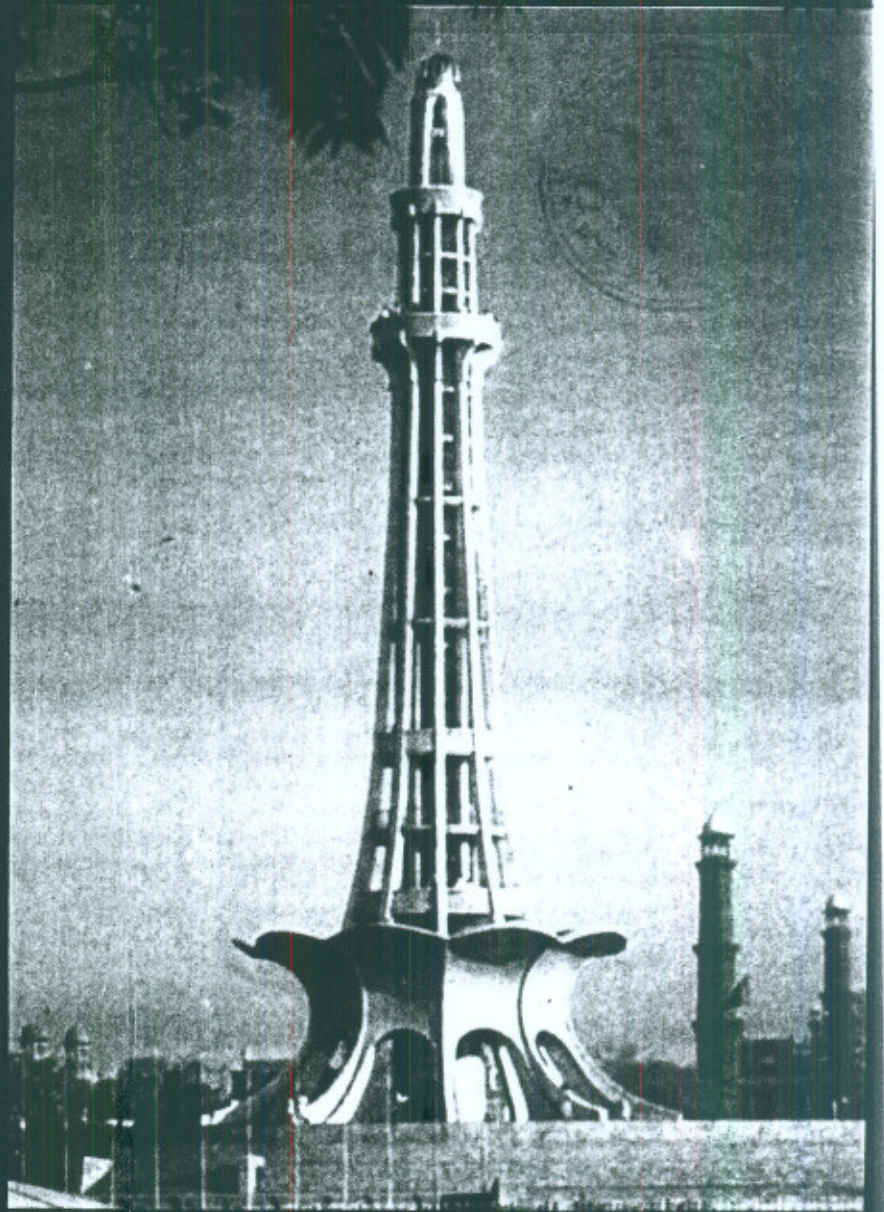


A QUARTERLY JOURNAL OF THE PAKISTAN ENGINEERING CONGRESS

JUNE - SEP - 97.



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THIRTY NINTH YEAR OF PUBLICATION ENGINEERING NEWS

Quarterly Journal of the Pakistan Engineering Congress

Vol. XXXX

June 97, Sep 97

No. 10 & 11

ON OTHER PAGES

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Pakistan Engineering Congress is an age old professional body dedicated, inter alia to technical advancement of Science & Engineering in the country. This magazine is distributed free of cost to all concerned commensurate with PEC objectives.



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50 Years of Pakistan's Technological Life

Pakistan is celebrating Golden Jubilee of her independence on the 14th August '97. This is indeed a thanks giving occasion for the entire Nation. The enemies of Pakistan at the time of independence had predicted that the country (God forbid) would not last for more than a few years. Today Pakistan is politically more stable than many other nations in Asia including India.

None-the-less, Pakistan's economic and technological progress is much lower than what we could have achieved with tremendous natural resources, hard working and patriotic manpower and good defence capability; but unfortunately our system of bureaucracy and political leadership in the past failed to make the fullest use of our national resources of men and materials.

Technologically we should have gone much ahead than what we are today. The scientists & engineers of the country never got their due place to serve the Nation & they were always suppressed by vested interests of the bureaucracy inherited from the colonial past. Research and development activities were not allowed to get due importance and as a result innovation and quality in development & manufacture could not emerge institutionally. Nation is under huge foreign debts to the tune of U.S. \$ 30 billion or so because of turnkey projects loans and non utilisation of indigenous resources fully. Consultancy was not allowed to grow as was required. Research & Development Institutions are places of frustration & lack of due support.

