

Engineer Demand strong, but Economy Constrains Hiring

Significant demand persists within the chemical process industries (CPI) for those with engineering backgrounds and technical skills.

Companies across many CPI sectors are finding it difficult to find enough individuals with chemical and engineering skills and expertise to staff their operations. But despite strong demand for technical skills, recruitment of chemical engineers is somewhat constrained by a stubbornly slow economic recovery and continued uncertainty over the future economic situation.

In the difficult economic environment, and depressed housing market, companies are generally not making broad hiring moves, and are very picky with those they do make, holding out for candidates with near perfect matches to the particular mix of experience for which they are searching. In addition, both individual engineers and companies face hurdles to job changes and staffing due to the difficulty selling homes in many markets.

"In almost every company I have dealt with, one of the top challenges is finding scientific and engineering talent," says



Patrick B. Ropella
Chairman & CEO, Ropella
Tel: (850) 983-4777
Web: www.Ropella.com

Patrick Ropella is Chairman & CEO of the Ropella Group an international Executive Search, Leadership Transformation, and Corporate Consulting firm. He authored the book and web-based training program, *The Right Hire – Mastering the Art of SMART Talent Management*, and has seen his content featured in many trade magazines, business publications, and industry journals. Patrick regularly speaks at webinars, career fairs, and conferences.



Kevin Swift, chief economist and managing director at the American Chemical Council (Washington, D.C.; www.americanchemistry.com). For example, Kraton Performance Polymers (Houston; www.kraton.com) CEO Kevin Fogarty notes that his company has had a difficult time finding engineers for its business in styrenic block copolymers. "Overall, there may be high unemployment, but it's a different situation for technical talent – it's a very tight labor market for those folks," he says.

Strong demand appears to exist for entry-level workers as well, with chemical engineering graduates continuing to find work opportunities. In one case, Heather Fahlenkamp, assistant professor in the Chemical Engineering Department at Oklahoma State University (OSU; Stillwater, Okla.; www.okstate.edu) reports "100% placement" into the workforce of 2010 graduates who sought jobs, rather than graduate school. Department faculty noted that many graduates were offered signing bonuses, and starting salaries ranged from \$50,000 to \$90,000 annually.

Drivers of demand

Although a weak housing market and other forces have tempered the limited economic recovery, the prospects for medium- to longterm growth in the chemical industry are good, suggests

Swift, and that bodes well for chemical engineers and their opportunities. There are a number of additional forces at play driving the need for engineers. For example, in the U.S., the effect of the shale gas supply has put this country in a stronger export position, and will be a force for job creation over the next three to seven years, Swift says.

Larry Jacobson, executive director of the National Society of Professional Engineers (NSPE; Alexandria, Va.; www.nspe.org) sees an even wider trend in the need for engineering-trained workers. Engineers are becoming increasingly important to diverse aspects of the future of the planet, including national security and military operations, as well as economic growth and government projects. "Engineers are no longer seen as people who design and build stuff; they are seen as essential for solving the world's problems," Jacobson says.

Despite the demand for individuals with engineering skills, and solid future prospects, an engineering degree offers no guarantees. In his experience leading a wide-ranging engineering professional society, Jacobson has observed two groups of engineers in the job market – those who are having trouble finding new work, and those who have a choice of opportunities. "Many engineers who are one-dimensional, having done the same thing for a long time, and who and have expertise only in one narrow area, are finding it difficult," Jacobson says. More than ever, companies seek potential employees who can draw upon a wide knowledge base to solve critical problems. "Many companies are looking for novel solutions to major challenges, and 'cookbook' solutions are not likely to work," Jacobson explains, adding, "there's real money where firms are tackling the biggest problems." To develop and implement those solutions, individuals with a broad set of experiences and a vast assortment of problem-solving tools that span several engineering disciplines are the most needed. Not only are experiences in a wide range of engineering

subdisciplines important, but skills and knowledge from areas outside chemical engineering can be equally important. Knowledge in areas as far afield as medicine, music, religion and many others can prove valuable, Jacobson says.

Industry personnel confirm that skills outside engineering, as well as less tangible traits, are often crucial to chemical engineering jobs. Patrick Ropella, CEO of the Ropella Group (Milton, Fla.; www.ropella.com), an executive search firm specializing in the chemical industry and related high-technology areas, says his company's clients often place as much value on an individual's attitude toward a new job and interpersonal ability as they do on technical skills and experience. Russ Reinhart, OSU Chemical Engineering Dept. head, says industry is seeking chemical engineers who can write clearly and effectively, and who can deliver high-quality presentations.

John Peterson, a senior recruiter at Advanced Search Group (Willowbrook, Ill.; www.advancedsearch.com) who specializes in the specialty chemicals and petroleum refining sectors, also sees experience with a wide variety of different unit operations as a great help for job seekers and job changers. "Currently, there tends to be much less time for training," he says. "Companies really want people who can jump right in and be immediately effective without a lot of hand-holding."

CE Salary Survey

In October 2011, CE asked readers* to respond to an online survey, supplying anonymous salary information along with details on their level of experience, education, CPI sector and geographic area. Close to 1,600 CE readers replied from all across the globe. More than 70% of the respondents had more than 11 years of professional experience, while the remaining 30% had 10 years experience or fewer. Over 52% of respondents hold a bachelor's degree, while 30% have a master's degree and 9% have earned a doctoral degree. A professional degree such as medical, law or business administration was reported by 5.7% of respondents. A fuller profile of the respondents can be found in the graphs

(Figures 1–5). While the CE survey is a nonscientific survey, the results nonetheless provide a touchpoint for discussion of salaries and experience within the CPI.

