

Boise State University  
Department of Construction Management

2015-2016  
Quality Assessment Report  
and Action Plan

January 11, 2017

## Executive Summary

The Construction Management program is accredited by the American Council for Construction Education (ACCE). The most recent visit from that body occurred in the spring of 2013. As laid out in our data collection plan the following Student/Program Learning Outcomes were to be evaluated in the 2015-2016 school year:

5. Create construction project schedules.
10. Apply electronic-based technology to manage the construction process.
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
14. Understand construction accounting and cost control.
16. Understand construction project control processes.
19. Understand the basic principles of structural behavior.

To do this three instruments were used:

- American Institute of Constructors Level 1 (Associate Constructor) Exam
- Review of Student Work
- Graduating Senior Exit Survey
- Industry/Employer survey

Based on the data collected all of the Outcomes continue to be met, with the possible exception of Outcome 12. With respect to Outcome 12, some data indicates that this Outcome is being met, while student course work does not. When this program transitioned to this current set of Outcomes, an estimate of which courses covered which Outcomes, and to what extent was made. This estimate was found to be faulty with Outcome 12. More courses will need to be evaluated to determine student ability with this Outcome in the future.

# Table of Contents

PART I – PROGRAM ORGANIZATION.....	1
Mission.....	1
Vision.....	1
Student & Program Learning Outcomes.....	1
Program Objectives.....	2
Program Quality Assessment.....	2
Assessment of Student/Program Learning Outcomes.....	4
Assessment of Program Objectives .....	5
PART II – DATA AND ANALYSIS FOR THE 2015-16 SCHOOL YEAR .....	6
Student/Program Learning Outcome 5 .....	7
Student/Program Learning Outcome 10 .....	8
Student/Program Learning Outcome 12 .....	9
Student/Program Learning Outcome 14 .....	11
Student/Program Learning Outcome 16 .....	12
Student/Program Learning Outcome 19 .....	13
PART III – INSTRUMENTS USED FOR DATA COLLECTION AND ANALYSIS .....	14
American Institute of Constructors Level I Exam .....	14
Review of Student Work.....	17
Graduating Senior Exit Surveys.....	18
Industry/Employer Survey .....	21
Additional Assessment Measures .....	22
Advisory Board Feedback.....	22
Construction Competition Results .....	22

**Table of Figures**

Figure 1 – Program Assessment Process ..... 3  
Figure 2 – AIC Results, BSU vs Minimum Score ..... 14  
Figure 3 – Average AIC Results by Outcome ..... 15  
Figure 4 – AIC Results, BSU vs National Average..... 16  
Figure 5 – Courses vs Program Outcomes..... 17  
Figure 6 - Student Perception of Program Learning Outcomes Fall 2015..... 18  
Figure 7 - Difference between Achievement and Importance of Student/Program Learning Outcomes in the Fall of 2015 ..... 19  
Figure 8 – Student Perception of Program Learning Outcomes Spring 2016 .....19  
Figure 9 – Difference between Achievement and Importance of Student/Program Learning Outcomes in the Spring of 2016..... 20  
Figure 10 – Achievement of Program Outcomes According to Industry 2015 ..... 21

**Table of Tables**

Table 1 – Student/Program Learning Outcomes Assessment Plan..... 4  
Table 2- Program Objectives Assessment Plan ..... 5

## **PART I – PROGRAM ORGANIZATION**

### Mission

To provide comprehensive educational opportunities, applied research, and service-oriented outreach for the development of future professional constructors who, through innovation, character and ability are prepared to meet the construction needs of society and provide leadership to the construction industry.

### Vision

To be recognized and respected for providing consistent, creative, high quality, student centric education, applied research, and community focused outreach, with a clear emphasis on ethics, sustainability and leadership.

### Student & Program Learning Outcomes

The Student Learning Outcomes and the Program Learning Outcomes are defined as the knowledge and skills we expect our students to possess at the time of graduation.

Upon successful completion of the Construction Management course of study, graduates can be expected to:

1. Create written communications appropriate to the construction discipline.
2. Create oral presentations appropriate to the construction discipline.
3. Create a construction project safety plan.
4. Create construction project cost estimates.
5. Create construction project schedules.
6. Analyze professional decisions based on ethical principles.
7. Analyze construction documents for planning and management of construction processes.
8. Analyze methods, materials, and equipment used to construct projects.
9. Apply construction management skills as a member of a multi-disciplinary team.
10. Apply electronic-based technology to manage the construction process.
11. Apply basic surveying techniques for construction layout and control.
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
13. Understand construction risk management.
14. Understand construction accounting and cost control.
15. Understand construction quality assurance and control.
16. Understand construction project control processes.
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project.
18. Understand the basic principles of sustainable construction.
19. Understand the basic principles of structural behavior.
20. Understand the basic principles of mechanical, electrical and piping system.

## Program Objectives

Program Objectives are defined as the abilities we expect our alumni to exhibit three to five years after graduation.

