

CHAPTER 3 : RESEARCH AND CONSULTANCY

3.1 Research and Development

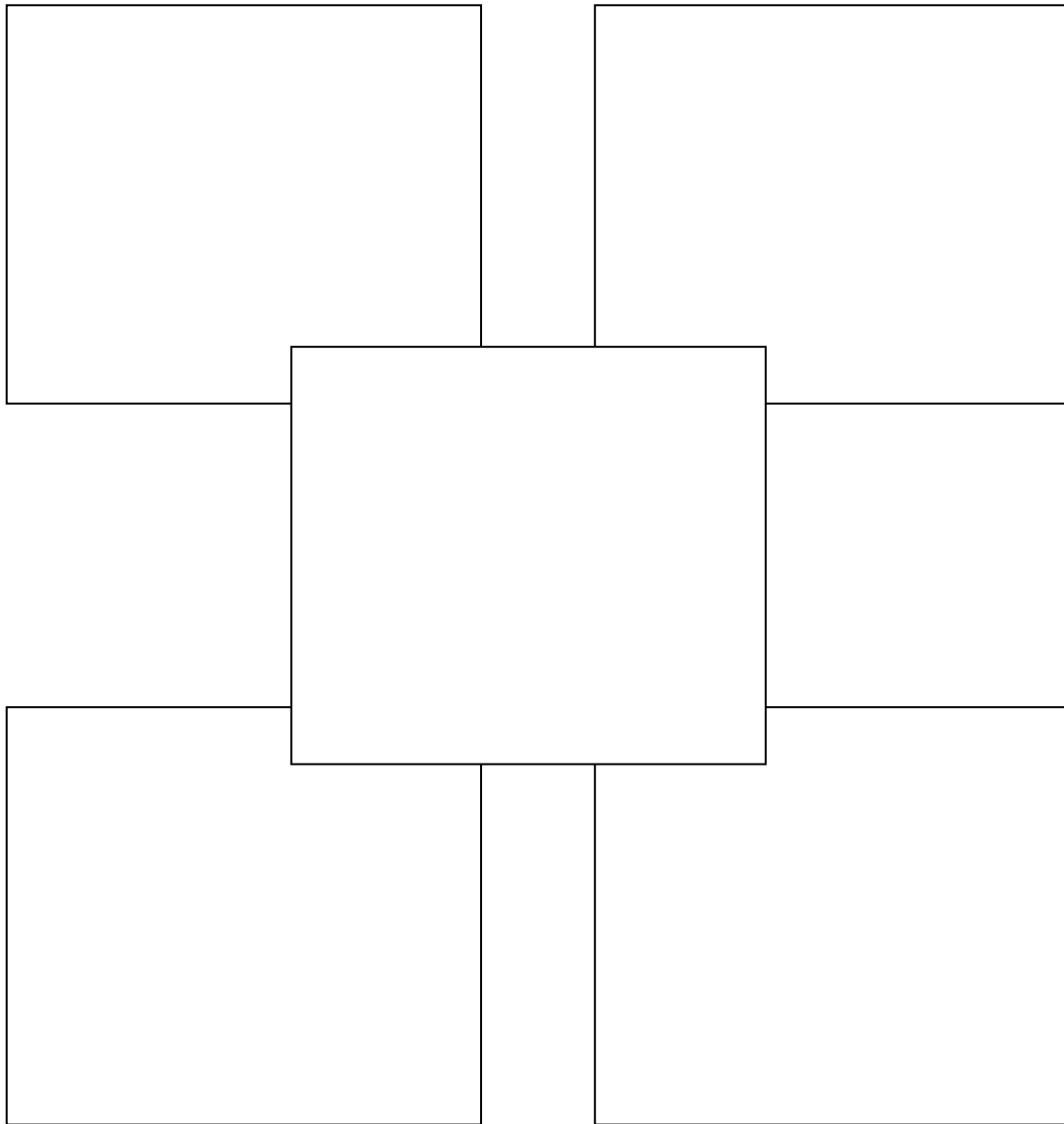
Research and Development in the Faculty gains its momentum at the beginning of the 80's. With the formation of Research and Consultancy Units in 1983 at Universiti Teknologi Malaysia, numerous numbers of Research and Development activities have been carried out in the faculty.

