

Women in Engineering - the Challenges of Part Time Working in Engineering Design

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Abstract

Finding the right balance between developing a professional career and at the same time raising a family or dedicating time to other similarly demanding personal obligations, poses some very significant challenges. The chemical engineering industry is not always perceived to be at the cutting edge of creating a work environment where people can combine these two aspects. But there are success stories, individuals who have gained a lot of job satisfaction and some very impressive careers.

The basis of this article is the experience of six female engineers in Shedden Uhde's Process Engineering and Technology Services Division. These experiences, although in very similar work environments, are all from different personal perspectives. Part of the article is based on outcomes from a series of interviews with individuals directly or indirectly involved: co-workers, project and department leaders, clients.

This paper is not a cookbook for success: it sheds light on what has worked well and what did not work as well. It does however, give some interesting insight into the opportunities to better facilitate the balance between raising a family and having a career.

1. INTRODUCTION

There is a world shortage of technical talent and Australia in particular is currently experiencing a severe shortage of engineers, with this sector having being ranked as number one on the skills shortage index for the last two years (Lebihan, 2007). Engineers Australia have designated 2007 the “Year of Women in Engineering” and have identified the recruitment and retention of a greater number of women into the engineering profession as one of their strategies to address this shortage (Bright, 2007). The recruitment of women into engineering has been a long term initiative with some positive effect as the percentage of female engineering students has increased from about 4 to 18% over the last twenty years (Burrowes, 2006). There is also ready access to literature, websites and societies encouraging women into the profession. However, the more alarming statistics relates to the retention of women in the workforce. While Engineers Australia has a total female membership of 5.6% only 2.1% are post graduate members and statistics indicate that women over 30 are leaving the profession (Burrowes, 2006). At the experienced level only 15% of female engineers over 40 years of age are still practicing engineering and this figure hasn't changed in the last five years, (Roberts & Ayre, 2002), (Bright, 2007). This represents a significant skills loss from the market and a poor return on the investment of education and on-the-job training. The problem of combining an engineering career with motherhood has been put forward as one of the main reasons for women leaving the profession. The provision of family friendly policies including flexible work hours and part time working are essential to any strategy for skills retention.

A typical experience for many senior women engineers over the years is to have been the only female engineer in an organization. Shedden Uhde has a high number of female engineers both in full and part time roles. Two of the full time employees are in department management and chief roles and three of the part time engineers are or have been in project management and lead roles. Shedden Uhde has offered flexibility opportunities for interesting work for personnel of all levels and abilities for many years. It has provided opportunities for personnel to pursue outside professional and personal interests. The current Process Manager's chemical engineering post graduate research was sponsored by Shedden Uhde at the same time as providing her engineering design work experience by working part time in the Shedden Pacific engineering consultancy in the late 80's. In 1996 they gave a part time position to a female engineer returning from a 16 year career break. Based on the success of that position they recruited another female engineer returning to work after a long career break. Both engineers are still working for Shedden Uhde and are well thought of within the company.

In response to market demand Shedden Uhde have significantly increased their employment of part time women engineers over the last two to three years and others have become part time after returning from maternity leave. One engineer was even recruited while pregnant with a view to returning to work on a part time basis. All of this has developed on a casual basis and women have been recruited based on previous success and personal contacts within the company. There has been no structured recruitment drive or strategic policy to employ part timers. However, now that the part time engineers represent about 10% of the process department and these part timers are essentially all women with primary caring responsibilities outside work it was decided to review the level of success of part time work within Shedden Uhde's Process and Technology Department compared to the general engineering community.

2. THE CASE STUDIES

The case study is primarily based on the feedback from six senior part time engineers working for Shedden Uhde and one full time engineer who previously worked part time for four years. The experience ranges from 12 to 20 plus years with three of the engineers in the 20 year bracket. Three of the engineers are currently in or have had Lead or Project Management positions with the company while working part time. Two of the engineers have had long career breaks (10 to 16) years and have returned and been promoted to senior and principal level. The engineers work between 2 to 4 days depending on their lifestyle preference and their current role requirements. Two of the engineers combine working from home with office attendance. Three of the engineers have worked for two or more companies on a part time basis. Two engineers returning from maternity leave have only been working part time for 6 to 18 months but the other engineers have been part time for 5 to 13 years.

There are currently 9 part time employees in the Process and Technology Department. Two are under graduates (one male and one female) working at Shedden Uhde on a part time basis during the academic year with the possibility of full time employment on graduation. One is a consultant with outside interests.