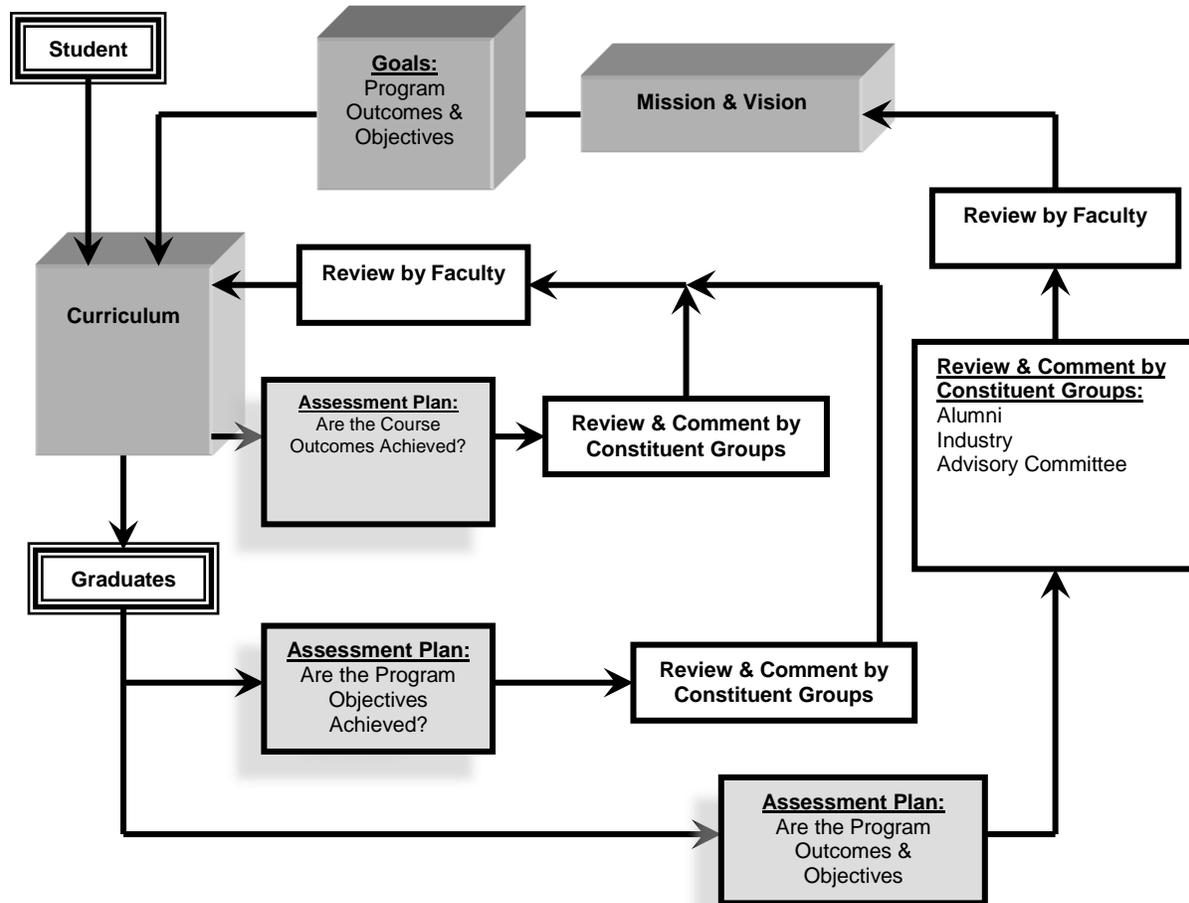
Students who are granted the Bachelor of Science in Construction Management will demonstrate knowledge and understanding in the following areas:

1. **General Education** - Graphic, oral and written communications, and the understanding of human factors.
2. **Math and Science** – Principles of mathematics, statistics and physics in order to appropriately anticipate the behavior of the materials, equipment, and methods used in construction.
3. **Business and Management** – The demands of working in a global environment including: knowledge of sustainability, accounting, finance, business regulations, contract law, labor law, and marketing practices. The fundamentals of contemporary management and business practices appropriate to the construction profession.
4. **Construction Science** – The contribution of other professional disciplines to the construction process. The ability to lead, coordinate, communicate and interact with professionals in various disciplines to solve project challenges.
5. **Construction** – The total project process including: concept, design, procurement, construction, and delivery of the functioning project. The constructor's professional responsibility as a leader and member of a multi-disciplinary team, working in diverse environments, assessing risks, and showing definitive progress, all while maintaining priorities in safety, sustainability, purpose, business, and societal issues.
6. **Life-Long Learning** – An appreciation of the need for, and the value of, leadership, collaboration, productivity, and professionalism in sustaining or developing one's own career growth.

## Program Quality Assessment

The Construction Management department has an established process of assessment and improvement, as depicted in the figure below.

Each course offered by the department has established a series of Course Outcomes that are measurable learning outcomes specific to each course. Course Outcomes must support the Program Outcomes and Objectives. In turn, the Program Outcomes and Objectives must support the Mission and Vision of the program.



**Figure 1 – Program Assessment Process**

Performance of our current students and graduates is measured in a number of ways, including:

- results of the comprehensive American Institute of Constructors (AIC) Exam;
- review of student work;
- graduating senior exit survey;
- alumni and industry surveys; and
- input from the program’s industry advisory board.

This assessment information is compared to our desired performance, which is articulated in the Program Outcomes and Objectives. Any gap or discrepancy between our actual and desired performance indicates that a modification is needed, either within the curriculum, or to the Program Outcomes or Objectives. This process is driven by program faculty both directly (through day-to-day involvement with course design, delivery, assessment, and evaluation), and indirectly (through the influence of service and research).

Assessment of Student/Program Learning Outcomes

The table below lists our planned assessment methods for each Student/Program Learning Outcome listed previously (page 1).

*Table 1 – Student/Program Learning Outcomes Assessment Plan*

<b>Assessment Measure:</b>	<b>Outcomes Addressed: (list by number)</b>	<b>How is the information used</b>	<b>Timeline</b>
<p><b>American Institute of Constructors Level 1 (Associate Constructor) Exam</b> This comprehensive exam, which covers all aspects of construction project management, is required to be taken and passed with a score of 70% or better by all students in our program.</p>	<p>Correlation</p> <p>Strong: 1, 4, 7, 8, 13 &amp; 14</p> <p>Moderate: 5, 9, 16 &amp; 17</p> <p>Weak: 2, 3, 6, 10, 11, 12, 15, 18, 19 &amp; 20</p>	<p>Scores are an assessment of student learning in the test subject areas in comparison to national averages. Scores equal to or higher than national averages indicate the learning goals are being achieved. Scores below the national averages or indicating a weakness lead to a faculty review of the curriculum to identify classes where course content can be revised to address the weakness.</p>	<p>Twice per year (November and April)</p>
<p><b>Review of Student Work</b> This is a review of student performance on tests and assignments relative to the stated learning objectives for every CMGT course. This is an ongoing assessment.</p>	<p>All</p>	<p>Faculty review student performance on selected assignments, projects or exams to measure whether the program outcomes are being achieved and at what level. Faculty address weaknesses by revising content or course objectives as appropriate.</p>	<p>The 20 Program Outcomes are reviewed on a 3-year cycle</p>
<p><b>Graduating Senior Exit Survey</b> These questionnaires are designed to evaluate the level at which graduating seniors believe they have achieved the CM Program Outcomes.</p>	<p>All</p>	<p>Faculty review questionnaires completed by graduating students to identify areas in the curriculum which the students feel are not being addressed to their satisfaction. Faculty address weaknesses by revising course objectives or content as appropriate.</p>	<p>At the end of every semester</p>
<p><b>Industry/Employer Surveys</b> These questionnaires are designed to evaluate the relevance and achievement of CM Program Outcomes with respect to current industry requirements.</p>	<p>All</p>	<p>Faculty review questionnaires completed by Industry and Employers to identify areas in the curriculum which members of industry feel are not being adequately taught based on graduate knowledge and job performance. If the Respondent does not employ Boise State CM grads, they may provide feedback about the relevance of the Program Outcomes. Faculty address weaknesses by revising program outcomes, or course objectives or content as appropriate.</p>	<p>Every three years.</p> <p>Last conducted – Fall 2015</p> <p>Next survey - Fall 2018</p>

Assessment of Program Objectives

The table below lists our planned assessment methods for each Program Objectives listed previously (page 2).

