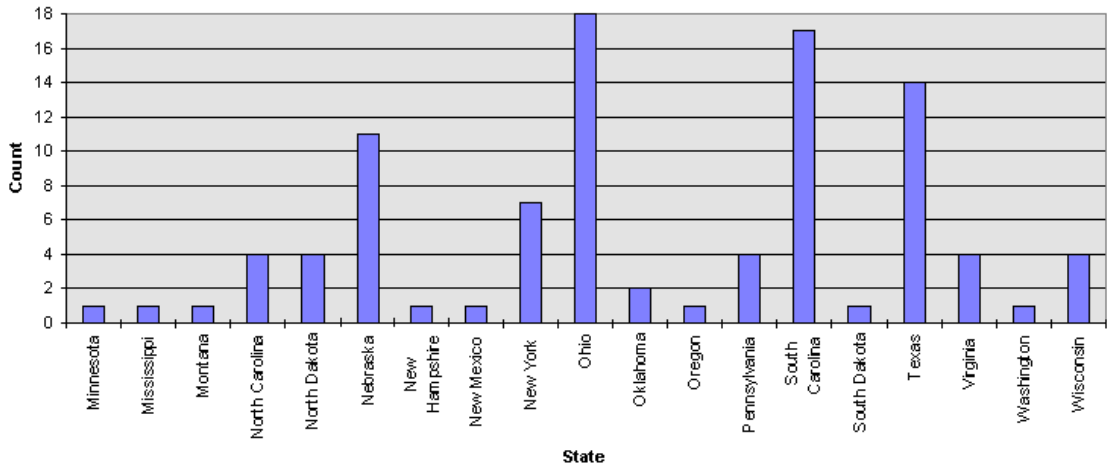

Figure 1b. *Distribution of Respondents by State*.

As shown in Figure 2, the majority of the respondents indicated that they were "General Contractors" (111), with the fewest respondents being "Specialty Contractors" (18). Twenty-seven educators also completed the survey.

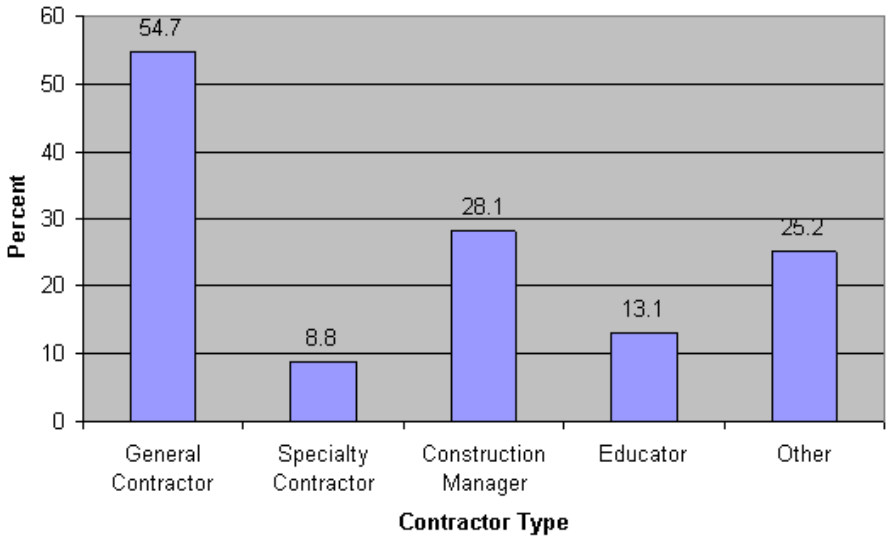

Figure 2. *Contractor Type for Which Respondents Work*.

