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**Engineers
for Hire
Yes, we're Open**

Annual Engineering Salary survey

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ENGINEERS turned ENTREPRENEURS

Is
now
the
right
time
to
start
a
business?

As part of our annual salary survey, engineers who have struck out on their own tell us how and why they did it.

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Key points

Engineering salaries are up for the sixth year in a row.

As the economy worsens, engineers are considering starting their own companies.

Don't start a business without putting a lot of thought behind it.

Resources

2028 Vision for Mechanical Engineering
tinyurl.com/6yjmpe

Advantage Automation,
advantageautomation.com

Aerie Engineering, www.aerie-corp.com

Fuentek, fuentek.com

Pathfinder Therapeutics Inc.,
www.2pti.com

Insitu Tec Inc., insitutech.com

The troubled economic climate in 2009 has engineers concerned about their jobs. Sixty-eight percent of readers surveyed by MACHINE DESIGN said they were unsure of their job's stability. Those who are worried say they are cutting back on spending and updating their resumes.

Is the fear justified? Only 39% of respondents say engineers have been laid off at their companies in the last year, and overall salaries are up to \$81,200, compared to \$78,300 from last year. (see MD, 04/24/08, pg 56.) For 53% of them, this was an increase of 1 to 5%, and only 5% say their salaries declined. In addition, 65% receive a bonus, overtime, or special compensation based on company profit sharing or personal performance.

Soon we'll all be entrepreneurs

Sixty-four percent of survey takers say they have considered self-employment at some time in their career. In August 2008, the American Society of Mechanical Engineers released a report called *2028 Vision for Mechanical Engineering*, which prognosticated about what engineering might look like in 20 years. The report predicts engineers will be more likely to work at home and for themselves. The report says "advances in computer-aided design, materials, robotics, nanotechnology, and biotechnology will democratize the process of designing and creating new devices. The engineering workforce will see more engineers working at home as part of larger decentralized engineering companies or as independent entrepreneurs."

It's a tough call to strike out on your own. Job loss has been the impetus for many who have done so. This was the case for Chris Dreike, who started **Advantage Automation**, Torrance, Calif. "In 1990 I was laid off," he says. "Not knowing any better, I thought I could start out by servicing the equipment my former employer made. This proved to be a good starting-off point for a business. Month after month, customers came in to fill my schedule and this has continued for almost 20 years."

Another reason engineers put out a shingle is to get flexibility. For example, Lori Morton, who started **Aerie Engineering**, Greenville, S.C., got her motivation in 1998 when her brother was having major surgery. "I wanted to be there for his family for as long as it took. The need for time off pushed me over that hump. I never looked back."

Laura Schoppe founded **Fuentek**, a technology-consulting firm in North Carolina out of dissatisfaction with her job. "I was tired of working long hours and feeling as though I wasn't making any headway. I was paid about 30% less than a man in the group who was comparably qualified, though I actually had more technical degrees. Also, I was in meetings all the time that felt like a waste of time."

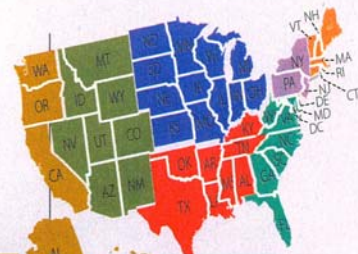
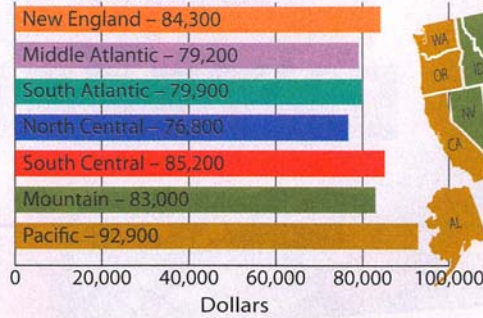
Robert Galloway Jr., an engineering professor at Vanderbilt University, had a different motivation. A major multinational company approached him about commercializing some of his systems. After nine months of deliberations the company decided to pass on the opportunity. "After the collapse of those negotiations I was told that large medical-device companies don't innovate, they acquire." At that point Galloway and other colleagues decided to start **Pathfinder Therapeutics** in Nashville to develop their ideas themselves.

