

THE INDUSTRIAL EXPERIENCE: HOW WOMEN ENGINEERS RESPOND

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Although the major factor that determines the size of the industrial work force in science and engineering is the individual's selection of an engineering degree, the perception of a less-than-favorable climate in industry for women engineers has a profound impact on the numbers of women seeking employment and remaining in that work force. A report by the National Research Council's Committee on Women in Science and Engineering (CWSE) describes elements of that climate and strategies of women engineers in response to it.

Introduction

Women constitute only 12 percent of the S&E work force in industry although they make up 45 percent of the total work force, a trend since 1986. This disparity in large part reflects the fact that women receive fewer S&E degrees than men. Further, women tend to hold degrees fields in which industry traditionally has not been a major employer. But even after taking into account field preference, a considerably smaller percentage of women than men gain industrial employment.¹ Also, women in industry are more likely than men (by a factor of about two) to drop out of S&E careers in the early years.² These facts suggest that the industrial climate may be less than favorable for women scientists and engineers.

In 1993 CWSE attempted to identify ways in which the climate in industry is less favorable to women and how it could be improved. It sponsored a conference during which women scientists and engineers shared data and personal experiences about the principal causes of underrepresentation of S&E women in industry and explored effective strategies for change.

Barriers and Strategies for Overcoming Them

Conference participants identified a number of barriers that inhibit progress for women engineers in industry at every stage of career development:

- recruitment and hiring practices that create *de facto* entry barriers for women,
- aspects of a male-oriented corporate culture that are hostile to women,
- sexual harassment,



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- failure of corporations to accommodate work-family issues, and
- difficulty for women to advance into management.

Recruitment and Hiring Practices

According to Ronnie Cresswell, chairman of Parke-Davis Pharmaceutical Research,

Our success depends on the caliber of people that we employ. As we plan for the future of the company, our greatest challenge is to create an environment that will attract and retain the most talented people. To do this, we must *recruit* from the entire population of talent and allow each colleague the opportunity to reach her/his full potential.³

However, in today's rapidly changing corporate work environment, pressures to fill jobs quickly often lead employers to resort to well-established and often exclusive networks. Women are not as likely to be well represented in these networks. In fact, CWSE learned of one manufacturing company where managers responding to the question "Why haven't we hired more women?" answered:

- "The person must fit in with the rest of the group."
- "There weren't any women applicants."
- "We need a person who can hit the ground running."
- "The job requires long hours and weekends."

Women can respond to these exclusionary practices by joining networks:

Professional Networks. Professional networks offer women support in their pursuit of careers that have not traditionally been open to them. Networking within professional societies helps one to expand her knowledge and skills beyond a specific area, to develop leadership skills, and to have a broader impact.

Corporate Networks. Corporations can help women by encouraging the formation of groups to address the concerns of women as well as mainstream business issues. For example, the Women Managers Roundtable at Xerox was established to report how well the company recruits, retains, and responds to issues of concern to women.

Perceptions of the Role of Women

Paternalism—condescending or protective treatment of women by men in authority at their companies—is not uncommon. It may be evidenced when women are not given assignments on the grounds that their physical strength is inadequate or the working conditions unsuitable for them⁴ or when corporate management doubts women's willingness or ability to handle both work and family responsibilities. For instance, one human resources representative questioned the appropriateness of a particular job for a female engineer, saying,

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The engines will finally fire up at 11:00 at night and you've got to be there. That's where heroes are made and that's kind of conflicting with family responsibilities.⁵

Women must respond to stereotyping that encourages them to just follow the rules, to take few risks, for societal programming has many implications for a woman's choice of and advancement within a career. Women engineers should use take advantage of their current situation, "getting involved in company politics:"

Every company has it, and you have to know who the best technical people are, who the most influential people are, who can give you the best advice, and who can help you get ahead. Tell your supervisor and manager what your goals are, because this knowledge will help them to assist you [in] meeting those goals.

Furthermore, another engineer advised:

If women start playing office politics and reach positions higher on the career ladders, perhaps they can change some of the corporate structure and integrate different ways of acting and addressing issues.

At the same time, women must overcome their self-defeating behavior.⁶ A woman who introduces her comments, either in presentations or conversations, with such statements as "I am not an expert here. . . ." or "I am not sure about this, but. . ." may unwittingly undermine the competence and confidence she needs to project. Instead, women are encouraged to engage in activities to heighten their feelings of self-confidence, tackling increasingly difficult problems that lead to recognition of their skills.

Sexual Harassment

Women in nontraditional fields such as engineering are especially vulnerable to sexual harassment "because they may be perceived as 'barging into' an area where women 'don't belong' and should not be in competition with men for jobs."⁷ Sexual harassment may be evidenced by the posting of pin-ups in the workplace, nuances of language by male co-workers, and putting the only female engineer at a business meeting on the spot by asking irrelevant, gender-related questions.⁸

How should one respond to such actions? Conference participants suggested three responses: (1) directly tell the person committing the offensive behavior that it is offensive and should be stopped, (2) verbally report the offensive actions to one's supervisor, (3) document the continued behavior in writing to the company's women's advocacy group or, if that doesn't exist, the corporate EEO office.

Styles of Communication

Misunderstandings between men and women can occur in the workplace



because of the different ways that men and women sometimes communicate and provide feedback. For example, when a manager says "no objection," a man often interprets the phrase as approval to proceed. A woman, by contrast, may interpret the phrase to mean the boss has no positive feelings about the issue: he is neither enthusiastic nor supportive, and therefore she should not proceed.

