Construction Education at Texas A&M University:  
A Comparative Longitudinal Study of Graduates

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ABSTRACT

This research study reports the findings of a series of three surveys, over a period of 17 years, sent to graduates of the Department of Construction Science (COSC) at Texas A&M University in an attempt to assess the needs of the industry for construction graduates. A comparison analysis was made of the descriptive data regarding salary, employment information, employer demographics, curriculum ratings, and professional development. The data and findings can be used by institutions to respond to changes in trends of the construction industry.

Keywords: Construction education, construction graduates, construction industry, longitudinal study, outcome assessment

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1. INTRODUCTION AND BACKGROUND

Construction education programs’ mission statements typically include striving to prepare students for successful careers in the construction industry. To achieve this goal, construction education programs must provide students with the skill-sets and competencies needed to excel after graduation. These skills and competencies can be identified through feedback acquired from surveys of former students as well as from industry entities, such as the Construction Industry Advisory Board which most programs have in place. This study focuses on a series of surveys of graduates of the Construction Science (COSC) program. Implementing this feedback into the curriculum allows construction education programs to remain responsive to the changing demands of the industry as well as continue preparing students for future success (Newitt, 1987).

The Department of Construction Science at Texas A&M University periodically conducts follow-up studies of department graduates. These surveys allow the Department to assess the strengths and weaknesses of the curriculum being taught, as well as obtain descriptive information such as salary, employment information, employer demographics, and professional development after graduation. Each singular study provides the graduates’ responses at a single point in time, which offers only a limited number of conclusions to be drawn from the results.

Over the last several decades, construction education has evolved, and some even say transformed, in response to the needs of the construction industry (Burt and Hatipkarasulu 2007). Schools of construction’s department directors have found it necessary to conduct self-studies periodically to keep abreast of industry needs and changes, confirm the academic curriculum, in order to provide a rationale on how a curriculum should change. By replicating the follow-up studies of graduates and surveying at regular intervals, a longitudinal study can be developed to follow graduates’ responses over time. A longitudinal study allows for a comprehensive set of conclusions
to be drawn from the data gathered, leading to better informed decisions regarding program development.

1.1 Problem Statement

The purpose of this study is to analyze data collected from Construction Science graduates of Texas A&M University from 1987 through 2004.

1.2 Research Objectives


1.3 Delimitation

- This study is limited to data collected from surveys of Texas A&M Construction Science graduates conducted in 1987, 1998, and 2004.

2.0 METHODOLOGY

2.1 The Surveys and Data Organization

The survey recipients in all cases came from the department set of graduated students. The alumni database is regularly updated by the department through correspondence and more recently through emails. Although some alumni contact is lost over time, those that could be reached constitute the set used in the surveys in this timeline.

The surveys used for this study were refined from the original survey conducted in the fall semester of 1982. In 1982, the department initiated a survey of prior graduates as part of a movement toward accountability and outcomes assessment. This was designed to coincide with the
American Council for Construction Education (ACCE) re-accreditation process. Data gathered from the first survey is inconsistent and incomplete, therefore, not incorporated into this study. Since the original survey in 1982, the study was refined and replicated in 1987, 1998, and 2004. Table 1 shows the total number of surveys mailed in each of these studies along with response rates. The events in the economy and in the construction industry during the intervening times of the survey is not in the scope of this research.

The data collected through the surveys conducted in 1987, 1998, and 2004 were compiled into a comprehensive database for graduates from the Department of Construction Science at Texas A&M University (COSC). The data was then sorted into groups based on the number of years since graduation (Graduate Groups). The groupings of students into each Graduate Group were then chosen to coincide with the number of years comprising the groups from the 1987 survey, as described by Bilbo (1992). In other words, the groupings were designed and described by Bilbo 1992 and the same groupings were used in subsequent surveys. The Graduate Groups are defined in Table 2.

Salary datum (Figure 12) were collected and analyzed, both as reported and adjusted for inflation to 2004 dollars (present day value). The Consumer Price Index (CPI) was utilized for the adjustment. Although there are many methods of translating dollars for inflation, CPI is a commonly used method, and is often considered the best method for changing income to “real” or “inflation-free” dollars (U.S. Department of Labor, 2004). The translated dollar amounts standardize the reported salaries so that conclusions can be drawn from the data. The formula utilized to adjust the reported salaries may be found in the Average Salaries portion of the Analysis section of this paper.