The average salary for all respondents worldwide was \$89,100, which includes respondents from six continents, and some with backgrounds other than chemical engineering specifically, including mechanical engineering and others. For those in the worldwide sample who reported a chemical engineering background, the average salary was \$87,400. The total is significantly higher (by over \$10,000) than that calculated from respondents to a similar survey conducted in late 2010. A number of factors are likely to be at play in the increase, so it is difficult to draw firm conclusions about the magnitude of the increase, but it seems as if salaries are generally at least somewhat higher than a year ago.

More than half of the survey respondents live in North America. Focusing on that group, the average annual salary was \$110,000. As a comparison, last year, the U.S. Bureau of Labor Statistics calculated an average salary for chemical engineers of about \$94,600 (May 2010). Also last year, The NSPE reported an average salary of \$112,750 for licensed professional engineers in its membership. This population spans multiple engineering fields, and holds a licensure based on demonstrating on-the-job experience and passing an exam on engineering principles and practice.

By work function, those North American respondents who reported product or process design work in the CE survey had higher average salaries (\$119,000) than those working in process operations or R&D (\$100,000 and \$101,300, respectively). Petroleum refining seemed to have higher salaries than those of chemicals and petrochemicals. Among those who work in the petroleum refining industry, the average salary was just over \$120,000, while the average for those reporting work in the chemicals and petrochemicals area was \$111,700. As expected, experience seemed to add significant value to workers — survey respondents

with 11 to 30 years of experience had an average salary of \$112,000, while those with zero to six years of experience had an average salary of \$67,300. The less experienced group of respondents was much smaller.

A smaller sample size was also the case of respondents reporting a mechanical engineering background. However, the average salary of mechanical engineers (\$97,000) topped that of chemical engineers (\$87,400) when all regions of the globe are included.

*Editor's note: Thank you to the almost 1,600 readers who responded

Also related to future demand for engineers is the much-discussed issue of retiring engineers from the baby boomer generation, the replacement of whom is an issue not limited to companies in the CPI. However, the effects to date of retiring engineers have not been as pronounced as predicted, according to recruiters specializing in CPI markets.

Many older, experienced engineers have delayed retirement largely because of the shaky stock market — many a retirement account has lost value — and a depressed housing market, says Ropella. Other engineers in the CPI have retired, and then re-entered the chemical industry workforce as independent consultants, Ropella points out.

The problem of replacing experienced chemical engineering and related workers may have been delayed in some cases by the economic situation, but it has not gone away. Ropella projects an increased demand on the horizon to replace those workers. "There is a real and growing demand for young professionals with chemistry and chemical engineering degrees, and the talent pool for workers trained in science, technology, engineering and math (STEM) is shrinking," says Ropella. OSU's Fahlenkamp says that companies without specific job openings are still recruiting their graduates in anticipation of continuing retirements, which are likely to increase if the stock market improves.

In the energy sector, Al Thumann, executive director of the Association of Ener-

gy Engineers (AEE; Atlanta, Ga.; www.aeecenter.org), agrees, remarking that the challenge of finding enough engineers to meet Federal energy goals is the single biggest challenge faced by the energy enterprise. "Over the next five years, the engineer shortage will likely become an even bigger challenge because of the retirement of engineers in the baby boomer generation," he says.

As the retirement rate increases, the transfer of process and plant knowledge from older engineers to younger ones is going to become increasingly critical. For companies, the crucial aspect of that issue is not only the transfer of knowledge, Jacobson says, but the transfer of the sense of judgment that comes with experience. Recruitment signs for future

Despite the current shortage of engineering talent and likely increased demand in the future, hiring activity among chemical industry workers is only mildly better than the same time last year, says Ropella. To a large extent, that is explained by an economic climate in the aftermath of the recessionary period in 2008 and 2009. Many company leaders are not feeling confident in the economy, and the U.S. Congress hasn't made progress on job-creation legislation. "There are clear signs that if the economy improves, hiring will increase," Ropella said.

Demand for workers in the upstream processing of natural gas is particularly strong right now, said Ropella, including positions related to drilling and hydraulic fracturing chemicals. Engineering positions having to do with renewable energy technologies also remain strong. For engineers willing to work abroad, there are many positions available in China, Ropella says. China's many infrastructure projects require a large supply of engineers, which China is unable to meet.

Recruiters at Engineering Resource Group (Morris Plains, N.J.; www.engineeringresource.com) point out that hiring activity is improved modestly from last year in New Jersey, but has slowed in recent months, paralleling the economic situation. Company president Jim Terkovich says that companies are increasingly searching for candidates that are exact matches with regard to experience and qualifications. "Some clients have staffing needs, but they are looking for that perfect match, and they are willing to wait for that person to come along," Terkovich commented.

Weak housing; strong influence

The sluggish housing market is playing a significant role in job-seeking and recruitment. "The economy has made it a real challenge to move," says David L. Barron, a labor and employment attorney with Cozen O'Connor, a Texas-based law firm specializing in labor and workforce issues.

Peterson, who also sees a shortage of chemical engineers, suggests that the depressed housing market represents a significant hurdle in filling openings, mostly because of the difficulty in selling homes when relocation is required.

"Chemical engineers that are willing to relocate will have no problem finding jobs," Peterson says, pointing out that there are many jobs available in Texas and Louisiana, for example, especially for those workers with between five and 20 years of experience. However, in many cases, candidates are unable to sell their homes, or may be unwilling to sell at current prices to avoid losing equity that they have established. Meanwhile, cost-saving efforts on the part of many companies have meant that the relocation packages offered to potential employees are generally smaller and less comprehensive than they have been historically, notes Ropella.

One situation where relocation packages may get a boost is where a top-performing individual may have several companies interested. Peterson says he has seen cases where companies offer more attractive relocation packages, rather than significantly higher salaries, as enticements to attract candidates.