The respondents were asked to approximate the size of their organization in terms of 1992 annual construction volume. Six different size categories were given as choices. Of the 206 total respondents, 31 did not answer this question. Educators accounted for the majority of non-responses. The resulting percentages were:

Less than $1 million: 5.7%
$1 million-$5 million: 12.0%

$5 million-$20 million: 18.3%
$20 million-$50 million: 17.7%
$50 million-$100 million: 8.6%
Greater than $100 million: 37.7%

The respondents were also asked to indicate what type of experience they have attained in various construction types. Respondents were able to mark all applicable answers, thus, as can be seen in Figure 3, the resulting percentages added up to more than 100. As can be expected, the vast majorities of the respondents have worked or are working in four construction types:

Residential: 99 respondents
Commercial: 170 respondents
Institutional: 166 respondents
Industrial: 132 respondents

An "Other" category was provided, and 25 respondents indicated that they have experience in construction types not listed in the survey.

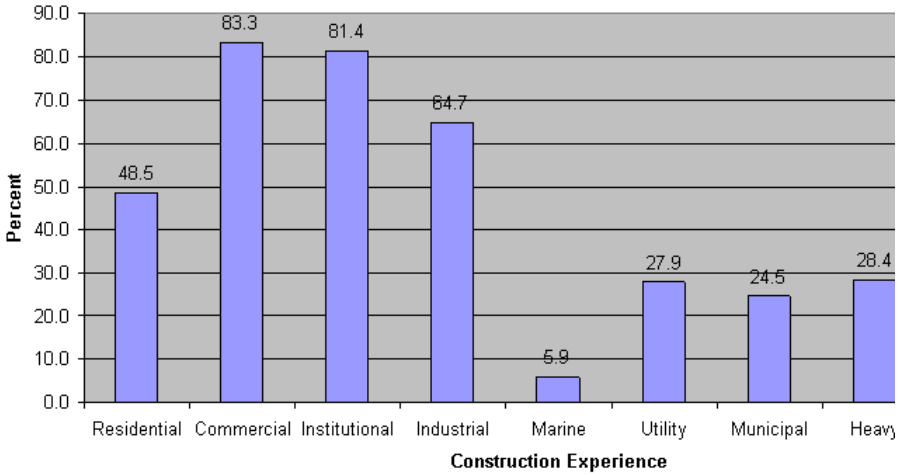

Figure 3. *Construction Experience of Respondents.*

Forty-one of the respondents fell between the ages of 41 and 45 and the remaining respondents were well distributed around this mode (see Figure 4). The vast majority of the respondents were male (97.6%), and Caucasian (98%). About one-half of the respondents had obtained a Bachelors degree (102). Program types for all higher degree categories (Associates, Bachelors, Masters, Doctorate) indicated that 74 respondents had obtained a degree in construction management or a related field. Some other program types represented were civil engineering (34 respondents), architecture (7 respondents), architectural engineering (5 respondents), and business/accounting/finance (18 respondents).

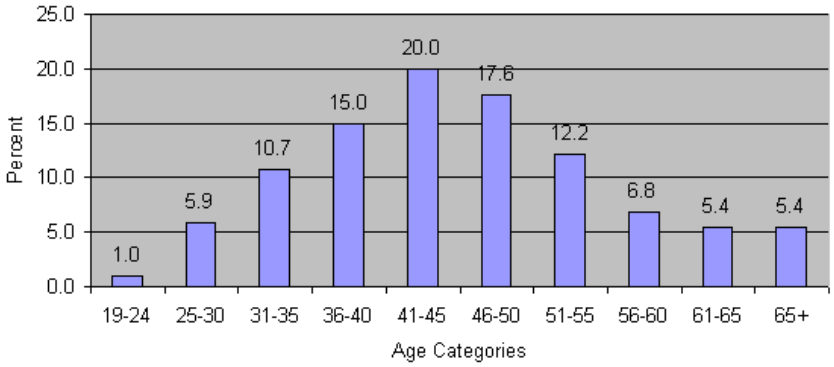

Figure 4. *Age Distribution of Respondents.*

Survey Format

The total survey consisted of several "forms" or sections. The first survey form dealt with various demographic issues, and the results from this form are presented above. The second survey form was the most significant. This form is known as the "Skills and Knowledge Instrument Validation Form,". For each of the 257 Performance Criteria, respondents were asked to indicate an answer to the following four questions:

1. Is the performance criterion relevant to the job you now perform? (Yes or No)
2. How critical do you feel the criterion is, as compared to the other criteria in this task, to the successful completion of a project? (Responses indicated on a five-point Likert Scale)
3. Are you now performing or have you ever performed this criterion? (Yes or No)
4. At what level are you now performing the criterion? (Capability or Understanding or Awareness)
5. The results from this survey form are presented in the following section.

