

2006 Salary Survey Of Embedded Systems Engineers

Jack G. Ganssle
jack@ganssle.com

The Ganssle Group
PO Box 38346
Baltimore, MD 21231

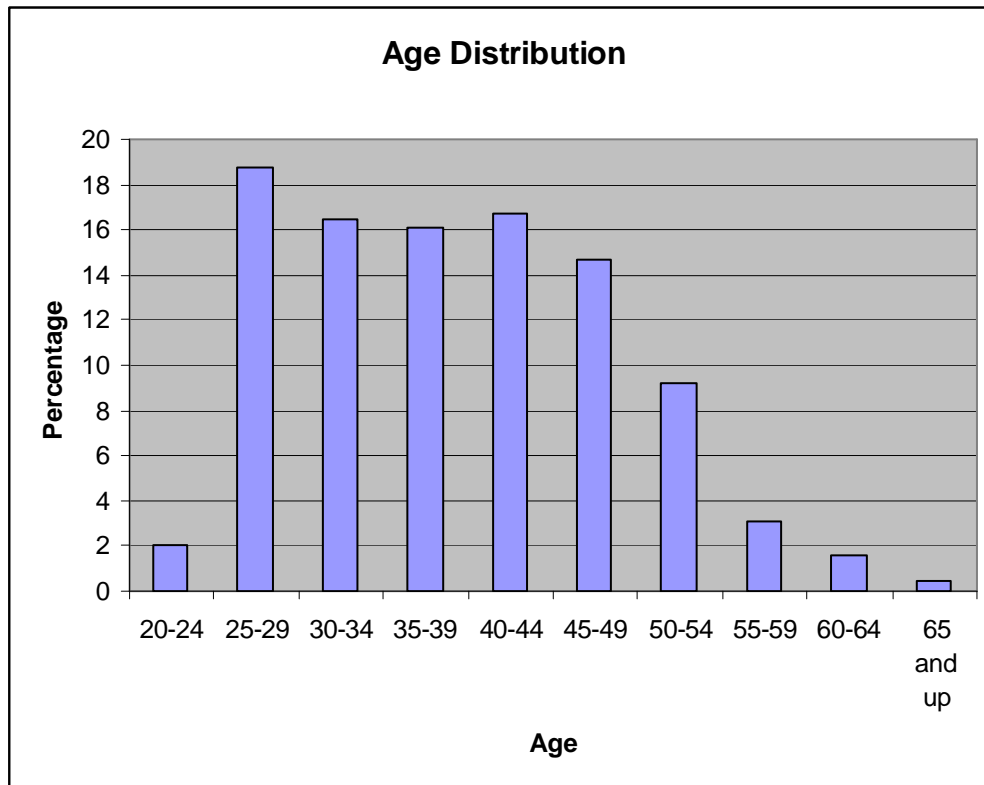
Every year Software Development Magazine runs a salary survey for programmers. Unfortunately that genre includes embedded developers, IT programmers, PC developers and even web designers. No one studies the embedded systems population, which is quite distinct from other dialects of developers.

On December 11, 2006 I sent a request to participate in an embedded survey to the approximately 18,000 readers of The Embedded Muse. 491 went to the web page and submitted data.

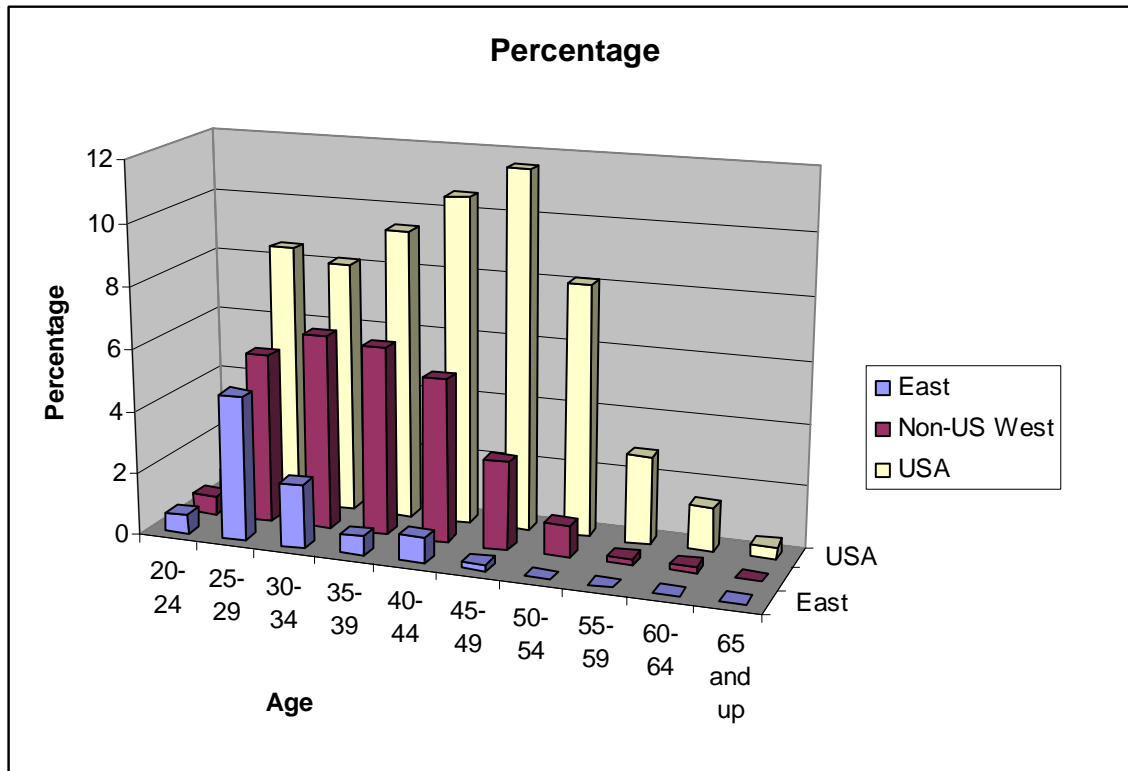
This is hardly a scientific survey; no tests were performed to insure the accuracy of the data. It's likely that more than a few errors were made, especially since overseas respondents were asked to convert their wages into US Dollars. But the data is interesting and suggestive.