3.0 DATA ANALYSIS

3.1 Professional Development

In Figure 1, the data shows that approximately half of the graduates surveyed pursued no additional education after obtaining their bachelor’s degree. Approximately 28% of graduates have received
some education since graduation but earned no additional degree. Many graduates completed continuing education for career development or to meet requirements for membership in some professional associations. Of those graduates who did earn an additional degree, a master’s degree was the most common level of continued education, with response levels around 11% for each of the three surveys.

Figure 2 shows the data for those who have earned a master’s degree, distributed across the Graduate Groups for each of the surveys. The data shows a positive trend between the number of years since graduation and the percentage of graduates who have obtained a master’s degree. The construction industry has a demand for experienced graduates with management knowledge (Chan et al. 2002), and as some construction graduates progress through their careers, after earning a Master of Science in Construction Management degree and secure a Master in Business Administration, for instance (Chan et al. 2002).

The data shows the Ph.D. as the educational level with the lowest percentage of responses. The low numbers may be attributed to a lack of Ph.D. programs available for construction graduates who want to continue on the same course. Burt and Hatipkarasulu 2007 speculate that in times of full employment by the industry, graduates of bachelor’s and master’s programs are eager to enter the workforce and produce, and since their career tracks incremental advances in the industry, there is no perceived need to return to academia and re-tool or change careers (for example: from industry to academia) (Bilbo et. al 2000). Burt and Hatipkarasulu (2007) note that the industry as a whole has indicated that there is little additional value in master’s and Ph.D. programs as attested by the current research findings (See Figure 1 between 1 to 1.7% PhD are reported in three surveys, it is inferred that if the industry needed Ph.D, there would be more). Most building construction Ph.D.’s come from civil engineering. According to Williamson (1999) few building construction (or construction science) programs throughout the nation provide a Ph.D. aligned with a College of Architecture, rather than civil engineering aligned with a College of Engineering. The nature of the industry
(Fernandez-Solis 2008) plays a part in this as well, considering that there are not many positions within the industry that require a Ph.D. or research experience Burt and Hatipkarasulu (2007).

Figure 3 shows the data indicating the graduates’ professional associations and certifications. This data were not sought in the 1987 survey, and so is not included in the current analysis. The highest percentage (an average of 48%) of responses was in the category of “Other,” probably due to the large number of associations in which graduates can take part, many of which were not listed as choices for these surveys. Among those associations most often listed as “Other (41.9% in 2004 and 53.6% in 1998)” were (as a whole) the Texas Society of Architects (TSA), the National Council of Architectural Registration Board (NCARB), and the American Society of Civil Engineers (ASCE). Also listed under the category of “Other” were many state licenses and certifications. The survey was not intended to capture the level of detail of all the different associations but specified those that are most common among building construction professionals.

Figure 4 shows the percentage of responses for the Realtor category, distributed across the Graduate Groups for the 1998 and 2004 surveys only. The percentage of graduates possessing a realtor’s license at the time of the 1998 survey is noticeably lower than that for the 2004 survey for Graduate Groups 2, 3, and 4. The larger percentages in 2004 indicate the desirability of having a realtor’s license during the housing boom during the early 2000’s (Mankiw and Weil, 1989; Weller 2006).

Both the Associate Constructor (AC) and Certified Professional Constructor (CPC) certifications have been in existence since 1996; however neither AC nor CPC were listed as responses in the 1998 survey, so this data is unavailable for comparison with the 1987 survey. Beginning in the 2004-2005 academic year, COSC students in their last semester of studies were required to sit for the Associate Constructor (AC) exam, leading to professional certification. The data shows that 40% of those in Graduate Group 1 (those that have graduated up to 8 years ago from the date of this research) hold the AC certification, in contrast with zero responses from Graduate
Group 2 – from 9 to 18 years, Group 3, - from 19 to 23 years and Group 4 - 29 years and more, see Table 2). The percentage of those taking the AC exam are no longer predicted to rise in the future, as the AC exam was dropped as a requirement for graduating seniors in 2008. To sit for the CPC exam, AC certification along with seven years of construction project management experience is required. Although the percentage of responses from the 2004 survey are low (23.6% in comparison with previous surveys), the numbers were expected to rise as more graduates became AC certified and gained the necessary project management experience required to take the CPC examination. This has not been shown to be the case, as the numbers taking the CPC remain far below previous years as the incentive to take the exam was removed from graduation requirements. There is little, if any, indication that this will change in the foreseeable future.