At the beginning of the 80's, most of the research was done by individual personal which emphasis on basic engineering solutions. Normally the research carried out ends up with a firm understanding of basic engineering concept. However, at the end of the 80's, the approach at the Faculty has been to put emphasis on problem identification, to select a subject area suited for teamwork and to emphasise on such a subject area over a prolonged project period. Developing a subject area becomes a concerted effort of the Faculty throughout the time. It was realised by the Faculty that one of the major challenges in Civil Engineering is that no single person can master a number of disciplines. Research teams need to be developed which can eliminate the divergence of transboundary communication. To bring this into fruition, in the early 90's several research groups were formed. At the initial stage, research groups such as Structural Design and

Appraisal Research Group, the Construction Material Research Group, the Water Resources Research Group, the Highway and Transportation Research Group, the Geotechnical Engineering Research Group, the Water Treatment Research Group and the Domestic and Industrial Wastewater Treatment Group were formed.



Most of the Research and Development activities were funded by the Research and Consultancy Units (which was later known as Research and Management Centre), and the Ministry of Environment, Science and Technology through IRPA (Identified Research Priority Area). As competence and experience in the research and development, increased the Faculty was entrusted to conduct research funded by Industries such as Indah Water Konsortium, Equiventures Sdn. Bhd. and Lyonnaise Des Eaux of France. This gives the opportunity for the Faculty to prove itself as one of the established research centres throughout the region.

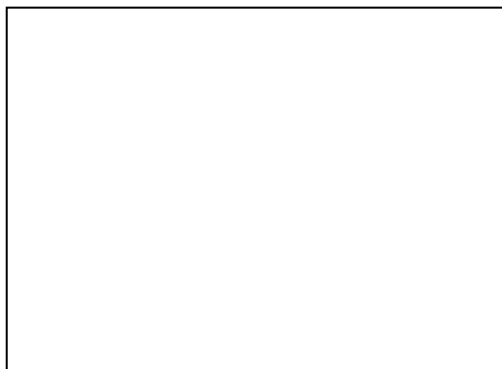


Some of The Research and Development Activities Run by The Faculty

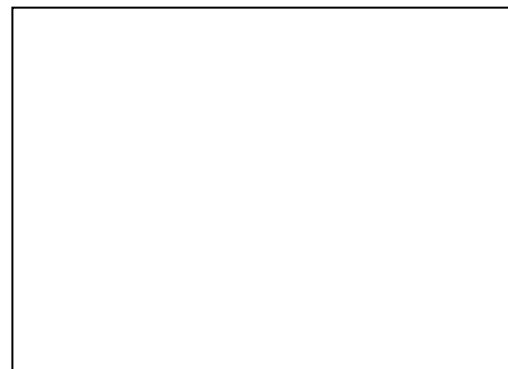
The research today is devoted mainly to words solving engineering problems. To enhance research activities, , Centres of Excellence were later formed such as the Steel Technology Centre, the Institute of Coastal and Offshore Engineering, the Institute of Environmental and Water Resources Management and the Construction Technology and Management Centre.



Institute of Environmental and Water Resource Management (IEWRM)



Steel Technology Centre (STC)



Construction Technology and Management Centre (CTMC)



Institute of Coastal and Offshore Engineering (ICOE)

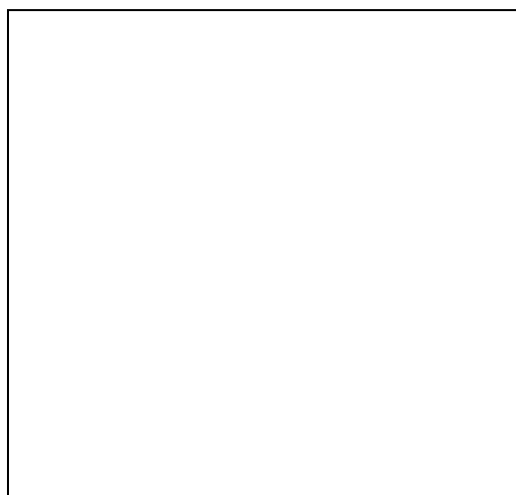
The Centre of Excellence helps to promote the faculty in leading the research and Development together with consultancies activities in this region. Supported by the biggest Civil Engineering laboratory in this country which were equipped with sophisticated equipment and instrument with the participation of experts from the faculty. As a result Universiti Teknologi Malaysia has been commended in its field of Research and Development by other R & D institution throughout the region.

