



## Developing a Professional Internship for Faculty in Construction Higher Education Programs

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## Abstract

The Associated General Contractors of America's Education and Research Foundation (AGC-ERF) launched a professional paid internship initiative for construction faculty starting on the summer of 2013. Prior to the official program launching, a pilot program was tested in the summer of 2011, with an AGC member contractor hosting a single faculty member selected from an ACCE accredited institution. The internship was designed as a three-way partnership between the AGC-ERF, the faculty host institution, and the host company. The initial budget of the program was \$30,000 funded in equal parts by the three internship partners. The internship was for a period of two months, and the faculty was a member of the jobsite management team at a level similar to a project engineer or assistant project manager. This paper presents the model followed for the implementation of the internship, as well as evaluates the results of the pilot program from the perspective of the academic side of the partnership. The internship was an excellent opportunity to develop closer ties between academia, the construction companies, and AGC; by promoting the free exchange of information, knowledge, and ideas that benefits the construction industry as a whole.

## Introduction

For attaining accreditation, construction programs must hire teaching candidates with the appropriate academic, professional and scholarly credentials. Most advertisements for open positions require or prefer that candidates possess both a doctoral-level degree and construction industry experience, among other credentials. This is occurring as the number of construction programs engaged in research increases, and the focus on professional experience in construction decreases<sup>4</sup>. However, the majority of junior faculty hired by construction programs possessing a doctorate-level degree has little professional experience relating to their teaching areas.

One direct method for obtaining industry experience is for faculty to seek employment directly with a construction company for a limited time period, such as during the school summer vacation or during a sabbatical leave. Such arrangements, sometimes referred to as professional internships, are often beneficial not only to the faculty member, but also to the company hiring the faculty member<sup>8</sup>. Professional internships can be tailored so that the faculty member is able to learn a specific skill set that they may not have possessed prior to the internship but is necessary for teaching particular courses<sup>5</sup>. The experience also exposes the faculty member to the daily rigors of working in a corporate environment, which will help them better understand it, and as such be in a better position to convey this information to students. This will improve teaching and will ensure that the course subject matter is relevant to employment in the industry<sup>6</sup>.

Professional internships are also beneficial to employers for several reasons<sup>2</sup>. First, they receive temporary help on projects without committing to a full time permanent employee. Second, while the faculty member is learning specific skills important for teaching the developing generation of construction professionals, they can also distribute best practices and critical

information to their industry employer gained through research. Lastly, by supporting a faculty member, construction companies have the opportunity to build a company advocate who is familiar with the students within a particular university program. Overall, these types of arrangements lead to a positive relationship between academic and industry<sup>8</sup>.

A basic model of a professional internship experience is conceptualized as a partnership between the construction industry and the construction management faculty and his/her academic institution<sup>8</sup>. A needed component is a list of companies representing a variety of construction operations from which a potential intern must seek employment. For internships tailored for students, the list of companies is provided by either a placement office or an internship coordination office<sup>3</sup>, however for faculty internships this list is usually restricted to the faculty's department industry advisory council or his/her own personal and professional contacts<sup>2</sup>

Recognizing the need of faculty for professional development opportunities, the Associated General Contractors of America's Education and Research Foundation (AGC-ERF) launched a professional paid internship initiative for construction faculty starting on the summer of 2013<sup>7</sup>. Prior to the official program launching, a pilot program was tested in the summers of 2011 and 2012. During each summer, an AGC member contractor company hosted a single faculty member selected from an ACCE accredited institution.

### **Internship Program Description**

The internship was designed as a three-way partnership between the AGC Education and Research Foundation, the faculty host institution, and the AGC contractor host company.

#### *Purpose*

The internship was designed to allow the selected faculty member to be immersed in the host construction company providing professional field experience, in order to understand work competencies which have been identified as necessary for: the professional development of faculty in the construction management program; and to improve the value of courses taught by such faculty member.

The faculty intern performed the duties and the professional roles and responsibilities of a project engineer, or assistant project manager, on the assigned project and jobsite. During the internship, the faculty intern was a temporary employee and a representative of the host company. During the internship, the faculty was a member of the construction jobsite management team at a level similar to a project engineer or assistant project manager

#### *Location and Duration*

Internship was conducted during a two-month (nine-week) period, from May 31<sup>st</sup> to July 29<sup>th</sup>, 2011, at Bowen Engineering's Clifty Creek FGD Construction Project jobsite. Intern followed the job site's work hours and schedule. The jobsite was located in Madison Indiana, and required temporary relocation of the faculty and his family from Boston Massachusetts. Travel to the internship location, and return travel back to the intern's hometown added a total of four days to

the faculty's time commitment to the internship.

