



Profile of IEEE Consultants

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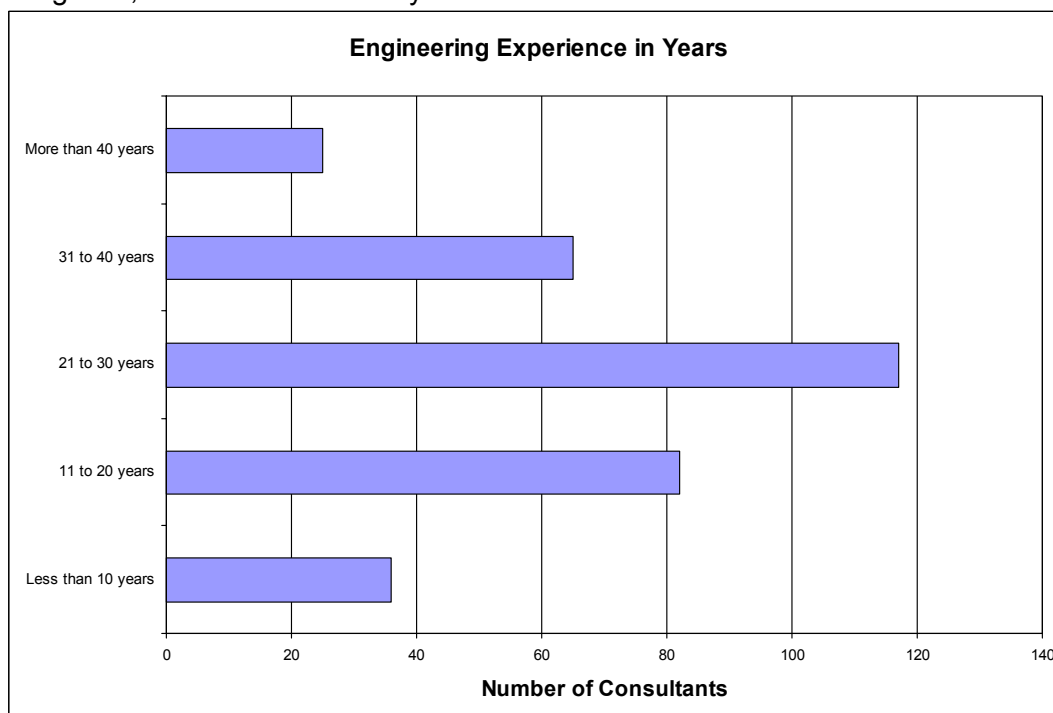
Introduction to a Consultant's Profile

When a consultant is preparing a proposal or negotiating a contract, one of the ongoing concerns is deciding how much to charge. In order to establish a fixed price or a fee that is fair yet competitive, the consultant needs to know what other consultants in similar fields charge. In response to this need, the Alliance of IEEE Consultants' Networks (AICN) conducted a national fee survey of their members. The current survey, completed in late 2002, queried more than two thousand IEEE consultants, making it the most comprehensive fee survey by the IEEE or any of the other technical societies.

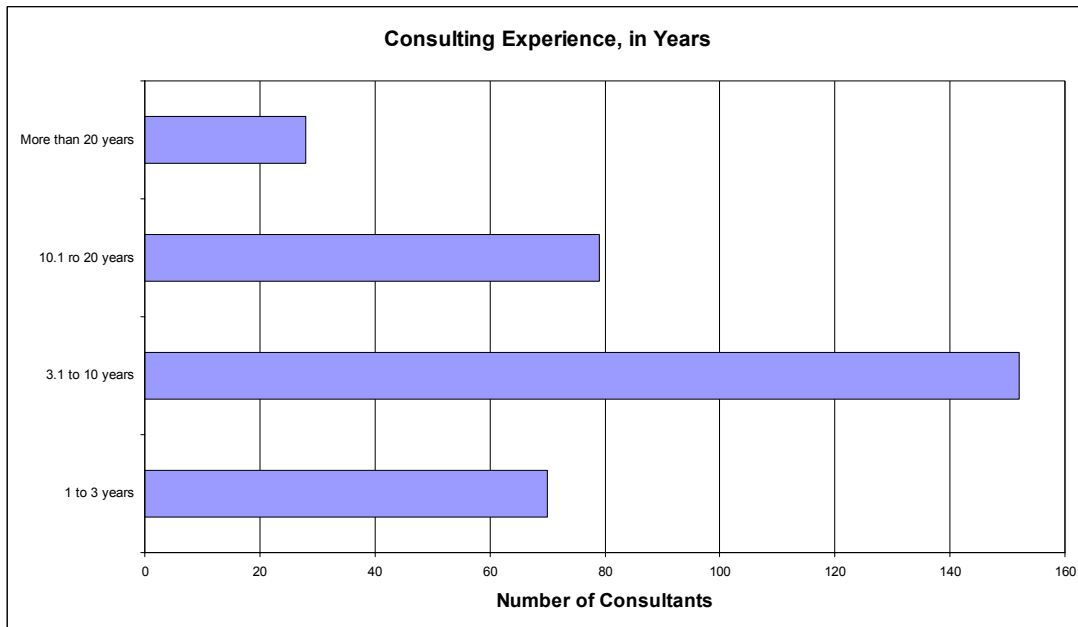
More than 400 consultants responded but the AICN is primarily concerned with those consultants who work as independent contractors. Because of this, the data base was sorted to remove those engineers who worked more than half time as contract engineers (job shoppers) or as employees of other companies. The remaining 333 consultants were classified as "independent" and used for this profile.

The Experience and Background of an IEEE Consultant

The respondents showed a wide range of experience, ranging from two years to 52 years in the engineering field, with a median of 24 years.

