

2008 SALARY REPORT

Ch.E.s wonder when the CPI will feel the hit of the changing economy

The past decade has been a volatile period for chemical engineers in the workforce. The late 1990s was a booming time in the chemical process industries (CPI), with salary increases greater than ever and an unprecedented demand for Ch.E. expertise. This prosperity quickly gave way to harder times in the early 2000s, when engineers struggled to keep their salary increases on par with inflation. Luck had turned around again in recent years with steadily increasing pay, but in light of the recent economic crisis, Ch.E.s wonder — when will the CPI feel the hit of the changing economy?

Recent salary trends

This year, most Ch.E.s enjoyed a greater annual salary boost than has been found in nearly a decade. In its 2008 salary survey, the Engineering Income and Salary Survey and the National Society of Professional Engineers (NSPE; Alexandria, Va.; www.nspe.org) report a median income of \$102,000, an impressive 11.1% increase since 2007. Gulshan Dua, vice-president of process engineering and gas processing of SNC-Lavalin's chemical and petroleum business unit, has seen a high level of job satisfaction with sustained growth. "The trend in the last two years in particular has been significant increases in salaries and overall packages, as much as 40 to 60% increases."

As expected, education, licensure and experience pay off greatly for Ch.E.s. According to the NSPE survey, having earned a masters degree boosts the median salary to \$104,600, a 7.5% edge over Ch.E.s with a bachelors degree, up from 4.9% in 2007.

Meanwhile, attaining Professional Engineer (P.E.) licensure proves to give a significant boost to Ch.E. salaries. With a median income of

\$114,000, P.E.s earn a 37.3% higher salary than unlicensed Ch.E.s, a number that may also reflect the fact that many licensed engineers have completed a higher level of education and have more years of experience than most other Ch.E.s.

An annual survey report released by the Engineering Workforce Commission, a division of the American Association of Engineering Societies, Inc. (EWC; Washington D.C.; www.aaes.org/ewc) provides engineering salary data at every level of experience, proving that experience pays off, with steadily increasing salaries with increasing years of experience. Table 2 and Figure 2 show Ch.E. salary data for 2008, which illustrate this trend, with new graduates starting around the \$60,000 mark and the most seasoned Ch.E.s commanding a median salary of \$110,000.

In Figure 3, we compare EWC data from its five most-recent annual salary surveys. The graph shows the median salary of working Ch.E.s as a function of years since a bachelors degree was earned. Data for 2004 through 2008 is shown, with data for years up to 2007 adjusted for inflation to 2008 equivalency. From this data, we see that pay generally increased with experience, with the exception of 2004 and 2007 data, where the salary of engineers approaching retirement reduced. Also, when comparing years, we see that survey participants did not see salary increases that kept up with the rise of inflation from 2005 to 2006, though data has remained somewhat consistent since then.

When compared to engineers of other disciplines, Ch.E.s still boast one of the highest median salaries, as shown in Figure 1. EWC's latest report, which found a median Ch.E.

salary of \$102,000, is beat out by computer engineers, and only slightly by biomedical engineers, as seen from the data in Table 1. Petroleum engineering proves to be the most profitable area of Ch.E. practice, with a median salary of \$120,000, the highest of any engineering discipline.

Overall, according to the National Association of Colleges and Employers (NACE; Bethlehem, Pa., www.naceweb.org), the chemical industries boasted the second brightest outlook of any category of employer, being exceeded only by computer-software-development companies. Andrea Koncz, employment information manager of NACE, reports that companies in the CPI plan to hire 19.2% more new graduates than they did last year.

Though employers are seeking to hire a record number of Ch.E.s, an October 2007 NACE report that studied data from the Bureau of Labor Statistics shows that engineering enrollments are decreasing at a rate of 2.2% per year. With a slowly dwindling supply of Ch.E. professionals, the demand for this expertise is higher than ever. Usha Singareddy, director of compensation for Dow Chemical Company (Midland, Mich.; www.dow.com), has seen a decreasing availability of new Ch.E.s, noting that "numbers have gone down tremendously," though the



quality of Ch.E. graduates remains high. One factor that she sees as causing this is a dropping ratio of students enrolling in Ch.E. programs to other engineering programs. Despite the profitability of working in the CPI, Singareddy sees many students moving toward other engineering disciplines, including computer and electronic engineering.

