

Faculty Internship in Demolition Management: Advancing and Reinforcing Construction Management Education

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Beginning in 2004, the National Demolition Association (NDA) began to convey to the leadership of university construction management (CM) programs a need for inclusion of demolition in the undergraduate CM curriculum. NDA's membership expressed a need for courses designed to help future general contractors and construction managers better manage the demolition process in addition to providing students with a background appropriate for employment in the demolition industry. After seeking acknowledgement from their Construction Advisory Committee that a significant proportion of current construction activity involved existing built environments, Purdue University agreed to establish a demolition and reconstruction concentration as one of the specialized areas of CM study available in their program. A significant challenge in taking the step to establish this unique specialized area of study was the development of faculty with a sufficient range of knowledge and experience to adequately develop the new curriculum and teach the new courses. This paper describes the use of a faculty internship to support the refinement of the demolition content covered by this area of concentration.

Key Words: Faculty Internship, Demolition, Undergraduate Education, Curriculum Refinement, Course Development

Introduction

Through the encouragement of the National Demolition Association (NDA) and the perceived need for a college level curriculum that includes the special requirements of demolition and reconstruction activities of all types, Purdue University has established an area of concentration in demolition and reconstruction management for its construction management (CM) students.

Demolition is not the same as new construction. Many misconceptions about the activities of demolition contractors are held by the general public, general contractors, and young construction management professionals. The most frequently cited misconceptions include the belief that demolition contractors primarily "blow-up" buildings, recycle very little, operate unsophisticated businesses, and can successfully complete demolition activities with little knowledge or experience (National Demolition Association, 2009). Even experienced general contractors have been challenged by demolition projects. A recent example is the construction management complexity involved in the demolition operations to remove the Deutsche Bank building damaged during the September 11, 2001 terrorist attack on the World Trade Center site in New York City (Lower Manhattan Development Corporation, 2009). Few projects have as many complex demands as the Deutsche Bank building demolition. Nevertheless, demolition is project specific and seldom has significant input from a design professional experienced in demolition practice. Consequently, the demolition contractor makes many critical decisions that should be understood by all construction managers involved.

Hiring faculty to develop the curriculum and teach the courses in this specialized area was hindered by the combined requirements of extensive experience in the content area of demolition that the new faculty member was to teach and the preference for a candidate with a Ph.D. in a related field. The author, possessing both a Ph.D. and extensive construction experience was selected, even though his demolition specific experience was limited. This limitation required a rigorous exposure to demolition activity in a manner that allowed a thorough introduction to the work requirements of the demolition industry in the shortest period of time. A faculty internship was chosen as a means to

obtain the new knowledge needed that would reinforce the CM curriculum in support of this new specialized area of study.

Literature Review

Use of faculty internships has been advocated as a means to build valuable collaboration between industry and university programs. Tener (1996) suggests that design and continuous updating of the construction engineering curriculum is a fundamental function that requires the university to collaborate with industry practitioners. Cooperation with industry practitioners can lead to many forms of collaboration with faculty such as curriculum enhancements, identification of potential research direction, and joint educational or research opportunities (Beckman, Coulter, & Khajenoori, 1997). To facilitate regular contact with industry, academic departments often establish committees of industry practitioners who regularly meet on campus. This organizational vehicle can help to bring together faculty internships as part of their role in maintaining positive university-industry relations (Baha & Glon, 1988).

The need for faculty development is noted frequently in the literature, and faculty-industry collaboration through internship opportunities offers significant potential in meeting that need. Adaptation to change and the need for faculty to be aware of that change while maintaining competence in the field of study all require constant faculty development (Camblin & Steger, 2000). The need to bring the most up-to-date industry “best practices” to the classroom also requires ongoing faculty development (Hynds, 2000). Some even suggest that the academy must follow the needs of industry while at the same time acting as agents of change, a challenge not easily accomplished without the opportunity for faculty and industry practitioners to work together on topics of mutual interest (Reinhartsen, 2003).

Curriculum improvement is also noted frequently as an area that must be ongoing and influenced by university-industry collaboration. Advisory committees can play a role in curriculum updates (Baha & Glon, 1988; Tener, 1996). For more concentrated curriculum improvement, the extended contact provided by the faculty internship is often a more desirable approach when trying to meet the needs of industry (Davis, 2003). These internships are not unique to construction and engineering programs. They are used in many programs that utilize application of specific practices or technologies. A notable example is in the area of hospitality. Faculty internships, varying in duration from days to weeks, are common with large organizations such as Marriot, Hyatt, and Red Lobster as well as with smaller proprietors (Hales, Wiener, & Lynn, 2007).