Several awards and achievements were gained throughout the course of Research and Development in the faculty. Beginning from the year 1993, Faculty of Civil Engineering had gained award from the Petronas Invention Incentive Award through Assoc. Prof. Ir. Dr. Hasanan Md. Nor research work entitled "*The Use of Palm Oil Products to Modify and Rejuvenate Bitumen*". In 1994 and 1995 through a research project entitled "*Production of Asphalt Mixes from Industrial Waste and Normal Bitumin*", from The Highway and Transportation Research Group headed by Assoc. Prof. Jamaluddin Mat, won another Petronas Invention Incentive Awards and Mindex/Innotex, respectively. The group was awarded by silver medal for its inventions. Also in the same year, Mindex/Innotex commended a silver medal to the Structural Design and Appraisal Research Group through their research on "*Stress Transducer for Concrete Structures*".

One of our academic staff, Assoc. Prof. Ir. Dr. Amir Hashim Kassim has been acknowledged as the Researcher of the Year 1997 during UTM Quality Day in recognition of his research activities throughout the year before. Among the significant contribution in his research work is the Hydrological Study of Water Catchment Area in Cameron Highland. The activities involved various agencies

such as UTM, Tenaga Nasional, Department of Environmental, Department of Agriculture, Forest Research Institute and Department of Irrigation and Drainage.

The Faculty of Civil Engineering moves further in its Research and Development activities in accepting the challenge to be the world class institution.



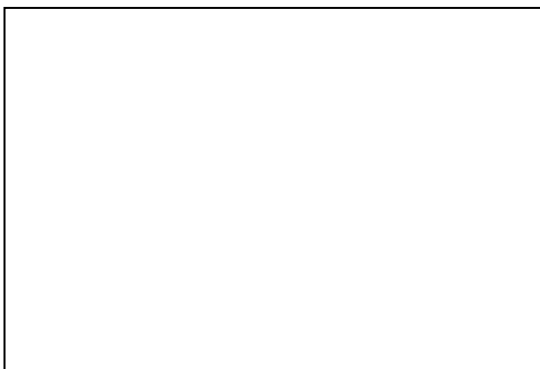
Sine Slab

In 1998 and 1999, through its Coastal and Offshore Engineering Institute, a bronze medal was awarded by ITEX '98 for the invention of Sine-Slab in controlling coastal erosion.



Sine-Slab Application for Coastal Erosion

The invention was forwarded to the prestigious 27th International Exhibition of Invention of Geneva '99 in Switzerland. The invention was awarded with gold medals. Two of the researches namely Assoc. Prof. Dr. Noraeini Hj. Mokhtar and Assoc. Prof. Hadibah Ismail was awarded with a WIPO Gold Medals - Best Woman Inventors 1999. With the awards obtained by the faculty, it is undoubtly that the Faculty of Civil Engineering is spear heading the Research and Development activities in Malaysia. Details of Research and Development activities are as shown in APPENDIX C.



Assoc. Prof. Dr. Noraeini bte Hj. Mokhtar



Assoc. Prof. Hadibah bte Ismail

3.2 Consultancy

Apart from teaching and research as a core business of the faculty, the academic personnel do also heavily involved in consultancies work. The faculty has been providing multi-disciplinary engineering consultancy services in industrially based projects. Before the establishment of Specialist Consultant Group in 1998, most of the consultancies jobs in the faculty were monitored by Consultancy and Innovation Bureau of UTM.