### *Funding*

AGC Education and Research Foundation, the AGC host company (Bowen Engineering), and the faculty member academic institution (Wentworth Institute of Technology), funded the faculty internship sharing the cost equally among the three partners. The initial budget for the internship was estimated at approximately \$30,000, each sponsoring party contributing \$10,000. The internship budget was designed to cover the following expenses:

- Faculty salary and fringe benefits
- Administrative overhead and payroll taxes
- Housing allowance
- Travel allowance
- OSHA 10-hour Construction Industry Outreach and Miscellaneous Expenses

Figure 1 below shows the budget distribution among the various allocated internship expenses.

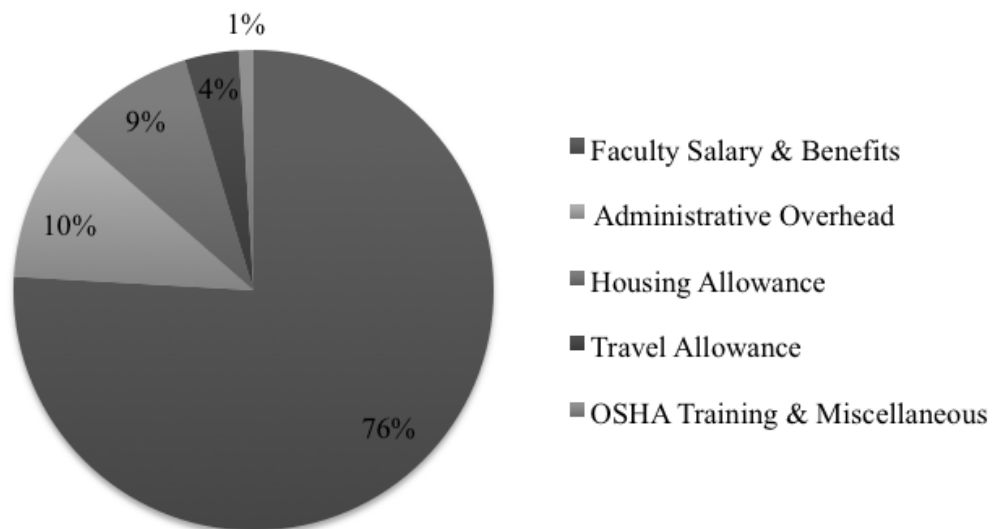


Figure 1. AGC Faculty Internship Budget Allocations.

The faculty member school managed the internship funds and process housing and travel allowance reimbursements, however faculty salary and payroll taxes were paid two-thirds through the school's payroll system, and one-third through the sponsoring company's payroll system. This allocation of salary was used in order to satisfy jobsite, worker compensation, and insurance requirements of the host company. Faculty salary was similar to compensation for a full-time course load of summer classes at the faculty's institution. Health and disability insurance for the faculty person were covered during the internship under the school's system. During the internship, the faculty intern was an actual employee of the host company, with duties, responsibilities, and work expectations at the level of project engineer or assistant project manager

### *Roles, Responsibilities and Expectations*

The internship program developing committee identified three entities that comprise the internship team: The faculty intern, the company directing manager, and the faculty's institution supervisor. The committee developed a set of goals, expectations, and deliverables for each of the internship partners that defined the organization and application process of the program.

Professional faculty interns are expected to:

- Demonstrate their commitment to their company and their learning.
- Know the areas they perform.
- Assume the professional roles and responsibilities linked with the directing manager.
- Systematically think about their practice and learn from their experiences.
- Be responsible for managing and assessing their work.
- Be responsible for demonstrating the outcomes, professional skills and objectives of the internship experience.
- Provide a written report of their experiences and learning outcomes to AGC Education & Research Foundation within one month of completion of internship.

Company directing managers are expected to:

- Work as a collaborative team member on the internship team.
- Plan the intern experience and assess performance.
- Suggest ways for strengthening intern's competencies.
- Clearly communicate their expectations.
- Orient intern to work place, staff, and organization.
- Regularly confer with the intern.
- Provide ongoing documentation on intern's demonstration of essential competencies.

University supervisors are expected to:

- Review intern's work.
- Review and complete intern plan.
- Develop timelines for intern activities.
- Maintain intern's profile.
- Provide feedback and record outcomes in evaluation/tenure documents.

The application package for the "AGC Education & Research Foundation Professional Faculty Internship Program"<sup>1</sup> was developed with the intent to fit as many as possible situations and organizational structures of colleges and universities. The initial application was drafted and required information on the faculty's personnel data, hosting institution data, and brief statement on what the faculty hoped to gain from the experience. The form went through much iteration and was discussed and presented to the full AGC-ERF Board of Directors where it received unanimous support. The final version of the application now requires some collaboration between the faculty intern and the intended company supervisor/mentor.