The Internship Experience

The author’s faculty internship experience was not simply one of faculty development or keeping up with change. Instead, the need was to identify and define subject areas not currently included in the CM curriculum that demolition practitioners require to become competent in their field. As noted by Baha and Glon (1988), this internship was to help make the author an expert in the field.

College faculty take many paths in preparation to teach in a new subject area. Use of the literature is a common path. Textbooks can provide both content and structure for course development. Many modern textbooks even provide PowerPoint presentations, tests, and supplementary materials as instructor resources. The experiences of other faculty are also a valuable resource when teaching a course for the first time. Unfortunately, with the exception of the use of explosives included in some mining engineering programs, demolition is not a subject that has been covered by university curricula in the past. In addition, current demolition books published in English were not available for course development. German and Spanish books were located by the author, but partial translations showed them to be primarily descriptions of available demolition equipment with some country specific regulatory information. A few limited journal articles and demolition case studies were located and used as teaching resources.

The dearth of academic literature and experience made a faculty internship experience a logical choice to build the author’s knowledge and experience with demolition. Since the department’s Construction Advisory Committee did not have a large representation of demolition contractors, the internship process was started with help from the

Education Committee of the National Demolition Association. Faculty internships facilitated by an industry association can provide structure and, sometimes, financial support (Hales, et al. 2007). Although a structured internship through NDA was not available, some NDA funding was available. In addition, the participating demolition contractors were generous in their hospitality and the university provided lodging and transportation as required.

Table 1

<i>Faculty Internship – Demolition Projects Visited</i>		
Brief Description of Project	Project Location	Course Material Developed
Dormitory Demolition – Complex of Two-Story Structures	Bloomington, IN	Project Video Project Planning
Automotive Parts Foundry – Industrial Demolition	Indianapolis, IN	Equipment Video High-Reach Demo
Automotive Parts Plant – Industrial Demolition	St. Joseph, MI	Photos - Utility Protection
Construction Equipment Plant – Industrial Development	Aurora, IL	Project Video Demolition Techniques
High-Rise Historic Hotel – Preparation for Reconstruction	Chicago, IL	Project Video Complete Interior Demo
Power Plant Demolition	Philadelphia, PA	Photos - Impacts of Hazardous Materials
Inner-City Hotel Demolition	Philadelphia, PA	Project Video Site Planning
Steel Mill Dismantling – Industrial Demolition	Fairless, PA	Photos - Hazardous Conditions
Three Mid-Rise Buildings in Dense Urban Environment	Manhattan, NY	Photos - Hand Demolition
Steel Scrap Yard	Youngstown, OH	Photos - Material Recycling
Demolition Contractor’s Office Facility & Yard	Youngstown, OH	Demolition Equipment
Hydraulic Demo Tool Manufacturing Facility	Youngstown, OH	Building Material Reuse in Plant
Steel Mill Dismantling at an Operating Facility	Zug Island, MI	Industrial Dismantling
Steel Mill Dismantling at an Operating Facility	Gary, IN	Crane Pick Dismantling
C&D Landfill & Recycling Facilities	St. Paul, MN	Photos - Material Disposal & Recycling
Office Building – Interior Selective Demolition	St. Paul, MN	Photos - Selective Interior Demolition
Bridge Demolition – Interstate & Over Regulated Waters	Eugene, OR	Photos - Bridge Demolition
Demolition Contractors Office Facility & Yard	Eugene, OR	Photos - Equipment Maintenance
RCA Dome Demolition – Conventional & Explosive Demo Structure Attached to Convention Center to be Expanded	Indianapolis, IN	Photos, Safety & Project Planning Information

The internship was organized to provide exposure to a variety of demolition projects. Since demolition seldom has detailed project documents to guide the process, the author was most interested in field observation of projects with the ability to question personnel about the planning that preceded the current activity as well as the management process and decision making that took place during demolition. Because the author had previous experience with residential and small commercial demolition, the site visits concentrated on large commercial, industrial, and bridge projects, especially those with special challenges. The internship activities took place during the summer months in addition to frequent short visits to the RCA Dome Demolition during the fall semester. The opportunity to make frequent visits to the RCA Dome demolition was helpful due to the complexity of the project. A brief description of the projects visited and the course materials developed from each project is provided in Table 1.