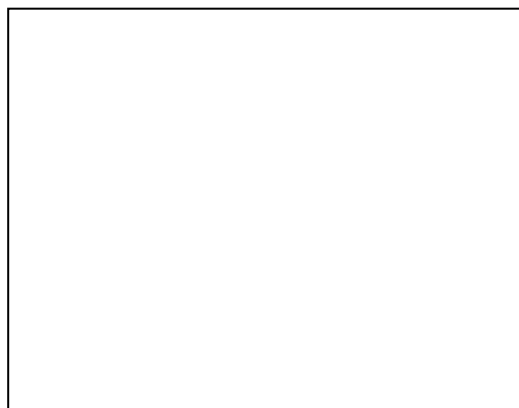
Investigation on the failure of the water tank at Bukit Cagar Flat, Johor Bahru

However with the establishment of the Specialist Consultant Group in 1996, all consultancy jobs have been monitored by the organisation. Numerous consultancies job has been done throughout the last decades as shown in TABLE 3.1. The faculty through various research groups and personnel provides a broad range of services which principally include :-

- (i) Innovation and design
- (ii) Independent testing services

- (iii) Instrumentation and development
- (iv) Specialist Investigation
- (v) Product Development
- (vi) Site Investigation
- (vii) Manpower Training

With an extensive experience in the field stated above, the faculty has provided an invaluable services to the nation.



3.3 University-Industry-Linkages

Technology transfer and technological self reliance have been the objectives of all developing countries. Basic requirement to attain such objectives through the linkages between the university and industries. The Faculty of Civil Engineering has accepted this challenge to improvise its R & D through this program. With the launching of UNITAP (University-Industry Advanced Program) by the Prime Minister Dato' Seri Dr. Mahathir Mohamed in 1996, it has expedite the University-Industry Linkages programme. The MOU and MOA with Industries have been signed upon with the faculty.

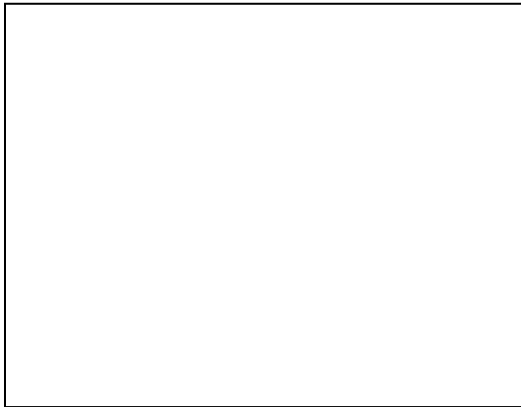
Various programme have been highlighted in these MOU's and MOA's. TABLE 3.2 shows details of the industries signing the MOA and MOU with the faculty

MOU signed between UTM and IWK

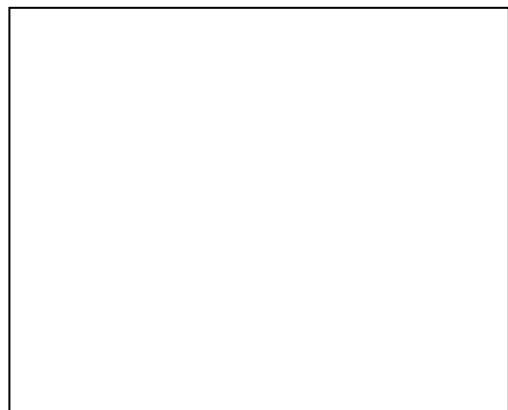


Malaysia – Singapore Second Crossing Bridge Under Construction (MSSC)

Through University-Industry Linkages, exposure of the faculty academician towards industrial problems have been enhancing their knowledge.



Young Engineers Training Programme :
The MOA between Faculty of Civil
Engineering and Linkedia for MSSC
Project



The faculty has been providing services through R&D to Industries needs. It inevitably helps to built our reputation in R&D, thus moving in advance from other R&D institutions.