Findings

The statistical analyses for the ten Duties are shown in Table 1. Given the process by which the survey was created, it is not surprising that the results indicated an overall positive response to the Duties, Tasks, and Performance Criteria described in the instrument. The design of the survey included only those items that the Commission felt would most likely be representative of the skills and knowledge required of this pool of respondents.

Respondents indicated that all ten Duties were "relevant to the job" they now perform approximately 80% of the time or more. Similar trends were found in the other response categories as well. The large majority of the respondents (68% or more) answered either "Moderately High" or "High" with respect to the criticality of each Duty. The remaining response categories showed that about 80% or more of the respondents "had performed or are presently performing" the Tasks and Criteria within each Duty. Further, about 62% or more of the respondents considered themselves to be performing these Tasks and Criteria at a level of "Capability" rather than "Understanding" or "Awareness".

Table 1

Statistical Summary of Duties

	JOB RELEVANCY		CRITICALITY							PERFORM			SKILL LEVEL			
	YES [1]	NO [2]	LOW [1]	MOD LOW [2]	NEUTRAL [3]	MOD HIGH [4]	HIGH [5]	MEAN	STD DEV	YES [1]	NO [2]	CAP [1]	UNDERST [2]	AWARE [3]	MEAN	STD DEV
Duty I	90.9%	9.1%	1.8%	5.0%	18.1%	30.6%	44.5%	4.108	0.945	94.3%	5.7%	75.9%	17.3%	6.8%	1.308	0.582
Duty II	81.4%	18.6%	3.7%	7.2%	18.1%	27.8%	43.2%	3.994	0.993	80.5%	19.5%	62.1%	24.0%	13.9%	1.519	0.717
Duty III	83.6%	16.4%	2.0%	5.9%	18.5%	30.1%	43.5%	4.071	0.970	83.6%	16.4%	67.4%	22.6%	10.1%	1.428	0.653
Duty IV	83.6%	16.4%	2.1%	6.9%	19.5%	31.0%	40.4%	4.010	0.957	85.6%	14.4%	67.4%	21.5%	11.1%	1.436	0.672
Duty V	79.7%	20.3%	3.1%	7.0%	21.1%	29.5%	39.2%	3.944	0.979	80.0%	20.0%	66.8%	20.1%	13.0%	1.372	0.688
Duty VI	81.5%	18.5%	2.0%	5.7%	18.4%	31.6%	42.4%	4.067	0.947	84.2%	15.8%	66.5%	20.6%	12.9%	1.465	0.683
Duty VII	90.7%	9.3%	0.7%	2.3%	12.2%	27.4%	57.3%	4.381	0.819	94.0%	6.0%	80.7%	11.2%	8.2%	1.276	0.603
Duty VIII	87.2%	12.8%	2.5%	6.0%	18.8%	30.7%	42.1%	4.039	0.979	86.5%	13.6%	73.2%	16.9%	9.9%	1.369	0.637
Duty IX	84.2%	15.8%	3.0%	5.7%	22.5%	33.9%	34.8%	3.916	1.017	79.6%	20.4%	65.1%	24.9%	10.0%	1.450	0.663
Duty X	95.1%	4.9%	1.2%	4.6%	15.9%	33.7%	44.6%	4.157	0.904	96.5%	3.5%	82.4%	12.2%	5.3%	1.229	0.530

To better clarify the results from this extensive survey and to uncover trends in the data, the researchers determined the rank order of the ten Duties for each of the four response categories (job relevancy, criticality, performance, and skill level). These rank orders are summarized in Table 2. The mean rank order for each of the ten Duties across all four of these response categories was then calculated. Based on this calculation, an overall rank order of the Duties was determined as shown in the right hand column of Table 2. The rank order of the Duties, and their associated descriptions, are as follows:

1. Duty X--Solve Problems and Make Decisions
2. Duty VII--Monitor Project Costs
3. Duty I--Plan Project Execution
4. Duty VIII--Create, Maintain and Enhance Effective Working Relationships
5. Duty III--Establish Responsibility for Operations and Communicate Relevant Information
6. Duty IV--Determine and Procure Physical Resources for the Execution of the Project
7. Duty VI--Monitor and Control the Use of Project Resources
8. Duty V--Develop Staffing and Subcontractor Requirements and
9. Duty IX--Develop Teams, Individuals and Staff to Enhance Performance
10. Duty II--Establish and Maintain Systems and Procedures to Operations

Although the survey results indicated that all ten of the Duties were considered to be very important, the summary presented in Table 2 revealed four distinct groupings as distinguished by the mean ranking calculation. In the first grouping, Duties X, VII, and I were ranked by the respondents no lower than first, second, or third in each response category. These rankings, and their resulting mean rankings of 1.25, 2.25, and 2.50 respectively, served to distinguish these three Duties from the rest. The second grouping included only Duty VIII with a mean ranking of 4.50. A third grouping by this analysis included Duties III, IV, and VI. The mean ranking of these three Duties ranged from 5.75 to 7.00. Finally, the fourth grouping included Duties V, IX, and II and included a range of mean rankings from 8.25 to 8.75. While this analysis does not

detract from the importance of any of these Duties, this modified "forced ranking" does provide some insight into the relative importance of these characteristics of professional constructors.

Table 2

Overall Rank Order of Duties

	Job Relevancy	Criticality	Performance	Skill Level	Mean Rank	Overall Rank
FIRST GROUP						
Duty X	1	2	1	1	1.25	1
Duty VII	3	1	3	2	2.25	2
Duty I	2	3	2	3	2.50	3
SECOND GROUP						
Duty VIII	4	6	4	4	4.50	4
THIRD GROUP						
Duty III	6	4	7	6	5.75	5
Duty IV	6	7	5	7	6.25	6
Duty VI	8	5	6	9	7.00	7
FOURTH GROUP						
Duty V	10	9	9	5	8.25	8 (tie)
Duty IX	5	10	10	8	8.25	8 (tie)
Duty II	9	8	8	10	8.75	10

Discussion

The analysis of the results of this "Skills and Knowledge Survey" was designed to answer two research questions:

1. Are the ten "DUTIES" outlined in the AIC Constructor Certification Skills and Knowledge Survey perceived as being important to construction professionals?
2. Which of these ten "DUTIES" are perceived to be the most important?

Table 1 above summarizes the results in order to address the first research question. In general, all ten Duties were found to be:

1. very "job relevant" (79.7% to 95.1% indicating "Yes")
2. "moderately high" to "highly" critical to the "successful completion of a project" (means of 3.916 to 4.381 on a 5-point Likert scale)
3. performed by the great majority of the respondents (79.6% to 96.5% indicating "Yes")
4. performed primarily at the "capability" level (range of 62.1% to 82.4%)

While the results summarized at the Task level rather than at the Duty level were slightly more variable (see Appendix C), similar very positive ranges were reported indicating a high level of importance attached to nearly all 257 Performance Criteria. These data support the conclusion that the first research question--regarding the perception of importance of these ten Duties--was answered positively.

The analysis outlined in Table 2 was designed to address the second research question. With such a high level of support for all ten Duties, it was difficult to conclude from the raw data which of these responsibilities were more important than the others. In order to make this determination, a rank ordering procedure for each of the four response categories was used. The mean rank order of these four categories was used to place each of the ten Duties in one of four groupings:

1. First Group: Duties X, VII, and I
2. Second Group: Duty VIII
3. Third Group: Duties III, IV, and VI
4. Fourth Group: Duties V, IX, and II

This modified "forced ranking" procedure supported a conclusion that the above ranking represents a listing of the Duties in order of perceived importance. The "mean ranks" within each grouping were too similar to conclude that a notable difference existed among the Duties within each group. Differences between each of the four groupings did support the conclusion that Duties in the higher groups were considered to be more important. In answer to the second research question, this pool of respondents indicated that the first group of Duties above was considered to be the most important to successful professional practice.