Thousands of engineers are unemployed. The generalist bureaucratic heirarchy ruling the country and enjoying vast powers in the last 50 years has been lacking understanding of the real problems of a modern emerging State like ours. As a result we were driven to a situation economically in which we are today.

The present government led by Muhammad Nawaz Sharif gives us a ray of hope that the Nation will be pulled out of the accumulated morass in the shortest possible time. Growth of professionalism, R&D and eradication of corruption can alone take us to the 21st century with some measure of pride.



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Indus Associated Consultants (Pvt) Ltd. was established in Lahore to meet the urgent need of engineering consultancy services for the speedy implementation of large development programs in Pakistan.

Indus Associated Consultants (Pvt) Ltd. is registered with the World Bank, Asian Development Bank, OECF and other similar international financing agencies and have executed a number of important projects financed by these agencies.

The company offers multidisciplinary services which include surveying, planning, geotechnical and other investigations, feasibility studies, detailed engineering designs, contract/tender documents, project and financial management, construction supervision, maintenance and project post evaluations etc. in a wide range of civil engineering disciplines by execution of major projects in the following fields throughout Pakistan.

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There is a long list of prestigious projects of great national importance financed by the Asian Development Bank, World Bank and OECF and undertaken by our firm which includes Metropolitan Water Supply (Khanpur-I) project Islamabad, Second Urban Development Project (phase I & II) NWFP, Greater Faisalabad Water Supply, Sewerage and Drainage Project, Rural Water Supply and Sanitation Projects in Sind, Jamrud Torkham Expressway, Faisalabad Multan Motorway, Farm to Market and Rural Roads in Punjab and NWFP and Jinnah Bridge on Chinna Creek in Karachi.

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- ♦ National Highway Authority.
- ♦ Ministry of Local Government and Rural Development, Government of Pakistan.
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- ♦ Karachi Port Trust.
- ♦ Irrigation and Power Department Punjab.
- ♦ Small Dams Organization.
- ♦ Water and Power Development Authority.
- ♦ Agency for Barani Area Development (ABAD)
- ♦ Ministry of Agriculture, Works and Food.
- ♦ Capital Development Authority.
- ♦ Faisalabad Development Authority.
- ♦ Lahore Development Authority.
- ♦ Azad Govt of the State of Jammu & Kashmir.
- ♦ Project Management Unit (PMU) Punjab and NWFP

AHSAN IQBAL SPEAKS TO ENGINEERING NEWS ON SERVICES REFORMS & PROGRAM PAKISTAN IN 2010

(In an interview with Mian Fazal Ahmad, Chief Editor, Engineering News at Islamabad on July 09, 1997, Engr. Ahsan Iqbal, MNA & Chief Coordinator, National Program Pakistan in 2010, with the status of Minister of State, spoke on the National forthcoming Services Reforms and the ongoing National Program for the year 2010 for reshaping our national policies on long term basis. Below is a record of his views.)

EN: Pakistan Engineering Congress congratulates you on your appointment as Chairman, Task Force on Services Reorganization which is very vital for a real breakthrough in making Pakistan an economic tiger. Engineers have felt much ignored & downtrodden in national economic endeavor. How you plan to give due role to engineers in national affairs in the current & future challenges? The generalists rule in the country in last 50 years has ruined the national economy. Low growth & huge national debts are mainly due to this misrule.

Ahsan Iqbal: The Task Force set up by Prime Minister Nawaz Sharif, to reform the civil services in the country is in line with his program to introduce reforms in various sectors of the government, to put Pakistan on a fast track of development path. Civil structure is the basic instrument through which any government accomplishes her policies. Unfortunately, in the last 50 years, 26 committees were setup to suggest the reforms in the civil services but no major package was implemented fully to produce the desired objectives. The task of the present body is not to reinvent the wheel.

What needs to be done is known already by & large on basis of the recommendations of the previous several commissions. With a little updating, the reforms package will be prepared. A delegation recently visited Malaysia to study their civil services structure which has shown remarkable results in the progress of that country. We would like to adopt relevant features of their system of civil services. Their main elements are professionalism and corporatisation. Prime Minister Nawaz Sharif desires to see our civil services very efficient and responsive to people's

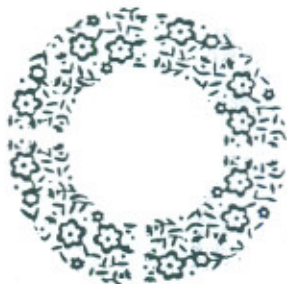
needs. We would like to have a system of incentives to reward competent and honest officials & curb corruption. The present structure needs to be transformed and converted into a system which promotes good performance, integrity, & merit. Corruption and leakages would be plugged on long term basis. This committee will also review salary

structure of government servants.