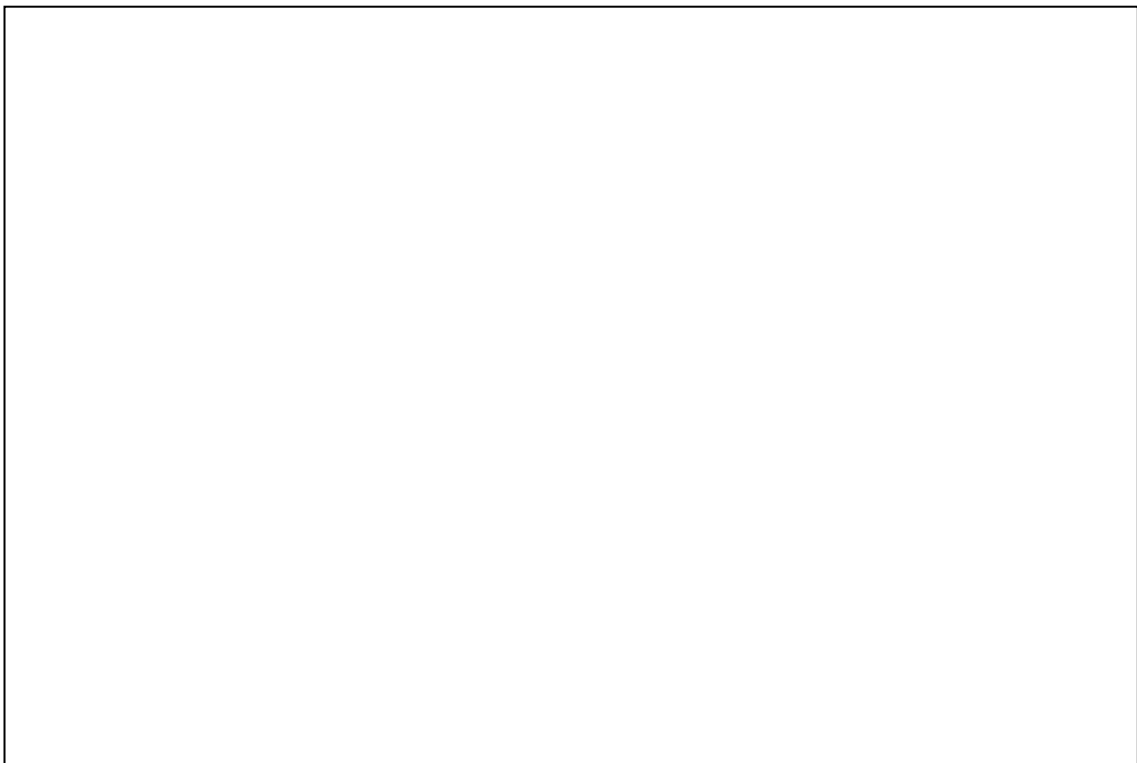


TABLE 3.1 : Details of Consultancy Projects Done by the Faculty

No.	Project	Client	Cost of Consultant (RM)	Year
1.	Assessment of Bridges in Melaka	Majlis Bandaraya Melaka	250,000.00	1993
2.	Projek Penyelidikan Tukun Tiruan Hex di Terengganu	Kementerian Pertanian	216,699.80	1997
3.	Projek Penyelenggaraan Benteng Pencegahan Hakisan Ombak dan Kajian Tukun Hex	NAHRIM/JKR	64,170.00	1997
4.	Coastal & River Mouth Protection Work at Sg. Balok Mukim Sg. Karang, Kuantan	JPS Pahang	50,000.00	1997
5.	Coastal Fringing Protection Study in Gebeng, Kuantan	Pasted Resource Sdn. Bhd.	17,388.14	1997
6.	The Proposed Hydraulic Study of the Straits of Penang	Dev. Corp. Sdn. Bhd.	232,000.00	1997
7.	The Study on Artificial Island of Pulau Layang-Layang, Sabah	JPM	167,900.00	1997
8.	Projek Kajian Tukun Tiruan Sebagai Pemecah Ombak di Terengganu	UPEN/Terengganu	215,854.00	1997
9.	Penambakan Laut Negeri Kedah – Kajian Hidraulik	UPEN Kedah/NAHRIM	731,600.00	1997
10.	Projek Cadangan Pembesaran Pelabuhan Kuantan	Port Kuantan	84,739.40	1997

