

**AC 2009-1114: CREATING INDUSTRIAL PARTNERSHIPS WITH
CONSTRUCTION-MANAGEMENT TECHNOLOGY PROGRAMS**

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Creating Industrial Partnerships with the Construction Management Technology Program at the University of Maine

Abstract

Construction companies are an integral part of developing and sustaining a construction management technology program. Ongoing support from these companies has several aspects from financial support to political maneuvering. Construction companies can benefit from active participation with the construction management program through indirect recruitment; the CMT program builds mutual benefit with access to extended resources often not available in university budgets.

Our program has an active and supportive industrial advisory committee. Participating members help in curriculum development and monitor the progress as the program expands. They provide mentoring opportunities, summer employment, and classroom assistance to enhance the learning environment. Many contractors open their active project sites to student groups to allow direct observation of the industry. We encourage professional networking and the industry encourages student participation in the monthly trade meetings to give students greater understanding of the issues surrounding construction. This paper presents the structure of the industrial partnership that our construction management program has with the construction industry. It discusses how this relationship enhances our program and what the benefits are to the industry. Industry is a great asset in our continuing ABET evaluation.

Introduction

The Construction Management Technology (CMT) program at the University of Maine is a four year ABET accredited program that gives students a broad education in applied construction, civil engineering, and business subjects. This program is offered through a combination of CMT courses supplemented by traditional civil engineering and business courses. As modern construction practice evolves, students need to have a broad background and education to meet the challenges associated with construction practice.

In the past 5 years, the CMT program at UMaine has increased approximately 75% to a student body of nearly 200. In addition to traditional CMT students, several students from other programs pursue minors in CMT. As result of the demand for the program, student rosters in construction courses have become significantly larger. Though CMT has increased in size, budgetary constraints have not allowed hiring additional full time faculty to supplement the current 3 full time faculty members. The active support of the construction industry has helped alleviate some of the challenges associated with an expanding program in a severely constrained environment.

The support of industry for the CMT program at UMaine comes in many forms from both private and corporate levels. This support is in both political and financial areas as the program evolves to enhance student education. Through communication with industry, the CMT program is successful with the partnership in educating future construction leaders. This paper will discuss some of the initiatives that we have at UMaine.

Industrial Advisory Board Meetings

The CMT program is one of four programs in the School of Engineering Technology (SET) at the University of Maine. To foster this cooperative partnership with industry, an industrial advisory board has been created for each of the programs in SET. These boards are made up of individuals that represent industries that have a presence in Maine or who are graduates of the UMaine CMT program or who hire UMaine graduates. Several small and major companies in both the public and private sector are represented. The boards for each program meet twice a year to learn about the progress of the programs and how they may serve the respective programs. (1)

The CMT program has a board comprised of 14 members representing construction companies from both in Maine and out of state. Current companies consist of Kiewit Construction, CPM, Cianbro Corporation, Sargent Corporation, Gilbane, Nickeson & O'Day, James W. Sewall Company, Bancroft Construction, the Maine Department of Transportation, SW Cole engineering, and the Lane Construction Company. Additionally, the board has a representative representing the Maine section of the Associated General Contractors, the Maine section of the Associated Builders and Contractors, a professor from Eastern Maine Community College, a 2 year Civil Engineering Program that feeds some students to our program, and a professor emeriti who retired from the UMaine CMT program. Several representatives on the board are former

students who graduated from the program and have personal awareness of the composition of the program.

The industrial advisory board to the CMT program meets in the spring of each year prior to graduation. Members of the board meet with a cross section of students in the CMT program to discuss the program and the courses that are offered. Students meet with the industrial advisory board faculty present. This meeting is part of the ABET assessment process that faculty in CMT use to improve the program. The meeting is structured such that students can discuss openly their concerns, suggestions, and experiences without fears of speaking out in faculty presence. The industrial advisory board members report back the results to faculty. This information is used to assist in program development for continuous improvement. Though some concerns are certainly personality driven, student comments and suggestions are very helpful in making adjustments. The advisory board meets with faculty near the end of the fall semester to discuss the information collected in the spring student meeting. The fall advisory board meeting is used to discuss programmatic changes. It is used for discussing developments with the program, the university, and the industry. These meetings have become the foundation for continuous improvement.