EN: The National Program for Pakistan 2010 is very promising & inspiring. Could you kindly enlighten on the salient features of the program?

Ahsan Iqbal: National Program for Pakistan 2010 is actually a Plan for reshaping national policies in all sectors on long term

basis, rather than following short term policies of adhocism as done in the past for a long time. This will also give confidence to investors and business communities here & abroad for forming views about Pakistan's long term policies. This program is planned to be launched on the occasion of the Golden Jubilee of Pakistan this year on August 14, 1997.



A man's true wealth is the good he does in the world.

(The Holy Prophet Muhammad P.B.U.H.)



NEWS IN PICTURES

Dr. Hakoon Stole of Norway Speaking on "Some Recent Developments on Sediments Handling Techniques Use at Run of the River Hydro Power" at a lecture meeting organised by PEC on April 15, 1997.



President PEC, Engr. Khalid Latif Khawaja, Addressing a Gathering of Engineers on April 15, 1997.

PEC Members listening to Dr Hakoon Stole of Norway.



Dr. M. Islam Sheikh former V.C. UET Lahore Speaking on "Impact of Urbanisation on Health" at a lecture meeting under PEC auspices.



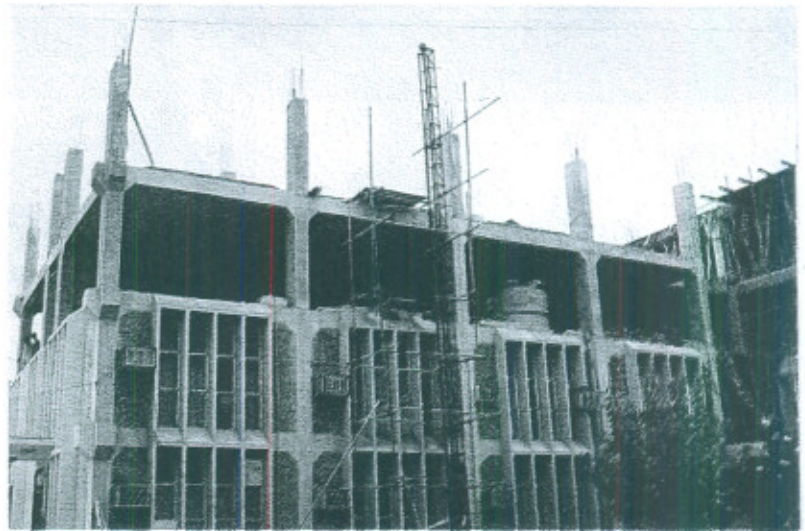
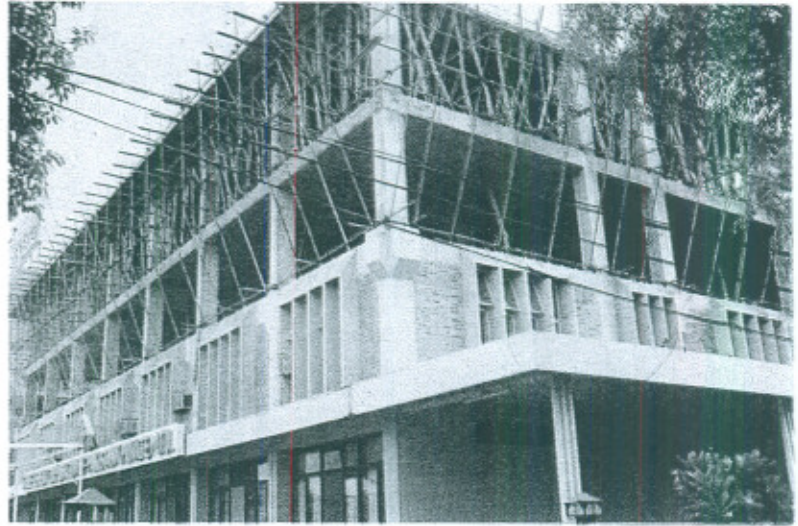
Engr. Khalid Latif Khawaja, President PEC on the right side in the picture sitting on the dais.

PEC Members listening to Dr. M. Islam Sheikh former V.C. UET Lahore, on March 31, 97 at the lecture meeting.