University Application of the Internship Experience

The faculty internship project visits enabled the author to expand his knowledge of the types of demolition encountered, common demolition techniques utilized, typical equipment used, project management challenges experienced, project planning needs, available checklists to assist the manager, regulatory requirements, material handling issues, safety issues, and many common business practices of the demolition industry. The most significant revelation of the internship was the realization that, to a large degree, the financial success of the demolition contractor depends on their ability to efficiently manage the handling and disposal of materials. Most outside observers of the industry concentrate on the wrecking process. Although fascinating to many and critical to the safe removal of existing built infrastructure, the evolution of high-power hydraulic tools has increased the predictability of the demolition process. It has also enabled the demolition contractor to minimize their use of labor. What has become a major driver of cost is the contractor's ability to handle material as efficiently as possible and to minimize disposal cost through reuse, recycling, or low-cost disposal. Numerous factors impact disposal and recycling including the regulatory environment where the demolition is taking place.

Many classroom resources resulted from the internship. Videos were taken of the project activities being observed whenever possible. These videos were edited to show one or more salient points about the project, the demolition techniques used, or management of the process. The resulting videos are typically no more than 15 minutes in length. They serve as a discussion tool to encourage students to think through planning steps, management decisions, or safety protocols that are typically made on the job. Since project conditions change quickly in demolition, there may not be time for consultation under some circumstances. Those individuals managing the demolition process must be able to react appropriately to the changing conditions.

Photographs were taken when video was impractical. These photos are useful in describing project challenges. The images show the context of site conditions, the impact of surrounding properties, the necessity for protecting the public, and the difficulty demolition contractors have when working in close proximity to other trades. In general, photography is the primary component of PowerPoint presentations used in the classroom. When logically organized, each photo provides a starting point for class discussion. Some photos can be used to demonstrate a point while others serve in providing background for asking questions that force students to think through a problem. Queries such as "What safety issue do you see here?" or "What conditions on this project need to be considered in the demolition plan?" would be difficult without a high-resolution photograph to frame the project conditions.

The internship also provided valuable interaction with members of the demolition industry. The time spent with multiple practitioners provided a variety of perspectives on everything from risk management to the value of regulation. In addition, contacts were made that have proven to be useful in developing research on the cost of ownership and operation of equipment imposed by the heavy service conditions that are experienced by demolition equipment when compared to similar equipment used in more typical construction settings. Due to the mutual respect developed during the project visits, it also allowed contacts to be made for a collaborative effort to produce a demolition textbook for use in CM programs.

Faculty Internship Opportunities and Challenges

The author's experience demonstrates many of the faculty development, curriculum improvement, research opportunity, and industry relation benefits of the faculty internship. In this specific instance, the internship provided a unique opportunity to gain field experience in a relatively short time period. It has been noted that at times academics and practitioners underestimate each other (Reinhartsen, 2003). This was not the case in the author's experience. The congenial and respectful relationship that has developed with the demolition companies involved, many of which hold leadership positions in the NDA, is likely to provide returns to university and practitioner alike.

By bridging the gap between the academician and the practitioner, many other potential benefits may accrue. For the practitioner, exposure to their company's projects may provide an opportunity for recruitment of future graduates as well as the availability of the faculty member as a willing participant when expert assistance is required within their organization (Beck, 2001). Future opportunities may arise for faculty to assist with educational needs within demolition companies or at the association level. In addition, future participation from the university might be helpful in providing an outside perspective with an unbiased point of view (National Environmental Health Association, 2005). Many of the mutual benefits of a faculty internship are displayed in Figure 1 adapted from Hynds (2000).