The outlook for Ch.E.s in the U.K. and Ireland has brightened as well, as determined by IChemE's 2008 salary survey (Rugby, U.K.; www.icheme.org). Like Ch.E.s in the U.S., IChemE survey participants were lucky if they didn't see a decrease in salary earlier in this decade — from 2002 to 2004, the reported median salary did not change. Since 2004, however, salaries have steadily increased. The median salary in the 2008 report was £47,000, up 8.8% from 2006.

In the U.K., professional engineers are given the designation of "Chartered Engineers." As in the U.S., Chartered Engineers participating in the IChemE survey earned a much higher salary than non-chartered participants, with a median chartered salary of £57,500 over £36,000, a 59.7% advantage.

Looking toward the future

Ch.E.s may have enjoyed steadily increasing salaries over the past couple of years, but the changing economy may dictate a slowdown in the CPI and Ch.E. employment. Andrea Koncz says that this is a difficult issue to predict. "With the downward trend in the economy, perhaps all areas will be affected." However, she notes, "there is a definite demand for chemical engineers, and with gas prices rising and [engineering enrollments declining], I would like to think they will not be affected."

Kevin Swift, managing director of economics and statistics for the American Chemistry Council (ACC; Arlington, Va.; www.americanchemistry.com), explains that the outlook may not be as positive as we hope. "If you look at industries that Ch.E.s are usually employed in, they usually peak at this point in the cycle." He points out that the housing market has gone down 60% in the past year, while vehicle sales have dropped 30%, two major markets that will directly

affect the CPI. While the demand for domestic sales in the chemical industries has dropped, until recently, increasing international exports had somewhat offset these losses. Now that foreign markets are entering the same economic turmoil as the U.S., Swift is seeing a drop in exports as well. All of this points to potentially rocky waters for Ch.E.s. "It will be a tough environment for a year or so," Swift says. Despite recent trends in the increasing demand for Ch.E.s, "industry might cut back production levels, and therefore, employment could drop."

Though the outlook may be grim, or uncertain at best, some sectors of the CPI may weather this economic storm better than others. John Pearson, president and CEO of Access Intelligence's chemical business media division,* expects that the companies involved in the green revolution may bode well over the upcoming year. On the U.S. West Coast, he has noticed that start-up alternative-fuel companies have been doing quite well during this time, citing companies such as LS9 (South San Francisco, Calif.; www.ls9.com), which focuses on the area of biofuel production.

Though SNC-Lavalin's Dua does not expect to see salaries increasing at the same rate as they have been recently, she still has a positive outlook, predicting 8–12% increases in 2009. She also agrees that the energy industry does indeed have a brighter

*Chemical Engineering is published by Access Intelligence

future. "A significant economic growth is expected in the coming 10 to 20 years in the energy sector. This will be complemented by stricter compliance with environmental regulations, in particular, related to carbon capture and sequestration, fuel efficiency improvements, use of alternative (to fossil fuels) fuels, and minimizing the use of the scarce water resources, and so on, which will all be adding to development of newer projects." Dua points out that these new projects will require a high level of innovation, research and development, making the energy sector an area where Ch.E.s with masters and Ph.D. degrees would be in greatest demand.

Increasingly global workforce

As engineering enrollment continues to decline yet Ch.E. demand increases, U.S. CPI executives are becoming increasingly concerned about the global position of the U.S. CPI.

In a Bayer survey of Fortune 1000 science and technology company CEOs, concerns about the science technology, engineering and mathematics (STEM) workforce showed up strongly. At 95%, nearly all of the executives are concerned that the U.S. is in danger of losing its global leadership position in science and technology due to a shortage of STEM talent, with more than half reporting that their companies are already experiencing such a shortage. When it comes to rising international competition, 68% are concerned that other countries' increasing access to STEM talent is giving rival companies based in these countries a competitive advantage over those in the U.S., with 20% of respondents saying they are "very concerned." Dow's Singareddy notices this trend as well, explaining that she is seeing a significant drop in American students, while the international student population continues to grow.

In the past few years, the CPI has seen an interesting change in the Ch.E. workforce worldwide. Andreas Beckers, head of corporate communications at Uhde GmbH (Dortmund, Germany; www.thyssenkrupp.com) points toward the increasing workforce in Asia. Just a few years ago, engineering firms could attract Ch.E.s in Asia

for relatively low salary. "Now," Beckers notes, "the engineering workforce is growing across India and China." Their demand is growing at the same time, and U.S. and European firms can no longer secure these professionals as easily. "Salaries must now be much higher in order to hold on to these engineers," Beckers explains. SNC-Lavalin's Dua, too, sees this change in the global Ch.E. workforce affecting the U.S., saying that the situation has changed drastically in the last 2–3 years with respect to the availability of good process engineers from China and especially India. "The demand for them has increased tremendously, and hence, their expectations [have too]," she says. Furthermore, she warns that "the downturn in the industrial-

ized world will be made by growth in the developing world, namely India, China and South America.”