3.2 Curriculum Content

Graduates were asked to rate the value of particular course clusters, see Table 3, with regard to the graduates’ past and present occupational responsibilities. For example Structure has a cluster of courses in statics, dynamics, steel and reinforced concrete coursework. The courses were rated according to their value, given the choices of “No Value,” “Little Value,” “Some Value,” “Valuable,” and “Extremely Valuable.” Those ratings were then converted to numerical values of 1 through 5, respectively. The data shows that all course clusters rate in the 3.5 to 4.5 range, from “Some Value” to “Valuable.” Because all course clusters fell into this range, no attempt has been made to determine statistical significance. Once the numerical average was figured for each course cluster, the clusters were ranked for each survey year (number one being the highest rank), as shown in Table 3 with the exception of the Materials & Methods course cluster, due to a survey instrument error in 2004 when it was left out and thus this cluster is not considered on the table.

For informational reference, if Materials & Methods were reported in the 1987 and 1998 survey years, it would rank first and third, respectively, among the other course clusters. This is a decrease in perceived value over the survey time span. It is important to note that this decrease in
ranking corresponds to an increase in the rankings of the Professional & Managerial and Estimating & Scheduling course clusters from second and third, respectively, in 1987, to first and second, respectively, in 1998. These changes appear to be due to an increased number of graduates employed in project management positions, therefore increasing the perceived value of the Professional & Managerial and Estimating & Scheduling course clusters over Materials & Methods.

Of the course clusters analyzed across all three survey years, the Professional & Managerial and Estimating & Scheduling clusters rank first or second, respectively, in all three survey years. The Science cluster ranks last across all three surveys. Increasing in perceived value between 1987 and 1998 are the course clusters of Math and English & Humanities. Decreasing in perceived value between 1987 and 1998 are the course clusters of Legal Aspects, Structures, and Mechanical & Electrical. With the exception of the Mechanical & Electrical and Structures course clusters, all other course clusters were ranked the same in 2004 as in 1998. The Mechanical & Electrical cluster increased in perceived value, while the Structures cluster decreased in perceived value between the 1998 and 2004 surveys.

These rankings infer that the majority of graduates from the Department are employed in management positions, and thus most often utilize the skills gleaned from the top ranked course clusters in their occupational responsibilities. The increasing perceived value of the English & Humanities course cluster indicates an increasing demand from the construction industry for graduates to possess well developed oral and written communication skills used in Request for Qualifications (RFQ) and Request for Proposals (RFP) proposals, contract negotiations, and executive transactions.

Graduates were also asked to indicate “Curriculum Areas for Increased Emphasis.” Topping the list are the curriculum areas of: (a) Estimating & Scheduling; (b) Professional & Managerial; (c) Project Management; and (d) Legal Aspects. Three of these curriculum areas are also among those rated “Valuable” in the course rating section of the survey. The fact that the top ranking course
clusters top the list of curriculum areas needing increased emphasis serves to highlight the Estimating & Scheduling, Professional Managerial, and Legal Aspects course clusters as the most crucial of the curriculum areas which need increased emphasis. Other curriculum areas mentioned in all three survey years as needing increased emphasis are: (a) Finance/Accounting; (b) Mechanical/Electrical; (c) Technical Writing; (d) Computer Applications; (e) Materials & Methods; (f) and Speech Communications. By continuing to focus on the evolution and improvement of the courses pinpointed by these surveys as being most valuable and most in need of increased emphasis, construction education can continue to meet the demands of the construction industry.

3.3 Gender and Ethnicity

Increased emphasis has been placed on diversity within both the construction industry and construction education programs. In an effort to track the progress made because of such an emphasis, gender and ethnicity profiles were gathered for the companies which employ those graduates surveyed in both 1998 and 2004. Figure 5 shows the gender profile averages for the two surveys. The number of males employed decreased and the number of females employed increased by the same 3% between the 1998 and 2004 surveys (since the sum is always 100%). This information appears consistent with a predominantly male workforce that is gradually becoming more diverse and closely mirrors the gender ratios of the Department of Construction Science’s student population.