Expressing oneself clearly and succinctly, to supervisors as well as subordinates, includes articulating desires—for example, for a better performance review or a promotion—in an acceptable way. However, at the CWSE conference, S&E managers noted that, too often, women assume that upper management should somehow know what they want. This is not the case. A computer scientist reported that she was told by her manager to find 10 different ways of telling her story, because she would have 10 different audiences and she needed to reach all of them.

Sometimes in the process of managing, a woman may have to point out to a man unacceptable behavior not related to his job performance. This requires clearly explaining the problem, dispassionately describing alternatives, and finally stating, "This conversation is expected to end the problem." In other words, women in management must sometimes begin an education process with some of the men they work with. "Not to do so is to abdicate responsibility," according to Betsy Ancker-Johnson, vice-president (retired), General Motors Corporation.

Opportunities for Advancement

Both women and men sometimes have difficulties in companies because they fail to understand what is required for promotion. Women tend to believe that if they work hard and do a fine job, they will be rewarded. Again, because rewards often do not result from such effort, women engineers are advised to employ certain strategies in order to advance. Many conferees emphasized the importance of becoming visible to upper management, to let them know what you have accomplished and that you are ready for promotion. In addition, one should exhibit a willingness to change or relocate if necessary. Relocation will not always occur, but change will. Women need to be open to change and not hold on to the idea that they will always be doing the kind of work they did early in their careers.

An overriding theme during the CWSE-sponsored conference was the importance of enlightened top management. Scientists and engineers reflected on the difficult atmosphere in companies where dialogue with top executives is absent. Men, as well as women, find this detrimental to their career advancement. CEOs and managers must lead the way in changing the cultural environment in the corporate engineering workplace so that women will want to work for that company.

Much has been said about women feeling frustrated by a glass ceiling, "an attitudinal hurdle consisting of unconscious stereotypes and perceptions."⁹ In addition, conference participants were concerned about the existence of "glass walls" inhibiting lateral movement, developmental assignments that challenge employees to take risks by moving into new areas of the business and learning new skills. Women and men report approximately the same number of vertical career moves, but more men than women report that they had had both vertical *and* lateral moves.¹⁰ This finding suggests that more needs to be done to communicate to

women the importance of accepting these assignments, for many women tend to avoid these transfers, apparently regarding them as risky.

Work-Family Issues

Women and men who choose to both practice engineering and have families must face reality: it *is* difficult to achieve both career and family success. One conference presenter defined "a mother's dilemma":

how to continue working at the exciting career she's trained for while also wanting and/or needing to spend time with her children, whether they are toddlers or teenagers, without being drop-kicked out of the race to advance and into the dead-end career zone at work.

To prevent negative career effects, many women are careful to time their pregnancies. One conference participant described her strategy this way, and others agreed that it was a good approach:

I think it is possible to have a family in this company, but you have to time it. Wait until you get the promotion, but then don't have the children too late. You have to be careful not to advance so far, and then get knocked out of consideration because of having children.

According to Jacqueline M. Akinpelu, head of the Network Capacity Operation Systems Planning Department, AT&T Bell Laboratories,

Balance between career and personal life will almost always become a critical issue. In order to handle it effectively, you must always retain responsibility for managing your own expectations and defining your success. This is especially difficult for the woman highly motivated by achievement and recognition on the job.

Concluding Remarks

Although the major factor that determines the size of the industrial S&E work force is an individual's selection of a particular degree field, gender differences persist even after field choice is controlled for. Thus, part of the answer to the question "Why so few?" must come from factors other than the simple scarcity of women in S&E careers. That women tend to prefer jobs in other sectors is consistent with a perception that conditions for women are less favorable in industry.

To achieve successful careers in industry, women engineers were advised to (1) set objectives, (2) meet performance requirements, (3) know their organization, and (4) seek opportunities for self-development. In suggesting the steps that might be taken by participants in U.S. industry—individual engineers, their managers, and CEOs of corporations—the Committee concurs with the assessments of several conference participants:

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*What benefits women usually benefits men. What we need to do is show how these changes make sense for us as a society.*¹¹

Many people have questioned the advisability of encouraging women to go into S&E careers at a time when there are few job openings in some fields. Conferees agreed that, particularly in difficult times, it is essential for companies to have the most talented people, whatever their gender or race. Clearly the essential recommendations that emerged from the conference that will benefit women will also benefit men and will be critical to the health of the corporate sector.

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2. Anne Preston, *A Study of Occupational Departure of Employees in the Natural Sciences and Engineering*, presentation at the conference sponsored by the National Research Council's Committee on Women in Science and Engineering, Irvine, CA, January 17-18, 1993.
3. Ronnie Cresswell, cited in *Career Development*, pamphlet from the Parke-Davis Career Development Committee, 1992.
4. Marion Yuen, director of advisory services at Catalyst, presentation at the CWSE-sponsored conference, Irvine, CA, January 17, 1993.
5. *Ibid.*
6. Nancy DiTomaso, George F. Farris, and Rene Cordero, *Women Scientists and Engineers: Gender Differences and a Model of Self-Assessment*, presentation at the CWSE conference, Irvine, CA, January 17, 1993.
7. Jean O. Hughes and Bernice R. Sandler, *In Case of Sexual Harassment*, Washington, DC: Association of American Colleges, Project on the Status and Education of Women, 1986.
8. Yuen, *op. cit.*
9. Paula A. Graham, presentation at the CWSE conference, Irvine, CA, January 17, 1993.
10. Arlene Johnson, presentation at the CWSE-sponsored conference, Irvine, CA, January 17, 1993.
11. Catherine J. Didion, executive director of the Association for Women in Science (AWIS), speaking at the CWSE conference, Irvine, CA, January 17, 1993.