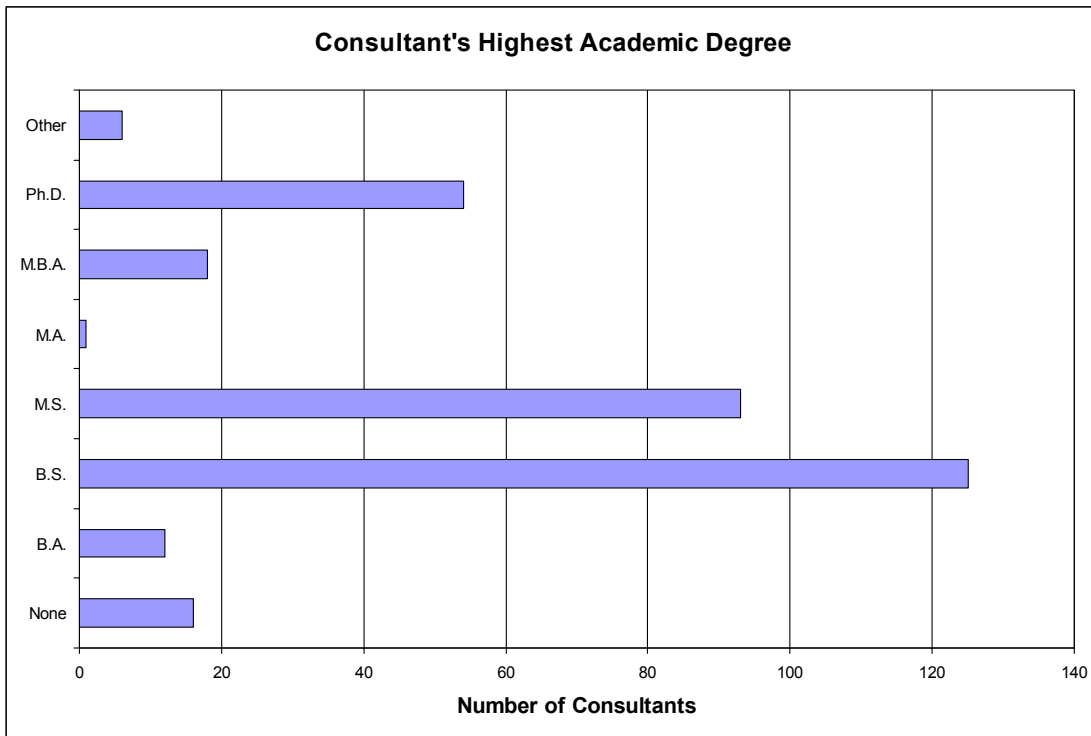


Their consulting experience ranged from less than one year to 40 years. For many of the engineers, consulting represented a second career or an opportunity to continue their career on a part-time basis.

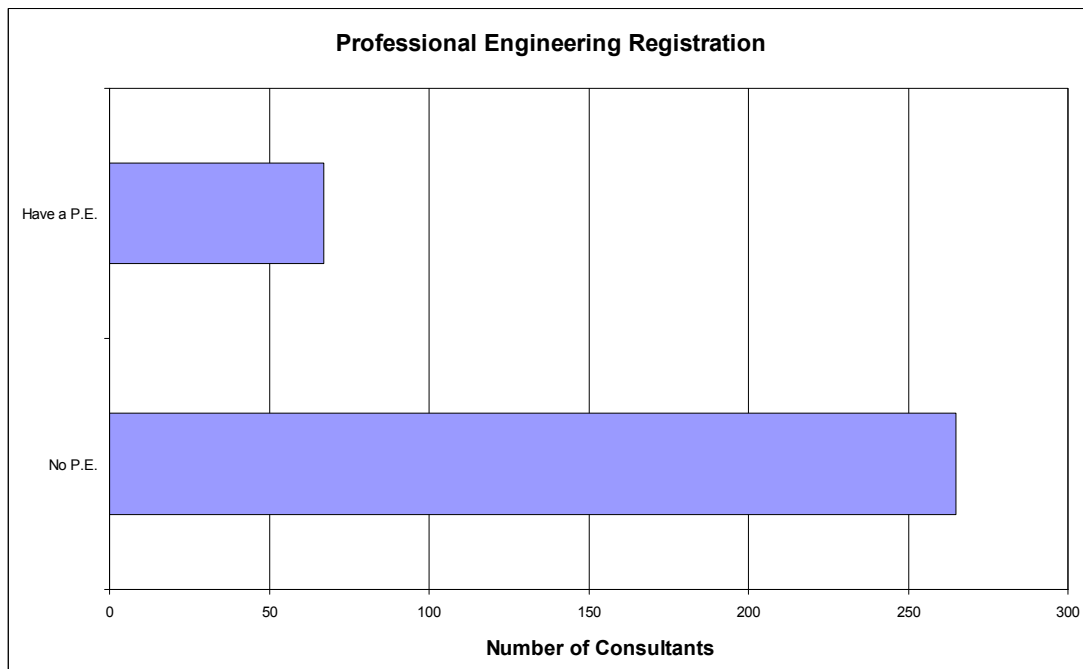


The Education and Registration of an IEEE Consultant

Experience, advanced degrees and professional registration all aid in establishing a consultant's image as an "expert" in the engineering field. Most of the IEEE consultants had at least a Bachelor of Science or a Master of Science degree. Many had a PhD.

