

Profile of IEEE Consultants, 2004

Prepared by R.H. Gauger, P.E.

December 2004

Introduction to a Consultant's Profile

As 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 both competitive and fair, the consultant needs to know what other consultants working in similar fields charge. In response to this need, the Alliance of IEEE Consultants' Networks (AICN) conducts national fee surveys of their members. This survey, completed in late 2004, is the third nationwide survey by the AICN. Prior surveys were conducted in 1998 and in 2002.

This survey provides the profile of typical self-employed and independent consultants, including their education, experience, business practices, and specialty. Of particular interest are the data regarding the typical consultant's median earnings and hourly fee.

Scope of the Survey

The survey was conducted by email and solicited responses from three groups of IEEE consultants.

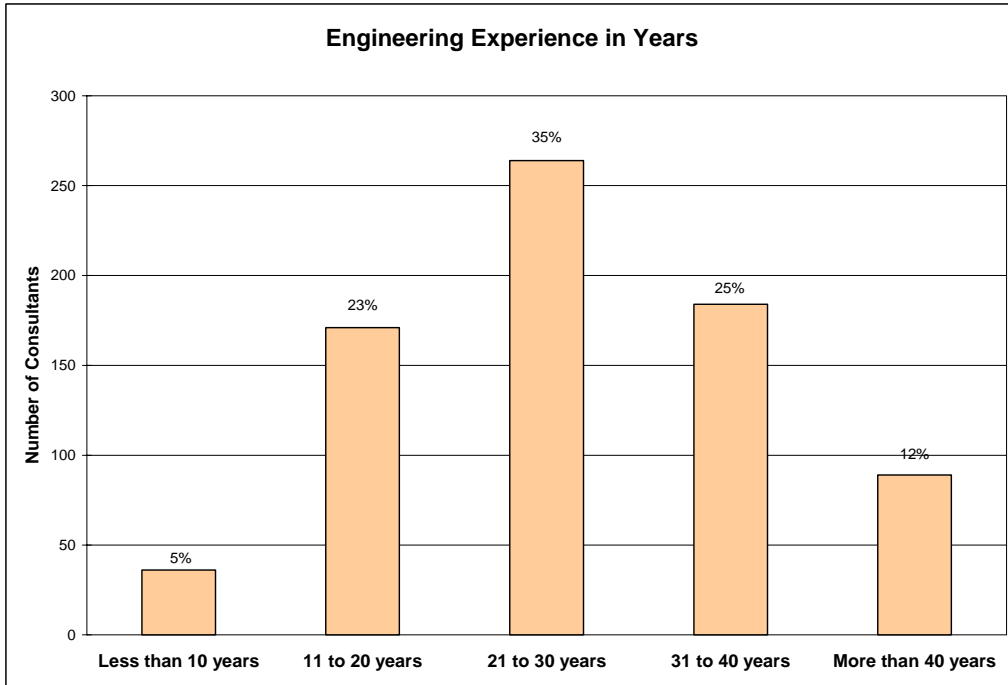
- (a) A direct solicitation of consultants on file with the AICN. This included current and past members who are or have been listed in the IEEE-USA Database. This is a searchable web directory and database of IEEE consultants who offer their services, primarily in electronic and electrical fields. This source accounts for about 230 responses.
- (b) Solicitation of a random sample of IEEE members who had indicated "consultant" as their title or occupation when they completed their annual IEEE membership form.
- (c) IEEE members/consultants who responded to the several announcements and invitations to participate in the survey, as posted on web sites and in IEEE-USA newsletters. The responses from (b) plus (c) account for about 700 of the total responses.

Because of the inputs from data sources (b) and (c), not all of the more than 900 consultants are self-employed or independent consultants. As the AICN is primarily concerned with those consultants who work as independent contractors, the data were sorted to remove those engineers who work more than half time as contract engineers (job shoppers) and/or as regular employees of other companies. The remaining 756 consultants are classified as "independent," and their inputs are used in developing this consultants profile.

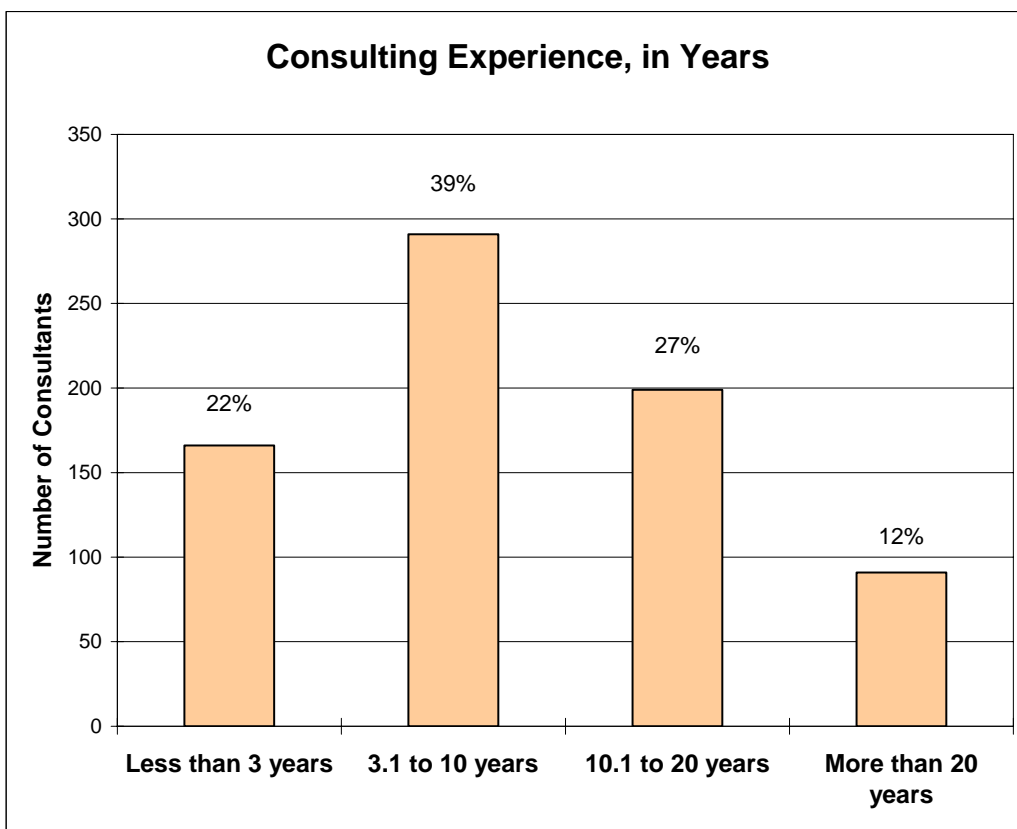
As the IEEE is the largest technical professional society, it is not surprising that this is the largest technical consultant fee survey to date.

The Experience and Background of an IEEE Consultant

The respondents showed a wide range of experience, with up to 63 years in the engineering field. The median is 26 years.

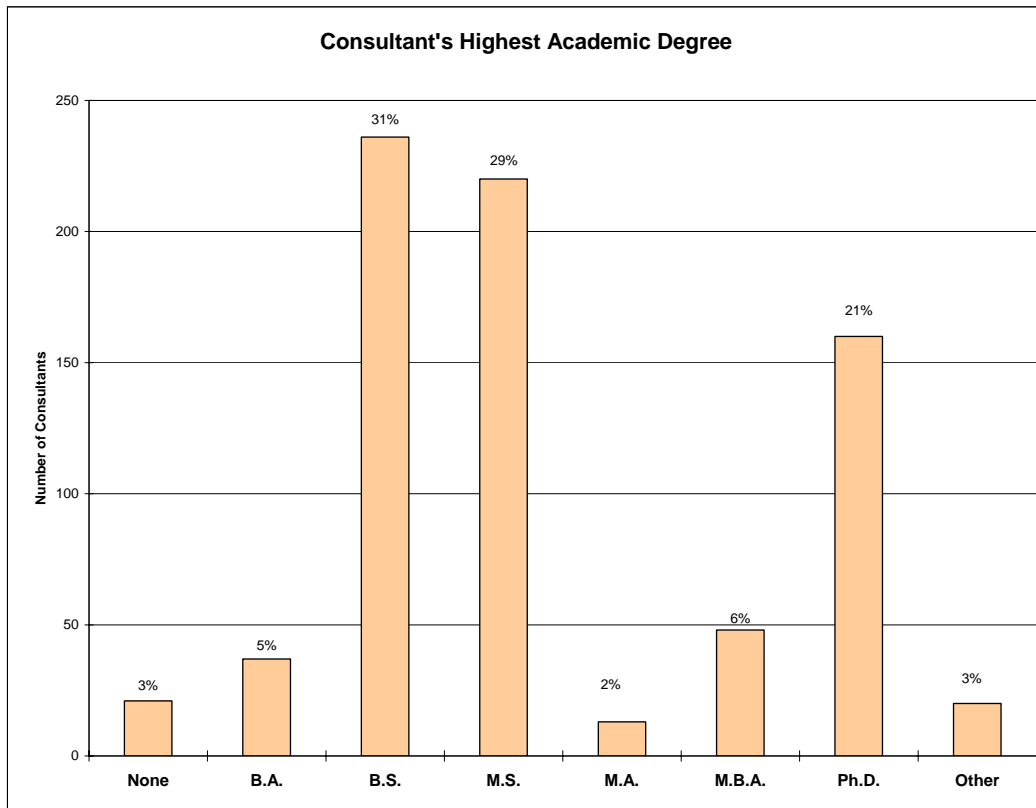


Their consulting experience ranges from less than one year to 43 years. For many of the engineers, consulting represents a second career or an opportunity to continue their career on a part-time basis.