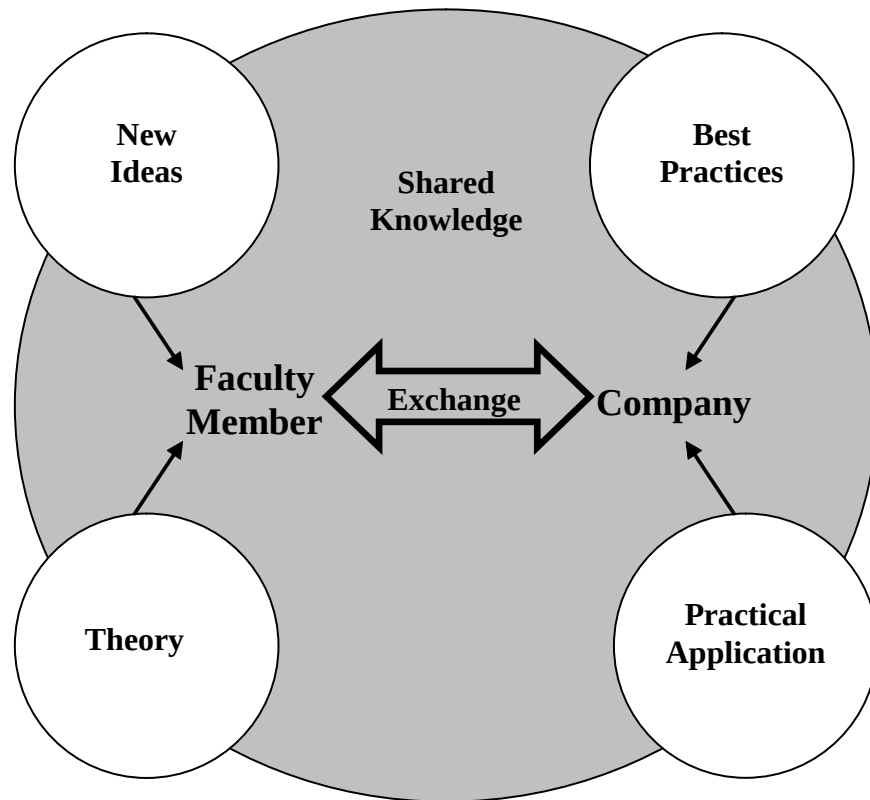


Figure 1: Mutual Benefits from Faculty Internship

Despite the plethora of benefits that can result from the faculty internship, the challenges involved in the implementation of the internship can limit their use. The logistics of the internship may prevent many faculty members from participating. Even if the internship takes place in one location, it may require the faculty member to relocate to another city. Working spouses, children, and the inconvenience of a temporary relocation will make an internship unpalatable to many. Cost may also be a stumbling block. The cost of employing the faculty intern may have to be shared in some way. Because participating companies benefit from the arrangement in many cases and

the university benefits as well, there is frequently adequate justification for sharing in the cost of the internship. Hales et al. (2007) describes an alternate funding opportunity with an industry association sponsored faculty internship in the hospitality industry. The partial NDA financial support of the author's internship is an example of companies helping the university develop a program through an industry association. NDA's participation will ultimately benefit the industry.

Faculty Internship Planning Tips

Based on the author's experience and tips provided by Beck (2001), the following suggestions can be helpful in planning a faculty internship.

- Establish expectations of the internship ahead of time. All parties should be aware of these expectations so that they can work together in a way that provides benefits to all. This could be done with a written document or a meeting of all parties at the beginning of the internship.
- If project visits are involved, review timing and accessibility issues. Advanced travel planning that leads to a visit where appropriate work activities are not taking place may nullify the benefits of the project visit.
- Agree beforehand if anything will be off-limits to the visiting faculty member. Execute nondisclosure agreements if necessary. Arrange for appropriate safety training and personal protective equipment on projects with the possibility for hazardous material exposure.
- Company representatives should explain the benefits and expected outcomes of the faculty internship to their employees to assure their comfort and cooperation in the process.
- Lines of communication should remain open between the faculty and company representative during the internship. Conditions may change that require some flexibility or a dramatic change in plans. Without open lines of communication, valuable opportunities can be missed.
- Creating a written document at the conclusion of the faculty internship outlining the process, successes, failures, and outcomes of the internship is helpful in planning for future internship activities.
- Parties involved in the faculty internship should maintain contact in order to realize the full long-term benefits of the relationships built during the internship period.

Conclusion

The faculty internship can be a valuable experience with benefits that accrue to the faculty involved, the university, the participating company(s), and the industry as a whole. The specific deliverables expected to result from internship experience can cover a range of outcomes including journal articles, course materials, research proposals, curriculum development, internship relationships for other faculty or students, field experience that supports teaching a new topic area, operational improvements at the internship company or simply enhancing university-industry working relationships. This example of an internship to develop the faculty member and to begin curriculum development for a new topic area in CM education was a success due to the cooperation of many individuals as well as their willingness to contribute time and money to the process. There is great potential for future faculty internships to help update faculty knowledge of industry practice, help educators respond to the needs of the construction industry, help faculty researchers become agents of change that move the industry toward improvements in management and technology, or to develop new areas of study that will become important to constructors of the future. Faculty internships can be built around a mutually shared need, whether it is an ongoing challenge such as cost control, or a new opportunity such as implementation of Building Information Modeling (BIM) in construction management.

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