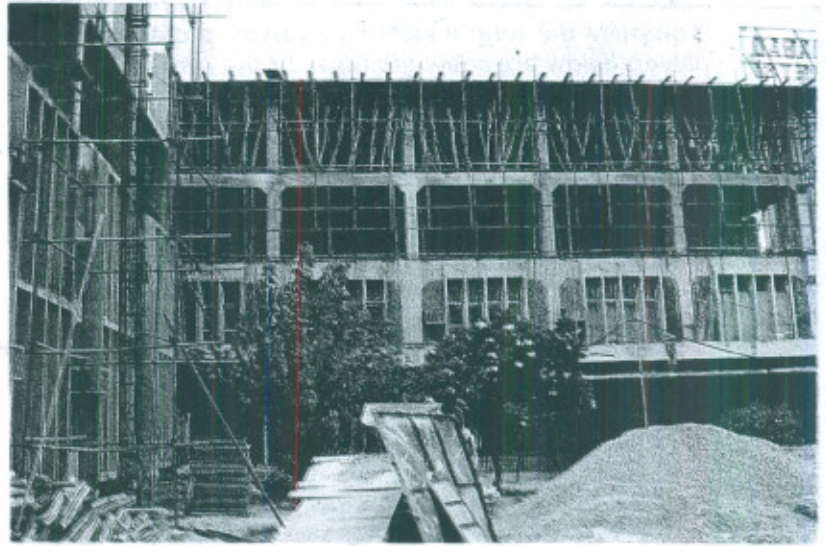


CONGRESS BUILDING UNDER SPEEDY EXPANSION

(The present building of the Congress Headquarters is currently undergoing further addition of floors and more covered area is being constructed fastly. This would complete the long awaited Congress project expected to be accomplished by Dec. 97. Given below are a few glimpses of the project under construction).



CONGRESS BUILDING UNDER SPEEDY EXPANSION



The Nation

SATURDAY, MAY 31, 1997

The Nation

SATURDAY, MAY 3, 1997

Engineers urged not to compromise on quality

LAHORE (PPI)—Pakistan Engineering Congress (PEC) has called upon the engineers working in Pakistan at different positions not to compromise over quality standard at any cost in on-going construction projects and nation building schemes. This appeal was made at a meeting of the executive council of the PEC held here on Friday with its President, Engr. Khalid Latif Khwaja in the chair.

The executive council stressed the engineering community that undue pressure from politicians or non-professional bosses should strongly be resisted in the national interest and to dispel the adverse impression about the profession created by some vested elements.

The engineering congress also asked the engineers to promptly report in confidence to the congress which could pressure from any quarters which could affect the quality of work or was against the principles and standards of the profession.

Governance through professionalism a must

LAHORE—(PR)—Pakistan Engineering Congress (PEC) has urged the Prime Minister Mian Nawaz Sharif to ensure that their respective fields. Similarly all Professional Departments, Autonomous bodies, Corporations and

انجینئر قومی اہمیت کی سیکسوں پر اعلیٰ تعمیراتی معیار برقرار رکھیں

لاہور (پ پ اے) پاکستان انجینئرنگ کانگریس نے ملک کے اندر مختلف شعبوں پر مہم چلانے والے تمام انجینئروں سے کہا ہے کہ انہیں تعمیراتی معیار اور قومی اہمیت کی سیکسوں پر اعلیٰ تعمیراتی معیار برقرار رکھیں اور کسی بھی صورت میں ملے شدہ کاموں اور طویل مدتی کے خلاف کوئی کنڈول سے سمجھوتہ نہیں کریں۔ یہ اعلان اس لئے ہی ضروری ہے کہ ملک کے بعض مفاد پرست عناصر انجینئرنگ جیسے اہم پیشہ کو بدنام نہ کریں۔ ان میں انجینئرنگ کانگریس کی ایگزیکٹو کونسل کا ایک اجلاس منعقد ہوا جس کی صدارت انجینئر خالد لطیف خواجہ نے کی اجلاس میں اس امر پر زور دیا گیا کہ انجینئرنگ برادری کسی بھی صورت میں ملے شدہ کاموں اور طویل مدتی کے خلاف کوئی کنڈول سے سمجھوتہ نہیں کریں۔ یہ اعلان اس لئے ہی ضروری ہے کہ ملک کے بعض مفاد پرست عناصر انجینئرنگ جیسے اہم پیشہ کو بدنام نہ کریں۔ ان میں انجینئرنگ کانگریس کی ایگزیکٹو کونسل کا ایک اجلاس منعقد ہوا جس کی صدارت انجینئر خالد لطیف خواجہ نے کی اجلاس میں اس امر پر زور دیا گیا کہ انجینئرنگ برادری کسی بھی صورت میں ملے شدہ کاموں اور طویل مدتی کے خلاف کوئی کنڈول سے سمجھوتہ نہیں کریں۔ یہ اعلان اس لئے ہی ضروری ہے کہ ملک کے بعض مفاد پرست عناصر انجینئرنگ جیسے اہم پیشہ کو بدنام نہ کریں۔ ان میں انجینئرنگ کانگریس کی ایگزیکٹو کونسل کا ایک اجلاس منعقد ہوا جس کی صدارت انجینئر خالد لطیف خواجہ نے کی

INTERNATIONAL
THE NEWS Saturday
May 31, 1997

PEC urges government to induct professionals

Pakistan Engineering Congress (PEC) has urged the government to induct professionals for the revival of national economy.

The Executive Council of PEC which met on Friday under the chairmanship of president Engr Khalid Latif Khawaja, passed a resolution appealing to the prime minister to give professional experts a chance to head various technical ministries, departments, institutions and corporations in

the Centre as well as in the Provinces.

The Pakistan Engineering Congress expressed hope that engineers, scientists, doctors, educationists, economists, agriculturists and experts in other technical and industrial fields if appointed heads of their respective departments would greatly assist the government to cover the backlog in their areas and deliver the goods.