No.	Project	Client	Cost of Consultant (RM)	Year
11.	Projek Cadangan Pembesaran Pelabuhan Kuantan	Port Kuantan	84,739.40	1997
12.	Johor Tenggara Strategic Planning Study	Pag. Consultant	63,000.00	1997
13.	Vibration Ellection – Pilecon	Pilecan Civil Work Sdn. Bhd.	83,000.00	1997
14.	Proposed TWP Plant at PLD 522, Jalan Keluli For Antara Steels Mills, Sdn. Bhd.	Trapezoid Web Profile Sdn. Bhd.	20,000.00	1997
15.	Appointment To Carry Out a Coastal Hydraulic Study & Soil Investigation In The Sea Hotel Development Lots 1027 & 1775 Mukim Padang Mat Sirat Langkaawi For Vista Vision Sdn. Bhd.	Ujjaya Environmental Equipment & Services Sdn. Bhd.	80,000.00	1997
16.	Kajian EIA & Hidraulik Bagi Cadangan Pembangunan Pelancongan Secara Integrasi di Atas Lot 1278 Mukim Serkat	Richtans (M) Sdn. Bhd.	65,000.00	1997
17.	Kajian Pemungkinan Bagi Pengorekan Pasir di Sungai Batang Lawas dan Sungai Lawas	Euro Circuit Technology Ujjaya Environment & Services Sdn. Bhd.	10,000.00	1997
18.	Kajian Awal Penilaian Kesan Alam Sekitar (EIA) Bagi Cadangan projek Kuari Di Mukim Sermin, Segamat, Johor	Sunway Juara Suma Sdn. Bhd.	38,000.00	1997

No.	Project	Client	Cost of Consultant (RM)	Year
19.	Cadangan Pembangunan Permulaan Kakitangan (Kawasan Selatan) Gombak, Selangor	UIA	35,000.00	1997
20.	Kerja-kerja Ujian Makmal Jalan Raya	JKR	15,000.00	1997
21.	Cadangan Menggantikan Pintu Air Sediada Kepada Pintu Air Automatik	Kementerian Pertanian	26,430.00	1998
22.	Kajian Membentuk Pelan Pengurusan Alam Sekitar Bagi Lembangan Sungai Terengganu	Jabatan Alam Sekitar	993,546.10	1998
23.	Tukun Tiruan Terengganu	NAHRIM	215,854.50	1998
24.	Projek Perumahan Termampu Pendekatan Kos Kitaran Hayat Rekabentuk Perumahan di Malaysia	Kementerian Perumahan dan Keraian Tempatan	1,579,068.40	1998
25.	Projek Tebusguna Tanah Persisiran Pantai Lekir, Perak	UPEN Perak	250,000.00	1998
26.	Projek IEA Pulau Bunting, Kedah	SKS Ventures Sdn. Bhd.	145,860.00	1998
27.	Development of Environmental Management Plan for Sg. Tong River Basin	DOE	1.1 juta	1998-2000

No.	Project	Client	Cost of Consultant (RM)	Year
28.	EIA Environmental Monitoring At Lumut Power Plant (LPP)	Asia Pacific Risk Management Centre (APRMC)	4,500.00 (setiap 3 bulan)	1998
29.	Kajian Kualiti Air Tukang Batu, Pasir Gudang, Johor Bahru	Euro-Circuit Tech Sdn. Bhd.	22,885.00	1998
30.	Kajian Hidraulik di Teluk Salang, Pulau Tioman,	Euro-Circuit Tech Sdn. Bhd.	20,000.00	1998
31.	Rivision of Testing Program	Elcon (M) Sdn. Bhd.	144,137.00	1998
32.	Cadangan Kilang Membuat Bata di PLO 565, Jalan Keluli Pasir Gudang, Johor	Pembinaan Prefab Sdn. Bhd.	169,500.00	1998
33.	Pembesaran Pelabuhan Kuantan	Kuantan Port Consortium/UKM	130,786.00	1998
34.	Physical Modelling Study of Submerged Berm – Batu Maung	Lembaga Kemajuan Ikan	133,134.40	1998
35.	Kajian Kualiti Air di Kawasan Tadahan Bagi Logi Pembersihan Air Yong Peng 2 & 3 Danah, Batu Pahat	Bekalan Air Johor	112,263.00	1999
36.	Projek Empangan Beris, Sik, Kedah - Ujian Modul Hidraulik Alor Limpah	JPS (Pengairan)	173,000.00	1999
37.	Cadangan Pembinaan Kompleks Usahawan Teknologi MARA di Technovation Park	MARA	80,000.00	1999