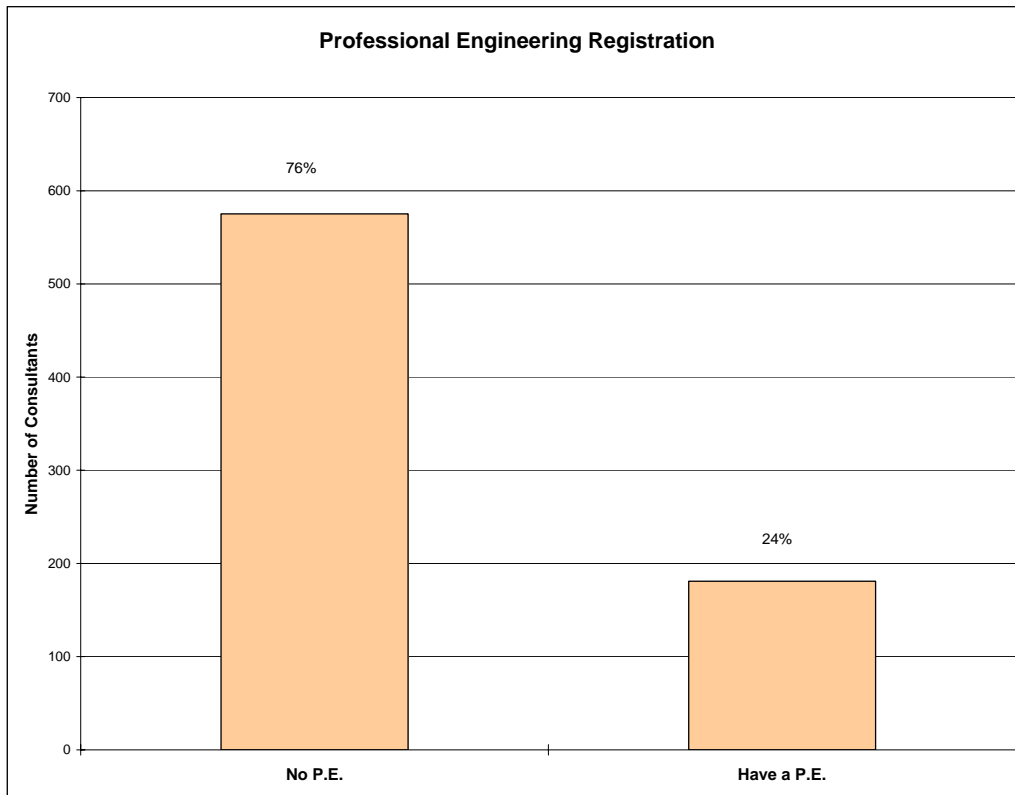


The Education and Registration of an IEEE Consultant

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 have at least a Bachelor of Science or a Master of Science degree and 21 percent have a PhD.

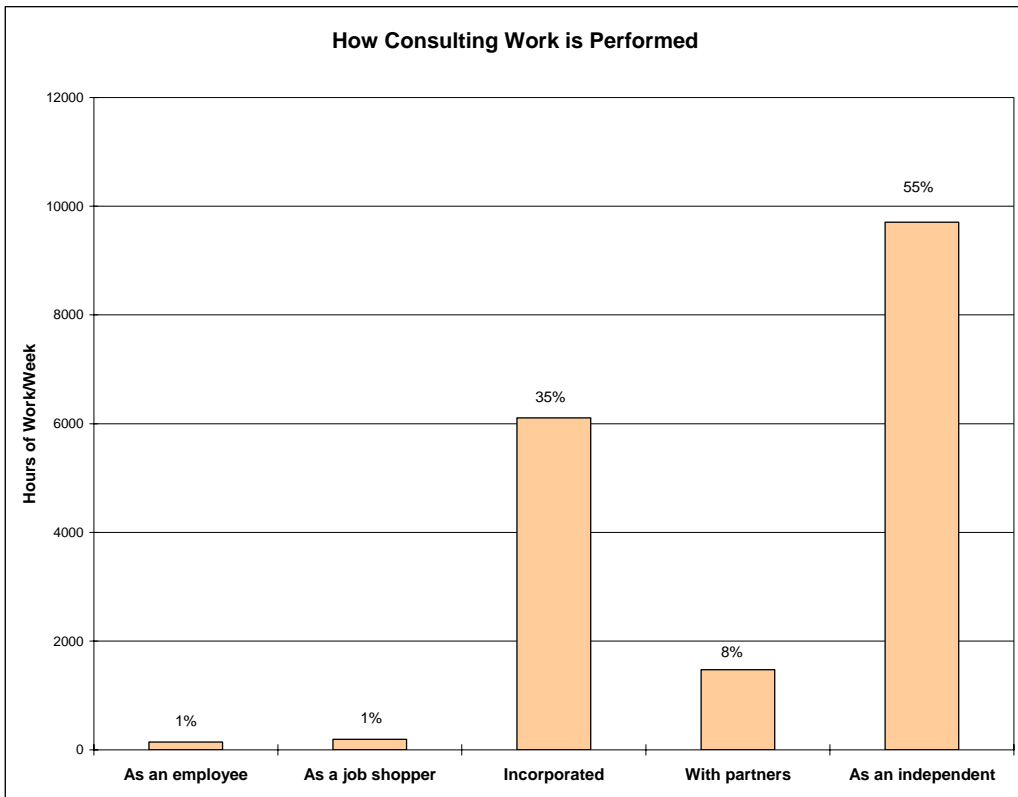


In some engineering fields, such as power, a professional engineering (P.E.) license aids in establishing credibility. In other engineering fields, a P.E. offers little advantage. In this survey, 24 percent of the IEEE consultants are registered professional engineers.