Within the past 5 years, several programmatic improvements have been implemented. At one of the board meetings, one of the members asked if the faculty encouraged students to seek any professional certifications. At that time, we did not pursue any sort of credential development. With the encouragement of our board, faculty pursued and now require students to take the Certified Professional Constructors, Level I, exam. This national exam is administered through CMT faculty at UMaine. After the exam is graded nationally, the results are sent back to the CMT faculty. Faculty review the results of the exam to make both subjective and objective judgment as to the adequacy of instruction based on the 11 categories tracked by the exam. Because of past exam results, the CMT program has included more information relating to estimating, materials, and surveying within the individual courses offered through CMT. Another IAC board member asked if students take the Fundamentals of Engineering examination. As a construction management technology program, we did not look at this exam as relevant to the program. Through discussion with the board, professional constructors indicated that students with a FE may have a better chance for employment. Because of increasing design-build contracts, modern construction professionals have a greater design role. This trend causes the contractor to need to be able to fully design some aspects of a construction project that would not have been part of past construction practice. We developed a Fundamentals of Engineering Review course within our program. CMT students are required to sit the review course, but are not required to take the exam. Since the first preparation class that we offered in 2004, 20 of our graduates have passed the exam. (Because of record confidentiality, we have no information as to how many have attempted the exam unsuccessfully.)

Through student meetings with the industrial advisory board, the faculty discovered that several students reported the desire to take some courses not offered within the program. Students identified the need for courses in pavement technology, LEED certification, and BIM modeling. Because of the limited resources, ABET accreditation requirements, and UMaine general education requirements, the curriculum is fairly defined. Faculty discussion of the courses has

resulted in contractor personnel coming into the classroom to present information on these respective topics. These presentations of applied topics give students a greater awareness of the subject not necessarily identified within the program.

Politically, the industrial advisory board is available to the CMT program to advocate resource allocation with university administration. Because the program is expanding, a fourth faculty member has become a priority in the CMT program. Administration has not established the allocation as a priority and a fourth position is not yet established. The board set up meetings with the university president to discuss possible allocation. They discussed the need of industry to have trained workers for future economic development. Though the allocation has not yet materialized, the advocacy of board members demonstrates the support that major industry has for the CMT program. A fourth position is promised in future budgets. Some financial needs for program resources have been collected through the strength of the advisory board. Members contacted associates to solicit funds that have been used for a CMT account to purchase non-budgetary items. The CMT industrial advisory board members lend an advocacy not often enjoyed by many academic programs.

Student Interaction

Construction industry professionals are very readily available to CMT students at UMaine. The state parent chapters of the AGC and ABC have student chapters at the university. Both of these professional organizations encourage students to participate in their respective professional activities. Students attending monthly meetings are welcomed and the professional organizations financially support students to attend these meetings. Construction companies sponsor individual students and make a point of having the students sit with their employees at the professional meetings. These organizations work cooperatively with the student chapters. For instance, the AGC of Maine sponsored the incoming freshmen at a first day of school barbeque. 52 new freshmen were treated to a barbeque cooked by upper classmen and were greeted by sponsoring company representatives. This show of support helps students realize that the professional community supports their efforts to gain a rounded education upon entering the industry. (Figure 1)

As a result of industrial encouragement, professor Philip Dunn put together a cross country trip to visit the project sites of 5 contractors in 3 days during the spring break in 2008. 30 students, professor Dunn, and professor Will Manion toured construction sites in the states of New York, Connecticut, Massachusetts, and Maine. The sponsoring contractors included Kiewit, Cianbro, Shawmut, Gilbane, and Pizzagalli. These contractors paid for meals, overnight lodging, and give away items for each participant. The coach bus for the 3 days was paid through the CMT gift fund. This valuable learning experience was only available through the cooperation of industrial partners who believed in the education of students to be future constructional professionals. Students were taken to many sites to witness construction techniques and see sites that they may have heard about, but would not see unless they were part of the company involved. Tour leaders gave students valuable insights into their daily work routines and construction challenges. (Figures 2 and 3)

Officers of the student AGC and ABC chapters have developed valuable contacts with industry at professional meetings. These industry contacts have come to many student “pizza” nights to discuss projects. The “pizza” nights are used to speak about individual companies and the work that these companies do. Student participation is very good and often leads to summer job opportunities, professional contacts, and some full time employment. Indirectly, industry uses these meeting nights for some preliminary screenings for employment. Most companies make themselves available to meet with students. In the past 5 years, the student chapters have done a couple service projects. The professional contacts that have been made have actually supplied some of the materials and equipment needed to execute the project.