Age

Most embedded developers are young to early middle age, with the biggest spike in the late 20s. By age 50 few remain in this field. One was listed his age as "50 (oh God!)". The average age is 38.9 years.

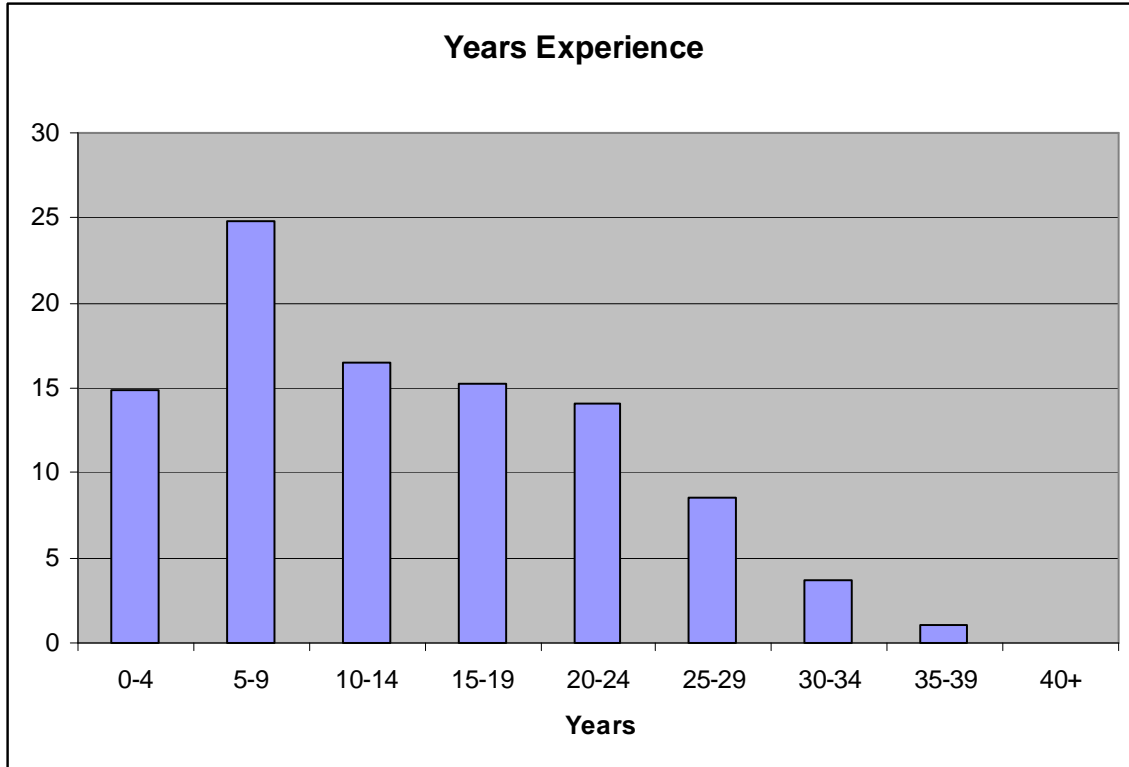


In my recent travels I've noticed that engineers in US and other "western" countries (Australia, Europe, etc) seem to be older than those in places like India and Asia. To try and get some insight I divided the world into three camps: the "east," "western non-US," and the USA. Apologies to all for being so western-centric in making such arbitrary divisions, but the numbers are indeed interesting. We in the United States are graying compared to the rest of the world. Eastern countries have by far a younger group of engineers.