*Table 2 - Program Objectives Assessment Plan*

<b>Assessment Measure:</b>	<b>Objectives Addressed: (list by number)</b>	<b>How is the information used</b>	<b>Timeline</b>
<p><b>Alumni Surveys</b> These questionnaires are designed to evaluate the achievement of CM Program Objectives (at 3 to 5 years post-graduation).</p>	<p>All</p>	<p>Faculty review questionnaires completed by alumni to identify areas in which the graduates, upon exposure to industry requirements, feel did not adequately prepare them for employment. Faculty address weaknesses by revising course objectives or content as appropriate.</p>	<p>Every three years.  Last conducted – Fall 2014  Next survey - Summer 2017</p>

## **PART II – DATA AND ANALYSIS FOR THE 2015-16 SCHOOL YEAR**

During the most recent assessment cycle the following Program Learning Outcomes were to be assessed.

5. Create construction project schedules.
10. Apply electronic-based technology to manage the construction process.
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
14. Understand construction accounting and cost control.
16. Understand construction project control processes.
19. Understand the basic principles of structural behavior.

In order to do that data was collected using the following instruments:

- American Institute of Constructors Level 1 (Associate Constructor) Exam
- Review of Student Work
- Graduating Senior Exit Survey
- Industry/Employer survey

The following sections provide a summary presentation and analysis of data collected during the most recent assessment cycle, first by Outcome then by instrument.

**Student/Program Learning Outcome 5**

*“Create construction project schedules.”*

Summary

This Outcome is to be achieved at level 6 – Create.

**Direct Measurements:**

**Student Work** (1-Remember, 2-Understand, 3-Apply, 4-Analyze, 5-Evaluate, 6-Create)

Course	Level of Achievement (1 - 6)	Achievement of Outcome (Y/N)
CMGT 417 – Project Scheduling	6	Y
CMGT 475 – Construction Project Management Project Plan assignment	6	Y

**AIC Exam** (BSU Score vs. AIC Minimum Score – normalized values shown, see Figure 2)

Category	Fall 2015	Spring 2016
7. Planning, Scheduling, and Schedule Control	0.17	0.07

**AIC Exam by Outcome** (Average BSU Score) – Correlation - Moderate

Category	Fall 2015	Spring 2016
5. Create construction project schedules	76.5%	71.1%

**Indirect Measurements:**

**Senior Exit Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 14		Spring 2016 n = 19	
	Importance	Achievement	Importance	Achievement
Create construction project schedules.	4.29	3.86	4.37	4.05

**Industry/Employer Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 9
Do you feel that Boise State Construction Management Graduates have the ability to create construction project schedules?	3.89

The data collected from all sources agree that this Outcome is being met. Senior Exit Survey data indicates that students would like to have more opportunities to learn and practice what this Outcome covers, but they feel that they are receiving a good grounding in the topic, and can create project schedules reasonably well.

**Student/Program Learning Outcome 10**

*“Apply electronic-based technology to manage the construction process.”*

Summary

This Outcome is to be achieved at level 3 – Apply.

**Direct Measurements:**

**Student Work** (1-Remember, 2-Understand, 3-Apply, 4-Analyze, 5-Evaluate, 6-Create)

Course	Level of Achievement (1 - 6)	Achievement of Outcome (Y/N)
CMGT 367 – Construction Estimating	6	Y
CMGT 475 – Construction Project Management	6	Y

**Indirect Measurements:**

**AIC Exam by Outcome** (Average BSU Score) – Correlation - Weak

Category	Fall 2015	Spring 2016
10. Apply electronic-based technology to manage the construction process	74.3%	73.5%

**Senior Exit Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 14		Spring 2016 n = 19	
	Importance	Achievement	Importance	Achievement
Create construction project cost estimates.	4.29	3.71	4.32	3.58

**Industry/Employer Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 9
Do you feel that Boise State Construction Management Graduates have the ability to apply electronic-based technology to manage the construction process?	4.10

Data collected from student work and from our survey of employers indicates that this Outcome is being met. The results from the AIC exam confirm this finding, but our students feel that they are not as capable in this area as they want to be. Discussion of this Outcome amongst the faculty leads to the conclusion that this Outcome is being met, but greater effort to use electronic-based technology in additional courses will be made.

**Student/Program Learning Outcome 12**

*“Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.”*

Summary

This Outcome is to be achieved at level 2 – Understand.

**Direct Measurements:**

**Student Work** (1-Remember, 2-Understand, 3-Apply, 4-Analyze, 5-Evaluate, 6-Create)

Course	Level of Achievement (1 - 6)	Achievement of Outcome (Y/N)
CMGT 385 – Construction Contracts and Law	4	N

**AIC Exam** (BSU Score vs. AIC Minimum Score – normalized values shown, see Figure 2)

Category	Fall 2015	Spring 2016
10. Project Control	0.11	0.04

**AIC Exam by Outcome** (Average BSU Score) – Correlation - Weak

Category	Fall 2015	Spring 2016
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process	73.3%	68.7%

**Indirect Measurements:**

**Senior Exit Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 14		Spring 2016 n = 19	
	Importance	Achievement	Importance	Achievement
Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.	4.00	3.79	4.16	4.00

**Industry/Employer Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 9
Do you feel that Boise State Construction Management Graduates have the ability to understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process?	3.40

This Outcome does not appear to be met based upon current data. Results of the AIC exam show that the Outcome is being met, and the students feel that they are adequately achieving this Outcome, but our course work data does not agree with this conclusion.

Previously we had planned to evaluate this Outcome in more courses than just CMGT 385. As the year progresses it was found that the other courses did not cover this Outcome as was originally assumed. The result is that only one course was sampled, and the student work did not demonstrate the level of understanding necessary.