Despite a high demand and increasing salaries for engineers in Asia, there appears to be a surplus of Ch.E.s in Nigeria. Using her own country as an example, one reader explains that “there are up to 30,000 chemical en-

gineers in Nigeria without a job, despite [all of] the petroleum companies in the country.” With the focus of the rising global Ch.E. workforce in Asia, the CPI may be overlooking an untapped resource in African countries and other areas of the world.

SNC-Lavalin’s Dua provides insight into the negligence of the U.S. to explore

talent in such areas. “I have dealt with a few chemical engineers from some untapped resources and have mixed opinions — not all have the right skill set and experience to fit directly into the North American markets — some need extensive on-the-job training.” ■

Kate Torzewski

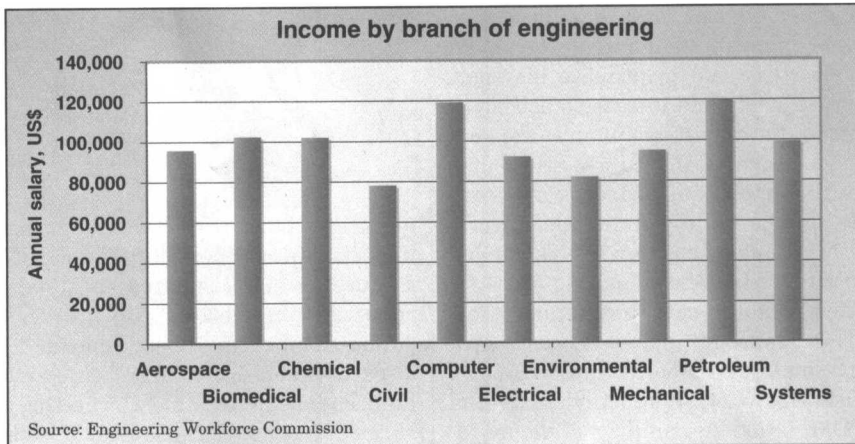


FIGURE 1. With a median salary of \$102,000, Ch.E.s are still near the top of the list

| | |
|---------------|-----------|
| Aerospace | \$95,800 |
| Biomedical | \$102,375 |
| Chemical | \$102,000 |
| Civil | \$78,000 |
| Computer | \$119,178 |
| Electrical | \$92,240 |
| Environmental | \$82,000 |
| Mechanical | \$95,000 |
| Petroleum | \$120,000 |
| Systems | \$99,200 |

Source: Engineering Workforce Commission

| Years since baccalaureate degree | Years since degree | | | | | | |
|----------------------------------|--------------------|--------|--------|--------|--------|--------|--------|
| | 3 | 4 | 5 | 6 | 7 | 8 | 9.5 |
| 2004 | — | — | — | — | — | — | 87,833 |
| 2005 | — | — | — | — | — | — | 83,021 |
| 2006 | 60,577 | 65,231 | 66,495 | 68,289 | 71,849 | 76,789 | 78,848 |
| 2007 | 64,701 | 73,190 | 76,708 | 78,768 | 78,344 | 79,976 | 80,134 |
| 2008 | 59,964 | 64,386 | 65,802 | 67,733 | 71,601 | 77,797 | 79,104 |

*2004–2007 data adjusted to 2008 dollars

| CURVES VERSUS YEARS OF EXPERIENCE* | | | | | | | |
|------------------------------------|--------|--------|--------|---------|---------|---------|---------|
| | 11.5 | 14.5 | 18.5 | 23 | 28 | 33 | 38 |
| | 89,977 | 94,287 | 96,588 | 109,844 | 118,355 | 123,263 | 119,106 |
| | 86,960 | 93,818 | 98,606 | 109,577 | 114,670 | 121,787 | 125,623 |
| | 81,020 | 84,971 | 91,068 | 99,648 | 104,657 | 108,463 | 108,822 |
| | 83,348 | 85,796 | 91,067 | 99,504 | 101,630 | 100,875 | 92,796 |
| | 81,970 | 84,531 | 90,667 | 96,366 | 101,463 | 105,326 | 106,749 |