Experience

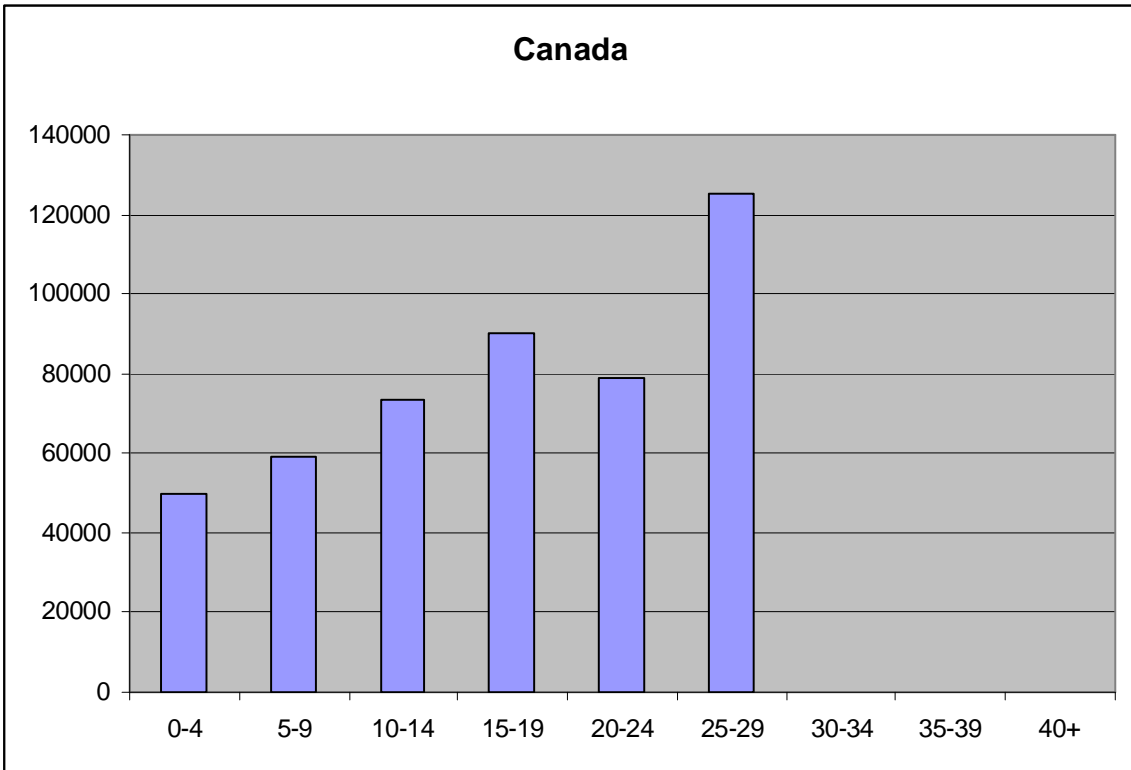
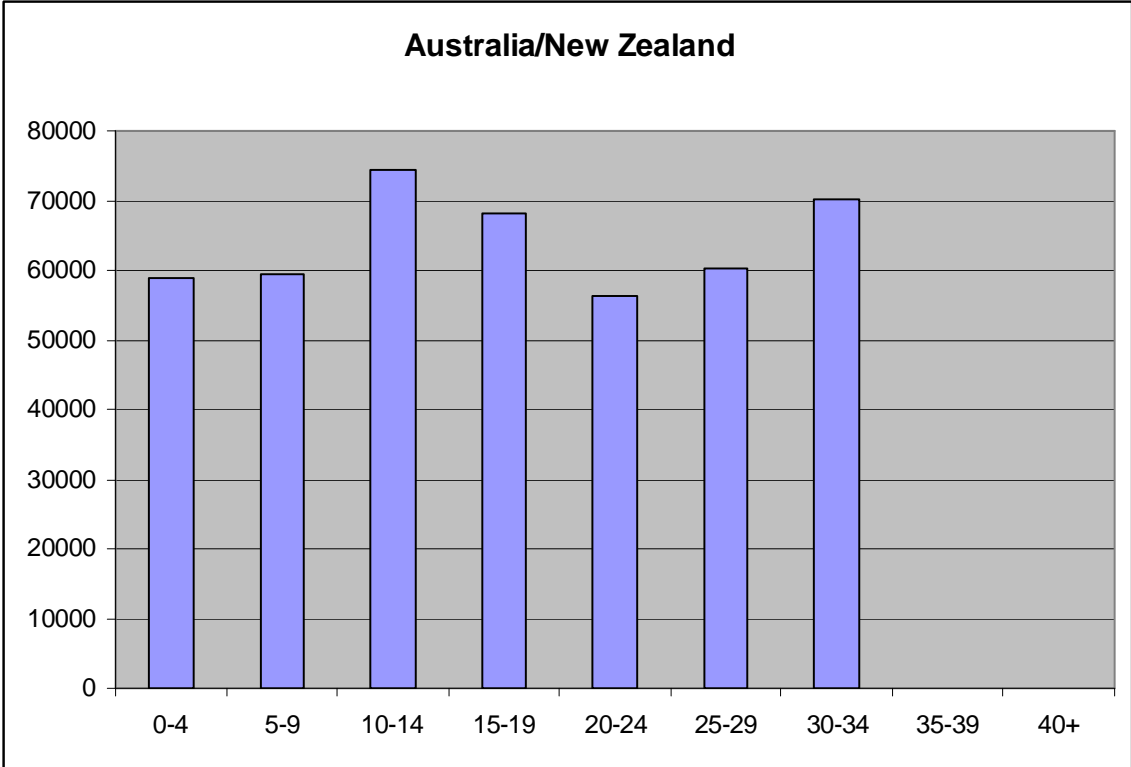
Not surprisingly, experience levels tracked ages closely, suggesting relatively few developers enter the field later in their careers. The average developer has 13.4 years of experience.