No.	Project	Client	Cost of Consultant (RM)	Year
38.	Makmal Austin	Institut Ibnu Sina	7,000.00	1999
39.	Cadangan Pembinaan Bangunan Tambahan Stadium Pasir Gudang	TPM (Total Project Management) PKENJ	60,000.00	1999
40.	Pembinaan Kolum Kawalan Banjir dan Pengukuhan Sistem Saliran Air Kampus UTM, Skudai, Johor	UTM	950,000.00	1999
41.	Hydraulic Study for The Proposed Coastal Reclamation Using Dredged Material	Kuantan Port Consortium	135,000.00	1999
42.	Kajian Pencemaran Sungai Skudai	Jabatan Alam Sekitar Johor	85,598.00	1999
43.	Program Pemantauan Kualiti Air Bawah Tanah Bagi Kawasan PTD 676 di Tanjung Buai Mukim Johor Lama Kota Tinggi, Johor	Continental Tanker Sdn. Bhd.	267,000.00	1999
44.	Pencemaran Udara Untuk Kilang	Steadler M'Sia Sdn. Bhd.	4,000.00	1999
45.	Senimentation Study for Johor Port Pasir Gudang Untuk Cargo Jeti No. 4	EEC (Engineering & environmental Cons. Sdn. Bhd.	145,000.00	1999
46.	EIA Environmental Monitoring at Lumut Power Plant (LPP)	Asia Pacific Risk Management Centre (APRMC)	4,500.00 (setiap 3 bulan)	1999

TABLE 3.2 : List of MOA's and MOU's sign with the faculty

No.	Partners	Type of Agreement	Year
1.	Loughborough University of Technology	MOU	1992
2.	University of Newcastle Upon Tyne	MOU	1992
3.	University of Sheffield	MOU	1992
4.	Ranhill Bersekutu Sdn. Bhd.	MOA	1992
5.	University of Western Australia	MOA	1993
6.	The Chartered Institute of Transport (Malaysia National Council)	MOU	1993
7.	Jabatan Bekalan Air Negeri Sembilan and Taliworks (Negeri Sembilan) Sdn. Bhd.	MOU	1995
8.	Linkedua (Malaysia) Berhad	MOA	1995
9.	Technical University of Braunschweig, Germany	MOU	1996
10.	Asian Institute of Technology	MOU	1996
11.	Persatuan Kontraktor Melayu Malaysia	MOU	1996
12.	Steel Construction Institution	MOU	1996
13.	National Hydraulic Research Institute of Malaysia	MOU	1998
14.	Triumph Hi-Tech Sdn. Bhd.	MOU	1998
15.	Equiventures Sdn. Bhd. and Suez Lyonnaise DCS Eaux	MOU	1998
16.	Equiventures Sdn. Bhd. and Suez Lyonnaise DCS Eaux	MOU	1998
17.	Petronas Penapisan (Melaka) Sdn. Bhd.	MOA	1998
18.	Indah Water Consortium	MOA	1998
19.	Universiti Malaysia Sabah	MOU	1999
20.	Jabatan Perkhidmatan Pembentongan Indah Water Konsortium Malaysia Water Association	MOA	1999

3.4 Contribution In National Committee

The faculty views extension services as part of its contribution towards nation building hence several members of the academic staff often contributed their expertise in the special National committee programme such as Standard and Industrial Research Institute of Malaysia (SIRIM), Construction Industry

Development Board of Malaysia (CIDB), United Nations Environment Programme (UNEP), (Committee for School Curriculum) Ministry of Education, Advisory Committee of Research JKR, Committee for Assessment on Agricultural Engineering Undergraduate Course Universiti Pertanian Malaysia, Politeknik Ungku Omar – Subject syllabus . Details of staff involved are as shown below :