Applying more general language to each Duty, one can more readily understand how each relates to the operations and management of the construction industry. In rank order, the ten Duties could be rephrased to read:

1. Duty X--Problem Solving
2. Duty VII--Estimating/Budgeting
3. Duty I--Project Management
4. Duty VIII--Work With People
5. Duty III--Organize People
6. Duty IV--Purchasing/Procurement
7. Duty VI--Cost/Schedule Control
8. Duty V--Staffing/Subcontractor Coordination and
9. Duty IX--Teamwork/Professional Development
10. Duty II--Support Operations

What results is a reasonable listing of those aspects of operations and management that parallels the job requirements of a modern construction organization. Considering the skills and knowledge required by such an organization, it is not surprising that the Duties included in the first group--problem solving, estimating/budgeting, and project management--were considered to be the most important. This rephrasing of the Duties may add some degree of content validity to these findings.

Areas of Future Research

Given the size of the database obtained from the Skills and Knowledge Survey--over 1200 items of information were collected from each respondent--there is great potential for additional research to be conducted on related topics. The following suggestions provide some direction to this future research.

Beyond an overall evaluation of the pool of raw data, several more detailed analyses might be conducted. Similar analyses could be done in an effort to compare responses among different groups of respondents. Those groups could be distinguished by:

1. the geographic region in which the respondents reside or work
2. the type of construction experience which they possess
3. the size of the company for which they work
4. the types of contractors for which they work (General Contractor, Specialty Contractor, etc.)

Such analyses should seek to identify any significant differences in the perceptions of required skills and knowledge when comparing one group of respondents to another.

As a necessary part of ensuring the quality of the entire certification process, the examinations must be tested for proper validity and reliability. It has been proposed that formalized pilot testing of both levels of the certification examinations be conducted prior to administering the first round examinations in November 1996. The primary objective of this pilot testing should be a determination of overall quality of the examinations as a valid measure of the requisite skills and knowledge to manage the construction process.

Upon completion of the first round examination series, a detailed item analysis of the examinations should be conducted. This analysis should review the results of each examination to ensure that each exam question is valid with respect to the overall objectives of the professional process. Doing so should give the Constructor Certification Commission the ability to evaluate both levels of certification examinations and update them where necessary.

All of the above research is intended to be additive in nature. In this way, each level of research or analysis will expand upon all former levels. The goal of this research has been to measure the perceptions of industry practitioners in an effort to establish the importance of those skills and knowledge outlined by the Constructor Certification Commission. Using these skills and knowledge to develop a series of certification examinations should provide the industry with something yet unknown--a tool that will allow for the elevation of standards in the industry to truly professional levels.

APPENDIX A

AIC Constructor Certification Skills and Knowledge Survey--Outline of Duties & Tasks
**NOTE: all Roman Numerals = "DUTY" (10 total)*
**NOTE: all letters = "TASK" (39 total)*

I. Plan Project Execution
  i. Identify & obtain relevant information to plan the project
  ii. Plan the Project
  iii. Estimate and schedule the project

II. Establish and Maintain Systems and Procedures to Support Operations
  i. Inspect, prepare and maintain project site.
  ii. Establish and maintain on-site administrative systems.
  iii. Establish and maintain systems for managing site safety and health.
  iv. Establish and maintain effective community and public relations.
  v. Establish and maintain quality systems & procedures.
  vi. Establish and maintain dimensional control.

III. Establish Responsibility for Operations & Communicate Relevant Information
  i. Assign responsibility & tasks for the completion of the project.
  ii. Communicate information relevant to methods, estimate & schedule to enable the completion of the project.
  iii. Communicate information on site organization and systems to enable the completion of the project.

IV. Determine & Procure Physical Resources for the Execution of the Project.
  i. Determine resource requirements for the project.
  ii. Procure materials for the execution of the project.
  iii. Procure plant & equipment for the execution of the project.