Each company must supply a directing manager who has successful managerial/technical experiences, workplace expertise, strong interpersonal skills, communication skills, and willing

to be a coach and mentor for the intern. While the directing manager plays a critical role in the internship process on a daily basis, the institute supervisor must provide open communications lines to the intern as well as coach and mentor. The intern as the third member of the internship team must be a construction faculty in good standing.

The ultimate goal of the internship experience is to assist the construction management faculty to develop competence in their teaching expertise, develop a set of professional/applied understanding, learn to examine their practice, learn from their experience while seeking to meet the needs of the construction profession.

### **Faculty Internship Experience**

As an employee of the host company, on the first day the faculty intern was required to attend the company's safety orientation and training in order to work at the jobsite. The intern was issued a company laptop and email account, necessary safety equipment, and was assigned a workspace in the project management offices. In addition, prior to the internship, the faculty member completed the OSHA 10-hour Construction Industry Outreach training online

The faculty person was a member of the jobsite management team, and worked directly under the supervision of an area superintendent, in this particular case the millwright superintendent. The intern reported directly to the site superintendent, and the site project manager.

During the internship, the faculty member was incorporated into the jobsite management team as an active and contributing member of the rotating equipment crew. Generally, the millwright trade has jurisdiction to install, align, and maintain any piece of process equipment that is not a pump. This crew was made up of 8 millwrights and a millwright superintendent. From the start, the intern participated of the weekly management team meetings, the daily end-of-shift team meetings, and attended the daily morning safety meetings.

The intern was assigned to this crew to assist them by making certain that the information, details, layout, space, materials, and overall site coordination for the planned crew activities were readily available, correct, and complete to provide the best and most efficient installation of the work tasks as they were put into place. The intern assisted the millwright crew by taking over the duties of verifying information and details of what the final product installation was to be, allowing our field superintendent to focus on his crew and daily planning.

As part of the millwright management group, the primary duties and responsibilities of the faculty intern were the following:

- Participate of the planning activities for the millwright team. These included completing operation plans, crane critical lift plans, and weekly activity look-ahead plans
- Assist millwright superintendent and project engineer supervise the activities of the millwright crew, including production monitoring and status updates of daily activities.
- Assist the millwright crew perform and complete daily assignments by relaying instructions, providing documentation and specifications, and facilitating coordination with crane/lift operators, as well as with the QA/QC team.

- Assist in obtaining permits from jobsite general contractor, such as confined space permits, open grate permits, and critical lift permits.
- Assist in preparing RFI's and purchase orders.
- Identify and help resolve issues that affected millwright crew production, and when necessary inform appropriate parties.

In addition to the millwright group responsibilities, the faculty intern also observed, participated of, and supported the activities of the field crews of ironworker, and the quality assurance/quality control teams on various days. Among the activities performed were field layout and surveying, critical lift plan documentation, QA inspections and documentation, and working directly with the siding panel crew as 'panel' rigger. The faculty intern was also invited to observe and help the estimating team submit a bid, at the company headquarters.

For the duration of the internship, the faculty member was effectively and employee of the host company, with similar responsibilities and expectations as a project engineer or assistant project manager. The intern had assigned duties and a work plan that supported the jobsite activities and needs, without creating unnecessary burdens on the project team. However, the intern retained flexibility in the assignments that allowed a broader exposure to the various issues and situations encountered during an actual construction, enhancing the overall experience. The faculty intern was a valuable asset to the host company that contributed positively to the daily work operations by bringing a different perspective into the jobsite.

### **Academic Contribution of Internship**

The internship provided valuable experiences to the faculty intern and exposure to a work environment and its corresponding issues, seldom encountered or discussed in higher education setting. It also provided the opportunity to interact with and better understand the various trades and crafts involved in the construction industry. The internship offered the faculty intern with valuable professional experience and actual construction knowledge that incorporated into the courses and curriculum at the school enhances the student's education

Observing the day-to-day operations of a large-scale construction project allowed to evaluate the relevance of the skills and knowledge taught in the classroom. The insight gained through the internship offered an opportunity to evaluate the current course and curriculum content in regards to the skills and knowledge required in an actual work environment. It also helped identify methods and concepts from other disciplines that could improve the construction industry efficiency by helping reduce mistakes, delays, and costs.

The faculty intern classroom environment was changed as a result of the observations and experiences obtained during the internship. Some of the changes incorporated into the classroom are:

- Recent real life anecdotes and experiences that are used during classroom explanations
- Laboratory exercises were modified to include more content relevant to the construction and construction management profession. For example, reduced the number of "engineering design" problems, and increased the number of "construction", "management" and "plan

reading” problems.