3. THE BENEFITS OF PART TIME WORK

One of the greatest challenges of making part time work acceptable is managing perception. Feedback from some of the part time engineers indicated that they were concerned that they were unfavourably compared with full time workers by management and co workers and that the reduced number of hours they work is seen as equating to their level of commitment. In reality the comparison should be between having part time access to a skilled resource compared to no access at all. Certainly the initial reaction of current lead engineers and managers interviewed from Shedden Uhde was that they did not believe part time workers would be generally effective and they were surprised at how successful it had been. It was therefore considered important to clarify the benefits that part time work offers individual companies and the wider engineering community. Overall there was a very positive feedback and the following benefits were identified.

- **Increased morale, productivity and efficiency** – All part time engineers surveyed indicated a strong awareness of limited time availability and indicated they were more focused at meeting deadlines. This is generally supported by research that indicates that skilled part time employees are actually happier because they have a better work life balance and are therefore more productive. When asked to quantify this lead engineers at Shedden Uhde indicated in their experience the productivity of a part time employee working 3 days was equivalent to 80% of a full time employee.
- **Flexibility and improved client service** – Where there is a fluctuating demand or project requirement for “half” a person the part time employee can fill the gap without excessive charging to the client or overheads. A client may be looking for a particular skill set for a small study or review rather than a full time employee. The greater the variety of skills retained by an organization the better chance they have of matching a client’s needs.
- **Access to experience** – The engineers surveyed all had a significant number of years of experience that would be lost to the company if part time work was not an option. Some of the engineers were in corporate and lead positions with specialist skills prior to maternity leave and these skills would have been lost or hard to replace. The use of a number of part time engineers on a recent large study has had the added advantage of project access to a wider range of experience with an increased number of contacts for the same man hour cost. This has actually led to an increased availability of personnel overall even though the availability of individuals is reduced. Traditionally part time work has been the domain of the unskilled worker but in the professional workforce it is likely that the women who performed well in their role prior to maternity leave are more likely to wish to return to work in some capacity. Some of the part time engineers at Shedden Uhde have been involved in running the graduate development programs as well as in house training courses as a way of passing on their knowledge.
- **Retention of personnel** – The benefits offered by family friendly policies have a positive effect on retaining personnel. All the part time engineers working for Shedden Uhde indicated that the company was the most flexible they had worked for with respect to working hours and days. They were grateful for the opportunity to combine career with family responsibilities or other pursuits. While they decline long term out of office assignments, the advantage is that they are a stable resource available to the home office. They are also unlikely to be attracted elsewhere by companies offering interstate or overseas opportunities.
- **Good role model** – When engineers working part time are seen in senior roles it offers encouragement for women in the early stages of their career. This is likely to influence their decision to stay in the industry, and because so few part time roles are available will influence their choice of employer.
- **Reduced Absenteeism** – Part time workers can minimize time away from the office by arranging medical appointments and domestic issues such as deliveries on days they are not in the office. Some of the employees indicated they had flexibility in the days they worked and could work an

alternative day to make up for sick days. Other employees worked from home to make up hours. They also have a better work-life balance and are not likely to suffer stress related illnesses and absenteeism.

- **Provides flexibility for transition periods** - Part time work is a fantastic way to cover some of the transitions in working life – student placements, return to work after short or long career breaks, periods of further study and reduction of hours prior to retirement. While the primary study is based on female engineers returning to work after maternity leave improvement of part time work will apply to a growing number. Shedden Uhde has already developed good links with the Universities by offering a number of student vacation placements which have continued on a part time basis and the number of engineers who want work part time prior to retirement will increase as the population chooses a work/life balance other than having a family.
- **Family friendly** –The APESMA Preliminary Women in the Professions Survey (Waldock, 2007) has indicated that a high number of professional women are without children and, of the professions, engineering had the highest level of childlessness (approx 67%). This is significantly above the national average of 25% quoted by the Australian Bureau of Statistics. The survey suggested that those professions with greater access to part-time work, such as pharmacists, were more likely to have children.

4. OVERCOMING THE CHALLENGES – PART TIME WORK IN PRACTICE

In theory the benefits of part time work look good but the employees and management interviewed identified a number of issues that make the juggling of home and work life particularly difficult for the part time employee and the co-workers interacting with that employee.