Figure 6 shows the ethnic makeup of the companies employing the surveyed graduates. The number of White/Anglo employees has decreased by 14% while the numbers of employees who are African American, Hispanic, and other ethnicities have increased by six percent, six percent, and two percent respectively. This data also displays a diversifying construction industry. The 14% decrease in the number of White/Anglo employees shows that there have been greater steps in ethnic diversification than for gender diversification, with a decrease of only 3% in the number of male employees. With the number of construction degree programs available at major universities and a
relative large number of scholarships from the construction industry available, there is opportunity and enticement for minorities, both gender and ethnic, to take part in construction degree programs but perhaps not to persist in the workforce, as in other professions.

3.3 Market Sector

Sector data was collected from all three surveys and is summarized in Figure 7. The Commercial sector (36.8%; 50.6%; and 50.3%) continues to be the leading employing sector for graduates of the Construction Science program. The second highest percentage of graduates indicated Residential (9.2%; 11.8% and 21.7%) as the sector in which they currently are employed, followed by Architect/Engineer (7.9%; 9.2% and 6.8%) and Industrial (10.1%; 8.3% and 5.0%). There has been growth in the number of graduates employed in the Commercial and Residential sectors of the construction industry. Most notable is the approximately 10% change in the Residential sector between the 1998 (11.8%) and 2004 (21.7%) surveys, which may be attributed to the housing boom in the early 2000s.

3.4 Shifts toward Project Management

The data in Figure 8 shows that, on average, most graduates of the COSC are employed as project managers or project engineers (PM/PE) (an average of 27%). There are also large numbers of graduates (average 21%) who are either owners or management officers of their firm. This shows that, on average, graduates are successfully progressing into management positions. Most notable are the rising percentages of PM/PE over the years. Figure 9 shows the PM/PE data distributed across the Graduate Groups. This data shows the rising percentage over the years for all Graduate Groups, with the exception of Graduate Group 4. The data shown for Graduate Group 1 displays a positive response by the Department of Construction Science to the industry’s demand to produce an increased numbers of graduates prepared for project management positions by increasing admissions while rising the average GPA, with changes of approximately 12% between the 1987 and 1998 surveys, and approximately 10% between the 1998 and 2004 surveys. The lower numbers of Project
Manager/Project Engineers for Graduate Groups 2, 3, and 4 are most likely due to promotions to Management Officer or Owner positions. This conclusion is derived from the trend of PM/PE decreasing from those in the 1987 while high in 2004. Apparently the alumni move from entry position to those of estimators, schedulers, cost control, purchasing and owner in time, as expected in trends in other professions.

Figure 10 shows the Estimator data distributed across the Graduate Groups. The data for Graduate Group 1 shows that a lower percentage of graduates are beginning their careers in estimating, with an approximately 9% drop since the 1987 survey, reflecting the trend that higher percentages of graduates are starting their careers in Project Management/Project Engineer positions.

There are very low percentages of graduates in the Scheduler, Cost Control, and Purchasing positions across all Graduate Groups, indicating that these positions are not often taken by graduates of the Department. Although the percentages for these three positions are low for all Graduate Groups, the data shows that many more graduates (see figure 8 for graphic symbolisms) in Graduate Group 1 at the time of the 1987 survey were taking positions in scheduling, cost control, and purchasing, than those in Graduate Group 1 at the time of the 1998 and 2004 surveys. This data, along with the data for the categories of Estimator and PM/PE, support the fact that graduates are now starting their careers in management related positions.

3.5 Job Experience
Job experience information was gathered through questions of how many employers the surveyed graduates have had since graduation and how long the surveyed graduates have been working with their current firm. Table 4 shows the average number of employers that each Graduate Group has had since graduation, along with the average number of years that each Graduate Group has worked with their current firm. The data shows, as expected, that the average number of employers is lowest for those graduates in the first Graduate Group and the number of employers increases for the
subsequent Graduate Groups. The average number of employers is consistent for each graduate group across the survey years (1987 – 2.57%; 1998 – 3.01%; 2004 – 3.38%).

Table 4 also shows that the relative average of number of years with the current firm across the survey years is approximately the same (1987 – 7.74 yrs; 1998 – 6.01 yrs; 2004 – 7.06 yrs). Economic conditions should have a strong influence on these numbers but this survey was not designed to capture the data. However the industry goes through downtimes approximately every ten years which may be an equalizer in the numbers that are shown in this part of the survey. Figure 11 shows the average number of years work experience the graduates have had with their current firm at the time of the survey. As expected, this data also shows that the average number of years work experience with the graduates’ current firms is lowest for the first Graduate Group and higher for subsequent Graduate Groups. The Department’s graduates are enjoying steady employment with their firms.