There are a few important steps a budding entrepreneur must consider when starting a business, including writing a business plan, securing financing, and finding customers. But even experienced business creators can have trouble with these steps. So says Dave Brown, an entrepreneur who has started several consumer-product companies in California since he got laid off in 2001. Though Brown has written business plans, he claims no one really knows how to write the perfect proposal. "Lis-

ten to feedback and act on it. Nothing worthwhile is done alone so always accept help and guidance from people who are wiser." Most entrepreneurs will spend a good amount of time perusing financial documents and spreadsheets. "You have to understand how the money flows and where it's going," he adds.

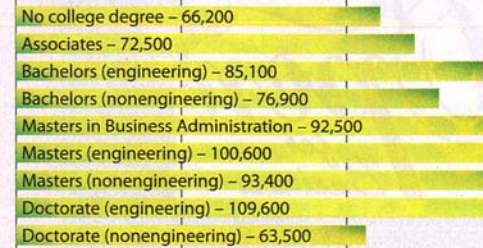
Dreike started his business with nothing more than his own bank account. But he's had success convincing customers to pay fees up front. "The deposit covers the cost of

AVERAGE SALARY BY REGION



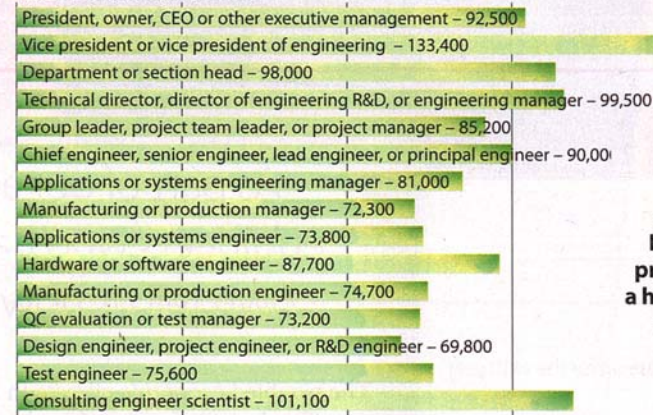
As in previous surveys, engineers on the coasts earn higher average salaries. Surprisingly, overall salaries across the country rose though it was a tough year.

AVERAGE SALARY BY DEGREE



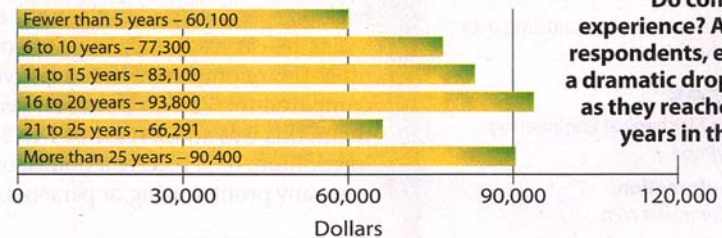
Is that advanced degree worth it? Engineers with MBAs only earn an average of \$7,000 more than engineers with bachelors degrees.

AVERAGE SALARY BY TITLE



Once again it pays to be second in charge. Interestingly, vice presidents average a higher salary than presidents in our survey this year.

AVERAGE SALARY BY YEARS OF EXPERIENCE



Do companies value experience? Among survey respondents, engineers saw a dramatic drop-off in salary as they reached 20 or more years in the profession.