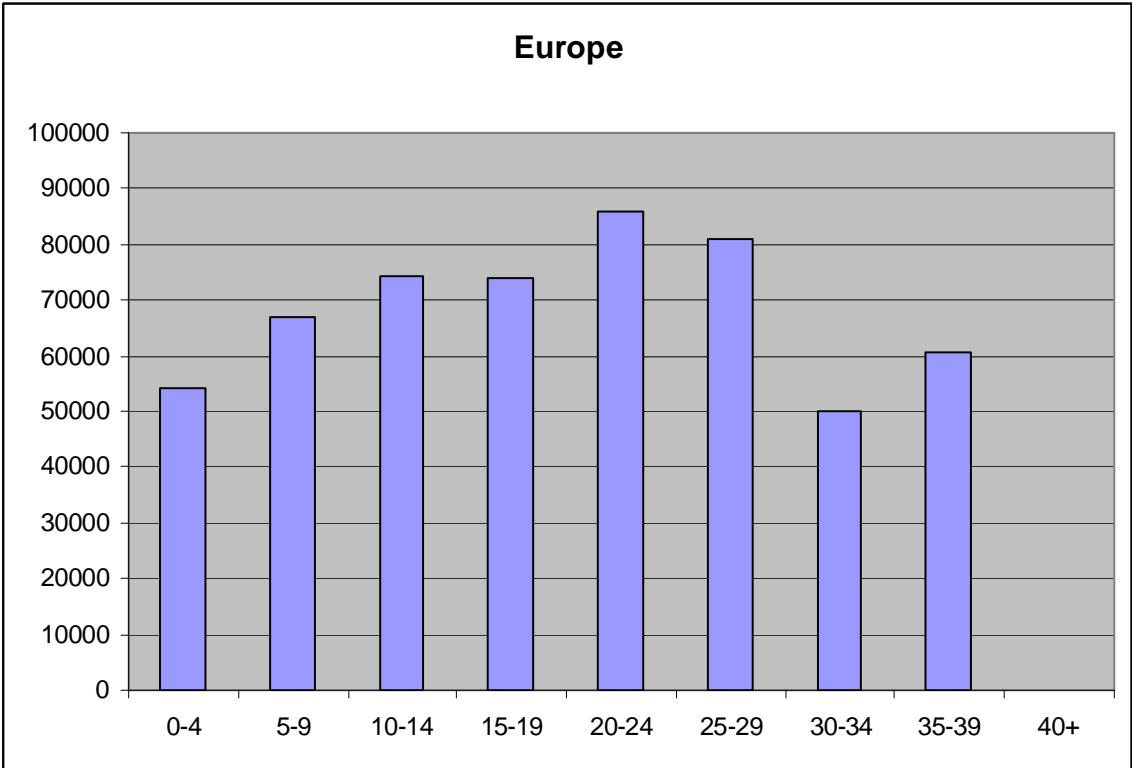
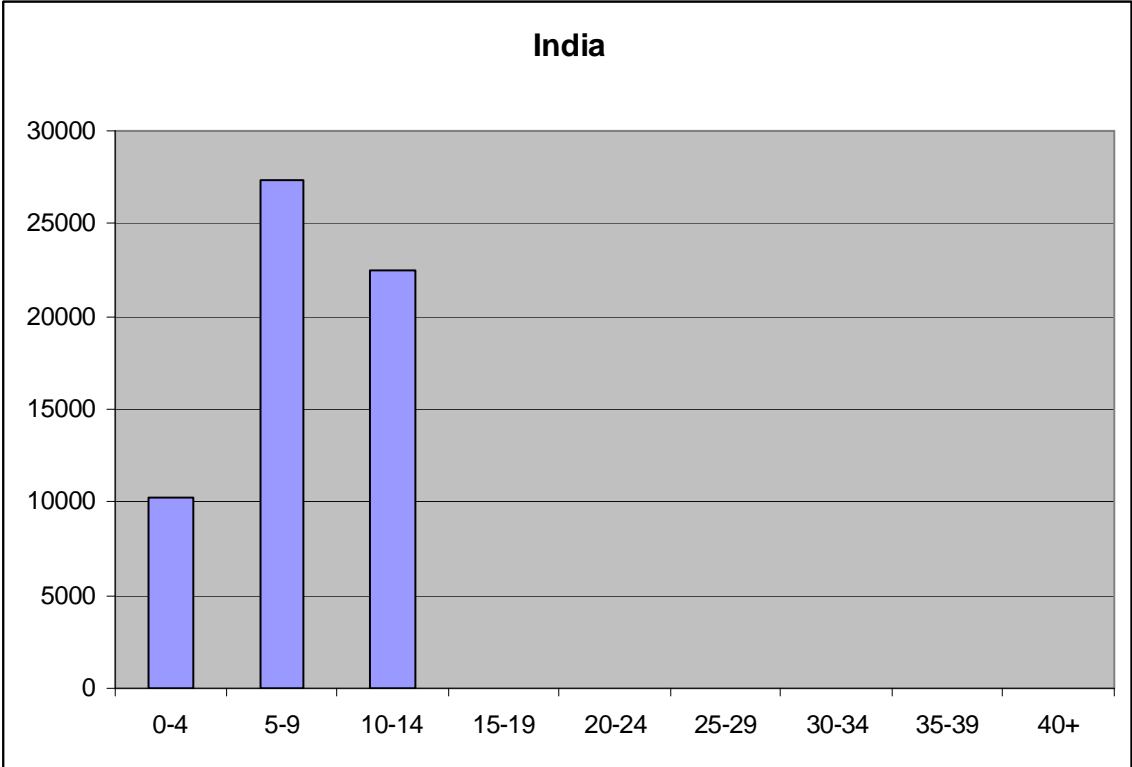