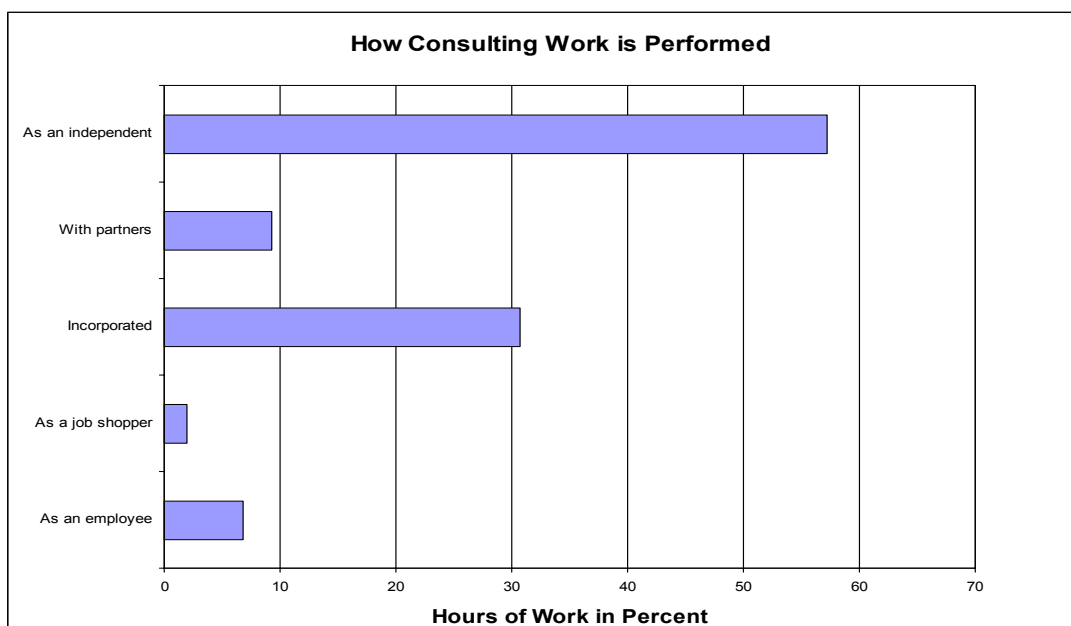


In some engineering fields, such as power, a professional engineering license aids in establishing credibility. In other engineering fields, a P.E. offers little advantage. Only 20 percent of the IEEE consultants were registered professional engineers.

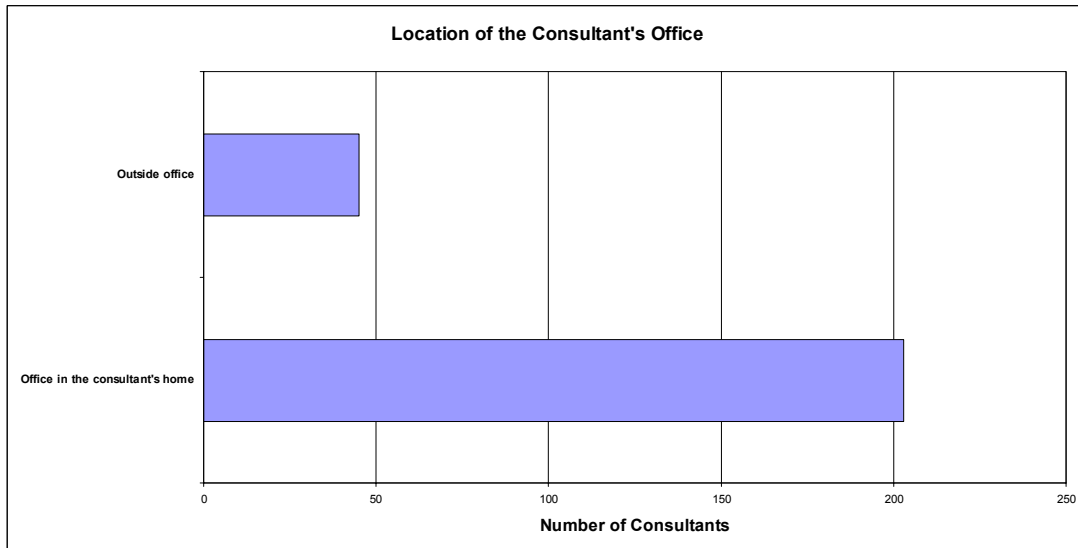


How an IEEE Consultant Works

The survey showed that most of the IEEE consultants worked under more than one organizational structure. This often depended on their client or the contract they were working on. As noted earlier, any consultants who performed more than half of their work as a contract engineer (job shopper) or more than half of their work as an employee of another company were not included in these data. The bars on the graph below show the fraction of all the engineering work performed in each organizational format.

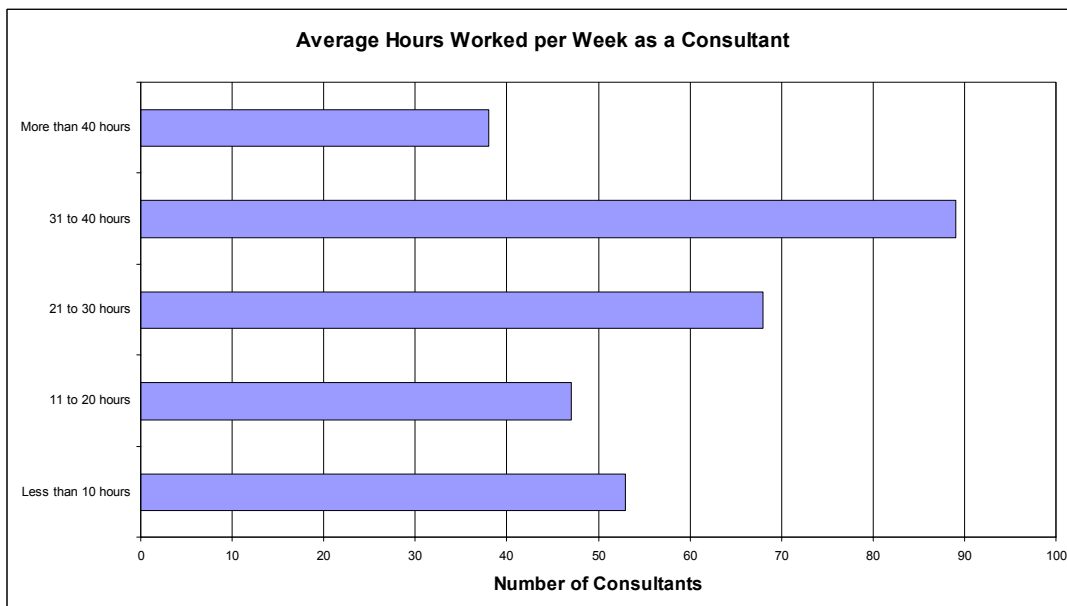


Most IEEE consultants reported that they maintained their office in their home.