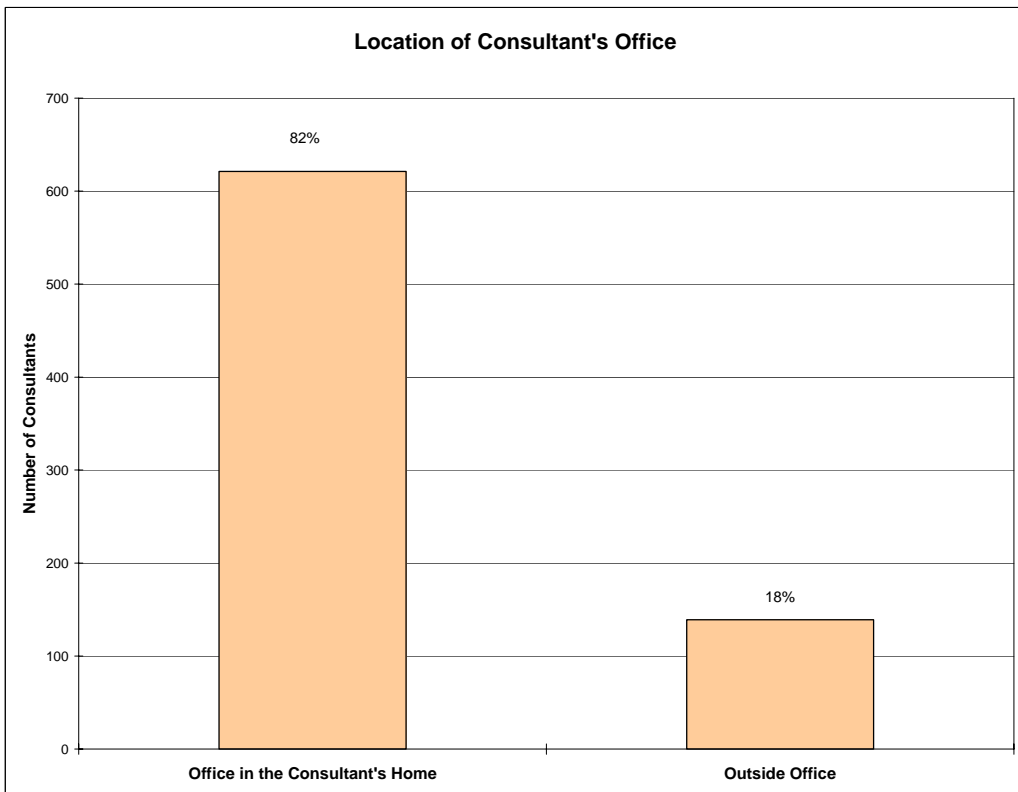


How an IEEE Consultant Works

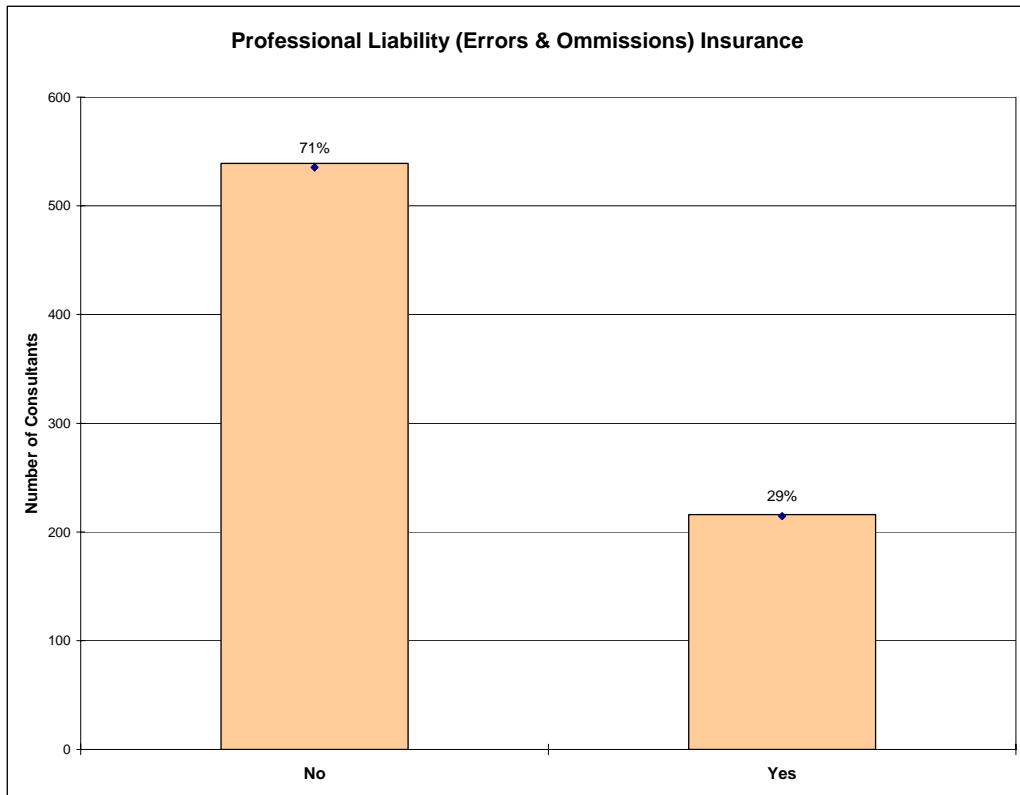
The survey shows that most of the IEEE consultants work under more than one organizational structure. This often depends on their client or the contract they are working on. As noted earlier, any consultant who performs more than half of his or her work as a contract engineer (job shopper) and/or as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



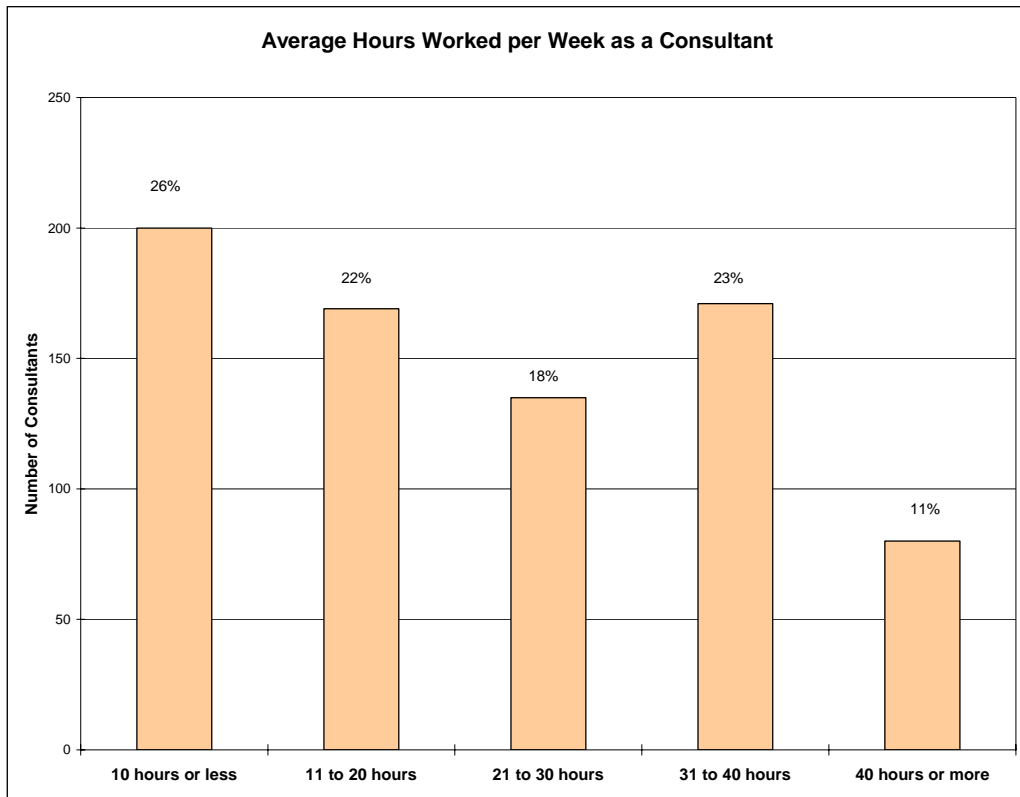
Most IIEEE consultants report that they have their office in their home.



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



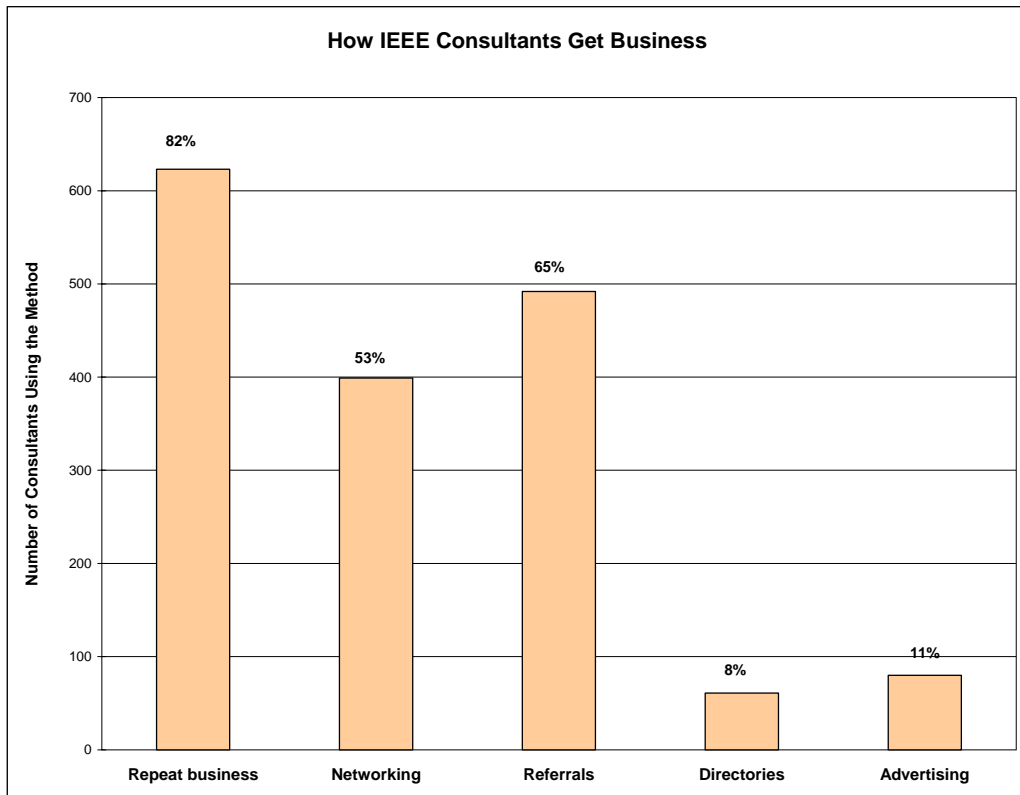
The IEEE survey shows that most consultants bill for much less than 40 hours per week. This indicates that they may be part-time consultants, possibly in partial retirement and using consulting as a second career.



How IEEE Consultants Get Their Business

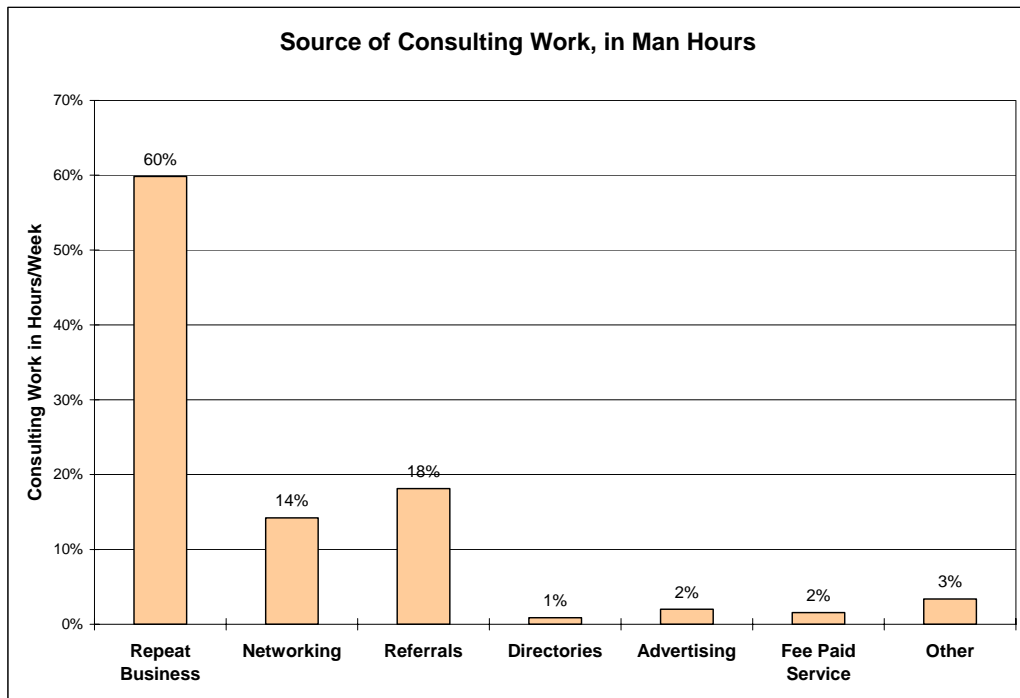
The IEEE consultants were asked what methods they use to get business and to estimate how much of their work is obtained by each method. This first chart shows what methods they are using. For example, 82 percent of the consultants get repeat business, 53 percent receive business from networking, and referrals provide business for 65 percent.