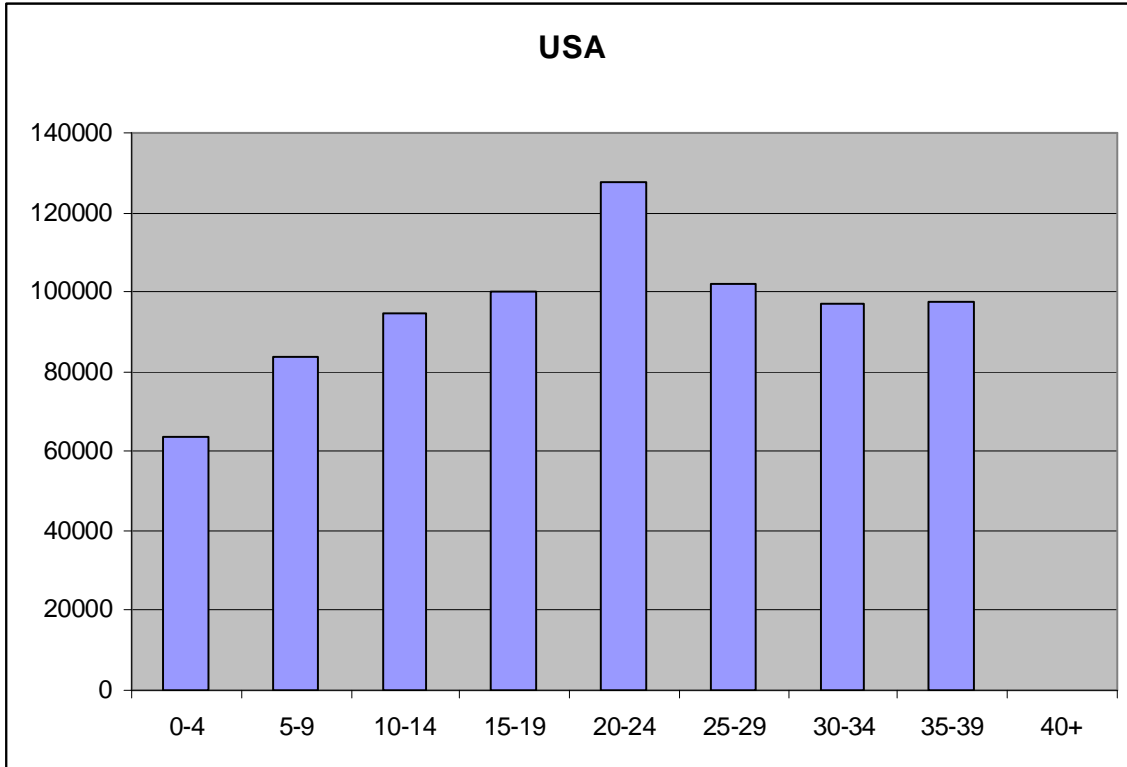
Salary

Salaries vary widely around the world, and by experience. The following graphs show experience in years versus salary in US dollars for a number of regions. Other areas had too few data points to be meaningful. I tossed out a few datapoints that failed the common sense test (like a \$100k+ wage in India... though possible for some ex-pat, it skewed the data).

A couple of people complained that the data should be adjusted by region in the USA. That's a good point... but I didn't collect such data.