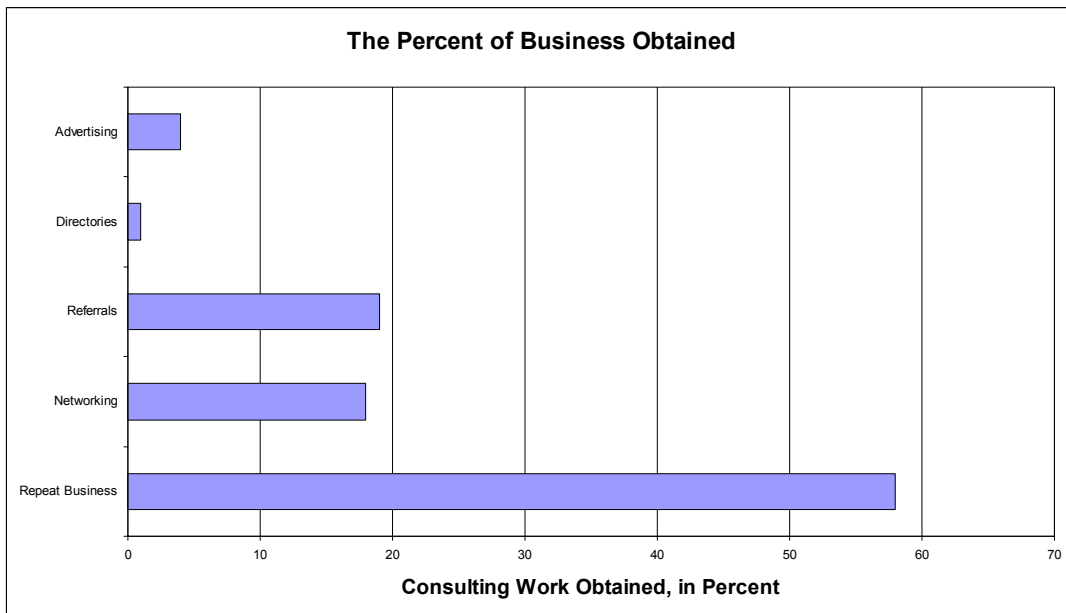
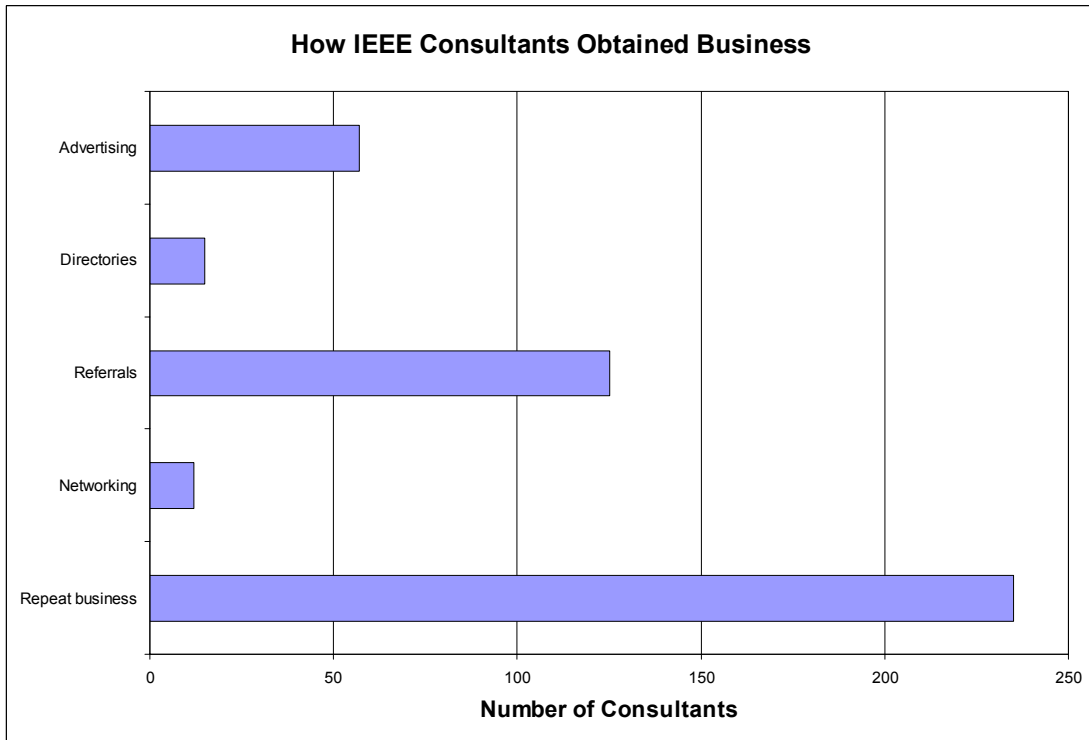
Working on their own as self employed consultants, engineers may be at risk of being sued by their client or a third party. Because of this, professional liability insurance or errors and omissions insurance is usually recommended. As can be seen below, most of the IEEE consultants did not carry this insurance.

The IEEE survey showed that most consultants worked 30 to 40 hours per week. Many others worked a much shorter week. This indicated that they were part-time consultants, possibly on a second career.



How an IEEE Consultants Got Their Business

The IEEE consultants were asked to estimate how much of their work was obtained by some of the more common practices.



Essentially, all of the IEEE consultants reported that they received some work as repeat business or follow-on from a prior contract. For that matter, 20 consultants reported that they received all of their work that way. Repeat business accounted for more than half of all consulting work.

Half of the consultants indicated that they received business from referrals, usually by clients and friends. This accounted for 19% of all consulting work.

Closely associated with referrals, is networking which was responsible for almost as much business as referrals.