Source: Engineering Workforce Commission

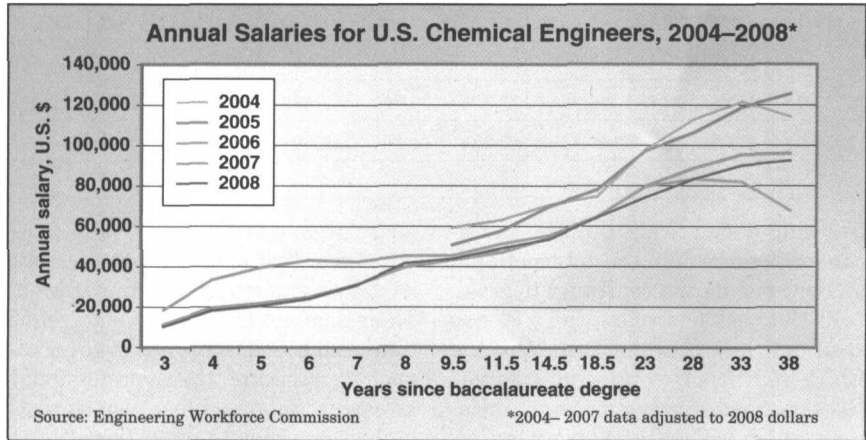


FIGURE 2. At times earlier this decade, Ch.E.s struggled to keep their salaries up with inflation. Now, salaries are much more consistent

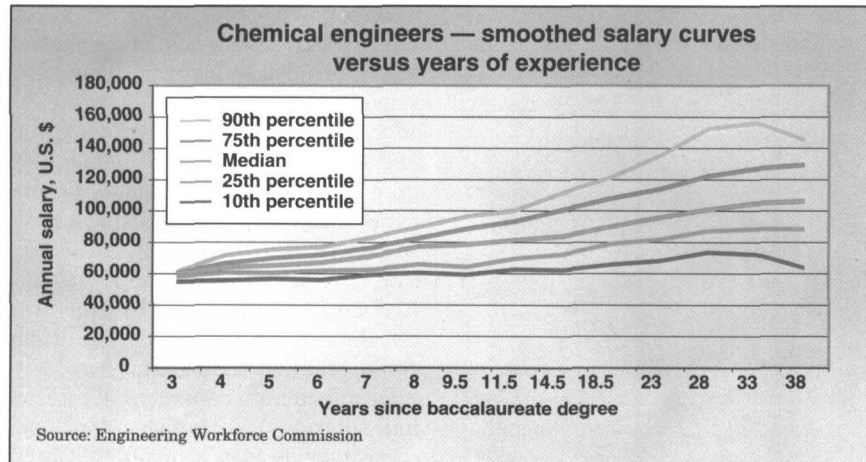


FIGURE 3. In 2008, new graduates saw starting salaries around the \$60,000 mark, while the most seasoned Ch.E.s commanded a median salary of \$110,000

| TABLE 3: CHEMICAL ENGINEERS — SMOOTHED MEDIAN SALARY CURVES VERSUS YEARS OF EXPERIENCE | | | | | | | | | | | | | | |
|--|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| Years since baccalaureate degree | 3 | 4 | 5 | 6 | 7 | 8 | 9.5 | 11.5 | 14.5 | 18.5 | 23 | 28 | 33 | 38 |
| 90th percentile | 61,800 | 72,166 | 75,981 | 77,627 | 83,463 | 90,135 | 96,912 | 100,827 | 112,183 | 121,975 | 135,474 | 152,879 | 156,522 | 145,526 |
| 75th percentile | 60,762 | 67,058 | 70,382 | 72,665 | 77,172 | 82,969 | 89,133 | 93,885 | 101,227 | 108,494 | 114,401 | 122,724 | 127,525 | 129,976 |
| Median | 59,964 | 64,386 | 65,802 | 67,733 | 71,601 | 77,797 | 79,104 | 81,970 | 84,531 | 90,667 | 96,366 | 101,463 | 105,326 | 106,749 |
| 25th percentile | 59,015 | 61,272 | 61,204 | 62,676 | 63,244 | 66,466 | 64,893 | 70,291 | 72,985 | 79,729 | 82,445 | 87,899 | 89,123 | 89,042 |
| 10th percentile | 55,474 | 56,175 | 57,130 | 56,567 | 59,884 | 61,030 | 59,847 | 63,159 | 62,835 | 66,349 | 68,591 | 73,976 | 72,764 | 64,105 |

Source: Engineering Workforce Commission