Women Engineers in Malaysia

By: Ir. Prof. Dr Siti Hamisah binti Tapsir and Norliza binti Mohd. Noor, Universiti Teknologi Malaysia

Abstract

Traditionally the field of engineering had been male dominant, as women were perceived as not suitable to take up this mentally and physically challenging profession. Thus women's participation in the work force was only confined to the non-technical profession such as teachers, nurses and administrators. However, due to the equal opportunity for both genders in education in Malaysia, the participation and contributions of women in engineering field in the last few decades are invaluable. This paper discussed the progress of women in engineering from tertiary education up to professional level in Malaysia. The 21st century women engineers are known to exploit their potentials in engineering field even if it is physically demanding such as working in oil platform for petroleum engineering.

Introduction

In most society, even in developed countries, the notion that women are only deemed fit to take up profession related to nurturing still persists. However, the National Education Policy in this country, which is based on merit rather than gender, has helped not only to change the perception of the Malaysian society on women in engineering but has also indirectly helped to increase the number of women engineers.

Malaysian's government open policy to provide education for all her citizen has resulted in both the male and female students being treated equally based on merit. Table 1 shows that in 1970, there were about 39 % of female having Lower Certificate of Education, 36 % having Malaysian Certificate of Education, 27 % having the Higher School Certificate, 22 % having University Degree and 38% having other certificate at tertiary level, [1]. During this era, most of the female students would opt for traditional non-technical courses and most of them would become teachers, nurses and administrators. Only a few took up the professional courses such as law, engineering and medicine.

The emergence of women taking technical course started in the seventies and the numbers then was relatively small. However, by the eighties due to increasing number of universities offering technical courses more women began enrolling in engineering courses. Table 2 compares the number of female and male students enrollment in the field of engineering from 1981 up to 1999, [2], [3], [4] and [5]. The percentage of female students enrolled in engineering course has risen from merely 5 % in 1981 to 30 % in 1999. The percentage of female students in university has increased by 6 fold in two decade. Despite the increasing number of female students in technical fields, the male dominance in the area of marine and aviation engineering is still expected to persist for a long time. This is as shown in Table 3 where only a few students registered in marine and aviation.

Progress of Women in Engineering in Malaysia

Even in the developed nations, the number of women engineers are undeniably low. However, their roles as nation builders and their contributions towards development of the nation cannot be taken lightly. Thus it is not surprising for the significant emergence of women engineers in Malaysia only began in the seventies. The earliest data available on the number of women graduating in engineering field were reported by Social Statistics Bulletin Malaysia in 1981 [2]. Even though it is believed the number were higher, only 8 women were reported to have graduated in 1981. Table 3 compares the number of female to male graduate in the field in engineering from 1981 to 1991. The percentage of female graduate in engineering course has risen from 3% in 1981 to 28% in 1991.

Numbers of enrollment and graduation as shown in Table 2 and Table 3, respectively, shows that most women in engineering prefer career in civil, electrical and chemical

Table 1: Number of persons holding certificate, diploma, degree and others in Peninsular Malaysia, 1970, [1]

	Lower Cert. of Education or equivalent	Malaysian Cert. of Education or equivalent	Higher School Cert. of Education or equivalent	University Degree	Other certificate at other tertiary Level
Male	73633	119510	26318	9675	14153
Female	46761	68472	9680	2801	8786
Total	120394	187982	35998	12476	22939
Percentage (Female)	39%	36%	27%	22%	38 %

Table 2: Students enrollment in engineering courses [2], [3], [4] and [5].