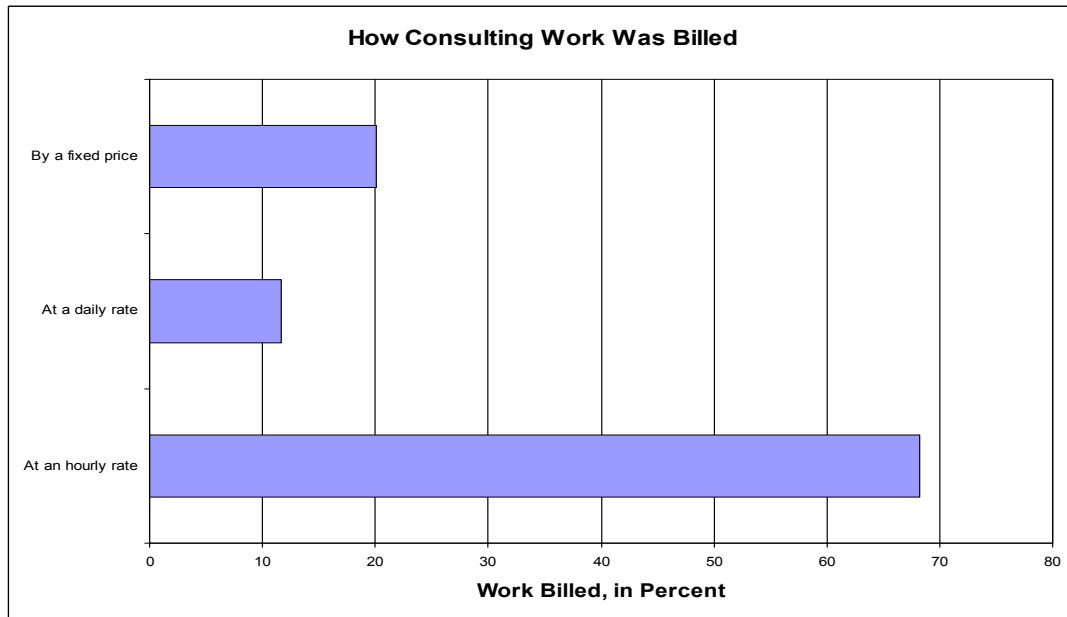
Most surprising was the report on directories and databases. Though they are accepted as a good means of advertising, and they do aid in establishing credibility, they were credited with few actual contracts. Only one percent of the consulting work was reported to have been obtained this way.

A more detailed analysis of the consultant's responses is shown in the table below...

Marketing methods used by the IEEE independent consultants to get their business	Number of consultants who got at least part of their work by this method	Number of consultants who got all of their work by this method.	Percent of all work obtained by this method, based on all consultants reporting
Repeat business from a current or prior client	235	20	58%
Client contacts made by networking	12	4	18%
Referrals from clients and friends	125	2	19%
Contacts through IEEE directories and databases, both local and national	15	None (Overall range was 1% to 20%)	1%
Consultant's own advertising	57	None (Overall range was 1% to 80%)	4%
When doing own marketing, what percentage came from cold calls?	31		8%
When doing own marketing, what percentage came from a marketing or referral service with a fee?	23		None (Overall range was 5% to 80%)
When doing own marketing, what percentage was due to other methods?	42		15%

How IEEE Consultants Bill for Their Work

If time to complete a consultant's assignment is difficult to estimate, the contract with the client is often based on an hourly rate. In twelve percent of the contracts, the consultants billed by the day. For those assignments where the scope of work can be well defined, the clients usually prefer that the consultant quote a fixed price.

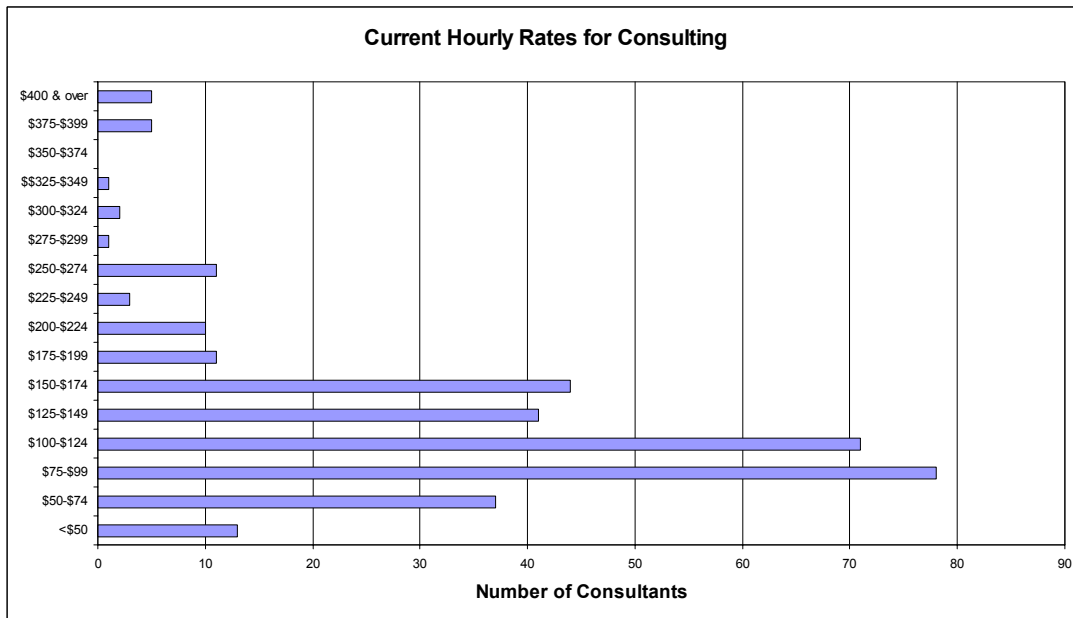


How Much Do Other IEEE Consultants Get Paid?