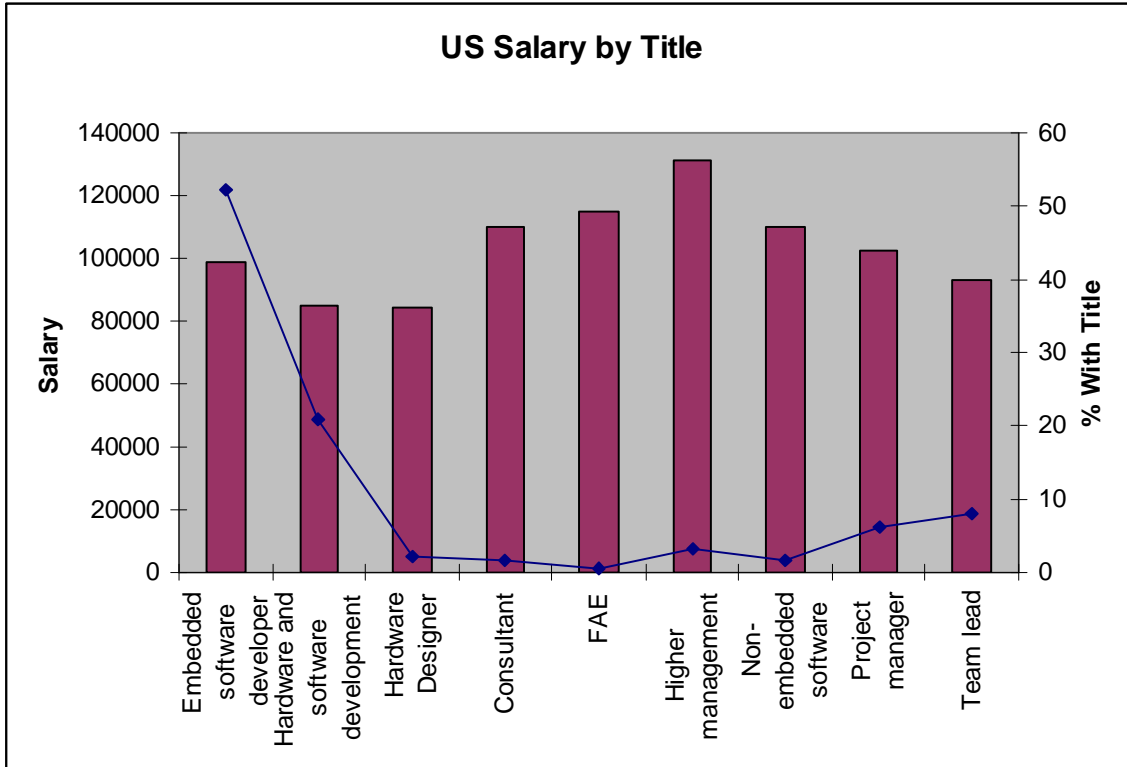




Salary by Title

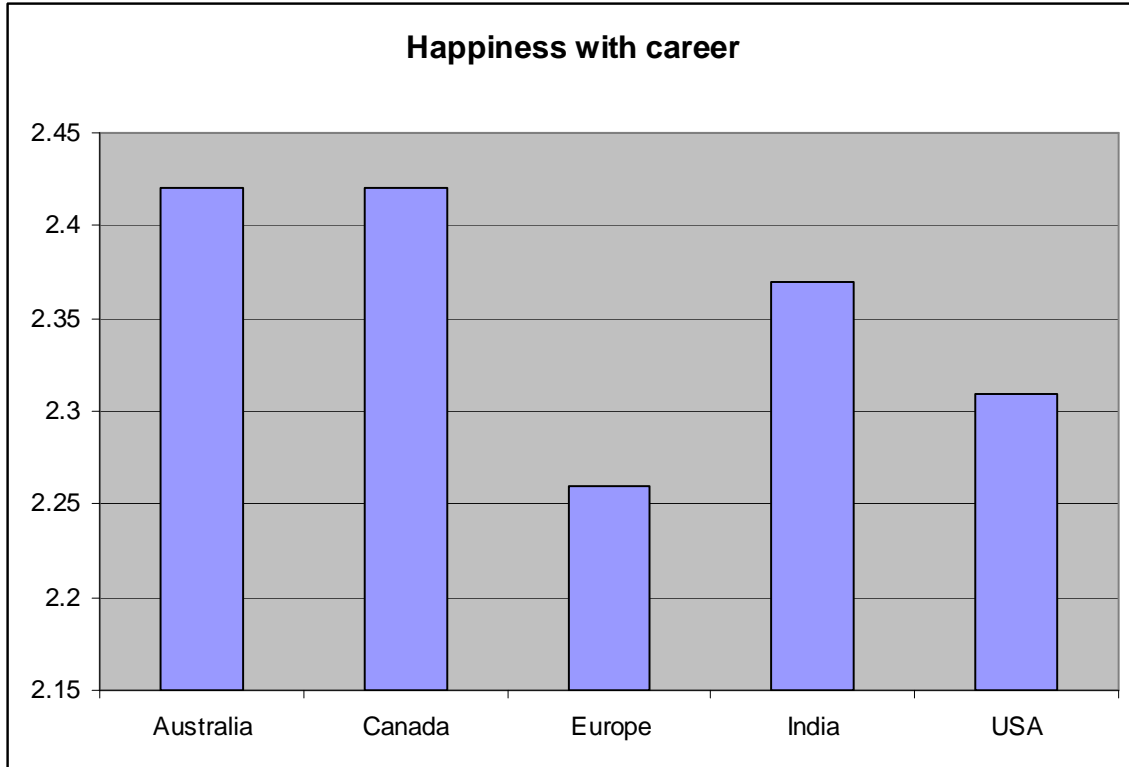
Interestingly, in Canada, Europe, Australia/New Zealand, and India most respondents develop embedded software. A few do hardware and practically none claimed to be in any sort of management role. There wasn't enough disparity in jobs to get a meaningful correlation between salaries and title. The USA had more useful data though, as shown in the following graph.