Due to several issues arising in the 2016-17 academic year, this Outcome will not be evaluated in the next school year as originally planned. Instead, it will again be evaluated in the 2017-18 school year. CMGT 120, and possibly CMGT 417 and 460 will be added to the list of courses used to evaluate this Outcome. All of these additional courses are felt to achieve this Outcome at a level equal to or exceeding the required level of Understand.

**Student/Program Learning Outcome 14**

*“Understand construction accounting and cost control.”*

Summary

This Outcome is to be achieved at level 2 – Understand.

**Direct Measurements:**

**Student Work** (1-Remember, 2-Understand, 3-Apply, 4-Analyze, 5-Evaluate, 6-Create)

Course	Level of Achievement (1 - 6)	Achievement of Outcome (Y/N)
CMGT 417 – Project Scheduling	4	Y
CMGT 460 – Project Cost Controls	6	Y

**AIC Exam** (BSU Score vs. AIC Minimum Score – normalized values shown, see Figure 2)

Category	Fall 2015	Spring 2016
3. Management Concepts	0.04	-0.04

**AIC Exam by Outcome** (Average BSU Score) – Correlation - Strong

Category	Fall 2015	Spring 2016
14. Understand construction accounting and cost control	74.6%	70.1%

**Indirect Measurements:**

**Senior Exit Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 14		Spring 2016 n = 19	
	Importance	Achievement	Importance	Achievement
Apply basic surveying techniques for construction layout and control.	4.36	4.23	4.37	4.32

**Industry/Employer Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 9
Do you feel that Boise State Construction Management Graduates have the ability to understand construction accounting and cost control?	3.80

Data from all sources agree that this Outcome is being met. The students feel that this Outcome is both very important, and that they have the tools to handle the requirements of construction accounting and cost control.

**Student/Program Learning Outcome 16**

*“Understand construction project control processes.”*

Summary

This Outcome is to be achieved at level 2 – Understand.

**Direct Measurements:**

**Student Work** (1-Remember, 2-Understand, 3-Apply, 4-Analyze, 5-Evaluate, 6-Create)

Course	Level of Achievement (1 - 6)	Achievement of Outcome (Y/N)
CMGT 475 – Construction Project Management	6	Y

**AIC Exam** (BSU Score vs. AIC Minimum Score – normalized values shown, see Figure 2)

Category	Fall 2015	Spring 2016
10. Project Control	0.11	0.04

**AIC Exam by Outcome** (Average BSU Score) – Correlation - Moderate

Category	Fall 2015	Spring 2016
16. Understand construction project control processes	74.3%	72.4%

**Senior Exit Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 14		Spring 2016 n = 19	
	Importance	Achievement	Importance	Achievement
Understand construction project control processes.	4.36	3.93	3.94	4.05

**Industry/Employer Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 9
Do you feel that Boise State Construction Management Graduates have the ability to understand construction project control processes?	3.60

This Outcome continues to be met. Student achievement in both their course work, as well as the AIC exam illustrates this. Students graduating in the fall were not as comfortable with their own ability in this area, even though they actually outperformed students graduating in the spring. This increase in confidence in the spring may have been due to a minor adjustment made in how the topic was discussed in class based upon the results from the fall.

**Student/Program Learning Outcome 19**

*“Understand the basic principles of structural behavior.”*

Summary

This Outcome is to be achieved at level 2 – Understand.

**Direct Measurements:**

**Student Work** (1-Remember, 2-Understand, 3-Apply, 4-Analyze, 5-Evaluate, 6-Create)

Course	Level of Achievement (1 - 6)	Achievement of Outcome (Y/N)
CMGT 410 – Temporary Structures	4	Y
CMGT 420 – Reinforced Concrete and Steel Construction multiple assignments	4	Y

**AIC Exam** (BSU Score vs. AIC Minimum Score – normalized values shown, see Figure 2)

Category	Fall 2015	Spring 2016
2. Engineering Concepts	-0.02	-0.07

**AIC Exam by Outcome** (Average BSU Score) – Correlation - Weak

Category	Fall 2015	Spring 2016
19. Understand the basic principles of structural behavior	73.7%	68.8%

**Indirect Measurements:**

**Senior Exit Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 14		Spring 2016 n = 19	
	Importance	Achievement	Importance	Achievement
Understand the basic principles of structural behavior.	3.93	4.00	4.05	4.05

**Industry/Employer Survey** (1 to 5, 5 high)

Question	Fall 2015 n = 9
Do you feel that Boise State Construction Management Graduates have the ability to understand the basic principles of structural behavior?	3.60

This Outcome is being achieved by the students at level above the minimum required in their coursework. Results of the AIC exam are mixed, with students not performing well in the spring based upon a small number of pertinent questions. Student opinion indicates a very strong feeling of ability, which is associated with the impression this subject is covered too extensively.

### PART III – INSTRUMENTS USED FOR DATA COLLECTION AND ANALYSIS

Two of the instruments used to evaluate our program, the American Institute of Constructors Level 1 Exam, and the Graduating Senior Exit Survey, collect data concerning more than just the selected Student and Program Learning Outcomes for a given year. By collecting this data biannually, we are able to monitor the health, and identify areas of concern across the program on a yearly basis. This section describes the data collected, and the follow-up actions taken by the program to address any issues which have been identified.

In addition, this year we conducted a survey of Industry and Employers of our students. This survey is conducted every three years, and it too collects data concerning more than just the selected Student and Program Learning Outcomes.

#### American Institute of Constructors Level I Exam

The bar charts below show the results of the November 2015 and April 2016 AIC Level I Exams. The values shown in the first chart are based on a comparison of the average score obtained by Boise State students compared to the scores that AIC considers to be the minimum acceptable using the following relationship:

$$\left( \frac{\text{BSU Average}}{\text{Minimum Score}} \right) - 1$$

Using this relationship all 10 sections of AIC Level I Exam are normalized to zero. Scores greater than zero mean our students are performing above the minimum acceptable value, and scores below zero means our students are performing below the minimum acceptable value.