NUMBER OF LAYOFFS

IN 2008	IN 2009	TOTAL	COMPANY
1,800	-	1,800	3M Co.
500	1,100	1,600	Advanced Micro Devices Inc. (AMD)
-	4,000	4,000	Agilent Technologies Inc.
-	13,500	13,500	Alcoa Inc.
-	-	1,800	Applied Materials Inc.
1,250	-	1,250	ArvinMeritor Inc.
-	1,500	1,500	Baker Hughes Inc.
-	20,000	20,000	Caterpillar Inc.
-	3,500	3,500	Corning Inc.
-	800	800	Cummins Inc.
1,700	-	1,700	Danaher Corp.
-	-	622	Deere & Co.
-	-	5,200	Eaton Corp.
-	154	154	Eaton Corp. (Van Wert Div.)
-	4,000	4,000	Federal-Mogul Corp.
-	-	315	International Truck and Engine (Div. of Ford)
-	-	179	General Dynamics (Bath Iron Works)
-	1,000	1,000	General Electric, Aviation Div.
34,000	-	34,000	General Motors Corp.
-	-	2,000	General Motors-Mich and Ohio (included above)
-	340	340	General Motors (GM Engine Plant)
-	1,000+	1,000+	Halliburton Co.
-	1,100	1,100	Harley-Davidson Inc.
25,000	-	25,000	Hewlett-Packard Co.
145	145	290	Honeywell International Inc. (Imaging Div.)
-	95	95	Illinois Tool Works Inc. (Miller Electric Div.)
-	6,000	6,000	Intel Corp.
-	2,800	2,800	International Business Machines
-	70	70	Johnson Controls Inc. (Tillsonburg Div.)
-	336	336	Lear Corp. (Janesville Div.)
-	375	375	Lexmark International Inc.
3,000	4,000	7,000	Motorola Inc.
-	43	43	Parker Hannifin Corp. (headquarters staff)
-	130	130	Parker Hannifin Corp. (New Haven Div.)
67	-	67	Parker Hannifin Corp. (Rubber Hose Div.)
600	-	600	Rockwell Automation Inc.
-	900	900	Rohm and Haas Co.
-	-	400	SPX Corp.
169	-	169	SPX Corp. (Lakes Mills Div.)
9,500	-	9,500	Sun Microsystems Inc.
-	60	60	Terex Corp. (Cedar Rapids, Iowa, Div.)
-	-	3,400	Texas Instruments Inc.
-	2,200	2,200	Textron Inc.
-	2,000	2,000	Cessna (Div. of Textron)
-	14,500	14,500	The Boeing Co. (headquarters)
-	911	911	The Boeing Co.
5,000	-	5,000	The Dow Chemical Co.
-	40	40	The Timken Co. (Bucyrus Div.)
-	48	48	The Timken Co. (St. Thomas Div.)
-	-	240	Pratt & Whitney (Div. of United Technologies)
-	5,054	5,054	Whirlpool Corp.
-	3,000	3,000	Xerox Corp.
-	-	275	Xerox Corp. (in NY)

materials plus a little more. No customer has failed to pay and few have even been late. The plan was to try it on my own for a year and see where things stood. At the end of the first year, I found I had made about 75% of my previous salary. The future looked bright, so I continued.”

Morton says writing a business plan forced her to think about her niche and objectives. “Objectives are tough in the beginning. What I thought we would be doing and what

Layoffs abound in industrial suppliers and manufacturers

With today’s dicey employment situation, it should come as no surprise that engineers are eyeing the independence of private practice and running their own business. At left is a compendium of announced layoffs by well-known manufacturers and industrial firms. The numbers were collected from public sources.

we are doing now are quite different. The business plan evolved each year as we learned more about our clients, fine-tuned our services, and expanded our geography.”

Tips for success

Before you quit your day job, these engineers-turned-entrepreneurs offer some words of wisdom. Dreike advises that business starters be sure they have “plenty of moxie, energy, a bright outlook, and certainly enough financial backing to last until the business is profitable.”

Morton notes that engineers solve problems, and so do entrepreneurs. “I use my engineering skills to analyze a need in the marketplace (which can be viewed as ‘the problem’) and then respond to it with technical services (the solution).” She says her engineering background helps in breaking problems down into their basic constituents to find the root cause. “I am convinced we are successful because we know how to translate our engineering skills into actions that directly benefit our clients.”

But just because you are a good engineer doesn’t mean you will be a good entrepreneur, says Bethany Woody, founder of **Insitu Tec**, Charlotte, N.C. “As an engineer-entrepreneur it doesn’t matter if you are excited about your technology. You have to find the market niche and how to communicate to prospects.”

Schoppe warns “don’t go out on your own until you have enough experience and expertise to have something unique to offer. Your Rolodex is critical. Contacts and relationships are your starting point for business. Without them you have to start from scratch and that is more costly and risky.”

What’s the worst that could happen? Galloway says anyone starting out should “be prepared to fail. After you’ve walked through the scenario of having to fire your employees, sell your equipment, lose whatever investment (time and money) you’ve put into the venture, and tell your spouse that you’ve lost that investment, then you may be prepared to succeed. I was told when we started that all start-ups go broke twice. We did it three times. It can be very rewarding but is not for the faint of heart.”

And Dreike offers one last piece of advice: “Have some idea about how long you are willing to try growing the business before giving up. And have an exit strategy.” **MD**