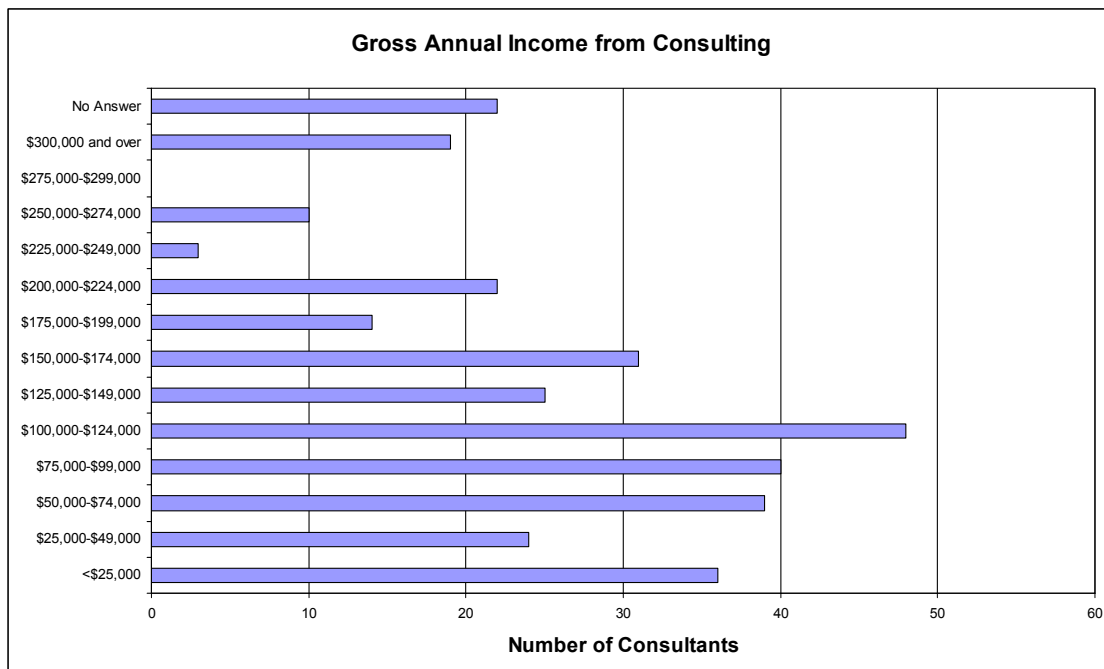
The prime purpose of this survey was to determine what fees other consultants were charging. Every consultant needs to know this in order to prepare a proposal or negotiate a contract that is fair, yet competitive.

Though many regional and less comprehensive fee surveys have been made in the past, this survey of 333 independent contractors provides the most comprehensive picture to date. Engineers working as job shoppers or employees were removed from the data base if they received more than half of their consulting income from either source. This was necessary, as independent contractors need to charge higher hourly fees to cover taxes and overhead not paid directly by job shoppers or employers.

The following chart indicates the range of hourly fees charged. For a more detailed study, see the tables in **Consultants' Fees and Business Practices**, and the scatter graphs in **Plots of Consultants' Fees and Annual Earnings**. Both can be found at www.ieeeusa.org/business/aicn.menu.html.

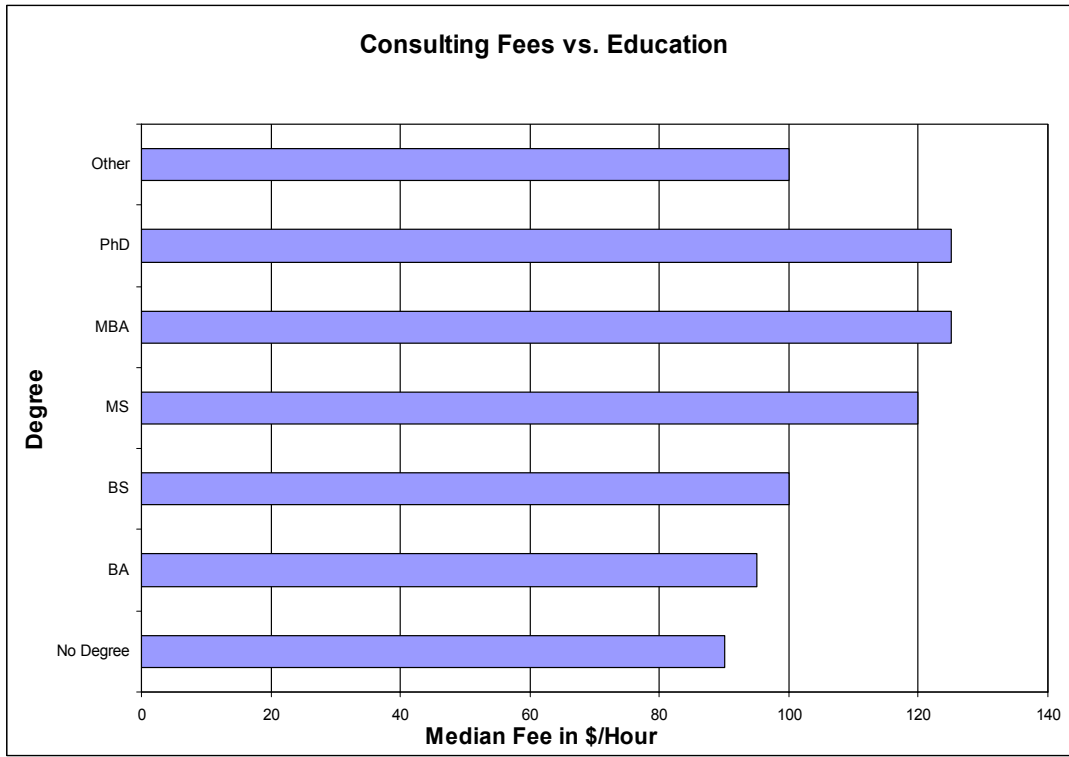


For the first time, the IEEE fee survey asked the respondents for their gross annual income from consulting. As might be expected, some considered this private, but most provided the data. Their median income was \$100,000 per year, with many of the part-time or occasional consultants reporting an income of less than \$25,000. Details for these data are shown in **Consultants' Fees and Business Practices**, and the scatter graphs in **Plots of Consultants' Fees and Annual Earnings**. Both can be found at www.ieeeusa.org/business/aicn.menu.html.



How Does Education Affect Earnings?

The survey asked for the consultant's highest academic degree. The response from each of the independent consultants was then compared with their hourly rate or fee. The results are shown in the chart and table below.



Only the median values of the fees are shown in the above chart. For more detail, including the minimum, maximum, and average values, see the table below.