V. Develop Staffing & Subcontractor Requirements
  i. Define future personnel requirements.
  ii. Establishing hiring requirements consistent with governmental regulations.
  iii. Identify & select staff & sub-contractors.

VI. Monitor & Control the Use of Project Resources
  i. Monitor progress of the project.
  ii. Monitor & control materials.
  iii. Monitor & control subcontractors.
  iv. Monitor & control use and deployment of plant and equipment.
  v. Monitor & control personnel.

VII. Monitor Project Costs
  i. Monitor expenditures against budget.
  ii. Monitor and document work performed to enable reimbursement.

VIII. Create, Maintain & Enhance Effective Working Relationships
  i. Establish & maintain the trust & support of subordinates.
  ii. Establish & maintain the trust & support of one's immediate manager.
  iii. Establish & maintain relationships with co-workers.
  iv. Identify & minimize interpersonal conflict.
  v. Implement disciplinary and grievance procedures.
  vi. Counsel and mentor staff.
  vii. Establish & maintain relationships with clients, their representatives and governmental agents.
  viii. Establish & maintain relationships with the general public.

IX. Develop Teams, Individuals & Staff to Enhance Performance
  i. Develop & improve teams through planning activities.
  ii. Identify, review & improve professional development activities for individuals.
  iii. Develop oneself within the job role.

X. Solve Problems & Make Decisions
  i. Conduct meeting and group discussions.
  ii. Effect problem solving & decision making.
  iii. Advise & inform others.