No.	Name of Staff Responsible	Agencies	Year
1.	- YB Dato' Raja Ariffin Raja Sulaiman - Prof. Dato Ir. Abd. Aziz Din - Prof. Ir. Ishak Abd. Rahman - Assoc. Prof. Ir. Mohd. Zain Yusuf	Politeknik Ungku Omar : Committee for Developing Civil Engineering Syllabus	1971-1984
2.	- Prof. Dato' Ir. Abd. Aziz Din - Prof. Dato' Ir. Dr. Mohammad Noor Salleh	UPM : Committee for Assessment on Agricultural Engineering Undergraduate Course Universiti Pertanian Malaysia	1977
3.	- Assoc. Prof. Dr. Che Nyan Husain - Prof. Ir. Ishak Abd. Rahman - Prof. Ir. Dato' Dr Mohd Noor Salleh - Prof. Madya Ir. Mohd. Zain Yusuf - Prof. Madya Ismail Hassan - Prof. Dato' Abd. Aziz Din	Ministry of Education : Advisory Panel for Technical and Vocational Education Syllabus	1980-1990
4.	- Prof. Ir. Dato' Dr Mohd Noor Salleh - Prof. Ir. Dr. Mohd. Zulkifli Tan Sri Mohd. Ghazali - Assoc. Prof Dr. Zaini Ujang	Ministry of Education : Committee for School Curriculum (KBSM)	1987-1989
5.	- Prof. Ir. Dr. Zainai Mohamad - Prof. Ir. Ishak Abd. Rahman - Assoc. Prof. Dr. Che Nyan Husain	JKR : Research Advisory Committee	1990-1992

No.	Name of Staff Responsible	Agencies	Year
6.	<ul style="list-style-type: none"> - Prof. Ir. Dr. Zainai Mohamad - Mr. Yusof Ahmad 	SIRIM : Committee of Rubber Material Engineering and Industrial Application	1991-1993
7.	<ul style="list-style-type: none"> - Assoc. Prof. Dr. Zaini Ujang - Assoc. Prof. Zainuddin Mohd Samsudin 	MATREM-UNEP : United Nation Environment Programme Steering Group	1996 to date
8.	<ul style="list-style-type: none"> - Prof. Dr. Zainai Mohamad - Assoc. Prof. Mat Lazim Zakaria - Assoc. Prof. Dr. Abd. Latif Saleh 	CIDB : Technical Committee for "Code of Practice for The Structural Use of Timber"	1997 to date
9.	<ul style="list-style-type: none"> - Assoc. Prof. Ir. Mohd. Zain Yusuf - Assoc. Prof. Dr. Aminaton Marto - Dr. Mahadzer Mahmud 	CIDB : Technical Committee for Standard on Foundation and Earthworks	1997 to date
10.	<ul style="list-style-type: none"> - Prof. Ir. Dr. Mohd. Azraai Kassim - Mr. Mohd. Nor Othman 	CIDB : Technical Committee for Design of Wastewater Treatment Plant	1998 to date
11.	<ul style="list-style-type: none"> - Assoc. Prof. Dr. Salihuddin Radin Sumadi - Assoc. Prof. Dr. Ahmad Mahir Makhtar - Assoc. Prof. Dr. Abd. Latif Saleh 	CIDB : Steering Committee for Industrialized Building System	1998 to date
12.	<ul style="list-style-type: none"> - Assoc. Prof. Dr. Ahmad Mahir Makhtar - Assoc. Prof. Dr. Salihuddin Radin Sumadi - Assoc. Prof. Dr. Abd. Latif Saleh 	CIDB : Taskforce Group for Malaysian Standard on Guide to Modular Coordination in Building	1999 to date
13.	<ul style="list-style-type: none"> - Dr. Fadhadli Zakaria - Dr. Mohammad Ismail 	SIRIM : Committee for Malaysian Standard (Cement)	1999 to date

No.	Name of Staff Responsible	Agencies	Year
14.	- Dr. Che Wan Fadhil Wan Putra	CIDB : Steering Committee of e- construction SIRIM : Committee member of Construction IT Center of Excellent	1999 1999

With the number of staff involved in these National Committees, Faculty of Civil Engineering UTM, has been entrusted as a centre of reference for Civil Engineering discipline in Malaysia.