- **Communication** - absence from the office during the working week can make project and corporate communication difficult. The part time employee has limited availability to answer day to day queries, respond to urgent requests or attend corporate or project information sessions running on their days out of the office. This may have schedule implication if limited availability of an individual affects the work flow process. This barrier has been overcome by the availability and ease of use of email and intra/internet facilities. Email is used effectively as a partial replacement for the office phone and all Shedden Uhde engineers have the ability to remotely access their email. Some engineers were also able to manage short phone calls from home on non-rostered days. Remote access and laptops are also provided to allow monitoring of email if necessary and work from home if required. Planning and communication is critical on all engineering projects and it has been found that work lists and scheduled meetings were effective tools. Even minor things like the improvement of minute taking for communication with those not attending the meeting helped.
- **Training** – the survey indicated there was a concern that part time employment may limit the training opportunities open to individuals. There are a number of reasons for this – it may be perceived that the return on the training investment is lower than for full time employees, the individual may not be available in the office on the days the training is organized for or the training may not align well with project schedule demands. However, feedback was that most of the part time employees had received or been offered some training while working part time at Shedden.
- **Time management.** – Effective time management is required for all engineers but when the available time is further limited by part time availability then it becomes critical. All of the engineers found that they were more task focused when part time and less distracted by peripheral activities. Part of good time management is identifying the tasks that are a priority compared to those that are unnecessary. Work lists with task priorities were used effectively on some projects and some of the women identified delegation as a key tool. One of the aspects difficult to manage is schedule creep. Jobs frequently take longer than anticipated and unforeseen problems arise. The part time employee has very little capacity to accommodate these increases. It is important in resource allocation that the roles allocated to the part time employee are achievable in the hours that they intend to work and that there is a plan to accommodate additional tasks.

- **Promotion** – Today the main child bearing time is during the 30's, which is also the optimum time for career progression into lead and management positions. It is perceived that this affects women's chances of being offered a management role and women have found that even the perception that they have children has affected their promotion prospects. None of the engineers surveyed expected to be given the same level of responsibility and career progression as a full time employee. Most of them had aspirations for a more senior or technically demanding role but expected this to occur some time in the future – the suggestion being that this was when they had essentially returned to full time employment. A couple of women returning from maternity leave indicated a frustration that they had initially returned at the same grade but at lower level of responsibility prior to maternity leave. Mentoring or transition planning may assist in managing the expectations and progression of part time employees who wish to increase their level of responsibility. However, it should also be noted that some engineers indicated that a lower level of responsibility was better for their work/life balance and they were happy to maintain their current role.
- **Interesting work** – previous studies (Roberts & Ayre, 2002) have indicated that many women report that having children reduces their opportunities for interesting work. This was supported in this review and comments came back that employees thought they were given work “no one else likes to do”, a high proportion of checking and parcels of work that were too small to get their teeth into. In discussion with some of the Lead engineers they admitted when they were given part time employees they found it easiest to assign them checking working as this was already discrete packages of work and had limited effect on schedule. Although the engineers indicated a tolerance to delayed promotional prospects there was higher expectation for good quality work and continued professional development. Some Project Managers and Lead Engineers may need more training/assistance on how to manage/incorporate part time employees to maximize their effectiveness and return on skills.
- **Exclusion from mentoring and social networks** – depending on the days worked and after work caring commitments there is a limited time available to participate in the networking or social aspects. These events/interactions are important for building up good working relationships, for gathering information on company opportunities and increasing a contact base. All women surveyed mentioned that they were now focused on completing tasks and that they were less likely to be involved in corporate or social functions outside their project. Those who work Fridays rarely attend end of month drinks as task completion takes priority.
- **Confidence deflator** – Several women indicated that on returning to work on a part time basis they were less confident in group and presentation situations than prior to their career break. They were now less frequently in client meetings or in a position where a major contribution was required, and they felt they were “out of practice”. The more part time workers are valued and the more opportunities they have to use their skills, the more productive and effective they are.
- **No. of days worked** – The survey indicated there was a lot of significance attached to the number of days rather than the number of hours worked due to the importance of having day to day access to a valuable resource.

None of the engineers surveyed or lead engineers considered one day a week as a feasible option for working in the process design environment as schedule and task variety make this difficult. One day a week may be possible for a junior position (such as a student placement) but this would not be appropriate to continue on a long term basis as the engineer would be unable to gain adequate experience to match their years of experience on paper.

Engineers working or who had worked two days indicated that professionally this was the least satisfying and gave the most limitations on potential roles within the company. Two days requires the most pre planning and structured assignment by the supervising engineer or project manager. It can work if the engineer has discrete packages of work; ideally work within their experience level that they can perform with the minimum supervision. Two days a week long term may hinder continued professional development but was good for transition periods such as return to work.

Three days a week was perceived as offering the best work/life balance but once working three days a week most women quickly increased their attendance to four days to overcome a lot of the communication and availability challenges of part time work. The actual overall hours worked remained the same but two of the women had increased from 3 longer days to 4 short days as this made them more available both at work and for child pick up. However, both indicated this was worse for them personally. Improved communication may address this balance. Feed back from the lead engineers indicated that at four days a week there should be little barrier to the engineer taking on a lead or supervisory role providing the individual had the appropriate skills and experience.