52% of respondents are embedded software developers; 21% do both hardware and software. Discouragingly, non-embedded programmers make more than firmware folks!



Happiness

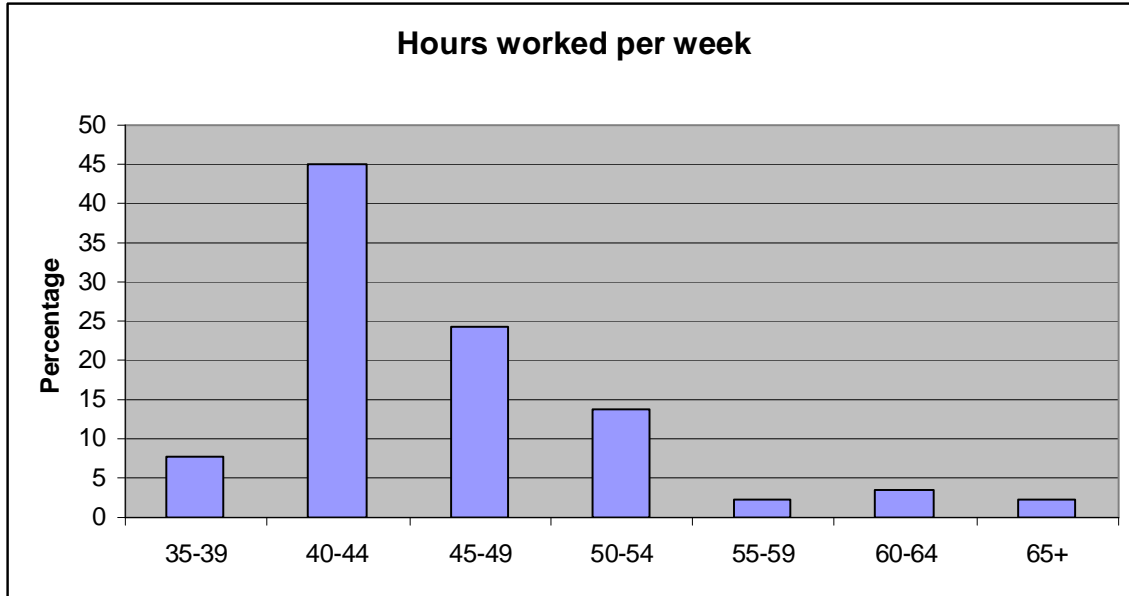
Perhaps attempting to measure happiness is a fool's quest, but as a middle-aged gent who has seen too many colleagues burn out from despair and overwork I'm convinced we *must* pursue happiness first and salary second. In the survey respondents rated their happiness with their career on an enumerated scale of [love it, reasonably happy, somewhat unhappy, hate it]. I rated the factors from 3 (love it) to 0 (hate it). Those results were normalized to the number of responses in each category.



In terms of the current job, 9.8% of us are looking for another job; 12.2% report being unhappy in it, and a whopping 77.5% are happy.

Hours Worked

We grumble a lot about overtime, but 80% of us work less than 50 hours per week.



Perversely, the happiest engineers work the most hours!



The Future

I asked how people felt about the future of engineering, giving four possible responses:

- Expect a strong demand for engineers
- About the same
- Demand likely to diminish
- It's likely to be offshored
- I'm hoping it's offshored to us!

The answers tabulate as follows:

	USA	Canada	Australia/New Zealand	India	Europe
Expect a strong demand for engineers	31%	37%	58%	76%	61%
About the same	33%	26%	21%	3%	44%
Demand likely to diminish	21%	26%	21%	3%	15%
It's likely to be offshored	14%	0%	0%	5%	5%
I'm hoping it's offshored to us!	1%	0%	0%	14%	3%

Comments

Many respondents made comments, some of which are listed here:

Although I am burned out, it is a great area and bound to expand as more and more devices embed computers.

As I get closer and closer to 50, I feel less secure in my job and what my options would be if I lost it.