The organisation pointed out the example of Japan, Korea, Singapore and Malaysia where economies have witnessed a phenomenal growth through professionalism.

The PEC also warned the government against over-dependence on foreign loans and grants. The congress said that the country had enough resources which should be exploited for its development and progress. —APP

CONGRESS IN THE NATIONAL PRESS



2 جون 1997ء

فنی ماہرین کو وفاقی، صوبائی تیکنیکی وزارتوں، محکموں اور خود مختار اداروں کا سربراہ بنایا جائے

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FRIDAY APRIL 25, 1997



Lahore, Saturday, May 3, 1997

'Food famine if Kalabagh Dam not erected'

By Our Reporter

LAHORE, April 24: Pakistan Engineering Congress (PEC) on Thursday urged the Government to urgently undertake construction of Kalabagh Dam.

"If this does not happen the country which is already facing an economic crises would soon be confronted with food famine by the turn of the century," Khalid Latif Khawaja, president, PEC, said in a statement.

He pointed out that detailed engineering investigations and geological studies on the Kalabagh Dam were completed in early 1980 at a cost of over Rs one billion rupees and there is no second opinion over its feasibility.

"The project is viable with numerous benefits accruing from its construction which are equally useful for all the provinces," he said.

"The entire nation will benefit immensely and no land in any

province will be inundated as wrongly and intentionally spell out by the vested interests," Khawaja added.

Because of shortage of water and hydel power, PEC chief said the country was importing three million tonnes of wheat every year and due to rapid increase in population wheat import would rise to five million tonnes by the year 2000. "Edible oil and sugar would also have to be imported in the same proportion," he pointed out.

Khawaja maintained that country's crippled economy will not be able to sustain for an indefinite period the heavy burden of paying the price on import of wheat, edible oil and sugar in foreign exchange.

He stressed that the PML government with the massive mandate should take a bold decision by giving green signal for the start of construction of Kalabagh, Basha and similar other water storage dams.

No compromise on quality, PEC resolves

By Our Reporter

LAHORE, May 2: The Pakistan Engineering Congress has asked all professional engineers to ensure strict quality control at all ongoing development projects with a view to what it called dispelling adverse impression created about the profession by vested interests. Engineers should not compromise on quality of work at any cost, it said.

The PEC executive council which met here on Friday with its president Engr Khalid Latif Khawaja in the chair, was of the view that the engineering community should strongly resist, in national interest, undue pressure from politicians and non-professional executives.

The meeting appealed to engineers not to give in to pressure for relaxing specifications. Controversial matters should promptly be reported in "confi-

dence" to the PEC council which had already set up a vigilance committee to examine such cases and take them up with higher authorities, it said.

The PEC council also asked the engineers executing various projects to make all out efforts for timely completion of the projects. In case of delays on account of non-availability of allocated funds, they should take up the matter with concerned secretaries and ministers.

The Engineering Congress welcomed the assurance by Prime Minister Mian Nawaz Sharif that his government would safeguard the interests of professionals and look after their welfare. The meeting also decided to hold a mid-term seminar on Challenges of the 21st Century and the Role of Engineers in Lahore next month.

NATIONAL PRESS HIGHLIGHTS PEC VIEWS **THE MUSLIM**

Friday, April 25, 1997

PEC demands Kalabagh Dam construction soon

BUREAU REPORT

LAHORE: Pakistan Engineering Congress (PEC) has urged Prime Minister and chief ministers of all provinces to urgently resolve and undertake construction of Kalabagh Dam, otherwise the country which is already facing an economic crisis, would soon be confronted with another crisis of food by the turn of century. In a statement President PEC Khalid Latif Khawaja pointed out that detailed engineering investigations and geological studies on Kalabagh Dam were completed in early 1980 at a cost of over one billion rupees and there is no second opinion over its feasibility. The project is viable with numerous benefits accruing from its construction which are equally

useful for all the provinces. The PEC president regretfully pointed out that on Kalabagh Dam, all the plans had fallen a prey to a handful of political leaders for which the entire nation is now paying and shall continue to pay price for the delay and neglect. All successive political governments did not realise the dire necessity of Kalabagh Dam nor undertake the construction of any other large or small dams during the last 20 years. Because of lack of water and hydel power, PEC chief said, "we are at present importing three million tonnes of wheat every year and due to rapid increase in our population wheat import would rise to five million tonnes by the year 2000. Import of edible oil and sugar would also have

to be imported in the same proportion." The congress chief stated that by harnessing our rivers through multi-purpose storage dams, the stored water would irrigate an additional 13 million acres of barren land which could produce crops worth Rs 40 billion annually thus greatly relieving the country of foreign dependence. The PEC president stressed that the present government with the massive mandate and having access to almost all the political leaders in the country, should take a bold decision by giving a go-ahead signal for urgently starting the construction of Kalabagh, Basha and similar other water storage dams. To save the country from impending food famine which is staring us in the face.