- **Handling the transition** - Anyone who has a period out of employment, for whatever reason, will experience difficulties returning to the labour market. Women in particular returning to the work place after maternity leave take lower skilled work in order to have some level of flexibility. The absence of part time work of the appropriate level means that mothers will be working at levels beneath their qualifications. At Shedden Uhde while there was feedback that some of the women had returned at lower levels than prior to their career break the general feedback was that this was short term and they were given promotion and more responsible roles appropriate to their level of experience. There were two engineers who had returned from a long career break. They had thought they would find it extremely difficult obtaining a position as they felt the perception was that they would not be able to perform effectively on a technical level and would be out of date with latest practices. Both employees indicated that Shedden Uhde actively offered them part time employment and both have gained more experience and been promoted accordingly while employed by Shedden Uhde.
- **Equal pay** – Generally when professional institutions conduct salary surveys the results indicate a differential between male and female salaries even for full time workers. Statistics from Australia indicate a large differential of up to 40% (Roberts & Ayre 2002). However the differential was diminishing and was negligible for the under 30 age group according to the IChemE salary survey (Lewis, 2004). The differential remained above this age group – although this was based on limited data as there was a very poor response from female engineers over 40. None of the surveys take into account part time work but it would be anticipated that the differential would be more pronounced for a women working on a part time basis for a significant number of years. At Shedden Uhde the engineers are paid according to their level of experience and performance. This is supported by the fact that when surveyed none of the engineers listed pay rates or salary packaging as an issue even though most of them had worked on a part time basis for more than 5 years.
- **Childcare** – The lack of availability of childcare places is frequently in the news and provision of childcare facilities by companies has been indicated as a family friendly policy required to facilitate part time work. However, none of the engineers interviewed from Shedden Uhde indicated that child care was an issue. Flexible hours were more important to them as this allowed them to make their own arrangements be it family, nanny or daycare. The arrangements depended on the family support available and the number of children. Shedden Uhde has been very flexible with the hours and days worked and these have generally been agreed at the project level. This flexibility was identified as key to the success of part time work.
- **Partner support** – Support from a partner can assist part time participation or the decision to return to work. One engineer had swapped roles with her husband for 7 months, and worked full time while he had a break between jobs and looked after the children. Due to the flexibility provided by Shedden Uhde this allowed her to fulfill a challenging role at the start of a project, which was then followed up as she continued to work part time. One engineer is married to a process engineer who “coached” her for her return to work. Another is able to swap days with her husband, who also works at Shedden Uhde, to facilitate client meetings or short term increases in work load.

5. CONCLUSIONS AND RECOMMENDATIONS

In conclusion it appears that the universities and colleges are succeeding in increasing the numbers of women entering engineering but that the real problem in Australia and the rest of the world is retaining women in the work force past their 30s. Australia in general appears to be behind the UK and USA in addressing the issue of retention. Shedden Uhde however is succeeding well above the national average in this area and has successfully employed and retained seven women in the over 30 age group by offering part time work. Six are currently employed by them on a part time basis, the seventh is now in full time employment and most have worked for them for more than two years. The potential for part time work was a recruitment driver for all but one of them.

The overall feedback from both management and employees has been that part time work has been very successful. While the focus of the study was specifically on women returning to work after maternity leave, as this is a target area for skills retention, the challenges they experienced were found to be applicable to any part time employee, male or female. The lessons learnt and improved communication and time management skills may also be applied to personnel with multiple responsibilities such as chiefs, managers and small project personnel who have to manage their time across a number of tasks and may frequently be away from their office. The following are a few recommendations resulting from this survey, some already effectively used at Shedden Uhde, which may assist in making part time work more effective.

- Provide some formal guidelines on transitions back to work and ensure expectations are clearly managed.
- Develop a mentoring program – this may be specific to a role the part time employee would like to develop in to.
- Provide a calendar of part time worker availability on intranet and/or at work station.
- Increase use of company intranet to allow access to information easily from the office or remote location.
- Encourage part time employees to involve themselves in a corporate activity that increases their company networking and awareness.
- Review the structure of corporate and project roles and think more creatively how these roles could be split to create positions of responsibility and progression for suitably qualified part time employees.
- Consider job sharing
- Ensure resource allocation takes into account that the role assigned to an employee is achievable in the hours that they intend to work and that there is a plan in place to accommodate additional work.
- Plan one common/core day to all part time employees – this would allow planning of company briefings.
- Review training requirements both for professional development and enhancement of time management and presentation skills and align with personnel availability. Consider breaking down training into lunchtime sessions to avoid impact on projects.
- Improve scheduling of project meetings to accommodate attendance of appropriate attendees even if they are a part time employee.
- Develop work from home guidelines.
- Provide a laptop to enable work from home and make ensure employees that need to work from home are aware of the facility.

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