Comparison of Consulting Fees vs. Degrees					
Highest Academic Degree	Number of Self Employed Consultants Responding	Minimum Fee Charged, in \$/hr	Maximum Fee Charged, in \$/hr	Average Fee Charged, in \$/hr	Median Fee Charged, in \$/hr
No Degree	16	\$60	\$250	\$103	\$90
BA	12	\$60	\$170	\$109	\$95
BS	125	\$20	\$1000	\$114	\$100
MS	93	\$31	\$600	\$132	\$120
MBA	18	\$50	\$250	\$138	\$125
PhD	54	\$7	\$2000 *	\$187 *	\$125
Other	6	\$65	\$160	\$100	\$100

* If the data point for the \$2000/hr maximum PhD fee is treated as an outlier, the maximum PhD rate is \$500/hr and the average PhD rate is \$150/hr. The median fee of \$125/hr is unchanged.

The question often asked is "What is a degree worth?" These results indicated that a consultant with a BS degree earned \$10 or \$11 an hour more than a consultant without a degree. The consultant with an MS degree received another \$18 to \$20 per hour, and adding either an MBA or a PhD brought in another \$5 per hour. Prior AICN surveys indicated an even greater benefit from education.

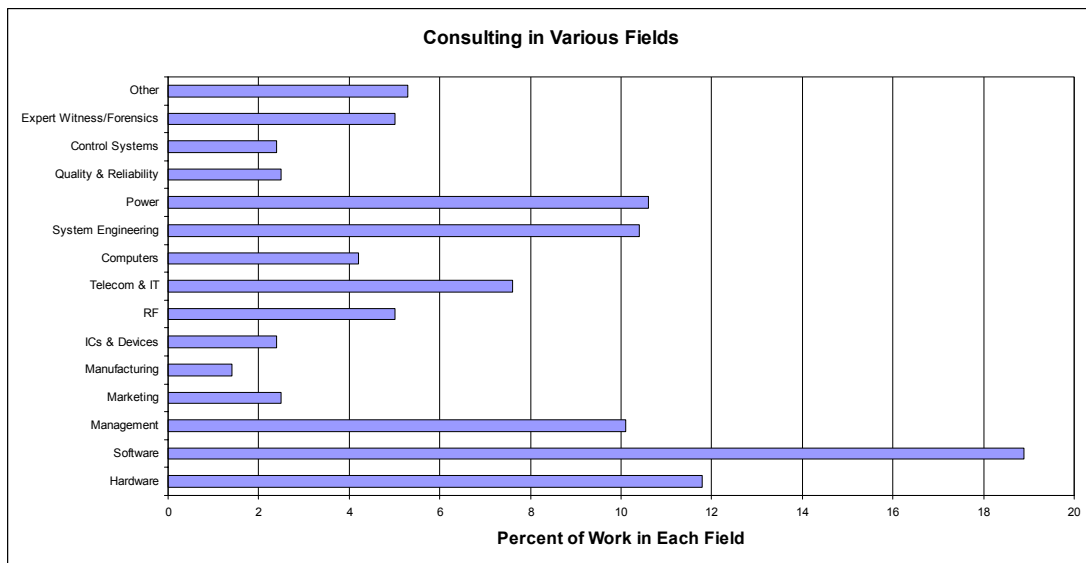
What Was a PE Worth?

Though the IEEE encourages professional engineering registration, this survey showed that only 20% of the respondents were registered. In this survey, the dollar value of the PE was found to be about \$10,000 per year. This is less than was reported in earlier AICN surveys. Because of the spread of the fees and earnings, looking at the medians is the best means of comparison.

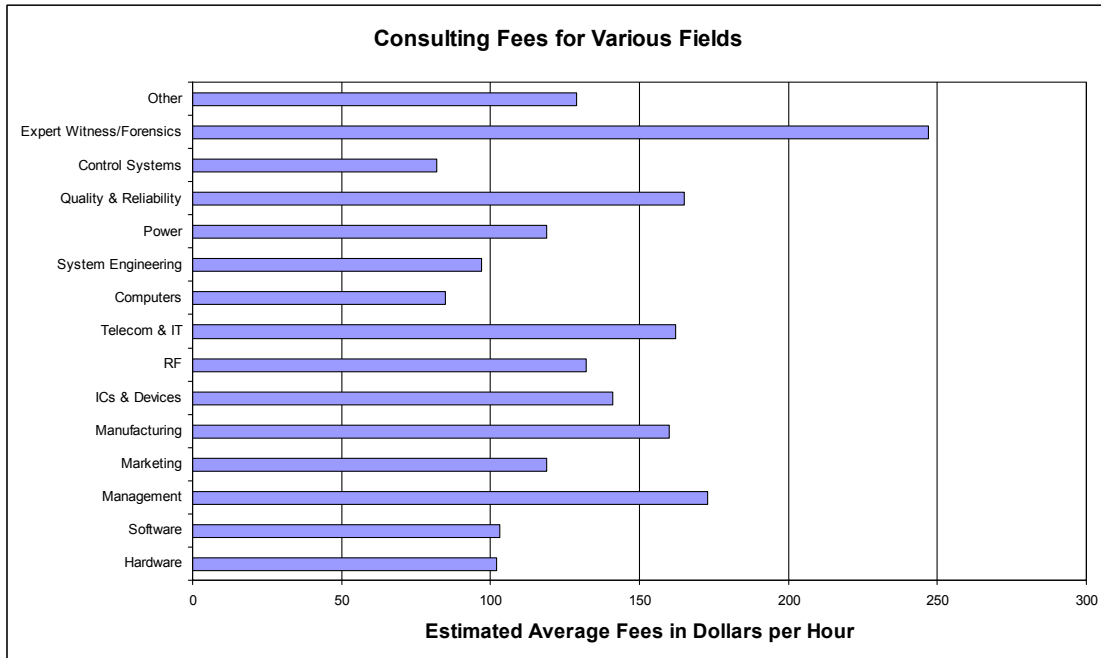
Professional Registration	Range of Fees Charged in \$/hr	Median Fee Charged, in \$/hr	Range of Annual Earnings	Median Annual Earnings
No PE	\$20 to \$600	\$100	\$1 to \$850,000	\$100,000
With PE	\$25 to \$2000	\$105	\$7,348 to \$5 million	\$110,000

Which Engineering Field Paid the Highest Hourly Rate?