For Graduate Group 3, the average number of years experience with the graduates’ current firms decreased between the 1987 and 2004 surveys. This indicates greater job mobility for those graduates at the peak of their careers (see Figure 11 and Figure 12 where apparently the greater earning potential is achieved between 19 and 28 years of experience), which may be due to the widening supply-demand gap in the construction industry, and thus, the high demand for experienced workers (see the increased salary rate between the 2004 and 1994 alumni across all groups in Figure 12). This demand will cause companies within the industry to make attractive offers to experienced workers, enticing them to change employers, as evidenced by the high average adjusted salaries reported by Graduate Group 3 for the year 2004 with respect to those reported in 1987.
3.6 Average Salaries

The salary figures reported by the respondents were averaged for each of the Graduate Groups. From the reported salaries alone, it appears that average salaries have been rising through the years for all Graduate Groups. However, in order to accurately assess the changes in salaries reported over the years, adjustments were made to the salary averages and salary ranges reported for the Graduate Groups. The salary adjustments were made utilizing annual average CPIs for each survey year, found in a database of the Consumer Price Index available from the U.S. Department of Labor’s Bureau of Labor Statistics (2007). The annual average CPIs for the years 1987, 1998, and 2004 are 113.6, 163.0, and 188.9 respectively. To adjust the reported salaries from the 1987 and 1998 surveys to 2004 dollars the following formula was used:

\[ S_{adj} = S_y \left(1 + \frac{(CPI_{2004} - CPI_y)}{CPI_y}\right) \]

where, 
\( y \) = year of survey to be adjusted (either 1987 or 1998)

\( S_{adj} \) = salary adjusted to 2004 dollars

\( S_y \) = unadjusted salary for year \( y \)

\( CPI_{2004} \) = annual average CPI for 2004

\( CPI_y \) = annual average CPI for year \( y \)

Table 5 shows the reported average salaries for all Graduate Groups, for the surveys conducted in 1987, 1998, and 2004, along with the salaries adjusted for inflation in 2004 dollars. Figure 12 shows a trend of increasing salaries for each Graduate Group. One possible reason for the increasing salaries is the increasing gap between the supply of construction graduates and the industry’s demand for those graduates (per increase in start-up salary per Figure 12). The increased difference in salary levels between the surveys conducted in 1998 and 2004 for Graduate Groups 3 and 4, which is higher than those for Graduate Groups 1 and 2, indicates that graduates with more years of experience are in greater demand than their less experienced counterparts as the supply-demand gap widens. Those in Graduate Group 3 are enjoying greater job mobility due to the increasing supply-demand gap, and thus, are being offered greater salaries to change companies, or
greater salaries to entice them to stay with their current employer. Another possible explanation for the increasing salaries over the years is the construction industry’s recovery after the recession of the late 1980’s, leading to a rise in construction spending and the recovery of the economy as a whole (Weller 2006). Salaries reported by Group 4 are slightly lower than those in Group 3, indicating that graduates in Group 4 on average have reached the peak of their careers and some in that group are nearing or have reached retirement age, see Figure 12).

4.0 CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

As a longitudinal study, consisting of three individual studies for the Department of Construction Science at Texas A&M University, the data gathered through the surveys may be used together as an additional departmental self assessment tool. The objective of this longitudinal study was to explore the trends in average salaries, job experience, curriculum ratings, and professional development of graduates from the Department of Construction Science over time. It is useful for both the Department and the construction industry as a whole by giving educators and employers an accurate overview of the graduates’ development as professionals, as well as their views on the effectiveness of the curriculum to which they were exposed while at the university.

Approximately half of the graduates surveyed received no additional education after graduating. Approximately 28% of the graduates received some additional education after graduation without earning an additional degree. Of those who did earn an additional degree (average of 12%), a master’s degree was the most common (average of 11%). The construction industry has a demand for experienced graduates with management knowledge, and as construction graduates are progressing through their careers, they are taking steps to gain the knowledge necessary to take on management or ownership positions by acquiring additional degrees. Because of the large number of professional associations and certifications available to graduates, all of the categories listed in this section of the survey instrument received low percentages of responses with the exception of the “Other” category which was the most common category chosen (approximately
The number of graduates holding the AC and CPC certifications is not expected to rise because the requirement for seniors to take the AC examination was dropped in 2008 unless the industry provides additional incentives that were deleted by academia.