- New topics introduced into the lecture material related to the construction process. Some examples:
  - Labor and equipment assignments and distribution between different trades (i.e. pipefitters vs millwrights)
  - Temporary MEP installations
  - Assemblies and prefabrication of MEP sub systems’
  - Some safety and QA/QC concepts pertaining to MEP systems.
- Reinforced the emphasis on giving no partial credit for “almost” right solutions. This student assessment adjustment was due to witnessing the time and financial losses resulting from “incomplete” or “almost right” solutions. The author firmly believes that by allowing incomplete solutions the students, and future professionals, do not develop the ability to fully solve and develop complete solutions, resulting in poor performance and expensive mistakes.

## **Discussion**

From the faculty member point of view, the internship was a successful experience. The whole project team was very supportive of the endeavor and contributed to the positive outcome of the experience. They offered help and guidance, answered all the questions, and they were also open to hear the faculty intern suggestions and comments.

### *Benefits of Internship*

A field-based internship offers a different perspective on the subjects covered in the construction management curriculum, and an opportunity to evaluate teaching and assessment methods. It provides insight into issues of construction management not necessarily available in a purely academic environment. The practical knowledge and experience gained through a practical internship can be incorporated into the program courses, and also into the future proposals for changes in the construction curriculum.

In addition to helping the faculty grow as a professional, and to gain relevant field experience, the internship allowed the faculty to participate in, and observe the day-to-day operations of a large construction site. Having real responsibilities and duties made the experience very valuable and productive, providing knowledge, insight and anecdotes that the faculty member brings back to the classroom, enhancing the classroom experience for students and faculty alike.

The construction company benefits from a different perspective brought into the jobsite, and the knowledge and observations of an “outside” person to the company. The collaboration of a faculty member brings academic methods, problem solving, analysis, and research skills to real jobsite situations and problems.

The school also benefits from a broader visibility in the construction industry, which might allow better placement of program graduates in the future. It also opened the door for future additional collaborations programs with industry, allowing faculty members to obtain valuable practical experience, as well as the sharing of best practices and methods between the university and industry.



The internship is an excellent opportunity to develop closer ties between academia, the construction companies, and AGC; by promoting the free exchange of information, knowledge, and ideas that will benefit the construction industry as a whole.

### *Lessons Learned*

The main lessons learned during the internship, and that might help future faculty internships are:

- Intern should be an active participant of a management or supervision team, while still maintaining flexibility/independence to assist and observe other teams in the jobsite and company.
- Jobsite supervisor should agree to host a faculty intern within his/her team, and be part of the pre-planning of the internship in order to fully benefit of the intern collaboration.
- Intern should participate and attend daily and weekly meetings, and training sessions as it applies to the assignment.
- Intern should be assigned to perform duties that will supplement his/her knowledge, but at the same time support day-to-day operation of the team he/she is assigned to.
- Finally, intern should be prepared to adjust to the jobsite in a relatively short period of time. Summer period is not a lot of time, but it is enough to make the experience worthwhile.
- The available \$30K budget is sufficient to cover reasonable salary and expenses. However, the amount might limit the duration of the internship to only two months. The available budget was enough to provide an adequate faculty salary, housing, and travel expenses by car, for the duration of the internship. However, a longer internship, or air travel and local transportation, might not be able to be covered with the available budget.

### *Suggested Improvements*

The following are some areas for improvement that might benefit the internship experience:

- Reduce overhead costs of the internship fund management. Possibly distribute funds as a faculty grant or scholarship exempt from school's high overhead costs.
- Identify host companies with available jobsites closer to the faculty intern home institution, decreasing housing and travel cost of the internship.
- When the internship location requires travel and temporary relocation, provide assistance locating and securing affordable and adequate short-term family housing, as well as local transportation.
- Use of standard internship contract and agreement forms developed and/or provided by AGC will facilitate planning of the internship, while protecting the interests of the parties involved.

In general terms, the internship was a very positive and enjoyable experience. As with any new program, at the time of the pilot program, the application process, internship requirements and procedures, as well as the legal and financial agreements between the parties involved in the internship needed to be fully developed, reviewed and adjusted to satisfy all parties.

## Conclusion

In order to fulfill the desire for the AGC Research and Education Foundation to become more actively involved with construction management higher education institutions, a professional faculty internship was developed with a commitment of resources and willingness to provide a clearinghouse of potential industry partners. This important program would help in providing credentialed faculty with the industry experience and applied understandings that are crucial for the general contractor and related professionals.

A first pilot of the program was conducted during the summer of 2011, and was a very positive experience for all the parties involved: the faculty intern; the host company; the faculty school; and AGC. The allocated budget of \$30,000 for the program was sufficient to cover faculty salary, housing and travel expenses, as well as fringe benefits and overhead costs.

The internship provided the faculty intern with knowledge and insight on “real world” construction issues not commonly available in a purely academic environment. The acquired knowledge and experiences will be incorporated into the curriculum, supplementing teaching topics and enhancing the classroom experience. The field internship is an experience highly recommended for faculty teaching in construction, construction management or related fields.

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