DAWN

Lahore, Friday, April 25, 1997

PEC favours Kalabagh dam construction

By Our Reporter

LAHORE, April 24: The Pakistan Engineering Congress has called for resolving the issue of Kalabagh dam and undertaking its construction without any delay, as the project is viable and will benefit all the provinces. PEC president Engr Khalid Latif Khawaja said in a statement here on Thursday that geological studies on Kalabagh dam were completed in 1980 at a cost of over Rs 1 billion. "There was no second opinion on its feasibility," he added. He urged the prime minister and all the four chief ministers to resolve the issue and undertake its construction. He feared famine in the country if the project was not undertaken. The PEC chief said no land in any province would be inundated if Kalabagh dam was constructed. He lamented that a "handful of political leaders were opposing it for which the entire nation is now paying a price for the delay and neglect." He regretted that all successive governments did not realise the necessity of dam on one hand, and of paying the price in foreign exchange on import of wheat, edible oil and sugar, he observed. Congress was of the view that under such circumstances, it had become necessary to construct Kalabagh dam and similar others like Bhasha and Dasu dams as envisaged in the Water Treaty of 1991. The PEC chief said by harnessing country's rivers through multi-purpose storage dams, the stored water would irrigate an additional 13 million acres of barren lands which could produce crops worth Rs 40 billion annually and relieve the country of foreign debts.

The Nation

FRIDAY, AUGUST 1, 1997

Dependence on foreign consultants eroding economy, says PEC chief

By Our Staff Reporter

LAHORE - Dependence on foreign consultants and contractors at the cost of indigenous companies is fast eroding the economy of Pakistan as the construction cost and profits of foreign firms are far higher than the home companies while the quality of works executed by the expatriates is in no way better than the projects undertaken by the Pakistani firms.

These views were expressed here on Thursday by the President of Pakistan Engineering Congress (PEC), Engr. Khalid Latif Khawaja, at the conclusion of a study visit of PEC delegation to the Rs 54 crore most modern Children Hospital and Institute of Child Health which is being constructed on Ferozpur Road by the Punjab Buildings Department.

The Engineering Congress Chief said that the tendency of giving preferential treatment to foreigners is also creating frustration among the local engineers who are leading technologists and the cost of works being executed by them is very competitive if compared with expatriate companies. Pakistani engineers have already made their identity as very efficient and capable professionals in the Third World and Muslim countries, he added.

Explaining salient features of the sprawling Children Hospital Complex, Engr. Shaikat Ali Shaheen, Superintending Engineer of the Buildings Department and in charge of the construction works, said that the Children Hospital and Institute of Child Health was being constructed on an area of 50 acres. The first phase

comprising 250 beds will be completed by the end of this year while the Emergency and Outdoor Wards have already gone into partial operation, he said.

Engineer Shaheen said that this centrally air-conditioned Children Hospital Complex is the first of its kind in Pakistan in the construction of which the Prime Minister, Muhammad Nawaz Sharif and the Punjab Chief Minister, Shahbaz Sharif, have been taking keen personal interest. Strict quality control measures are being observed in its construction while the construction cost compares favourably with similar other works in Lahore, he added. Lashela marble and white cement has been used extensively in the 4-storey hospital which has an attractive appearance he informed PEC delegations.



LAHORE: PEC President Khalid Latif Khawaja and members of Pakistan Engineering Congress during their visit to under-construction Children Hospital and Institute of Child Health.

— NAWA-I-WAQT, FRIDAY, AUGUST 1, 1997

غیر ملکی کمپنیوں کے ساتھ ترجیحی سلوک کے باعث مقامی صنعت متاثر ہو رہی ہے

قبرائی منصوبوں پر غیر ملکی کمپنیوں کی اگرت اور شرح منافع بہت زیادہ ہوتا ہے: خالد لطیف خواجہ

قبرائی کمپنیوں کے ساتھ ترجیحی سلوک کے باعث مقامی انجینئروں اور ماہرین میں باہمی بیوہوری ہے۔ 1950ء کے پچھلے اڑھائی دہائی میں چلڈرن ہسپتال کی قبر کی تنصیبات بناتے ہوئے پنجاب بلڈنگ ایڈیٹمنٹ کے پرنسپل انجینئر شوکت علی شاہین جو قبرائی ادارے کے ایس ایچ ایچ میں نے کہا کہ اس چلڈرن ہسپتال کی قبر ایڈیٹمنٹ میں سال کے آخر تک مکمل ہو جائیگا۔ اس ہسپتال میں 2500 بستوں کی گنجائش ہوگی انہوں نے بتایا کہ ایس ایچ ایچ میں اور آرت اور وارڈز نے تیزی سے ترقی کی اور اس کی سہولیات فراہم کرنا شروع کر دی ہیں۔ انجینئر شاہین نے وفد کے اراکین کو بتایا کہ اس کی قبر میں ڈیڑھ گھنٹہ میں ہوا لٹا کر اور ڈیڑھ گھنٹہ میں شہزادہ شریف گری واپسی لے رہے ہیں۔