APPENDIX B

Statistical Summary of Duties and Tasks

	JOB RELEVANCY									PERFORM.		SKILL LEVEL				
	YES [1]	NO [2]	LOW [1]	MOD LOW [2]	NEUTRAL [3]	MOD HIGH [4]	HIGH [5]	MEAN	STD DEV	YES [1]	NO [2]	CAP [1]	UNDERST [2]	AWARE [3]	MEAN	STD DEV
DUTY I																
Task A	93.5%	6.5%	0.8%	2.3%	18.8%	31.8%	46.3%	4.203	0.847	96.5%	3.5%	83.4%	10.9%	5.7%	1.223	0.54
Task B	88.0%	12.0%	2.3%	7.0%	20.4%	31.0%	39.2%	3.976	1.015	91.0%	9.0%	68.7%	22.1%	9.2%	1.406	0.645
Task C	91.1%	8.9%	2.3%	5.6%	15.1%	29.0%	47.9%	4.146	0.972	95.5%	4.5%	75.7%	18.9%	5.4%	1.296	0.56
SUMM.	90.9%	9.1%	1.8%	5.0%	18.1%	30.6%	44.5%	4.108	0.945	94.3%	5.7%	75.9%	17.3%	6.8%	1.308	0.582
DUTY II																
Task D	86.2%	13.8%	2.8%	6.9%	17.0%	31.1%	42.1%	4.03	1.018	86.2%	13.8%	68.5%	20.9%	10.7%	1.424	0.672
Task E	87.1%	12.9%	3.9%	8.3%	24.1%	28.5%	35.2%	3.83	1.062	85.0%	15.0%	68.3%	20.0%	11.6%	1.432	0.69
Task F	83.8%	16.2%	1.9%	4.5%	15.7%	25.7%	52.2%	4.219	0.983	77.0%	23.0%	54.7%	28.4%	16.9%	1.623	0.756
Task G	66.7%	33.3%	11.1%	17.0%	25.5%	24.2%	22.3%	3.291	1.16	73.8%	26.2%	59.8%	23.0%	17.2%	1.578	0.75
Task H	87.8%	12.2%	1.3%	3.0%	13.4%	29.2%	53.1%	4.294	0.842	84.9%	15.1%	62.0%	28.4%	9.6%	1.478	0.664
Task I	77.0%	23.0%	1.4%	3.5%	13.1%	27.8%	54.2%	4.298	0.893	76.2%	23.8%	59.5%	23.4%	17.1%	1.578	0.768
SUMM.	81.4%	18.6%	3.7%	7.2%	18.1%	27.8%	43.2%	3.994	0.993	80.5%	19.5%	62.1%	24.0%	13.9%	1.519	0.717
DUTY III																
Task J	82.8%	17.2%	0.9%	5.7%	17.4%	31.3%	44.8%	4.135	0.933	80.3%	19.7%	69.1%	21.5%	9.5%	1.405	0.653
Task K	89.0%	11.0%	1.7%	4.7%	16.6%	30.2%	46.7%	4.151	0.915	92.8%	7.2%	76.7%	16.8%	6.5%	1.299	0.58
Task L	79.0%	21.0%	3.4%	7.2%	21.5%	28.9%	39.0%	3.928	1.061	77.8%	22.2%	56.3%	29.5%	14.2%	1.581	0.725
SUMM.	83.6%	16.4%	2.0%	5.9%	18.5%	30.1%	43.5%	4.071	0.970	83.6%	16.4%	67.4%	22.6%	10.1%	1.428	0.653
DUTY IV																
Task M	86.4%	13.6%	2.6%	6.4%	20.5%	32.4%	38.0%	3.967	0.971	87.8%	12.2%	67.8%	23.6%	8.7%	1.409	0.643
Task N	86.7%	13.3%	0.9%	5.5%	16.1%	31.2%	46.3%	4.173	0.853	92.4%	7.6%	74.2%	16.4%	9.4%	1.35	0.629
Task O	77.6%	22.4%	2.7%	8.9%	21.9%	29.5%	36.9%	3.889	1.048	76.6%	23.4%	60.2%	24.6%	15.1%	1.55	0.743
SUMM.	83.6%	16.4%	2.1%	6.9%	19.5%	31.0%	40.4%	4.010	0.957	85.6%	14.4%	67.4%	21.5%	11.1%	1.436	0.672
DUTY V																
Task P	82.6%	17.4%	2.1%	6.6%	21.2%	33.2%	36.9%	3.962	0.987	84.6%	15.4%	70.6%	17.7%	11.7%	1.142	0.692
Task Q	69.9%	30.1%	5.1%	10.1%	28.4%	28.1%	28.3%	3.641	1.119	64.9%	35.1%	50.2%	30.1%	19.6%	1.693	0.779
Task R	86.5%	13.5%	2.2%	4.4%	13.7%	27.3%	52.3%	4.23	0.831	90.4%	9.6%	79.7%	12.6%	7.7%	1.28	0.594
SUMM.	79.7%	20.3%	3.1%	7.0%	21.1%	29.5%	39.2%	3.944	0.979	80.0%	20.0%	66.8%	20.1%	13.0%	1.372	0.688
DUTY VI																
Task S	89.7%	10.3%	1.0%	4.4%	16.1%	31.2%	47.3%	4.195	0.904	93.9%	6.1%	79.7%	13.0%	7.3%	1.275	0.583
Task T	80.4%	19.6%	1.7%	7.8%	21.5%	31.2%	37.9%	3.956	0.957	86.8%	13.2%	63.4%	24.8%	11.9%	1.486	0.69
Task U	87.0%	13.0%	0.6%	2.4%	13.1%	30.9%	53.0%	4.331	0.822	89.0%	11.0%	76.2%	15.5%	8.3%	1.323	0.621
Task V	69.9%	30.1%	5.0%	7.9%	22.5%	29.9%	34.8%	3.819	1.104	68.5%	31.5%	47.7%	26.7%	25.5%	1.779	0.827
Task W	80.5%	19.5%	1.6%	5.8%	18.9%	34.6%	39.1%	4.036	0.946	82.8%	17.2%	65.5%	22.8%	11.7%	1.46	0.694
SUMM.	81.5%	18.5%	2.0%	5.7%	18.4%	31.6%	42.4%	4.067	0.947	84.2%	15.8%	66.5%	20.6%	12.9%	1.465	0.683
DUTY VII																
Task X	91.4%	8.6%	0.9%	2.1%	12.8%	30.0%	54.1%	4.341	0.819	94.7%	5.3%	79.9%	12.4%	7.7%	1.279	0.596
Task Y	90.0%	10.0%	0.5%	2.5%	11.6%	24.8%	60.5%	4.42	0.818	93.3%	6.7%	81.4%	10.0%	8.7%	1.273	0.61
SUMM.	90.7%	9.3%	0.7%	2.3%	12.2%	27.4%	57.3%	4.381	0.819	94.0%	6.0%	80.7%	11.2%	8.2%	1.276	0.603
DUTY VIII																
Task Z	91.7%	8.3%	1.4%	4.2%	15.0%	32.8%	46.6%	4.19	0.901	93.0%	7.0%	82.5%	11.6%	5.8%	1.24	0.589
Task AA	92.5%	7.5%	0.9%	6.1%	17.6%	33.0%	42.3%	4.102	0.912	95.9%	4.1%	78.9%	15.7%	5.4%	1.262	0.55
Task AB	97.2%	2.8%	0.7%	4.5%	13.8%	32.5%	48.5%	4.235	0.875	99.2%	0.8%	85.9%	8.1%	6.0%	1.203	0.53
Task AC	87.4%	12.6%	2.9%	5.9%	20.0%	31.6%	39.6%	3.99	1.006	87.6%	12.4%	68.4%	21.0%	10.6%	1.424	0.672
Task AD	79.2%	20.8%	4.5%	7.5%	22.4%	30.7%	35.0%	3.843	1.1	71.2%	28.8%	57.0%	25.5%	17.5%	1.608	0.768