Note that most consultants use more than one method to get their business. Therefore, the percentages on the bars add to more than 100 percent.



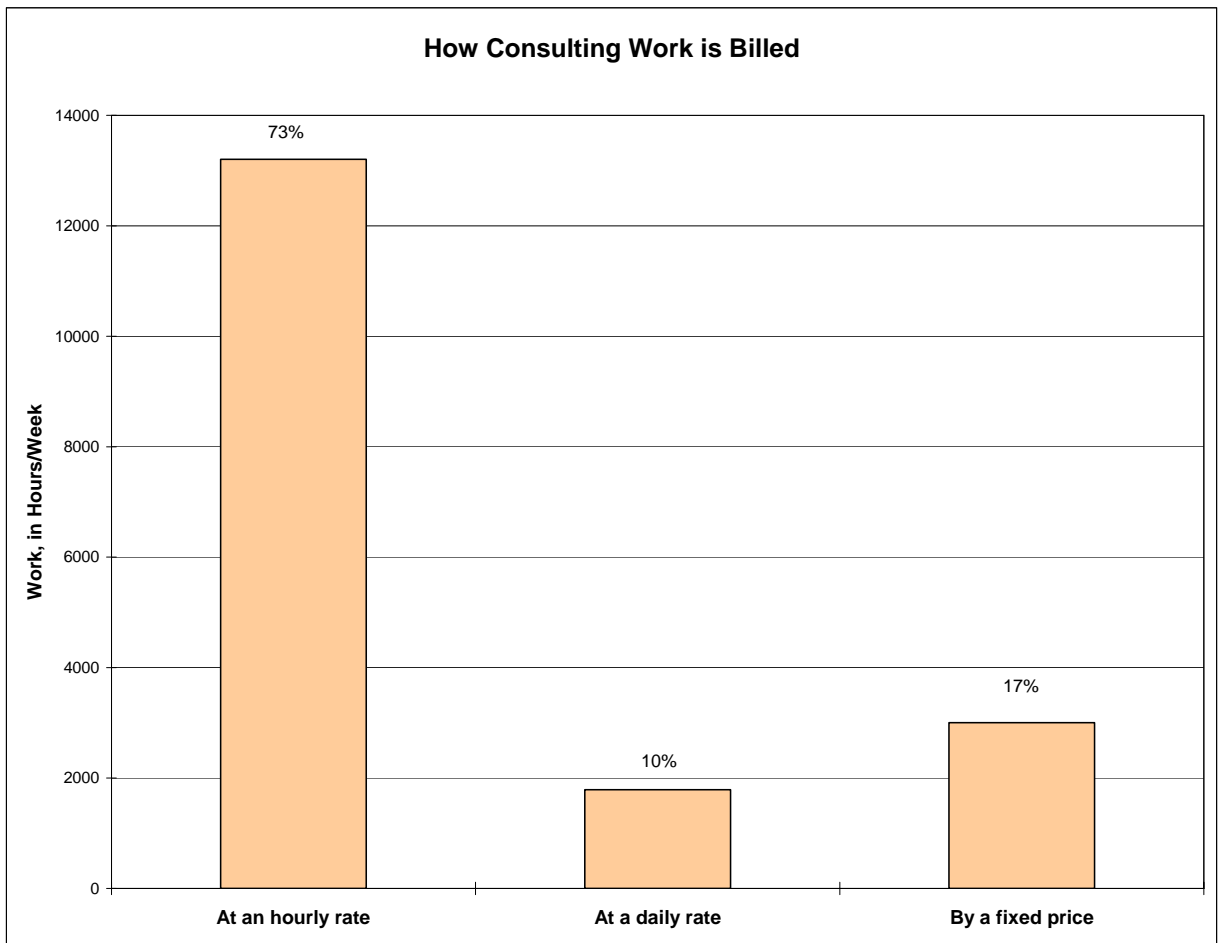
The next chart shows the survey results in terms of the man hours of work received. On this basis, repeat business is by far the most important source of work.

Surprising in this report is that only eight percent of the consultants use directories and databases and that this use accounts for only one percent of the consulting work. This is probably explained by the fact that less than a quarter of the consultants included in this survey are members of the IEEE-USA Consultants Database and thereby have the option of using the IEEE database and directory. In order to make a fair comparison, it would be necessary to multiply the one percent and eight percent numbers by four.



How IEEE Consultants Bill for Their Work

If the total hours needed to complete a consultant's assignment is difficult to estimate, the contract with the client is often based on an hourly rate. An alternate method, used for ten percent of the contracts, is to bill the client 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. Seventeen percent of the consulting is billed this way.

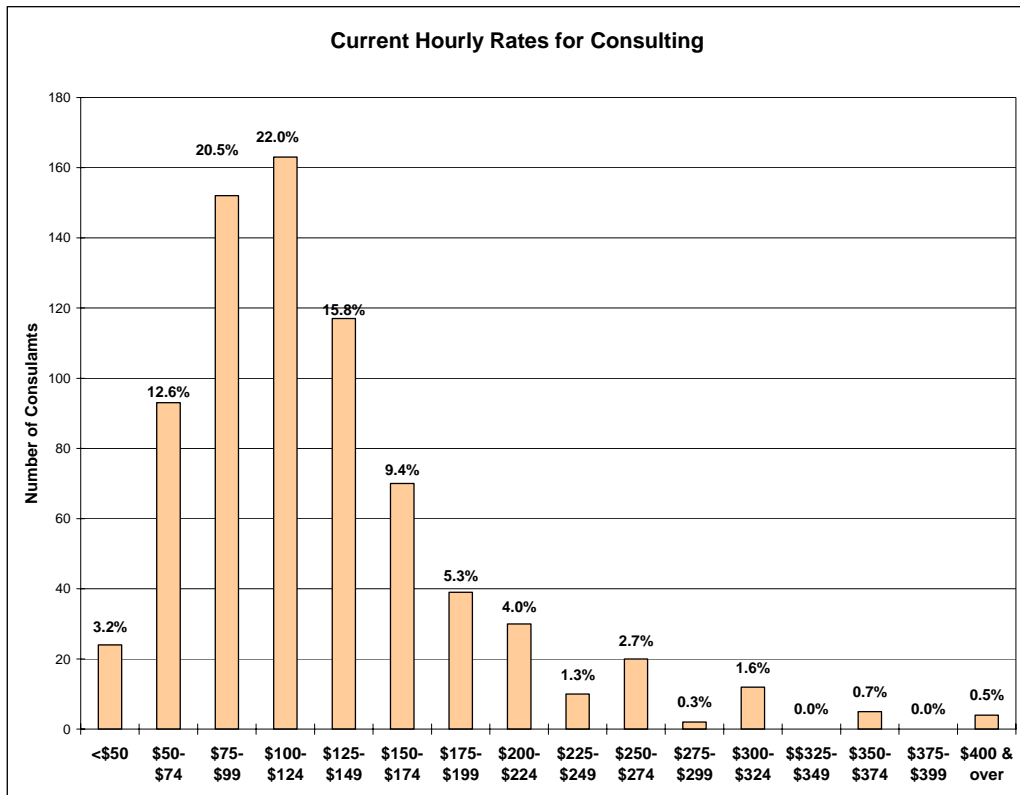


How Much Do Other IEEE Consultants Get Paid?

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

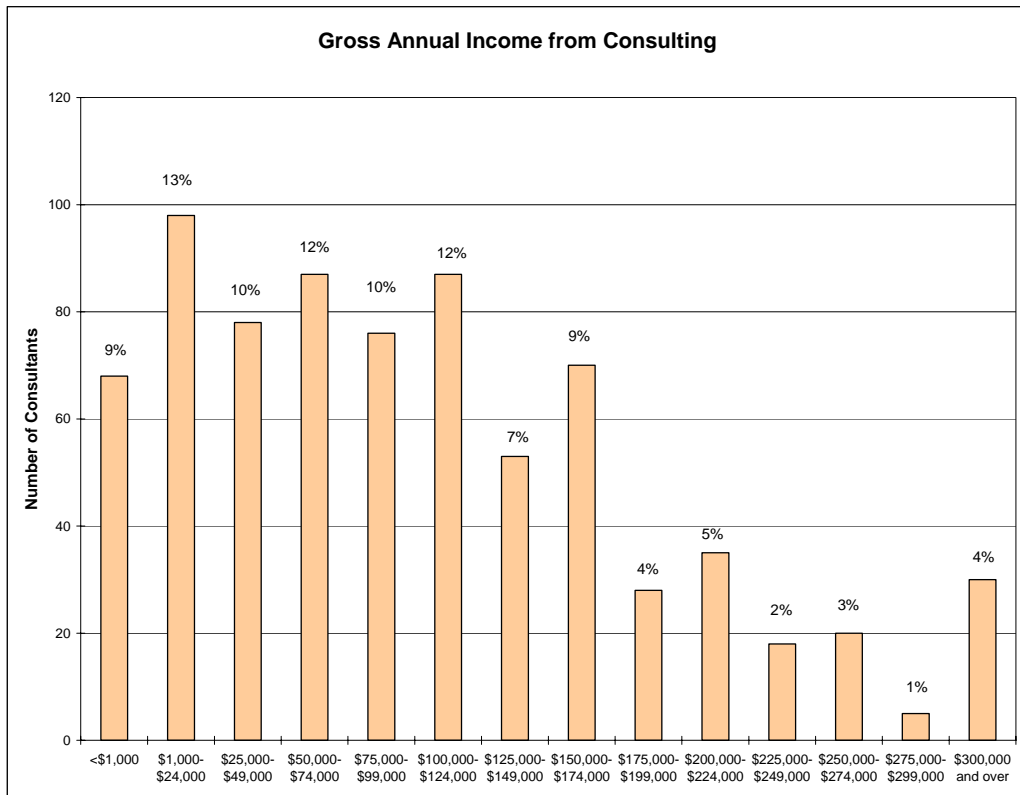
Though many regional and less comprehensive fee surveys have been made in the past, this survey of 756 independent consultants provides the most comprehensive picture to date. Engineers working as job shoppers or employees are not included in this data base if they receive more than half of their consulting income from either of these sources. This was necessary, as independent contractors typically charge higher hourly fees to cover taxes and overhead not paid directly by job shoppers or employers.