When asked to rate the value of several coursework categories, regardless of how long the graduates had been out of school and what year the surveys were taken, all coursework categories rated between approximately 3.5 and 4.5, corresponding to “Some Value” to “Valuable” categories. When asked what courses needed increased emphasis, the following course areas were most often mentioned: Estimating & Scheduling, Professional & Managerial, Project Management, and Legal Aspects. Three of the curriculum areas identified as needing increased emphasis were also among those rated “Valuable” in the course rating section of the survey. This information serves to highlight the most crucial of the curriculum areas needing increased emphasis as Estimating & Scheduling, Professional & Managerial, and Legal Aspects.

The number of males employed has decreased and the number of females employed has increased by 3% between the 1998 and 2004 surveys. This is consistent with a predominantly male workforce that is gradually becoming more diverse. These figures closely mirror the gender ratios (82% to 18% on the average) of the Department of Construction Science’s student population. In terms of ethnicity, the 14% decrease in the number of White/Anglo employees shows that there have been greater steps in ethnic diversification than for gender diversification. The survey assumes that the number of male survey respondents in a set is approximately the same from year to year.

The Commercial sector employs the highest number of graduates from the Department, followed by Residential, Architect/Engineer, and Industrial, respectively. There has been growth in the number of graduates employed in the Commercial and Residential sectors. Most notable is the approximately 10% change in the Residential sector between the 1998 and 2004 surveys, which may be attributed to the housing boom in the early 2000s as well as suburban sprawl.
Most graduates from the Department are employed as PM/PE. There are also large numbers of graduates who are either owners or management officers of their current firm. The data indicates a shift towards project Management. In particular, the increasing percentages of PM/PE in Graduate Group 1 over the years displays a positive response of the Department of Construction Science to the industry’s demand to produce an increased number of graduates prepared to enter project management positions immediately upon graduation, with changes of approximately 12% between the 1987 and 1998 surveys, and approximately 10% between the 1998 and 2004 surveys.

Graduates of the Department of Construction Science are enjoying steady employment and job mobility across all Graduate Groups for all surveys. For Graduate Group 3, the number of years experience with the graduates’ current firms decreased between the 1987 and 2004 surveys. This indicates greater job mobility for graduates at the peaks of their careers, stemming from a higher demand for experienced employees as the supply-demand gap for workers widens. The average salaries adjusted for inflation indicate that graduates’ salaries have risen over the years. One reason is the widening gap between the number of graduates being supplied to the industry from construction education programs and the industry’s demand for those graduates as measured by placement and increased initial salaries. For Graduate Groups 3 and 4, the jumps in salaries between the 1998 and 2004 surveys are larger than those for Graduate Groups 1 and 2, indicating an even greater demand for experienced workers.

Future studies will help expand our knowledge base and continuously improve construction education and the construction industry. In order to remain responsive to changes in the construction industry and to provide undergraduate construction students with the best possible academic program, it is important that the Department of Construction Science continue to periodically assess the needs of the regional industry. It should continue to use the assessments in order to make informed decisions about program development and to provide an up-to-date curriculum that meets the current and future demands of the construction industry.
REFERENCES


Tables

Table 1: Surveys Mailed, Responses Received, and Response Rate

<table>
<thead>
<tr>
<th>Study Year</th>
<th>Number of Surveys Mailed</th>
<th>Number of Usable Responses Received</th>
<th>Response Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>1500</td>
<td>493</td>
<td>32.9</td>
</tr>
<tr>
<td>1998</td>
<td>3,582</td>
<td>1,087</td>
<td>30.3</td>
</tr>
<tr>
<td>2004</td>
<td>3,965</td>
<td>935</td>
<td>23.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9,047</td>
<td>2,515</td>
<td>27.8</td>
</tr>
</tbody>
</table>
Table 2: Graduate Groups Defined

<table>
<thead>
<tr>
<th>Graduate Groups</th>
<th>Number of years since graduation</th>
<th>1987</th>
<th>1998</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 4</td>
<td>29 years +</td>
<td>N.A.</td>
<td>Prior to 1970</td>
<td>Prior to 1976</td>
</tr>
</tbody>
</table>
Table 3: Course Cluster Rankings *