Task AE	76.5%	23.5%	4.3%	7.0%	23.2%	30.1%	35.4%	3.854	1.088	71.8%	28.2%	61.9%	23.9%	14.3%	1.524	0.73
Task AF	94.6%	5.4%	1.0%	2.7%	11.6%	25.7%	59.1%	4.392	0.834	95.4%	4.6%	85.0%	9.1%	5.9%	1.208	0.532
Task AG	78.6%	21.4%	4.5%	9.7%	26.6%	28.8%	30.3%	3.706	1.116	77.5%	22.5%	65.9%	20.2%	13.9%	1.48	0.726
SUMM.	87.2%	12.8%	2.5%	6.0%	18.8%	30.7%	42.1%	4.039	0.979	86.5%	13.6%	73.2%	16.9%	9.9%	1.369	0.637
DUTY IX																
Task AH	86.1%	13.9%	2.8%	6.2%	22.6%	33.6%	34.9%	3.914	1.02	78.3%	21.7%	66.2%	24.6%	9.3%	1.431	0.657
Task AI	76.7%	23.3%	4.2%	6.1%	25.5%	35.2%	29.0%	3.787	1.047	71.4%	28.6%	58.9%	27.1%	13.9%	1.553	0.725
Task AJ	89.7%	10.3%	2.1%	4.9%	19.4%	33.0%	40.5%	4.047	0.983	89.0%	11.0%	70.2%	23.0%	6.9%	1.367	0.607
SUMM.	84.2%	15.8%	3.0%	5.7%	22.5%	33.9%	34.8%	3.916	1.017	79.6%	20.4%	65.1%	24.9%	10.0%	1.450	0.663
DUTY X																
Task AK	96.2%	3.8%	1.6%	4.7%	14.4%	32.1%	47.2%	4.184	0.926	97.3%	2.7%	84.4%	10.3%	5.3%	1.209	0.521
Task AL	95.7%	4.3%	0.8%	3.8%	13.1%	36.7%	45.6%	4.222	0.848	95.6%	4.4%	83.2%	12.0%	4.8%	1.216	0.514
Task AM	93.3%	6.7%	1.3%	5.3%	20.1%	32.3%	41.0%	4.064	0.938	96.5%	3.5%	79.7%	14.4%	5.8%	1.262	0.556
SUMM.	95.1%	4.9%	1.2%	4.6%	15.9%	33.7%	44.6%	4.157	0.904	96.5%	3.5%	82.4%	12.2%	5.3%	1.229	0.530