The following chart illustrates the range of fees charged in year 2004. The survey shows that the median fee for all consultants is \$110 per hour.



Again this year, the IEEE fee survey asked the respondents for their gross annual income from consulting. Most provided this information, but some considered it private and reported no income or a very low value. Reported incomes of less than \$1000 per year were not considered typical and these data are not included in subsequent analyses.

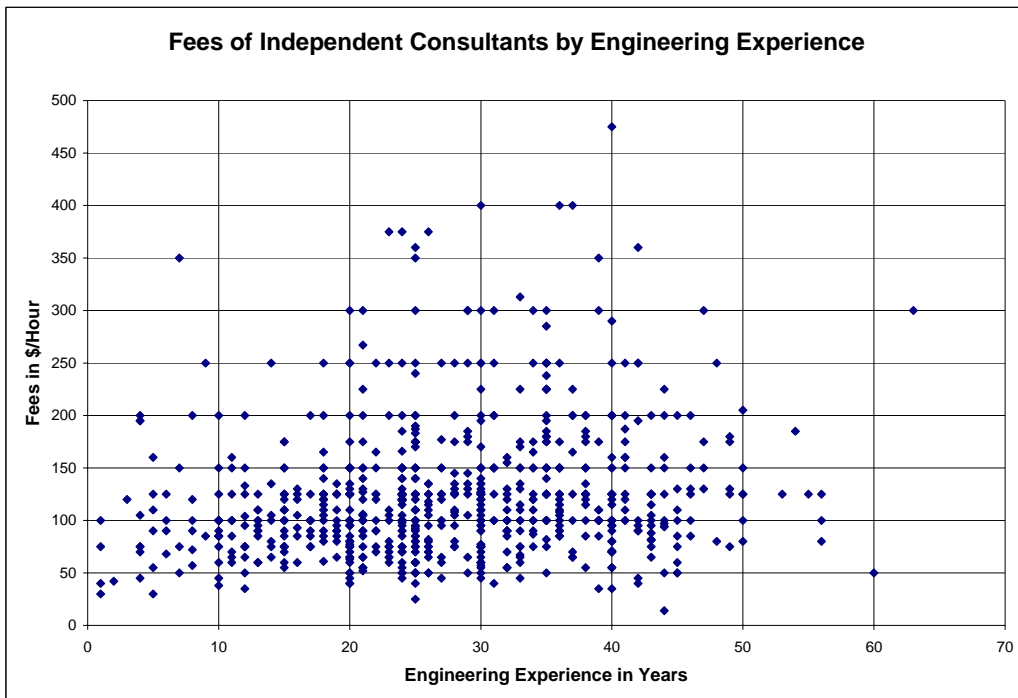
The median consultant income is \$100,000 per year, with many of the part-time or occasional consultants reporting an annual consulting income of less than \$25,000.



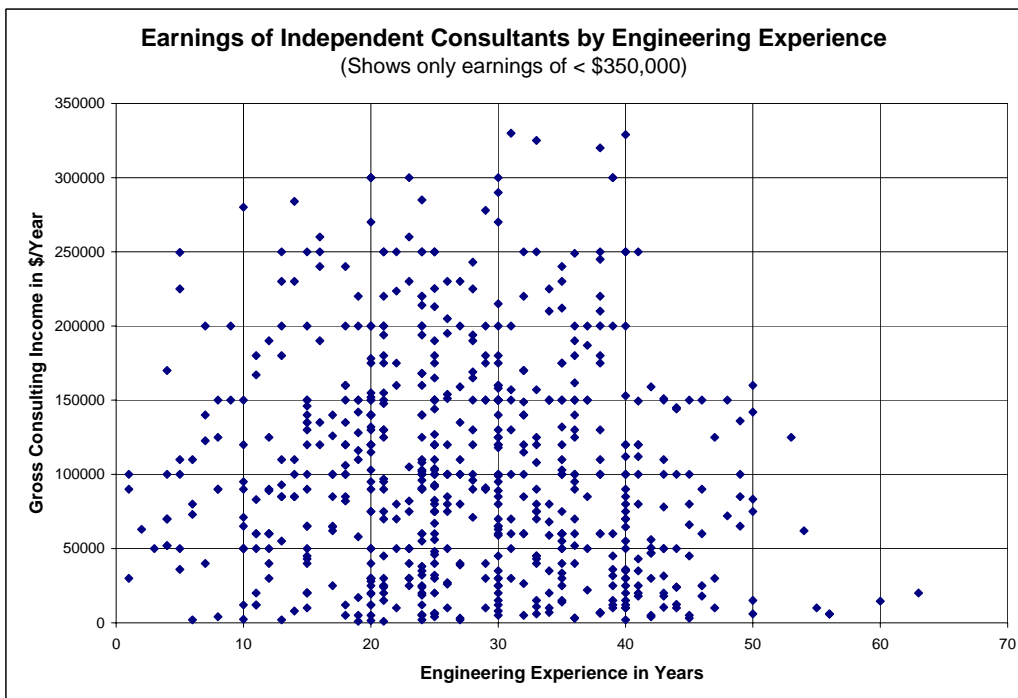
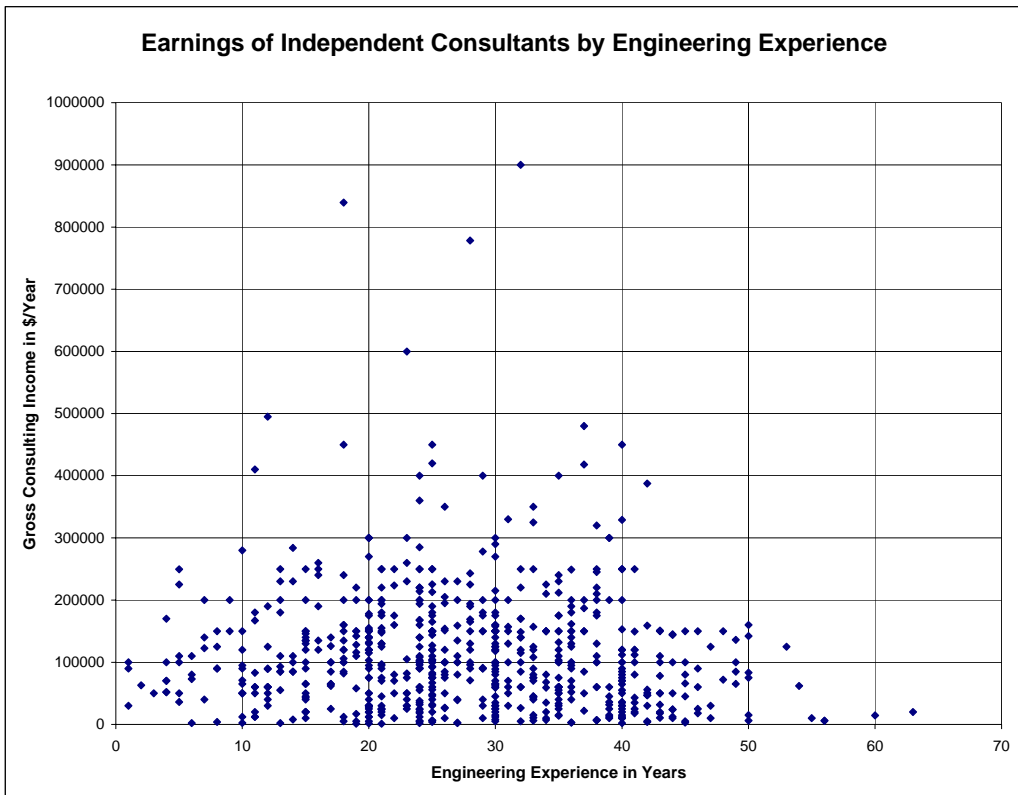
What is Engineering Experience Worth?

This question is answered by three scatter plots showing hourly fees and consulting earnings plotted vs. years of experience. Scatter plots are used here, as they provide more visual information than can be obtained from tables or bar charts.

Note that the third scatter plot has been expanded by displaying only the annual earnings of those consultants with annual earnings of less than \$350,000. The survey found 19 consultants with earnings of \$350,000 or more.

