

THE CLIMATE FOR WOMEN IN ENGINEERING
(a transcription of the plenary speech)

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It is a pleasure for me to be here today and to express my delight that a conference like this can take place. When I studied engineering I was made to feel like a very weird creature, and I use those words carefully. My family, friends, and high school teachers assumed that there was something wrong with me for wanting to be an engineer.

The changes in engineering enrollment for women from the early 70's through the early 80's were heartening because it seemed women were on their way. During that time, women graduating into the engineering work force increased from 2% to 15%. Then all of a sudden, we hit a plateau. That's why a conference like this is so critical to help raise national consciousness on the issue.

I want to talk today about working women engineers. You have been hearing a lot about support systems for female engineers on campuses. I want to talk a little bit about what happens once they are out in the work force. I base a lot of what I am saying on a recent survey we did at Cooper Union. We sent out 4,000 questionnaires to working women engineers. We hired a market research firm to help us do the number crunching and they told us that a 20% response would be extraordinary. We were indeed surprised when we received a response of 54%! What is especially interesting was that beyond the numerical and demographic information, we received many comments on women's personal experiences as engineers. One person wrote a 10-page letter. I have envelopes of comments, so I will separate hard numbers from anecdotal stuff and try to give you a picture of what is happening to the women engineering work force.

Women make up approximately 6% of the total working engineers. Our survey shows that the typical woman engineer is

young. two thirds are under the age of 35 which means they have gotten their degrees in the last 10 years or so. But even so, many have management responsibilities.

We did a second survey of women who were in college engineering programs. (Although we were not able to survey the women who dropped out of college engineering programs.) One of the major concerns these women have is what it will be like to supervisor men. Working women engineers wrote reams of paper on supervising men as well. Major complaints also included working for other women, which astounded me. I see a lot of you nodding in agreement.

One woman wrote three pages about what she calls the "queen bee" syndrome--her female boss wants to be special and unique--and therefore works very hard to keep down other women in her organization. As I look around I see from your reaction that this is not unusual. But this mentality must change. We are supposed to help each other, not stand in one another's way. Men have learned that long ago.

Half of the respondents are married. Two thirds of them are married to engineers or scientists. At first this surprised me, but I realized that they married the people they went to school with, so it makes sense that they marry engineers and scientists.

The reason women went into engineering was because they wanted an opportunity to do interesting work. They wanted the challenge of solving problems. They wanted a job that pays a good salary. Over 80% feel that the salary they are getting in engineering has met their expectations--that's good. 18% said they wanted a profession that was transferrable throughout the world. Many sought an opportunity to solve society's problems. Only 1% said they went into engineering to meet men! There are easier ways to meet men than that!

The survey also revealed some distressing signs. 70% of the respondents felt that they had to work harder than male engineers in the same position in order to get equal salaries and recognition. I wonder how much of that is real and how much is self-imposed. Something which must be studied closely is the mentality that often drives one who is a minority in one's field to overcompensate, to do better than one's peers. That adds tremendous pressure to an already challenging situation.

About half of the respondents felt that they view ethical issues differently than their male colleagues. I have always believed that.

It is particularly distressing to note that half of the women felt they have been subjected to harassment in the work place. Now, harassment can mean different things to different people. Harassment can mean being whistled at by the machinists as you walk by, which is not serious harassment. Most of the comments dealt with more serious issues related to harassment in the work place.

But I cannot believe that women continue to accept harassment with current protective legislations and with what I see as a fairly elevated consciousness on the part of our society at large. Yet the respondents were afraid to do anything to curtail the harassment they experienced. One woman explained that if she complained about harassment she would be labeled as a troublemaker within her company. If you complain about harassment, people think you are not a good sport. I see nods, indicating that these comments are not unique.

Some women described a curious sort of harassment. They complained that the men with whom they worked were often overprotective of them. Though they acted without malice, the women felt this patronizing attitude to be a subtle form of harassment because it prevented them from working to their potential and from facing all of the challenges a job normally presents. One woman referred to this phenomenon as "harassment with a velvet glove." People often do the wrong thing with the best of intentions. In that kind of a situation one should be able to reason with the offending party. It may not accomplish much, but it is important to give it a shot.

Many of the young women said they felt a need to prove themselves upon beginning a new job. But I'll tell you something--young male engineers feel the same way. One of the problems is that young engineers--women and men--don't support each other enough, don't network enough. Corporations can correct this easily. Just as they offer courses in relevant technical subjects, they should offer forums for discussing feelings, perceptions and other day to day realities of the workplace. Through such discussions, the feeling of needing to prove oneself can be easily alleviated. Because all young engineers feel it; they just don't talk about it.

What surprised me was the high level of job satisfaction despite the challenges. Over 80% say their salary surpassed their expectations and about 90% feel that the engineering profession is well-respected and that they are well-respected within it. 90% find their jobs interesting and approximately 85% consider their work important. In spite of all the problems and barriers, engineering is a good profession for women. Women are basically satisfied with their decision to become engineers. That's important to know.

About half of the women felt they were not being used to their fullest potential. That is a common problem for all engineers in American industry--not just women. The IEEE conducted a survey recently in which electrical engineers corroborated this theory.