**Figure 2 – AIC Results, BSU vs Minimum Score**

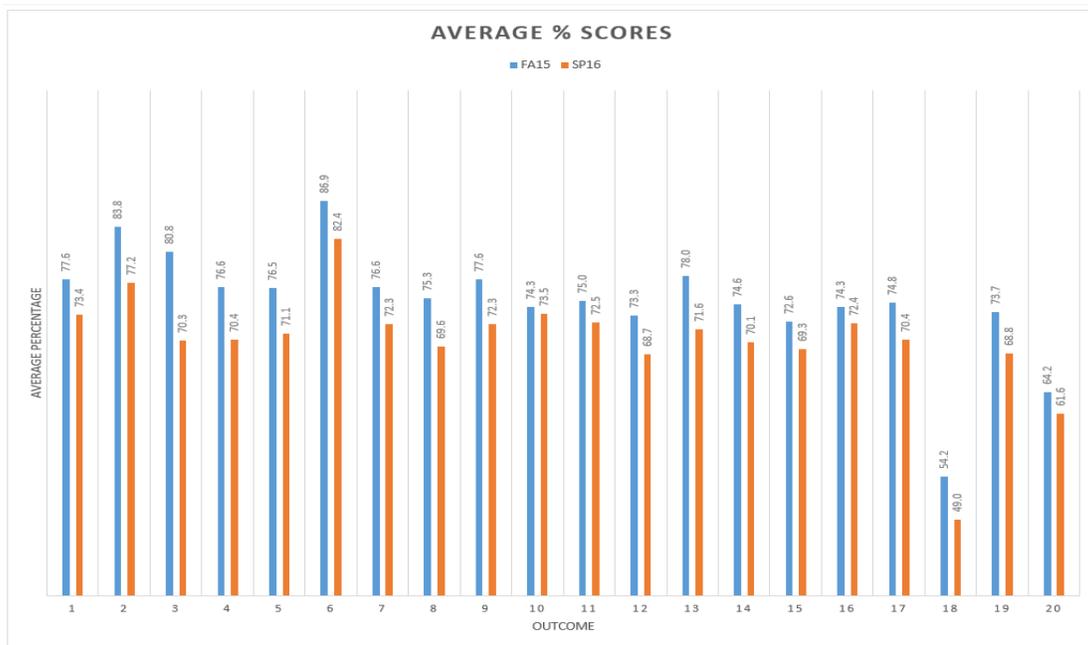
When reviewing the data from the AIC exam it was noted that the relevant portions of the exam for the six Program Outcomes under consideration this year, two show that our students are scoring above the minimum required score. Those areas used this year are:

- 7. *Planning Schedule & Control*
- 10. *Project Administration*

Two other areas show are students are close, but falling short of the minimum scores required. Those areas used this year are:

- 2. *Engineering Concepts*
- 3. *Management Concepts*

Starting in the fall of 2015, AIC began reporting student results not only in terms of the 10 categories used previously, but also by ACCE Outcome. For some of these Outcomes there is a strong correlation to AIC exam, others have a moderate correlation and some only weakly correlate to the exam. The average result for each Outcome is shown in Figure 3. Scores of 70% or higher are deemed to be acceptable.



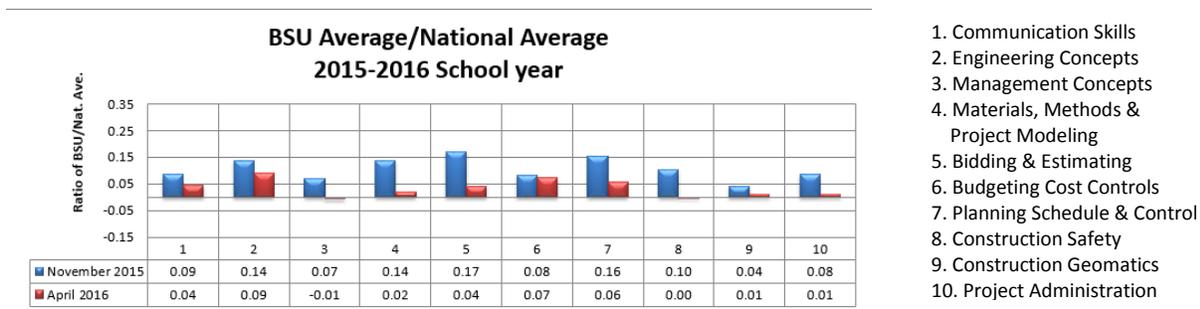
**Figure 3 – Average AIC Results by Outcome**

In the fall of 2015 there were 16 students who took the test, with 15 passing. All 15 of those passing the test were taking the test for the first time. In the spring of 2016, 19 students took the test with 16 passing. All 19 were first time test takers.

Students taking the test in the spring of 2016 had considerably more difficulty with this test than their counterparts taking the test in the fall of 2015. In the fall our students had problems with the content areas of 2. Engineering Concepts, and 9. Construction Geomatics, both of which fell below the AIC minimum acceptable score. In the spring, in addition to these two content areas, three more content areas, 3. Management Concepts, 4. Materials, Methods and Project Modeling and 5. Bidding and Estimating, showed poor results.

However, when reviewing the test results broken down by Outcome (Figure 3), it is seen that only three Outcomes that are closely related to the above mentioned content areas fall below an average score of 70%. These Outcomes are 8 (Materials & Methods), 12 (Project Delivery) and 19 (Structural Behavior), all of which have average scores above 70% in the fall and in the high 60's (69.8%, 68.7% and 68.8% respectively) in the spring.

Other Outcomes, not specifically evaluated this year, show evidence that concern is needed. Specifically Outcomes 18 (sustainable construction) and 20 (mechanical, electrical and plumbing systems) show very poor results. It must be noted that these two Outcomes only have a weak correlation with achievement as measured by the AIC exam. Regardless, these Outcomes will be closely monitored in the future.



**Figure 4 – AIC Results, BSU vs National Average**

When comparing the work of Boise State students to the National Average it is seen that even in the areas of concern listed above Boise State students outperform the National Average significantly in most areas.

Follow-up Action

The results of the AIC exam, both those sections relevant to this year’s Student/Program Outcomes as well as all the other sections were reviewed by the faculty. Multiple sections of the exam appear to be areas of concern, especially with the students who took the exam in the spring.

When we look at the test being divided into 10 sections, Engineering Concepts and Construction Geomatics have low scores in both the fall and the spring. In addition Management, Materials, Methods & Project Modeling, and Bidding & Estimating have low scores in the spring. However, when these topics are divided into program Outcomes it is seen that only two Outcomes demonstrate areas of concern. Outcomes 18 (sustainable construction) and 20 (mechanical, electrical and plumbing systems), both of which are only weakly related to our determination of Outcome achievement.