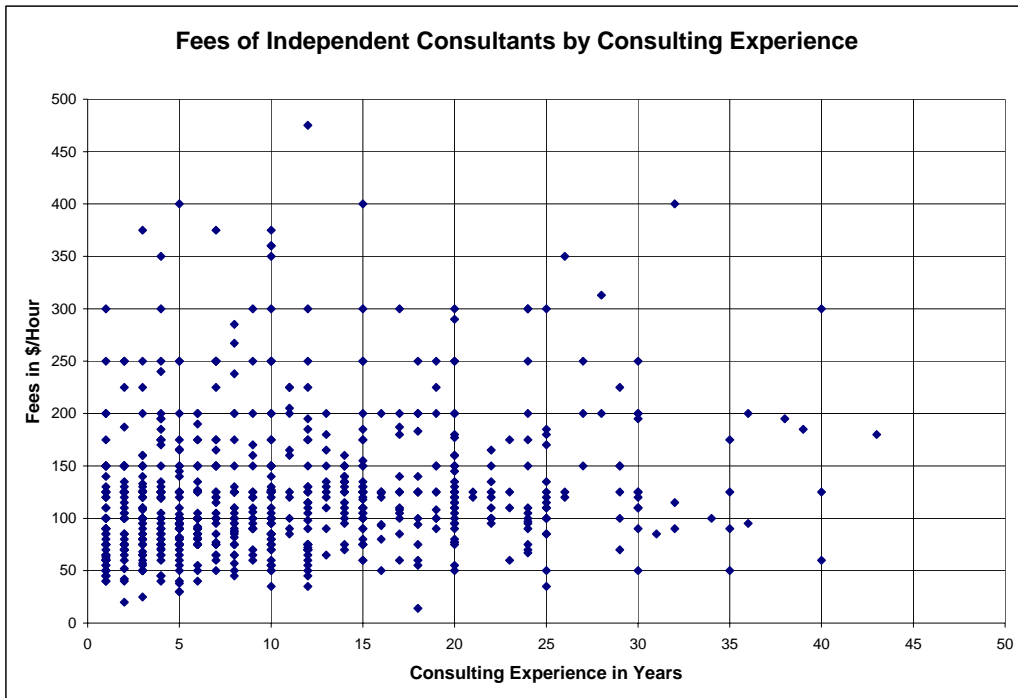


As might be expected, the hourly fees increase with added experience, though this trend reverses after about 40 or 50 years of experience.

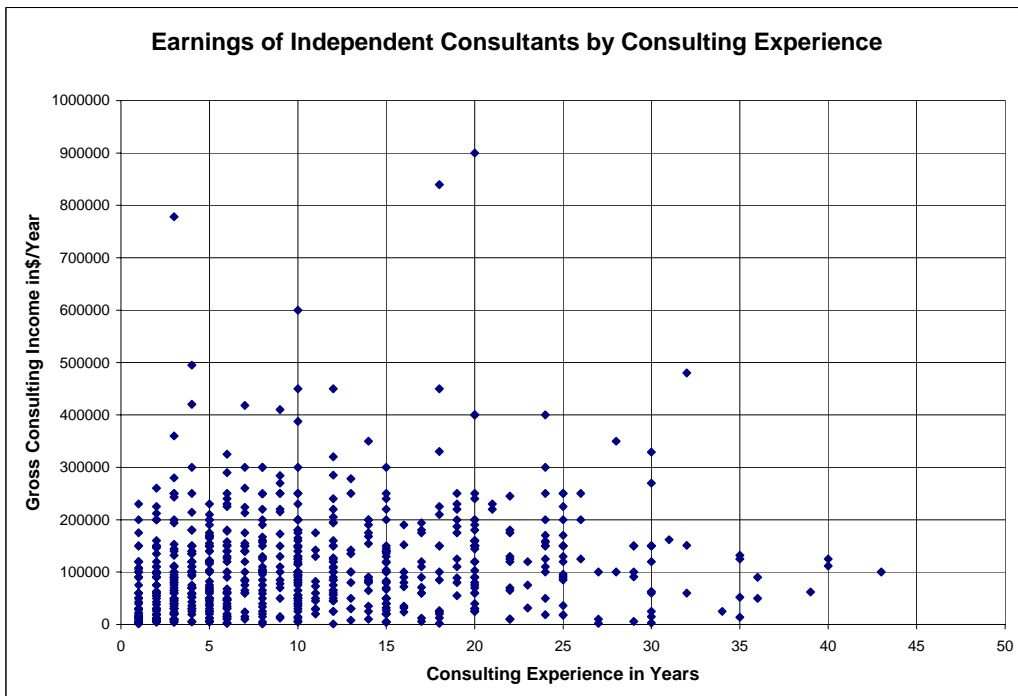


What is Consulting Experience Worth?

This question is answered by the next three scatter plots. All three use the same fee and earnings data as the three previous plots, but this time the fees and earnings data are plotted vs. the years of experience in the consulting field.

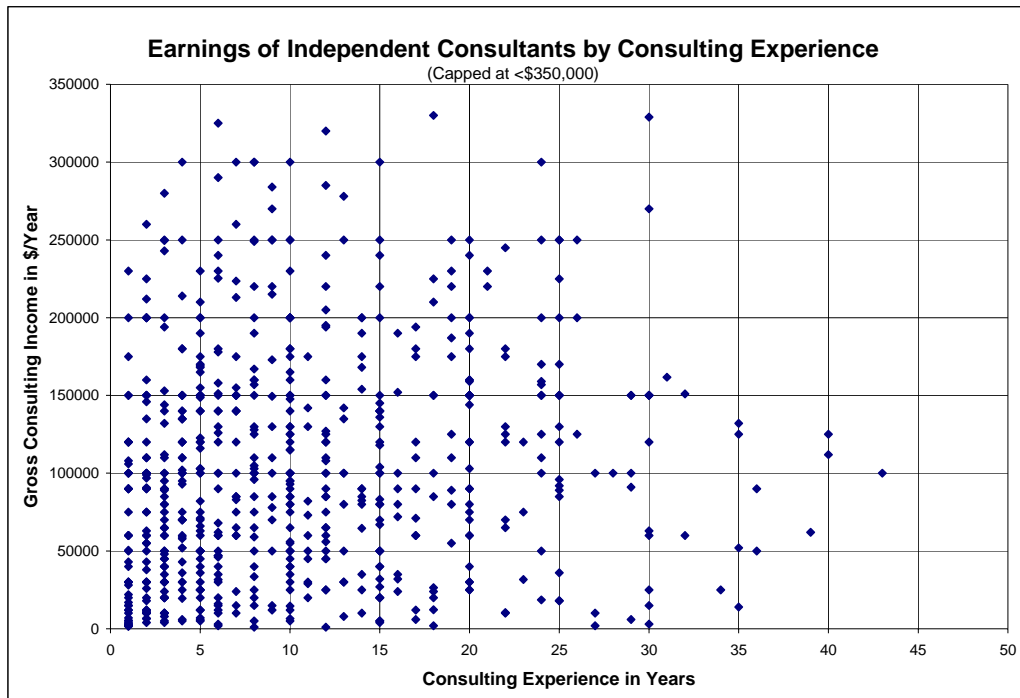


In this chart of fees vs. consulting experience, it can be seen that fees tend to rise, at least for the first ten or fifteen years of consulting.



The total earnings again seem to increase with the years of consulting experience for the first 20 or 25 years and then take a downward trend. This probably includes engineers who are semi-retired and not looking to maximize their earnings.

The same earnings data are presented in the next chart, but without showing any earnings of \$350,000 per year or more. This permits a closer examination of the gross consulting earnings of the majority of the engineers.



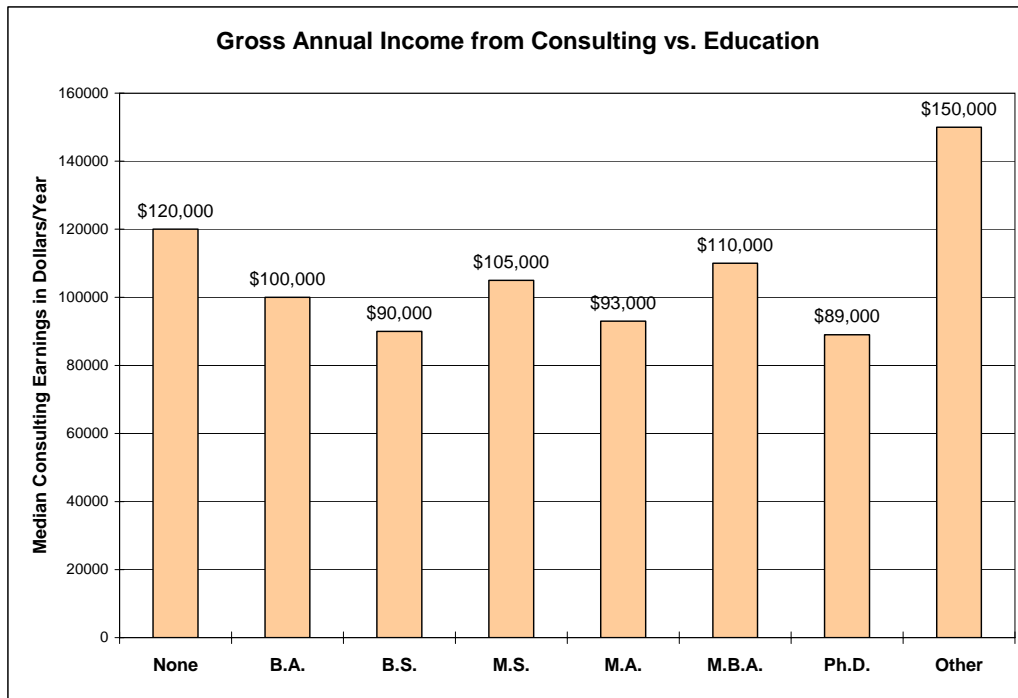
Comparison with similar data collected in 2002 shows that there is less dispersion in the 2004 data, but otherwise there is little change in general appearance.