Year	Civil		Electrical		Mechanical		Chemical		Petroleum		Marine		Aviation		Agriculture		Industrial		Computer		Tech. Management		Material & Mineral Sciences		Gas/ Bioprocess/ Polymer		Others	
Year	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
1981	955	56	212	19	233	4	-	-	83	1	27	-	-	-	116	6	-	-	-	-	-	-	-	-	-	-	-	-
1982	1047	57	245	29	290	6	-	-	96	-	38	-	-	-	115	10	-	-	-	-	-	-	-	-	-	-	-	-
1983	1114	72	280	39	368	5	17	9	109	-	64	-	40	-	139	12	-	-	-	-	-	-	-	-	-	-	-	-
1984	1241	88	313	48	447	7	43	16	134	-	80	-	71	-	26	1	-	-	-	-	-	-	-	-	-	-	-	-
1985	1559	150	358	66	501	14	63	18	132	-	81	-	73	-	51	3	205	52	25	5	--	-	-	-	-	-	-	-
1986	2032	248	431	88	511	17	80	26	124	-	76	-	69	-	110	7	74	63	47	3	-	-	-	-	-	-	-	-
1987	946	185	729	119	760	61	217	88	164	4	84	-	100	-	102	4	161	101	214	27	na	-	na	na	na	na	340	65
1988	973	138	678	115	763	64	240	70	141	-	95	-	106	-	96	22	217	140	197	38	72	36	na	na	na	na	645	90
1989	887	149	988	150	898	76	271	78	146	8	101	-	99	-	90	12	154	138	125	14	89	57	na	na	na	na	435	69
1990	923	181	1043	148	970	85	293	103	129	10	109	-	115	-	96	13	180	147	128	20	120	79	104	21	na	na	397	60
1991	998	196	1152	157	1094	112	330	108	142	19	123	-	132	-	92	12	177	158	146	23	164	101	110	28	na	na	518	100
1992	1022	205	1185	167	1155	99	326	118	138	22	99	-	131	-	90	19	188	152	157	33	188	101	133	39	na	na	569	129
1993	1097	228	1287	200	1273	98	351	146	140	25	95	-	145	-	124	22	200	180	162	31	241	121	155	55	na	na	623	130
1994	1277	281	1452	372	1606	116	394	177	153	28	93	-	125	2	128	29	200	177	200	57	281	139	173	72	na	na	821	204
1995	1479	392	1629	442	1769	187	474	229	170	29	104	-	139	6	183	47	217	181	204	75	335	157	191	86	335	127	600	201
1996	1736	813	1940	608	1719	239	579	363	193	32	108	-	226	14	173	38	268	202	363	187	386	197	221	111	402	146	1067	334
1997	2363	655	2698	1014	2266	291	699	514	219	39	150	-	342	27	177	38	318	231	430	265	1017	543	323	157	484	201	1510	619
1998	3087	1043	3581	1434	2737	350	863	756	267	58	188	2	505	52	188	56	373	273	591	390	1067	621	445	231	547	260	1938	1047
1999	3241	1187	3932	1615	2877	384	970	914	275	66	197	3	603	91	173	55	472	408	559	428	1113	747	442	273	551	305	2062	1249

Note: M = Male Students
F = Female Students

Table 3: Number of university graduates (1st Degree) in engineering course, 1981-1999, [2], [3], [4] and [5]

Year	Civil		Electrical		Mechanical		Chemical		Petroleum		Marine		Aviation		Agriculture		Industrial		Computer		Tech. Management		Material & Mineral Sciences		Gas/ Bioprocess/ Polymer		Others	
Year	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
1981	160	2	19	2	20	2	-	-	13	-	-	-	-	-	16	2	-	-	-	-	-	-	-	-	-	-	-	-
1982	151	7	17	-	13	-	-	-	4	-	-	-	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-
1983	165	8	34	5	22	-	-	-	14	-	-	-	-	-	23	1	-	-	-	-	-	-	-	-	-	-	-	-
1984	179	9	37	4	15	-	-	-	3	-	-	-	-	-	20	4	-	-	-	-	-	-	-	-	-	-	-	-
1985	215	17	32	5	16	-	-	-	8	-	-	-	-	-	32	1	-	-	-	-	-	-	-	-	-	-	-	-
1986	189	20	100	12	126	4	26	1	-	-	4	-	8	-	36	3	-	-	-	-	-	-	-	-	-	-	-	-
1987	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	-	na	-	na	-	na	na
1988	180	17	116	17	134	-	29	9	26	-	10	-	8	-	30	1	15	8	-	-	-	-	-	-	-	-	77	-
1989	198	17	152	296	135	13	39	-	9	-	15	-	21	-	21	-	13	9	-	2	-	-	-	-	-	-	81	13
1990	169	27	147	40	120	3	40	9	21	-	11	-	18	-	12	-	23	25	26	1	-	-	-	-	-	-	92	15
1991	201	32	166	31	130	9	41	11	22	-	14	-	13	-	16	4	40	31	18	1	-	-	-	-	-	-	85	16
1992	188	32	178	36	168	21	65	11	20	-	16	-	14	-	17	3	24	37	14	1	-	-	-	-	-	-	110	28
1993	182	39	198	32	188	25	81	15	38	-	12	-	18	-	8	3	45	32	30	7	21	7	29	24	-	-	80	24
1994	173	55	195	31	188	17	73	21	16	3	19	-	20	-	19	3	44	35	42	9	29	4	29	16	-	-	121	11
1995	193	40	210	36	225	18	78	12	23	7	18	-	16	-	16	2	43	35	38	5	28	13	32	22	-	-	96	8
1996	215	42	167	24	254	37	57	28	20	5	19	-	19	-	14	5	43	35	29	15	28	13	41	23	51	22	87	13
1997	287	67	288	63	309	14	70	49	22	3	6	-	24	-	25	13	38	51	45	5	36	22	129	29	33	13	138	19
1998	216	51	267	98	218	24	61	40	15	1	10	-	17	-	41	10	52	39	25	12	48	23	226	89	24	10	640	119
1999	585	164	469	196	474	31	163	163	29	4	3	-	22	-	69	13	93	77	112	80	80	47	106	67	65	31	542	230