Effort is to be put into upgrading the program in the area of Sustainable Construction. The faculty met on November 14, 2016 to discuss what is, and how to integrate Sustainable Construction into the curriculum. This discussion continues, with the possible addition of a course to the curriculum. The issues with the Mechanical, Electrical and Plumbing systems seem to come down to a shift in focus, away from design and towards looking at these systems from a more construction oriented point of view.

## Review of Student Work

For the years between ACCE visits student work is reviewed by Program Outcome on a 3-year cycle. The data is collected from selected courses and is then analyzed by the instructor of the course and presented to the faculty as a whole to determine if the Outcomes have satisfactorily been met, and if any adjustment in these courses or the rest of the curriculum are necessary to better meet these Outcomes in the future. If issues were raised in pervious reviews concerning a certain Outcome, these will also be addressed.

Required Level		Student Learning Outcome	Required Courses																	Review Year							
			CMGT 110 Materials & Math Lab	CMGT 111 Math & Math Lab	CMGT 120 Intro to CM	CMGT 201 Const. Comm.	CMGT 245 Drawing & Equipment	CMGT 320 Equipm.	CMGT 350 Mech. & Elec.	CMGT 360 Soils	CMGT 361 Soils Lab	CMGT 367 Estimating	CMGT 374 Ops. & Improve	CMGT 385 Contract & Temp Street	CMGT 410 Scheduling	CMGT 417 Cores & Steel	CMGT 420 Cont. Control	CMGT 475 Project Man.	ENGR 310 Statics & Surveing	CR210/211	14-15	15-16	16-17	17-18			
(6) Create	1	Create written communications appropriate to the construction		3	3	3		3		3	3		6	6		3		3	6								
	2	Create oral presentations appropriate to the construction		3	1	3		3		3			6	6					6								
	3	Create a construction project safety plan.		3	2			1											6								
	4	Create construction project cost estimates.			1			1				6				2		5	4								
	5	Create construction project schedules.			1											6			6								
(4) Analyze	6	Analyze professional decisions based on ethical principles.			3	2						5	5	6		5			6								
	7	Analyze construction documents for planning and			2		2		2	2		4	5	6		6		6	6								
	8	Analyze methods, materials, and equipment used to	2	3	1		2	3	3	2	2	4	4		4				6								
(3) Apply	9	Apply construction management skills as an		3	1	2							6	6		3		3	6								
	10	Apply electronic-based technology to manage the		3		2						6	4			4		4	6								
	11	Apply basic surveying techniques for construction		3																				3			
(2) Understand	12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the			3								4		2		2										
	13	Understand construction risk management.		2									4		2		2										
	14	Understand construction accounting and cost control.			1										4		6										
	15	Understand construction quality assurance and control.			1							6			2		2	6									
	16	Understand construction project control processes.			1										6		6	6									
	17	Understand the legal implications of contract, common, and regulatory law to			3	1							6		2		2	6									
	18	Understand the basic principles of sustainable construction.			1													4									
	19	Understand the basic principles of structural behavior.	1												4	4				2							
20	Understand the basic principles of mechanical, electrical and plumbing systems.							4																			

6	<b>Create</b> - At the highest level students are producing new ideas or products that integrate the knowledge they have gained. When students are involved in creating new artifacts they are actively engaged in the subject matter.
5	<b>Evaluate</b> - At this stage students are asked to judge an idea. This may involve predicting, experimenting, critiquing, or making an argument from evidence.
4	<b>Analyze</b> - Students begin to develop higher order thinking. They may be asked to compare and contrast or take a concept and break it into parts to explore the relationships present.
3	<b>Apply</b> - At this level students begin to put the information they are learning into context. Here they are able to integrate ideas across multiple situations, or utilize the content in a new way.
2	<b>Understand</b> - At the next level students demonstrate that they understand content by explaining, summarizing, classifying, or translating the given information.
1	<b>Remember</b> - The lowest level of the taxonomy requires students to do very little with the information they are learning. They may be asked to recall, list or name an idea or concept.

Figure 5 – Courses vs Program Outcomes

Data was collected from the courses highlighted in grey shown in Figure 5 for each of the Program Outcomes under review this year. Students were deemed to have met the Outcome in a given assignment if the majority of the students participating in that assignment received a grade of at least 70%. The results of this analysis may be found in the Outcome Summaries on pages seven to 13 above. All but one course was found to successfully demonstrate that the students were able to do work related to a specific Outcome. It is felt that the Outcome in question, Outcome 12, is being met, but that more courses need to be sampled to demonstrate this fact. It may be seen in Figure 5 that several other courses meet the required level of achievement on this Outcome, but none were used this year.

Follow-up Action

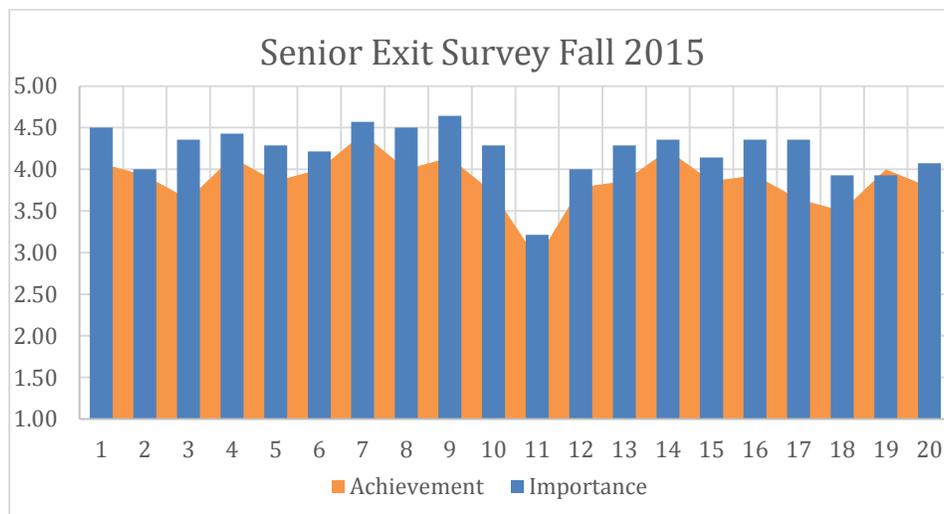
This data was reviewed by the faculty at a faculty meeting on December 5, 2016. The Faculty concluded that the data sample was too narrow, and that the specific problem may not have been as well focused on Outcome 12 as it might have been. More courses will be used in the future to document this Outcome, and more focused problems will be used.