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 and their earnings. The results, presented in the chart below, show how a degree affects earning and consulting fees. In general, education does not make as much difference as had been reported in several of the earlier surveys.

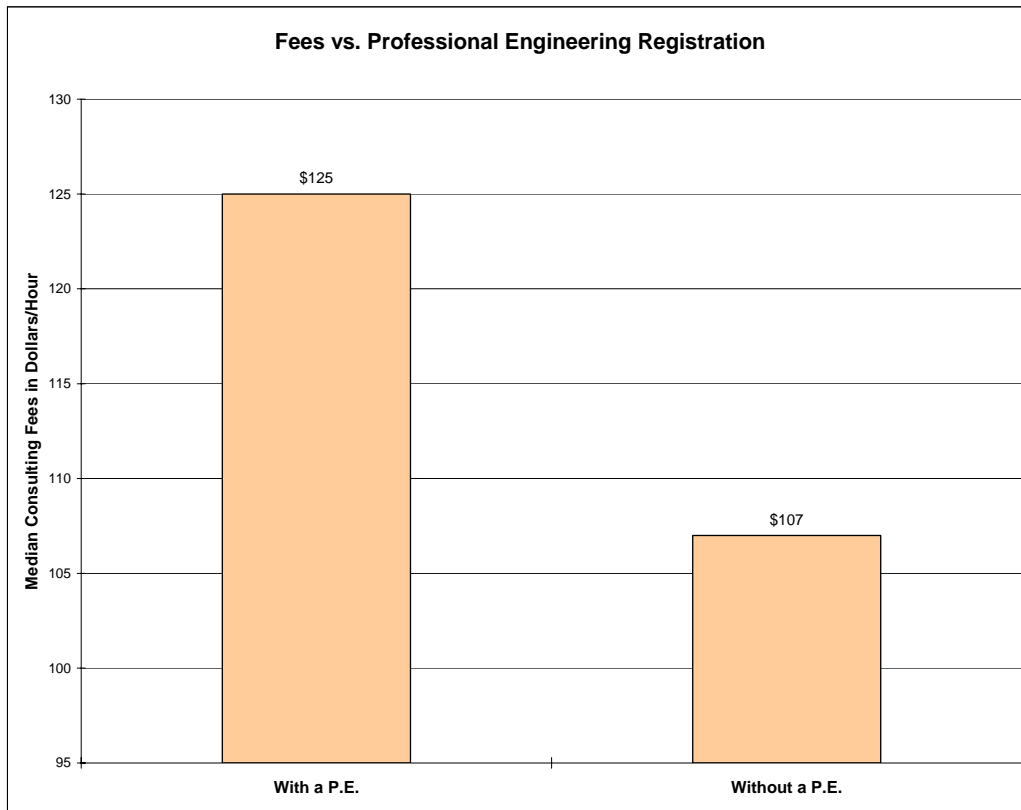
The highest earnings are shown for the "Other" category. This is a relatively small group with a limited number of inputs. The fact that the group includes consultants with legal degrees, advanced degrees from M.I.T, and board of directors members probably accounts for the higher earnings. No explanation is offered for the relatively high earnings of the non-degreed group.

The next chart shows the effect of education on the consultant's earning.



What Is a PE Worth?

Though the IEEE encourages professional engineering registration, this survey showed that only 24% of the respondents were registered. In this survey, the dollar value of the PE appears to be about \$18 per hour. Because of the spread of the fees and earnings, comparison of the medians is the most meaningful.

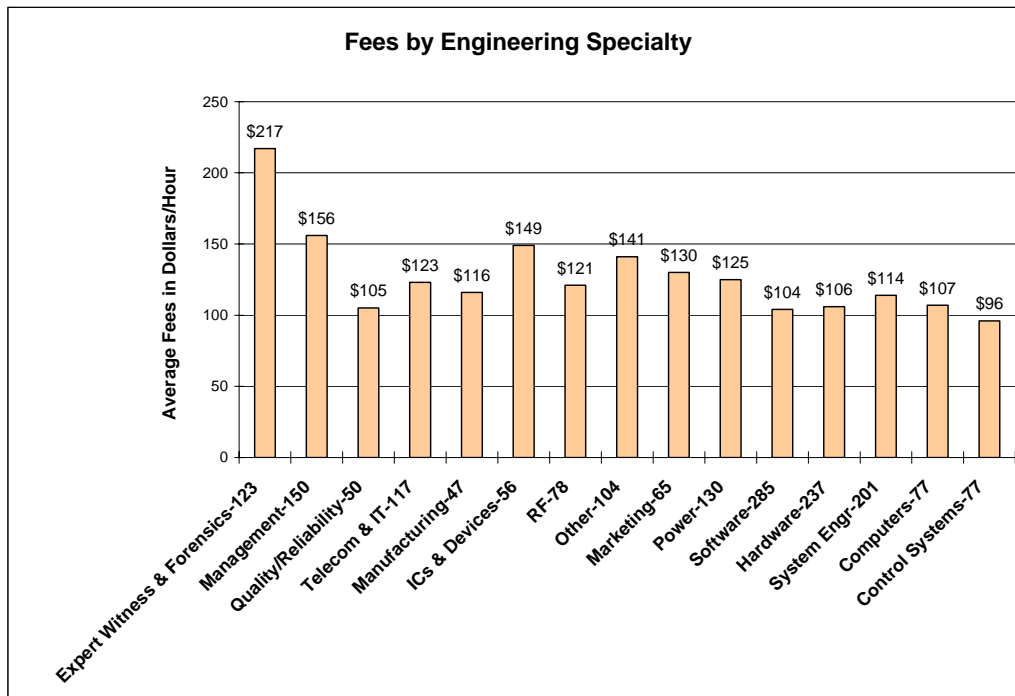


Which Engineering Field Pays the Highest Hourly Rate?

This AICN survey has provided enough data to begin to answer this question. It cannot provide an exact answer as most consultants work in more than one field, but they were not asked for separate fees for each field. The respondents were, however, asked to estimate their percentage of work in each field as well as their billable work hours per year. This provided the data needed to estimate 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 is 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 number after each specialty category (for example, Power-130) indicates the number of consultants reporting work in that specialty. The numbers are statistically significant, with 47 consultants in the manufacturing field being the smallest entry.



Comparison of the Fees by State

Many of the previous IEEE fee surveys were conducted on a regional basis or at regional workshops. These indicated some variation from region to region. In an attempt to provide data for both state-to-state and international comparisons, all consultants were asked to designate the location of their office.

Location of the Consultant's Office	Number of Consultants Reporting	Minimum and Maximum Fees Reported in \$/Hour	Median Fee Reported in \$/Hour
Alabama	5	\$75 - \$200	\$85
Alaska	2	\$110 - \$165	-
Arizona	21	\$35 - \$300	\$125
Arkansas	2	\$14 - \$85	-
California	158	\$30 - \$400	\$120
Colorado	24	\$45 - \$250	\$110
Connecticut	19	\$40 - \$475	\$95
District of Columbia	1	\$130	-
Florida	30	\$30 - \$250	\$100
Georgia	21	\$45 - \$250	\$120
Hawaii	2	\$75 - \$250	-
Idaho	2	\$100 - \$250	-
Illinois	29	\$50 - \$250	\$100
Indiana	9	\$68 - 150	\$95
Iowa	1	\$82	-
Kansas	5	\$50 - \$145	\$85
Kentucky	2	\$45 - \$100	-
Louisiana	5	\$80 - \$250	\$100
Maine	1	\$95	-
Maryland	20	\$45 - \$400	\$85

Massachusetts	48	\$25 - \$313	\$120
Michigan	7	\$42 - \$200	\$125
Minnesota	11	\$55 - \$360	\$125
Mississippi	3	\$50 - \$125	-
Missouri	5	\$75 - \$200	\$90
Montana	2	\$50 - \$95	-
Nevada	2	\$135 - \$375	-
New Hampshire	10	\$61 - \$250	\$106
New Jersey	43	\$45 - \$375	\$115
New Mexico	10	\$40 - \$238	\$93
New York	46	\$20 - \$250	\$110
North Carolina	14	\$50 - \$360	\$120
Ohio	14	\$40 - \$130	\$78
Oklahoma	3	\$75 - \$175	-
Oregon	14	40 - \$250	\$99
Pennsylvania	29	\$50 - \$300	\$100
Rhode Island	3	\$85 - \$175	-
South Carolina	4	\$75 - \$110	-
Tennessee	3	\$60 - \$85	-
Texas	39	\$35 - \$300	\$110
Utah	5	\$45 - \$105	\$85
Vermont	5	\$85 - \$350	\$115
Virginia	35	\$50 - 350	\$125
Washington	19	\$40 - \$250	\$110
Wisconsin	9	\$65 - \$240	\$105
Wyoming	1	\$75	-
Belgium	1	\$100	-

Similarly, the consultants were also asked to designate the state, province, or country of the clients for whom they do most of their consulting.