لاہور (پ ر) پاکستان انجینئرنگ کانگریس کے صدر انجینئر خالد لطیف خواجہ نے کہا ہے کہ قبرائی منصوبوں کی ترقی پر انجینئر کر کے نہ صرف مقامی قبرائی صنعت کی ترقی ہو رہی ہے بلکہ ان غیر ملکی کمپنیوں کی موجودگی سے کئی صنعت پر سزا پڑ رہا ہے۔ کیونکہ یہاں پر قبرائی منصوبوں پر قبرائی کمپنیوں کی اگرت اور شرح منافع بہت زیادہ ہوتا ہے جبکہ ان کی کلارنگ کی کٹ لٹ سے بھی مقامی ترقی سے بہتر نہیں آتی۔ کانگریس کے صدر نے ان خیالات کا اظہار کرتے ہوئے کہا کہ اگر وہاں پر یہ کی اگرت سے ذرا قبر مقامی چلڈرن ہسپتال اور راشی نٹ آف ہائڈرو پاور کے منصوبوں پر وہاں کی اگرت کے دوران کیلے وفد کے سربراہ نے کہا کہ غیر ملکی

WELCOME TO NEW MEMBERS

The Executive Council of the Pakistan Engineering Congress approved the following Engineers as Members in various meetings. The Engineering News extends warm felicitations to all of them.

MEMBERS ADMITTED ON 14TH DEC. 1996

S. NO.	NAME & DESIGNATION	S. NO.	NAME & DESIGNATION
1	Mr. Shahzad Hussain SDO Buildings, Burewala.	14.	Syed Muhammad Zahoor Mehdi, Assistant Director TEPA, LDA, Lahore.
2.	Mr. Muhammad Anis Butt, SDO Buildings, Lahore.	15.	Mr. Shabir Ahmad Qureshi, XEN. PHE Div. Lahore.
3.	Mr. Fawad Munir Khan, SDO, Buildings, Lahore.	16.	Kh. Gul Raiz Rab. A.D. ADS-I, LDA, Lahore.
4.	Syed Jahangir Ashraf, XEN Highway, Narrowal.	17.	Mian Abdul Majid, Dy. Chief Engineer, Pak Railway, Lahore.
5.	Mr. Islam Ullah Khan, Deputy Director, Highways (North), Lahore.	18.	Mr. Abdul Rauf, GM (Co-ord) NESPAK, Lahore.
6.	Mr. Ejaz Ahmad, Assistant Project Manager C&W Road Research Lab, Lahore.	19.	Mr. Muhammad Saleem Sheikh, GM (Geotech.), NESPAK, Lahore.
7.	Mr. Abrar Younis Butt, SDO, Road Construction, Sheikhpura.	20.	Mr. Israr Ahsan Siddiqi, Principal Engineer, NESPAK, Lahore.
8.	Mr. Shakil Ahmad Ch SDO, Excavator, I&P, Sargodha	21.	Mr. Shahid Pervaiz, Principal Engineer, NESPAK, Lahore.
9.	Mr. Naaman Baig, SDO, IRI, I&P, Lahore	22.	Mr. Dildar Muhammad, Senior Engineer, Highway Div. NESPAK, Lahore.
10.	Mr. Shahzad Maqbool, SDO, PHE, Lahore	23.	Mr. Mansoor Ahmad Hashmi, Senior Engineer, NESPAK, Lahore.
11.	Mr. Abdul Rashid Khan, Deputy Director, WASA Lahore	24.	Mr. Abdul Ghaffar, Principal Engineer, NESPAK, Lahore.
12.	Mr. Muhammad Hafeez, SDO E&M, WASA, Lahore.	25.	Mr. Muhammad Saeed Manzoor, Principal Engineer, NESPAK, Lahore.
13.	Syed Zahid Aziz, XEN, E&M, WASA, Lahore.	26.	Mr. Iqbal Ahmad Malik, Kals House, Al-Faisal Town, Lahore Cantt.