Due to a number of issues occurring in the 2016-17 school year, this Outcome is not going to be reevaluated in the following year as normally would have happened. However, this Outcome will be evaluated in the 2017-18 school year.

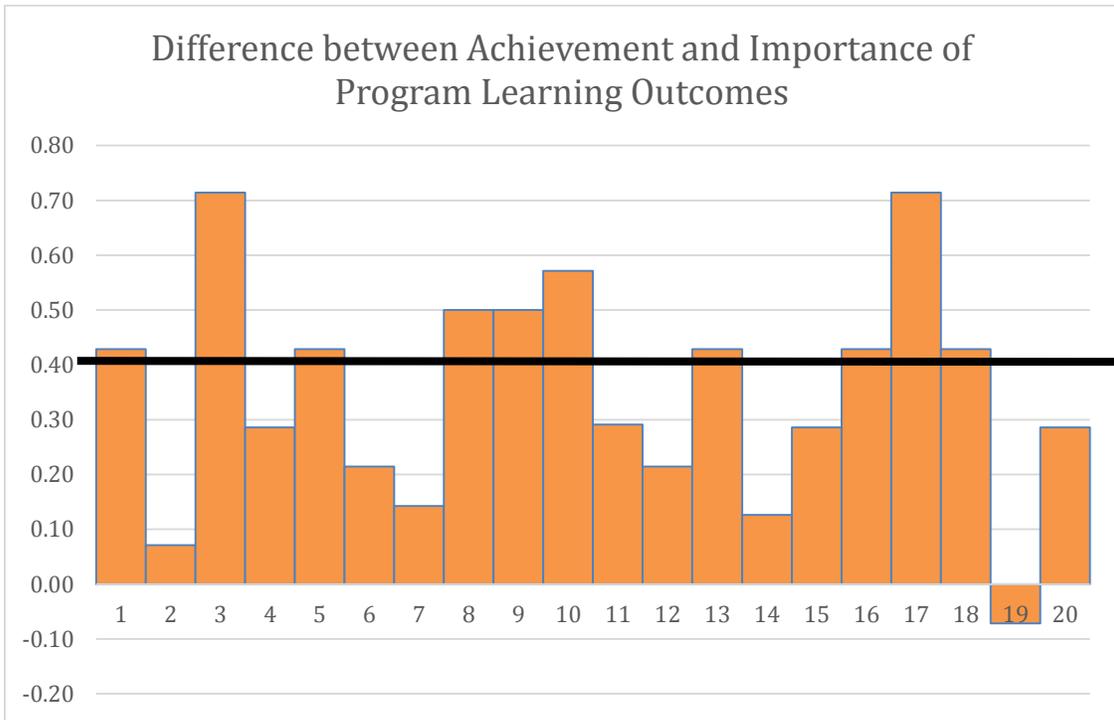
Graduating Senior Exit Surveys

At the end of each semester graduating seniors are polled by questionnaire to assess student perception of their achievement of the Student/Program Learning Outcomes.

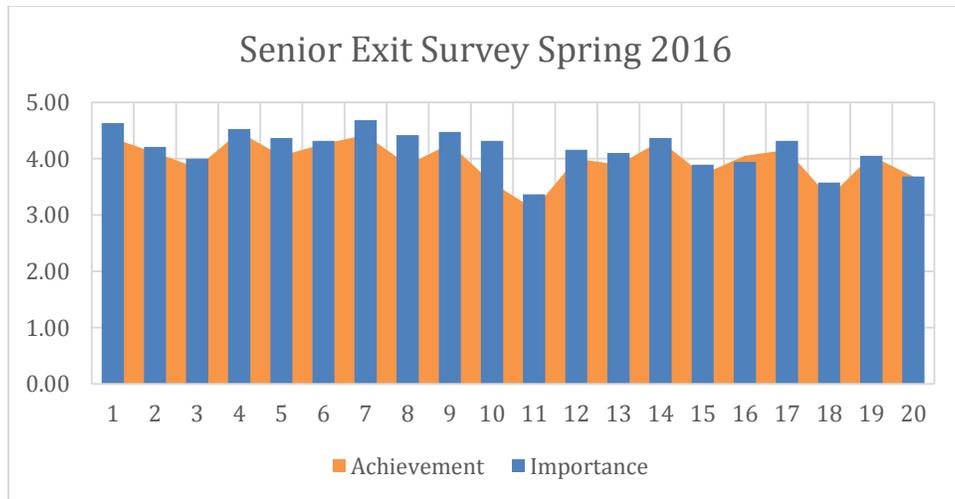
The questions the students were asked directly related to each of the Student/Program Learning Outcomes. The Figures 6 and 7 present the results of these questions where the students were asked how important are the Program Learning Outcomes, and how well they were able to achieve them by the time of graduation. The surveys used a five point scale, with one being low and five being high.



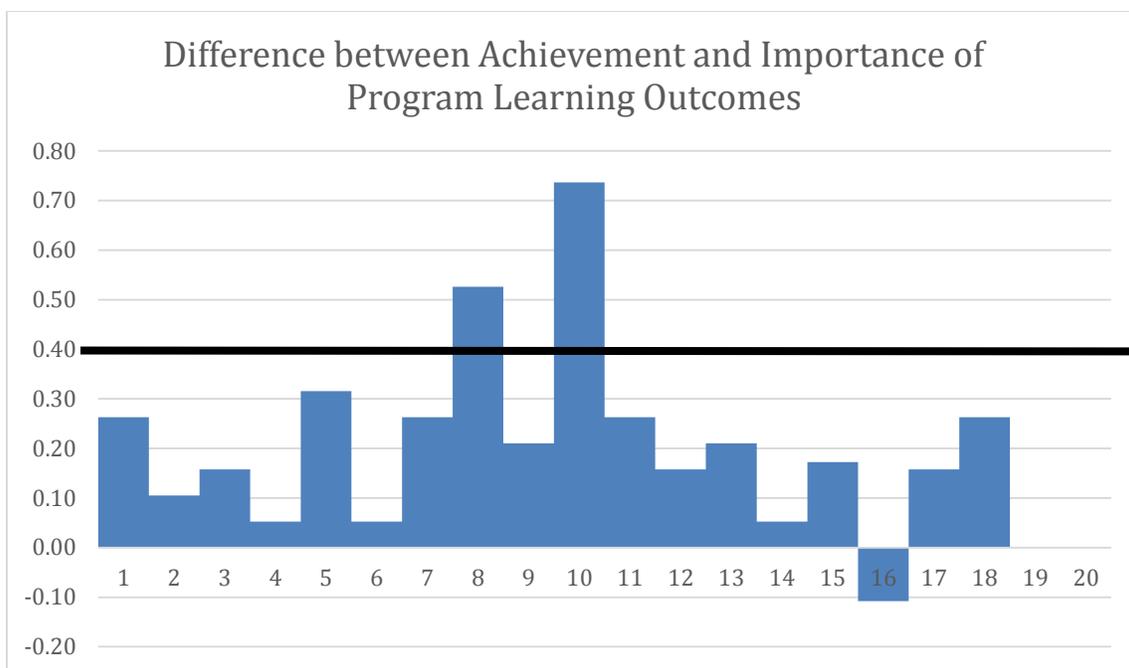
**Figure 6 - Student Perception of Program Learning Outcomes Fall 2015**