Classroom Partners

As result of one industrial advisory board meeting, the Lane Construction Corporation asked if the CMT program taught information about pavement technology. Because of program limitations, we did not have the ability to do so. The board member representing Lane Construction volunteered to have people to come to a classroom to discuss the topic. 2 professionals from Lane Construction have come into the classroom for the last 3 years to teach a unit in pavement technology. They offered interested students to come to their lab to see how pavement is tested and processed. Several students took advantage of the opportunity. (Figure 4) Pizzagalli Construction asked if we trained students in BIM. Again, our curriculum does not accommodate the instruction. At this time, a representative of Pizzagalli Construction came into the classroom to demonstrate the use of BIM. CMT encourages construction professionals to come and discuss specific topics to supplement course materials. (2)

The Maine Department of Transportation, a public member of the industrial advisory board provides plans, standard specifications, and specials books for current projects. These materials are used as part of the Estimating class and capstone course. With the size of classes, the number of complete plan sets recently delivered was 15. These resources would cost more than could be obtained through our budget. We have also obtained student copies of estimating and scheduling software provided through the cooperation of industry.

Industrial advisory board companies and other contractors have come to classes to discuss bonding, estimating, cost accounting, pipe materials, federal regulation, ethics, and project management. A recent speaker for the Sargent Corporation spoke to the senior capstone class about the uniqueness of construction finance. This speaker is the Chief Financial Officer of the Sargent Corporation and is an active member of the Maine Chapter of the Construction Financial Managers’ Association. He demonstrated the differences of a construction balance sheet and illustrated the importance of understanding the balance sheet from the perspective of the successful contractor. The discussions and supplemental materials provided to students on these subjects have provided invaluable assistance to our educational experience. (3)

The Career Center at the University of Maine sponsors two major job fairs at UMaine during the academic year. The fall job fair is held in October and had 100 participants interested in engineering and construction graduates both as full time and summer interns. The smaller spring fair is open to all majors and has about 10 construction industry participants. The CMT program encourages students to participate in these fairs by having students develop resumes. We foster

industrial cooperation by having students engage the participants. Many participants have had “pizza” nights before and after the fair for interested students. They discuss opportunities with the students. Career center exit interviews show that our students are very engaged with the participants and participants seek out CMT students in their respective construction companies.

The CMT program has decided to participate in the Associated Schools of Construction student estimating competition. Members of our industrial advisory board encourage students to compete and provide opportunities for the students to use plans and learn techniques needed for competition. The students have gone to the headquarters of Cianbro Corporation for training in software and estimating procedures. Because of tight funding, the AGC of Maine is committed to subsidizing travel expenses associated with the competition. (4) Student competitors presented an overview of the competition during the spring meeting of AGC in 2006 to reinforce the importance of the financial support that industry continually provides to the student body. Several companies have developed named scholarships to award to students based on need and academic achievement. Many of these scholarships have been created to encourage students to continue in their education. These scholarships have been used to interview many students for positions within companies that were not really looking for personnel. In one instance, the contractor interviewer representing one of the professional scholarship committees was so impressed by the credentials and interview with a scholarship interviewee that he offered the individual a summer internship.

Conclusion

The CMT program of the University of Maine has a strong partnership with the construction industry. Many construction companies in Maine and out of state employ graduates of the program and have an investment in our educational development. They provide program guidance through an industrial advisory committee that meets frequently. Through financial assistance, CMT has been able to provide opportunities to students beyond the traditional avenues of support. Individual company professionals have taken the time to encourage students to follow the professional training needed to be successful.



Figure 1- Freshmen students meet construction professionals from the Sargent Corporation at the Freshmen barbeque 2008



Figure 2 – students tour the Fenway Park Renovation with Shawmut Construction of Boston, Massachusetts in 2008



Figure 3 – Students tour an AMTRAK bridge rehabilitation with the Cianbro Corporation in Grotton, Connecticut in 2008



Figure 4 – Students work in the Lane Construction lab To see how pavement is tested. 2008

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