For the first time, an AICN survey provided enough data to begin to answer this question. This can not be an exact answer as most consultants worked in more than one field. For this survey, the respondents were asked to estimate their percentage of work in each field as well as their billable work hours per year. This provided the data to make an estimate of the relative amount of consulting work being done in each field.



This same estimate of the percentage of their consulting work performed in each field was used as a factor and applied to the engineer's standard fee in order to develop an approximate fee for each consulting field. The results are shown graphically below.



The table below provides more detailed data. Note that there are a few consultants who worked in only one field. They are shown in column four. Probably more useful is the number of consultants working at least half time in a particular field. That count is shown in column five. It was this number that was used in calculating the average equivalent hourly fee for consultants working at least half time in a given field.

Comparison of Consulting Fees Charged in Various Fields					
Engineering field or specialty	Work performed in this fields, in percent	Number of consultants working in this field	Number of consultants working full time in this field	Number of consultants working at least half time in this field	Average hourly fee for those consultants working at least half time in this field
Hardware	11.8%	91	4	26	\$102/hr
Software	18.9%	104	11	49	\$103/hr
Management	10.1%	90	5	17	\$173/hr
Marketing	2.5%	33	0	5	\$119/hr
Manufacturing	1.4%	30	1	1	\$160/hr
IC's & devices	2.4%	15	1	7	\$141/hr
RF	5.0%	33	1	12	\$132/hr
Telecom & IT	7.6%	55	3	18	\$162/hr
Computers	4.2%	8	3	5	\$85/hr
System Engineering	10.4%	92	2	19	\$97/hr
Power	10.6%	60	8	28	\$119/hr
Quality & Reliability	2.5%	25	2	5	\$165/hr

Control Systems	2.4%	28	0	4	\$82/hr
Expert Witness & Forensics	5.0%	50	4	9	\$247/hr
Other	5.3%	42	7	9	\$129/hr

The highest fees charged were for consulting in Expert Witness and Forensics, where nine engineers averaged \$247/hr. Also high on the list was Management consulting, where 17 consultants averaged \$173/hour. Prior surveys, though based on much less data, have also shown these two fields to command the highest fees.

The \$160/hr for Manufacturing should be ignored as it was based on a single input.

IC consulting at \$141/hr has some validity as it was based on seven inputs.

RF consulting, with twelve inputs, shows \$132/hr. This is not surprising as prior engineering surveys have shown RF to be a relatively well-paid field.

The \$162/hr average for Telecom consulting warranted a second look. The data were from 18 inputs that ranged from \$50 to \$320. The median fee was found to be \$125/hr, which is probably a more useful figure for comparison.

The \$85/hr consulting fee for Computers was lower than expected. It was based on only six inputs that ranged from \$50 to \$100/hr.

The average of \$165/hr for Quality & Reliability field was biased by data that ranged from \$100 to \$325/hr. Their median of \$125/hr may be more realistic.

Examination of the data for Expert Witness & Forensics showed a range of \$130 to \$500/hr for the nine consultants who worked at least half time (most worked at least 80%) in that field.

Comparison of the Fees by State

Most of the previous IEEE fee surveys were conducted on a regional basis or at a regional workshop. These indicated some variation from region to region. This is the first time that a single survey provided state-to-state and regional comparisons. Each consultant was asked to designate the state in which they did most of their consulting.

Consulting Location – The states tend to be grouped by IEEE region.	Number of Consultants reporting from this state	Range of fees reported	Median fee in \$/hour for those states with three or more consultants reporting
Northeast Region			
Connecticut	3	\$95-\$100	\$100
Massachusetts	15	\$60-\$500	\$110
New Hampshire	1	\$165	-
New York	19	\$65-\$200	\$100
Mid-Atlantic Region			
District of Columbia	4	\$75-\$1000	\$350
Maryland	11	\$55-\$175	\$110
New Jersey	15	\$45-\$150	\$85
Ohio	6	\$50-\$125	\$88
Pennsylvania	7	\$60-\$600	\$125

Southeastern Region			
Alabama	2	\$65-\$130	-
Florida	13	\$59-\$250	\$100
Georgia	4	\$71-\$150	\$100
Kentucky	1	\$120	-
North Carolina	6	\$75-\$100	\$125
South Carolina	1	\$135	-
Tennessee	3	\$75-\$200	\$150
Virginia	4	\$150-\$200	\$150
Midwestern Region			
Iowa	1	\$100	-
Illinois	7	\$80-\$150	\$100
Indiana	2	\$75-\$125	-
Michigan	2	\$80-\$250	-
Minnesota	4	\$75-\$105	\$93
Wisconsin	4	\$90-\$190	\$150
Southern Region			
Arkansas	1	\$80	-
Colorado	11	\$50-\$150	\$125
Kansas	2	\$80-\$85	-
Missouri	2	\$100	-
Oklahoma	2	\$60-\$85	-
Texas	13	\$75-\$250	\$105
Western Region			
Alaska	1	\$100	-
Arizona	6	\$75-\$250	\$110
California	52	\$20-\$375	\$135
Montana	2	\$100	-
Nevada	1	\$375	-
Oregon	1	\$180	-
Utah	2	\$65-\$225	-
Washington	4	\$90-\$190	\$150

The highest rates (median of \$350/hour) were reported from the District of Columbia, but that may be challenged as they were based on only four responses. Note that the median rates in surrounding areas (Pennsylvania at \$125/hour and Virginia at \$150/hour) were also above average.

California had the largest number of consultants responding to the survey. With 52 reporting, the median rate for the state was \$135/hour, well above the U.S. median of \$115.

A few consultants indicated that they did most of their consulting off shore. Their rates, though not shown, were much lower than the U.S. averages.

Problems Getting Paid

In the past, there have been reports of consultants having trouble getting paid. Questions were added in this survey in order to determine how serious this problem was. As can be seen, 61 consultants reported having at least some trouble getting paid but 54 of the 61 were not covered by a written contract. There is probably a basic business guideline that should be developed from this information.