Note: M = Male Students
F = Female Students

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Table 4: Number of men (M) and women (W) Engineers registered with IEM since 1969.

	1969		1979		1989		1999		2003		Total	
	M	W	M	W	M	W	M	W	M	W	M	W
Civil	249	0	719	8	2667	55	2299	155	1057	235	6991	453
Electrical	71	0	289	4	744	42	877	50	371	46	2352	142
Mechanical	25	0	308	0	829	4	925	20	586	53	2673	77
Electronic	0	0	1	0	23	1	141	10	245	79	410	90
Chemical	0	0	26	0	87	11	152	38	121	153	386	202
Other	6	0	23	1	169	2	146	15	112	52	456	70
Total	351	0	1366	13	4519	115	4540	288	2492	618	13268	1034

engineering compared to a career in mechanical and petroleum engineering. The reason is that the courses are less physically demanding and the work environment is more conducive for women.

Table 4 shows the number of women and men engineer registered with IEM from 1969 to 2003. In 1969 there is no woman engineer compared to 351 men engineer. In 1979 the percentage of women engineer registered with IEM is 1%. The number has risen steadily to 20% in 2003, which is approximately 20 fold within 2 decade.

The 21st century has seen women engineers in Malaysia involved in the construction of important projects in Malaysia such as KLCC and KLIA.

The Future of Women Engineers

In the era of globalisation and knowledge based economy, women engineers are continuously challenged to contribute towards nation building while maintaining balance in the personal life and at the same time acquiring intellectually challenging and rewarding life-long career. Besides being a career minded individual, women engineers still have to fulfill their social obligations and responsibility towards family. It is pertinent that women engineers in Malaysia do not loose sight of their femininity and still upheld their expected roles in the society such as getting married and bearing children.

Development in multi-disciplinary areas of engineering and related disciplines such as nanotechnology, biotechnology, genetic engineering, information technology, communication technology bring new challenges. Women engineers will have to keep abreast on new technologies continuously. Continuous personal development in non-technical areas such as management and financial planning is necessary if one is to be marketable in the industry.

The new challenge ahead is for women engineers to go global. We have succeeded in exporting workers in the non-technical field; for example, well-trained Malaysian nurses are much sought after by the middle-east countries. The challenge is also to export our services in engineering. However, this seems to be arduous task where even the men engineers have encountered difficulties in going global.

Conclusions

Women engineers in Malaysia have come a long way in earning due respect and recognition for their efforts and contributions towards nation building from the society. The future of women engineers in the 21st century is bright if the current atmosphere such as equal opportunity and political stability is maintained. One of the determining factors for Malaysia to achieve Vision 2020 will be contribution from women engineers. Women engineers will be among the main backbone in supplying the advance technical knowledge in transforming Malaysia into a develop-ed country. ■

References

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[3] Social Statistics Bulletin Malaysia 1989, Statistics Department, Government of Malaysia, July 1991. p. 115 and p. 117.

[4] Social Statistics Bulletin Malaysia 1994, Statistics Department, Government of Malaysia, May 1996. p. 142 and p. 145.

[5] Social Statistics Bulletin Malaysia 2001, Statistics Department, Government of Malaysia, Feb 2002. p. 158 and p. 161.