

Entry Level Needs of the Engineering and Water Resources Planning Sector

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This paper is based on the author's experience of hiring entry level engineers, economists, and scientists for positions dealing with water resources engineering and planning in private sector engineering firms and in State and Federal agencies. The author has been responsible for filling entry level positions requiring water quantity, water quality, ground water, surface water and wastewater and water treatment expertise. The experience gained from filling these positions has given the author some knowledge of:

- The qualifications that are valued for filling entry level positions, and
- What the new B.S. or M.S. graduate has to offer.

What We Want

The following is a list of what the author has looked for in a hiring an entry level individual for an engineering or technical position in either a government agency or a private sector engineering firm:

1. *Masters or Bachelors Degree.* Does the individual have a Masters or a Bachelors degree? The M.S. degree normally gives the new graduate some cutting-edge expertise that may not be otherwise available in the consulting engineering firm, (e.g. experience in running a ground water model that has new graphical user interfaces or knowledge of new treatment processes for removal of heavy metals from mine water discharges). For this reason, the author will normally select the entry level candidate with the M.S. over the individual with only the B.S.
2. *Good Communication Skills.* Does the entry level candidate appear to have reasonable communication skills? Success in consulting engineering or in a governmental agency requires abilities beyond turning out a nice set of drawings and specifications. Success in consulting engineering requires the ability to write well and to communicate with others. The author has asked entry level candidates to provide an example of their writing abilities (e.g. a report or some other document they have written and prepared in their university classes).
3. *P.E. Registration.* Has the entry level candidate for an engineering position passed the engineer in training (EIT) examination, or are they planning to do so in the near future? What are their plans for getting registered as a Professional Engineer? If the individual has passed the EIT examination and is clearly concerned about registration, this indicates that (s)he is seriously interested in engineering and that we have an opportunity to retain this individual in our firm over the longer term.
4. *Creativity.* Does the entry level candidate exhibit potential creativity and ability to innovate? These are definitely desirable skills; however, ascertaining whether these skills exist in an entry level candidate can be difficult. The author will generally ask some questions about whether the candidate has ever done any independent research projects as part of their undergraduate work or what the topic of their M.S. thesis was? I will then ask some questions about their research and how they solved various problems in their research. I will also

ask them about their work experience, or what they do for fun in an effort to determine the breadth of their curiosity.

5. *Technical Expertise and Competence.* In engineering, technical competence is expected. The range and depth of technical competence that can be expected from four years of education is limited, however. This is another reason for preferring the entry level candidates with the M.S. degree. In my experience, evaluating the technical competence of entry level candidates at the B.S. and M.S. level is based to a large degree on: (a) grade point average and (b) the record of previous technical experience outside the classroom such as summer jobs and past employment. I usually try to explore the applicant's previous technical experience with a series of questions during the interview process. Calling references can also provide information concerning the applicant's technical expertise and experience.
6. *G.P.A.* The author cannot recall seriously interviewing entry level candidates who had grade point averages much less than a B average (3.0). Candidates with 2.0 or 2.5 G.P.A. are generally weeded out before the interview stage. Therefore, grades are certainly relevant, but beyond a certain level, the other factors detailed above become more important.
7. *Potential Marketing Ability.* Normally we are interviewing entry level applicants primarily for their technical expertise and competence. I believe it is important when interviewing an entry level applicant to give some consideration to this person's ability to market engineering services to existing or potential clients. Although the entry level applicant will not be expected to immediately start marketing, it is always a plus for the applicant if (s)he demonstrates some interest or capability in marketing engineering services. Determining an applicant's interest in marketing and potential ability to market can be difficult. If, however, the applicant has demonstrated good communication skills, this is certainly a positive indication of ability to market. During the interview phase, I always ask the applicant if (s)he has ever sold anything? If

the candidate has worked in retail sales, I consider this an indication that (s)he has some fundamental understanding of what it takes to market engineering services.

What We Are Getting

In general, in my experience, it has been possible to hire good quality graduates for entry level positions in the engineering consulting firms and in the state and Federal agencies with which I have been associated. The technical competence of the graduates in engineering, economics, and the sciences that I have hired has been good to excellent. I can think of only one or two real duds we have hired and then had to subsequently let go. I would commend the schools of engineering and liberal arts for turning out good quality graduates in engineering, economics and the sciences.

Summary and Recommendations

1. Put more emphasis on the ability to communicate both orally and written. Make sure that all graduates can produce well written, succinct and readable reports about technical subjects and can competently express themselves verbally.
2. Encourage students to pursue a M.S. degree immediately after the B.S. or B.A. As indicated above, the M.S. gives the student more in-depth knowledge about cutting-edge technologies and innovations which can be very attractive and useful to a consulting engineering firm.

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