Location of the Client's Office	Number of Consultants Reporting	Minimum and Maximum Fees Reported in \$/Hour	Median Fee Reported in \$/Hour
Alabama	5	\$75 - \$200	\$75
Alaska	1	\$110	-
Arizona	11	\$50 - \$300	\$125
Arkansas	2	\$14 - \$85	-
California	205	\$30 - \$475	\$125
Colorado	22	\$45 - \$225	\$100
Connecticut	14	\$40 - \$250	\$100
Delaware	2	\$40 - \$100	-
District of Columbia	14	\$45 - \$350	\$125
Florida	23	\$50 - \$250	\$95
Georgia	12	\$45 - \$250	\$80
Hawaii	3	\$75 - \$250	-
Idaho	1	\$365	-
Illinois	26	\$55 - \$200	\$100
Indiana	11	\$45 - 150	\$85
Iowa	1	\$82	-
Kansas	4	\$50 - \$360	-
Kentucky	2	\$100 - \$125	-

Louisiana	4	\$80 - \$170	-
Maryland	22	\$50 - \$238	\$95
Massachusetts	45	\$25 - \$185	\$110
Michigan	6	\$42 - \$250	\$100
Minnesota	13	\$55 - \$250	\$150
Mississippi	4	\$50 - \$125	-
Missouri	7	\$65 - \$250	\$100
Montana	2	\$50 - \$95	-
Nevada	2	\$70 - \$165	-
New Jersey	34	\$60 - \$250	\$110
New Mexico	5	\$40 - \$140	\$80
New York	54	\$20 - \$375	\$110
North Carolina	9	\$70 - \$200	\$108
Ohio	12	\$75 - \$200	\$100
Oklahoma	4	\$93 - \$250	-
Oregon	9	40 - \$150	\$80
Pennsylvania	23	\$65 - \$313	\$100
Rhode Island	1	\$50	-
South Carolina	4	\$75 - \$110	-
Tennessee	4	\$55 - \$120	-
Texas	43	\$30 - \$300	\$100
Utah	3	\$45 - \$105	-
Vermont	2	\$85 - \$90	-
Virginia	35	\$60 - 350	\$110
Washington	15	\$40 - \$250	\$125
Wisconsin	6	\$75 - \$250	\$122
Wyoming	1	\$75	-
British Columbia	2	\$75 - \$100	-
Ontario	3	\$100 - \$110	-
Quebec	1	\$100	-
China	2	\$120 - \$250	-
Germany	1	\$150	-
Great Britain	2	\$60 - \$175	-
India	1	\$300	-
Japan	6	\$80 - \$300	170
Mexico	1	\$80	-
Netherlands	2	\$195 -	
Romania	1	\$108	-
Saudi Arabia	1	\$250	-
Taiwan	1	\$150	-
Virgin Islands, US	1	\$300	-

Membership in the IEEE-USA Database

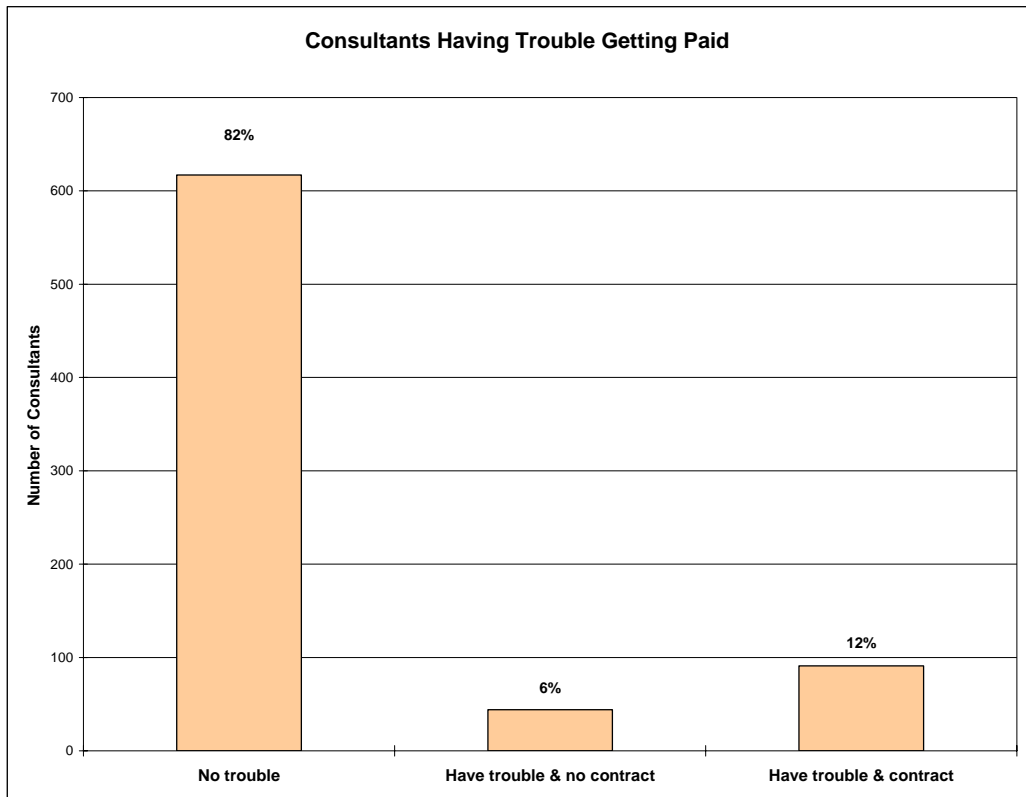
One of the new questions asked in this 2004 is “Are you a member of the IEEE-USA Consultants Database?” This database is a web-based for-fee listing of individual consultants and their capabilities. Access to this database is free and readily searchable by clients or anyone looking for consultants with particular skills. Examination of the response is shown below:

- (a) What is particularly surprising is the \$15/hour higher median fee earned by consultants who are currently or have been listed in the directory. Several further analyses did not provide a verifiable explanation.
- (b) Fifty three, or more than 29 percent, of those in the IEEE Consultants Database state that they do receive some work as a result of the listing.
- (c) These 53 consultants reported an average of 143 hours of work per year as a result of the listing.

	Current Database Member	Past Database Member	Never Been a Database Member
Number of Consultants	180	52	522
Range of Fees in Dollars per Hour	\$25-\$375	\$5-\$350	\$14-\$475
Median Fee in Dollars per Hour	\$120	\$120	\$105
The number of consultants who receive consulting work from database/directories	53 consultants, or >29% of the 180 consultants, who are in the current AICN database	2 consultants, or <4% of the 52 consultants who are shown as past members	2 consultants of the 522 non-members who have never been in the AICN database.
Hours of consulting work attributed to use of the database/directories	A total of 7578 hours per year by the 53 members who receive work from the database/directory		

Problems Getting Paid

In the past, there have been reports of consultants having difficulty getting paid. Questions were included in this survey in order to determine how serious this problem is. As can be seen, 135 consultants report having at least some trouble getting paid but 44 of the 135 are not covered by a written contract.



Comparison of the 2004 Data with Data from 2002 and Earlier Surveys

Of the 23 questions asked in the survey, 19 are essentially the same as were asked in 2002. This makes a direct 2002-2004 comparison possible for most questions. It should be noted that there are two factors that probably have some effect on the responses obtained.

The first is the background of the consultants responding to the survey. For 2004, we have a primary database of 756 consultants, compared to 333 in 2002. Most of the added responses are from consultants not previously associated with the AICN membership or database.

The second factor is the lower salaries reported for the engineering field in general. On 22 December 2004, the IEEE-USA released a news bulletin concerning their Salary Survey. It shows that the median salary for electro technology and information technology professionals declined for the first time in 31 years. Though their salary survey is based primarily on engineers who are employed by companies, there is probably a similar effect on the fees that self-employed or independent consultant can charge.

Some of the differences between the 2002 and 2004 surveys are noted below:

Though the median fees are \$10 per hour higher in 2004, the 2004 median consulting earnings drop by about \$20,000 per year.

Both the maximum fees and the maximum earnings are much lower in 2004.

The consultants in this 2004 survey report one year more experience than those in the 2002 survey.

In 2004, the consultants with a P.E. license earn \$18 an hour more than the non-P.E. consultants. This difference was only \$5 in 2002.

Consultants with non engineering degrees (Other) degrees earn the highest fees in 2004. This was surprising until a study of the notes showed that several have legal degrees and advanced degrees. In 2002, the “Other” category tied for fourth place.

Not explained is why consultants with no academic degree (None) earn a median fee of \$100 per hour, the same as consultants with a B.A. or a B.S. In 2002, the “None” category was at the bottom of the list, at less than \$90 per hour.

Finding	From the 2002 Survey	From the 2004 Survey
Number of consultants providing data	333	756
Median Years of Engineering Experience	25	26
Median Years of Consulting Experience	7	8
Median Fee	Median consulting fee of \$100/hour	Median consulting fee of \$110/hour
Highest Fee	Four of 333 consultants (1.2%) received \$500/hour or more.	Highest fee is \$475/hour
Median Earnings as a Consultant (with earnings of <\$1000/year censored)	Median earning from consulting of \$120,000/year	Median earning from consulting of \$100,000/year
Highest Earnings reported from consulting	Seven of 333 consultants (2.1%) reported consulting earnings of a million dollars/year or more.	The highest reported earning from consulting is \$900,000
Comparison of median fees for consultants with a higher education	The highest education degrees of PhD and MBA receive the highest fees at \$125/hour. “None” for higher education is \$90/hour.	Highest education designated as “Other” shows the highest fee at \$130/hour. In comparison, the PhD is \$127/hour and MA is \$125. “None” is \$100/hour.
Fees for P.E. vs. non-P.E.	Median fee for a P.E. is \$5/hour more than for a non-P.E.	Median fee for a P.E. is \$18/hour more than for a non-P.E.