Avoid it, go to medical school

Based on what I have seen in the last 20 years, I probably would not recommend engineering to my son.

Been laid off twice in four years, my salary has been stagnant over that time.

Engineering has a poor social status in most English speaking countries, however in non-English speaking countries e.g.: Germany, they have a very high status similar to that of Doctors.

H1B workers and offshoring are the greatest threat to engineering in the USA. I have told my children to NOT go into engineering for this reason.

Hanging on until my job is outsourced.

High demand for EEs and Computer Scientists in British Columbia, Canada.

I am a consultant -- After marketing, admin, travel, bookkeeping, etc, I am able to bill about 25 hours per week -- less hours at beginning of year, more hours at end of year.

I am from New Zealand and have been living in the United Kingdom for 2 years. I think electronic engineers here are really feeling the offshoring pains (seems to be later here than other places in the world) but they have not realised its not all going and that there is some work that should never go and will come back. There seems to be a pessimistic outlook in England, but I think it will pass once everything settles down (global thinking). I do exactly the same job in London as I did in NZ, but get paid about 2.5 times as much... how can these companies remain competitive? Every engineer I have met from any country is basically as competent and any other... but there are differences and that's where your job security is.

I love being an engineer. However, I couldn't recommend engineering as a career. Companies can't seem to move engineering functions out of the country fast enough. There is absolutely no job security any longer.

I moved from medical to automotive and I am amazed at the amount of auto code that is being generated

I think our colleges and universities need to do a better job training students for real careers in engineering. Certainly there's a place for the advanced theory and certainly it's important to learn how to think. But practical, real-world, hands-on engineering experience is important too. Our schools should require some type of co-op experience or other hands-on training. If I had it to do over again, I would take more courses with labs and would co-op.

I think that I'm happy because of the people I work with, and because it's a small company. I'd gladly give up some \$\$\$/yr to be in a smaller company where I can become 'the expert' on just about anything. That's why I love my job.

I think that one has to be careful when comparing salaries across different countries. I have done a lot of work with Swedish engineers and they were earning roughly 3-4 times what we were in SA but their standard of living was very comparable mainly due to the high cost of living in Stockholm.

I dearly love the field of embedded design, but employment has been rough and I wouldn't recommend this line of work to anyone unless they're a) passionate about the work, and b) very, very talented.

I understand that companies must be profitable or they cease to exist. US companies can hire engineers from India, China and Eastern Europe for less than they would pay a US engineer. As one of my friends said, 'We are in a race to the bottom.' How long will it be before there ARE no more US engineers? I do not have the answers. I am concerned about the future.

'd like to see data from Japanese engineers. From what I understand they've got an entirely different business model where engineers are truly empowered...

I'm a Senior Software Engineer in a very large aerospace company. I also have team leadership responsibility. Most engineers here watch more and more of our work moving offshore and we are just guessing at how long we can keep some technical work in-house. The Commercial work is already gone and my people have a temporary protection due to our US Military work but that is eroding quickly as even US Military work is moving out under 'export licenses.' I love embedded systems but I'm going to have to do something else soon. It's clear that in a few years that work won't exist internally at my company.

It seems that the trend towards moving development off-shore at any cost is letting up. In my opinion this is due to the limited success these projects have had (read failures). Offshoring will continue, but hopefully will be tempered with some realism for a change.

'Offshoring' is a natural 'supply and demand' economic trend. However, sometimes organizations overlook the 'cost of low-cost' in terms of learning curve, (potential) reduced quality due to lack of experience or miscommunication, and employee turn-over rate in 'low-cost' countries. For those of us 'On shore' the challenge remains to keep ourselves valuable. That means we probably should not plan on 'coding' long term, and should migrate toward system specification, architecture and design, quality assurance ('testing', etc.), and customer-focused activities.

Since engineers in India cost 1/4 or less of a US employee, can we assume this holds true for other jobs in the technology industry? If so, companies can save a lot more money by outsourcing the CxO's and their HUGE fat-cat bonuses and magically-timed stock options.

There is no engineering/software developer shortage and never has been. Just corporate and university propaganda to boost supply and 'customers', respectively. The only time the shortage shouting diminishes is when the unemployment rate during recessions rises so blatantly high that such comments become patently ludicrous even to casual observers. (Sometimes the terminology then switches from finding 'qualified' to 'highly qualified' employees. The worse the recession, the more difficulty companies claim to have finding 'good people'.) If there is such a terrible techie shortage, why aren't salaries rising? Why has the average time needed to secure another job risen to the highest levels since WWII?

Very concerned about outsourcing in the short term. I'm reasonably certain that in the long run, companies will find it doesn't work. But until then, we're in for a rocky ride. Education is a problem at all levels from K-12 right through the number of PhDs. Engineers need to organize! At least politically.

Wage stagnation and even deflation, along with the associated offshoring of jobs from the US are a huge concern for me. Unsure of how to reverse the trend. Considering subsistence farming as a second career.