Some interesting information revealed in our survey includes the fact that about half of the women in engineering have a family member who is an engineer, generally a father or older brother. That points out something very seriously wrong in the way the engineering profession is projecting its image. Women rarely consider pursuing engineering without having a family member as a role model. In my experience, people simply don't know what engineers do and believe it is much more complicated than other professions. Lay people understand what doctors and lawyers do--they even understand obscure medical specialties--but they don't understand what engineers do.

We don't do a good job explaining what we do, and then we complicate matters by having so many highly specialized branches of engineering. It is difficult to avoid using jargon when explaining, for example, what an electrical engineer does or when describing various specialties within electrical engineering. When you consider the entire spectrum of engineering, the task becomes immensely complex.

Clearly, a great challenge for the engineering profession is to develop guidance material for students which explains what engineering is and what engineers do in a simple, exciting, effective way. It should explain that potential engineers must be comfortable with math and have curious minds. But one needn't be a genius to think in terms of engineering. For some reason, most of the guidance material I see is put out by professional societies. It is written by engineers and it is boring.

Another problem is that the media and popular culture have not done much to help draw people to our profession. Not since Brian Keith played the cultured, world-traveling civil engineer on "Family Affair" have we seen an attractive role model. Instead, programs such as Saturday morning kiddie cartoons depict engineers and scientists as either very nerdy or very evil individuals.

Another thing that concerned me was that high school guidance counselors, in general, were not supportive of a woman's decision to become an engineer. Here again, what happens is that they simply don't know what engineers do and subsequently have a very cliché picture of engineers as being male. Too many guidance counselors think of engineering as a hard hat profession and therefore do not encourage young women to look into it.

So if you have career days for high school girls in your town, please invite local high school math and science teachers, guidance counselors, and parents to attend as well. Parents, by the way, often need this information more than young women do. Unless the parents are engineers themselves, they often, ironically, present the greatest barrier for young women to overcome in pursuing careers in engineering. Like guidance counselors, parents don't know that engineering is a suitable profession for women.

Another discrepancy we discovered is that while virtually all women in engineering had outstanding academic records in high school, not all of the men did. And though I certainly condone excellence in one's studies, it is important to dispel the notion that you have to be a genius to be an engineer. You have to be comfortable with math, but you don't even have to be the best student in your math class. This reputation scares too many potential engineers away from pursuing the field.

An issue that comes up again and again--certainly every time I speak before a group from SWE--is that of reentering the work force after taking time off to raise children. This problem is more acute in engineering than in most other professional fields because of rapid advances in technology and frequent reorganizations within companies. Women who take time off to raise children can be at an enormous disadvantage upon their return. This is a very serious issue which American industry must address.

Corporate personnel offices and office managers must create opportunities to combat this problem. Perhaps women can work out

of their homes on non-classified projects. Somehow, a means for them to remain involved with the company must be found. I also advise women to make efforts to keep up with the latest technological advances on their own, to the extent that is possible. For instance, women can take a course at a local university, get involved with the activities of a professional society and read journals. But I underscore the point that independent efforts like this are not enough and that some of the burden must be placed on the employer. After all, if a company makes a commitment to an employee, she can, in turn, return to work and make major contributions to the company.

I was pleasantly surprised to learn that half of the women's workplaces offered some sort of flex-time. I was not surprised, however, to discover that 90% of the companies offered no child care facilities at all. But that is a problem for working women in many fields, not just engineering. Married women with children said that while they consider their husbands equal partners in terms of housekeeping, women continue to provide the bulk of the child care. We are concerned about this.

I was surprised at how much time women engineers spend traveling. Many say they are away for overnight stays at least once a month. By the way, only 20% reported serious problems encountered traveling with men. One woman hoped to stress to her male traveling companions that, contrary to popular belief, a woman does not want a man to knock on her door at 1:00 a.m. with a bottle of wine in hand!

Other comments revealed that working women engineers felt enormously pressed for time and that they don't have enough free time to do the things they want to. But I was appalled to discover that most of these women, though money is not an issue, have no help with housekeeping.

Some interesting comments came from the black women who responded to the survey. They felt even more conspicuous than non-minority women in the field, and stressed that the particular problems of minority women in engineering must be carefully addressed.

Many of the respondents expressed a strong desire to network more with other women engineers. I was surprised at this because the women we surveyed were SWE members, and I thought SWE

members had sufficient opportunity to network among themselves. But the women most often spoke about other women in their company. They reported that they frequently don't know the female employees who work two rooms away and assume that the women they do see are secretaries, not engineers.

Companies must set up more organized ways for their employees to meet one another. As recruiters, you can help by making sure young women interviewing at firms have an opportunity to meet women already employed at the firm. They can discuss what it is like for a woman to work in a particular company. Your chances of hiring women will be much better if you make that option available.

All in all, the survey was important because it confirmed what many of us believe about women in engineering--it's highly gratifying, but we have a ways to go.

I feel strongly that women should pursue careers in engineering. Their presence in the field is a benefit both to the women involved and to the nation as a whole. The largely untapped potential of women in the work force is enormous.