**Figure 7 – Difference between Achievement and Importance of Student/Program Learning Outcomes in the Fall of 2015**



**Figure 8 - Student Perception of Program Learning Outcomes Spring 2016**



**Figure 9 – Difference between Achievement and Importance of Student/Program Learning Outcomes in the Spring of 2016**

The students felt strongly that all of the Outcomes were important to their education. Figures 7 and 9 above present the difference in perception of the students between Importance of the Program Learning Outcomes and the Achievement of those same Outcomes. When reviewing this data the faculty expect there to be a difference between how significant the students feel an Outcome to be and how well they achieve it. Generally values on Figures 7 and 9 greater than 0.4 will be seen to warrant close scrutiny.

Follow-up Action

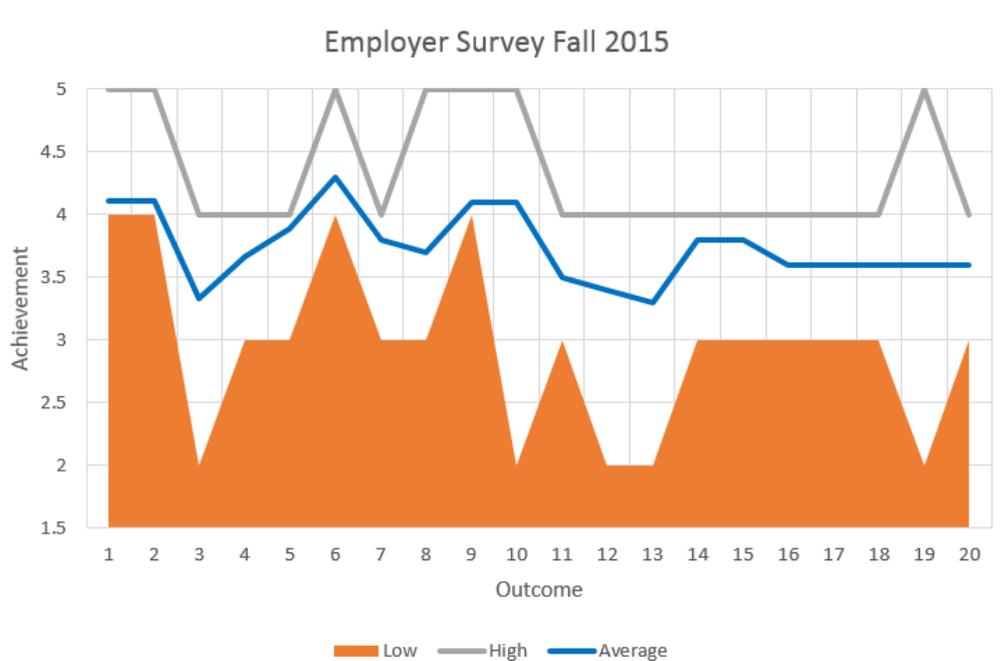
This year, due to practices put in place based upon data from last year, the response rate for the Senior Exit Survey approached 100% both semesters. Additionally, graduating students are required to speak with the Department Chair to discuss their experiences. Between the exit interview and the increased participation in the exit survey, this data is seen as far better representing the graduating senior’s point of view than in previous years.

The Senior Exit Survey data for each semester was reviewed by the faculty, and it was noted that Outcomes 8 (materials, methods & equipment) and 10 (use of electronic technology) showed signs of concern on the part of the students both semesters. A number of additional Outcomes were of concern to the students graduating in the spring. Upon review of student work, as well as student achievement on the AIC exam, it was determined that these Outcomes actually are being met, but the students do not understand this point.

In order to address some of the student perceptions in the coming year continued efforts will be made to reassure the students of their skills, demonstrate our use of technology.

### Industry/Employer Survey

The most recent Industry/Employer survey was conducted in fall of 2016. The survey was sent to members of the program Advisory Board. About 37.5% (n = 9) of those queried responded to the survey. The participants were asked to evaluate the level of achievement of the 20 Program Outcomes (see page 1) of students or alumni they employ or have employed on a scale of one to five, with five being best. The average of all the responses is shown in Figure 10 below.



**Figure 10 – Achievement of Program Outcomes According to Industry 2015**

The average response indicates that employers agree that our graduates demonstrate an ability to achieve the Program Outcomes in the work place.

### Follow-up Action

Data indicates the program is producing graduates who are able to demonstrate achievement of all the program Outcomes to a good or better degree. The next survey will be conducted during the summer of 2018. In the interim strategies will be discussed and developed to obtain a greater response rate for future surveys with both the faculty and with the Industrial Advisory Board.

## Additional Assessment Measures

### Advisory Board Feedback

In fall 2015, the Construction Management Advisory Board members were tasked with reviewing a new Strategic Plan for the Construction Management program. The Board approved the program without dissent.

### Follow-up Action

The Construction Management Advisory Board had created a subcommittee to review the undergraduate curriculum of the program. This is an on-going process.

### Construction Competition Results

Boise State Construction Management student teams participating in the annual Associated Schools of Construction (ASC) Region VI and VII competition were competitive with student teams from other construction management programs in attendance. The Heavy Civil team placed 2<sup>nd</sup>, while several other teams performed well. Success in the student competition requires outstanding performance in teamwork, time management, and oral presentations in front of a live industry judging panel, as well as comprehensive knowledge and understanding of construction materials and methods, drawings, contract documents, cost estimating, scheduling, and project management and administration.