<table>
<thead>
<tr>
<th>Ranking</th>
<th>1987</th>
<th>1998</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Professional &amp; Managerial</td>
<td>Professional &amp; Managerial</td>
<td>Professional &amp; Managerial</td>
</tr>
<tr>
<td>3</td>
<td>Legal Aspects</td>
<td>Math</td>
<td>Math</td>
</tr>
<tr>
<td>4</td>
<td>Structures</td>
<td>Legal Aspects</td>
<td>Legal Aspects</td>
</tr>
<tr>
<td>5</td>
<td>Math</td>
<td>English &amp; Humanities</td>
<td>English &amp; Humanities</td>
</tr>
<tr>
<td>6</td>
<td>Mechanical &amp; Electrical</td>
<td>Structures</td>
<td>Mechanical &amp; Electrical</td>
</tr>
<tr>
<td>7</td>
<td>English &amp; Humanities</td>
<td>Mechanical &amp; Electrical</td>
<td>Structures</td>
</tr>
<tr>
<td>8</td>
<td>Science</td>
<td>Science</td>
<td>Science</td>
</tr>
</tbody>
</table>

* Rankings of the Materials & Methods course cluster are not included due to survey instrument error in 2004
Table 4: Work Experience Summary

<table>
<thead>
<tr>
<th>Graduate Group</th>
<th>Avg. # of Employers</th>
<th>Avg. # of Yrs. With Current Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (0-8 yrs.)</td>
<td>1.74</td>
<td>1.89</td>
</tr>
<tr>
<td>Group 2 (9-18 yrs.)</td>
<td>2.83</td>
<td>3.11</td>
</tr>
<tr>
<td>Group 3 (19-28 yrs.)</td>
<td>4.16</td>
<td>4.01</td>
</tr>
<tr>
<td>ALL</td>
<td>2.57</td>
<td>3.01</td>
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</tbody>
</table>
Table 5: Average Salaries as Reported and Adjusted for Inflation (2004 dollars) by Graduate Group

<table>
<thead>
<tr>
<th>Survey Year</th>
<th>Group 1 (0-8 yrs.)</th>
<th>Group 2 (9-18 yrs.)</th>
<th>Group 3 (19-28 yrs.)</th>
<th>Group 4 (29+ yrs.)</th>
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</thead>
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<tr>
<td></td>
<td>Reported</td>
<td>Adjusted</td>
<td>Reported</td>
<td>Adjusted</td>
</tr>
<tr>
<td>1987</td>
<td>$33,156</td>
<td>$55,134</td>
<td>$55,857</td>
<td>$92,882</td>
</tr>
<tr>
<td>1998</td>
<td>$51,391</td>
<td>$59,557</td>
<td>$88,390</td>
<td>$102,435</td>
</tr>
</tbody>
</table>
Figures

Figure 1. Education since graduation averages
Figure 2. Education since graduation by education level – Master’s Degree
**Figure 3.** Professional association and certification averages
Figure 4. Professional associations – Realtor.
Figure 5. Gender make up of employing companies.
Figure 6. Ethnic make up of employing companies.
Figure 7. Sector averages
Figure 8. Employment position averages
Figure 9. Employment positions – Project Manager/Project Engineer
<table>
<thead>
<tr>
<th>Graduate Group</th>
<th>1987</th>
<th>1998</th>
<th>2004</th>
<th>N.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (0-8 yrs.)</td>
<td>16.6</td>
<td>7.8</td>
<td>4.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Group 2 (9-18 yrs.)</td>
<td>4.6</td>
<td>3.9</td>
<td>5.2</td>
<td>6.3</td>
</tr>
<tr>
<td>Group 3 (19-28 yrs.)</td>
<td>3.9</td>
<td>3.3</td>
<td>6.3</td>
<td>7.3</td>
</tr>
<tr>
<td>Group 4 (29+ yrs.)</td>
<td>4.1</td>
<td>4.1</td>
<td>4.1</td>
<td>4.1</td>
</tr>
</tbody>
</table>

*Figure 10. Employment positions – Estimator*
Figure 11. Average number of years work experience with current firm
Figure 12. Average salaries by Graduate Group adjusted for inflation to 2004 dollars.