MEMBERS ADMITTED ON 9TH JANUARY, 1997

S. NO.	NAME & DESIGNATION	S. NO.	NAME & DESIGNATION
1.	Engr. Rizwan Saeed, Assistant Manager, Projects Polyster Associates.	11.	Engr. Tariq Mahmood Rana, Gulshan Park, Moghalpura, Lahore.
2.	Engr. Ahmad Shamim, Senior Engineer, Dr. A. Q. Khan Research Laboratories, Rawalpindi.	12.	Engr. Arman Sajid Qureshi, Allama Iqbal Town, Lahore.
3.	Engr. Shahid Hussain, 32-E, Askari Apartments, Gulberg-III, Lahore.	13.	Engr. Mudassar Rafique, Allama Iqbal Town, Lahore.
4.	Engr. Rehan Ikram, Production Engineer, Packages, Lahore.	14.	Engr. Syed Qasim Ali Shah, Assistant Professor, GEA, Niaz Beg, Lahore.
5.	Engr. Sohail Islam, Mechanical Engineer, GEMCO (Pvt) Ltd, Lahore.	15.	Engr. Syed Tahir Manzoor, Senior Engineer, DSO, WAPDA, Lahore.
6.	Engr. Zulfiqar Ahmad Khan, Manager, MSK Associates, Lahore.	16.	Engr. Muhammad Waseem Butt, S.D.O Irrigation & Power, Lahore.
7.	Engr. Arif Mukhtar, Design Engineer, Haseeb Waqas, Lahore.	17.	Engr. Tanveer Akram Baig, 6-C, Upper Mall, Lahore.
8.	Engr. Saiyid Shahid Nazir, Assistant Engineer, M.M. Pakistan, Lahore.	18.	Engr. Zainul Abideen, Chief Executive, Delta Tech, (Private), Limited, Lahore.
9.	Engr. Amir Wazir, 262-Upper Mall, Lahore.	19.	Engr. Liaqat Ali, S.D.O. Irrigation, Depalpur Sub Division, Depalpur, Distt. Okara.
10.	Engr. Kashif Rahman, Gulshan Park, Garhi Shahu, Lahore.	20.	Engr. Aftab Safdar Bhatti, Principal Engineer, MASCON Associates, (Private) Limited, Lahore

MEMBERS ADMITTED ON 26TH FEBRUARY, 1997.

S. NO.	NAME & DESIGNATION	S. NO.	NAME & DESIGNATION
1	Mr. Abdul Qayyum, Chief Mech. Engineer, Pakistan Railway, Lahore.	3.	Major Tanveer Asad Rana, 42/3 Sarwar Road, Lahore.
2.	Mr. Tariq Bashir Bajwa, SDO, I&P, Govt. of the Punjab, Lahore.	4.	Mr. Muhammad Muneer Ali, Asstt. Professor, UET, Lahore.

S. NO. NAME & DESIGNATION

5. Syed Azhar Maqsood,
G.M. NESPAK, E/PHE Div.
77-E/I, Gulberg-III, Lahore.
6. Mr. Asad Rashid,
Assistant Director, EPA,
4-Lytton Road, Lahore.
7. Mr. Abdul Razzaq,
Asstt. Director, LDA, Lahore.
8. Mr. Inaam Ahmad Rana,
14-Khushnuma, GO R-IV,
Model Town, Lahore.
9. Mr. Raheel Anjum Shabih,
10-A, Aisha Street, Old Muslim Town,
Lahore.
10. Mr. Muhammad Shaukat,
11/C, Amir Town, Canal Bank,
Harbanspura, Lahore.
11. Mr. Asif Hameed,
H. No. 48/19, St. No. 9,
Fayyaz Park, Lalpul, Moghalpura,
Lahore.
12. Mr. Haroon Isaac,
46-FCC, Ferozepur Road, Lahore.
13. Mr. Asmat Baig,
Principal Engineer, REC,
7-D, Kashmir Egerton Road, Lahore.
14. Mr. Sibte Ahmad Jafri,
President, Jafri Associates, Lahore.
15. Mr. Mohammad Asim Iqbal,
Project Engineer, CALTEX,
37/5 Sarwar Road, Lahore Cantt.
16. Mr. Aslam Ali Shah,
Assistant Manager, Rana Farm
Industries Sheikhpura Road, Lahore.
17. Mr. Nasir Munir
243-P, Model Town Exten. Lahore.

S. NO. NAME & DESIGNATION

18. Mr. Nadeem A. Bhutta,
Site Engineer, Supercons,
136-P, Gulberg-III, Lahore.
19. Syed Raza Hamid,
Proprietor, Supercons,
136-P, Gulberg-II, Lahore.
20. Mr. Ayyaz Mahmood,
570-N, Samanabad, Lahore
21. Mr. Muhammad Sadiq,
13-Ghosia Park, Bund Road,
Lahore.
22. Mr. Muhammad Naveed Akhtar,
AEE/SDO, Investigation Cell,
Lahore.
23. Mr. Israr-ul-Haq Gilani,
SDO, Multan Dev. Authority,
Multan.
24. Mr. Mazhar Rashid,
2-Umar Colony, Infantry Road, Lahore.
25. Mian Liaquat Ali,
AEE/SDO, I&P Department,
Lahore.
26. Mr. Ikram Ahmad Hashmi,
SDO, PHE Sub Division, Hasilpur.
27. Mr. Faisal Riaz,
Junior Engineer, NDC, Lahore.
28. Mr. Shafique Ahmad,
121-H, Jalil Abad, Multan.
29. Mr. Maqsood-ul-Rauf,
House No. 14, Street No. 37,
Aziz Park, Nai Abadi, Garhi Shahu,
Lahore.
30. Mr. Muhammad Imran
Tariq Road, Ghazi St. Rasoolpura,
Sheikhpura.
31. Mr. Mohammad Saleem
Tanveer 16-Tipu Block, New
Garden Town, Lahore.

S. NO. NAME & DESIGNATION

32. Mr. Bakar Razaq Chaudhry,
69-A, Canal View Housing Society,
Lahore.
33. Mr. Khalid Farooq,
Design Engineer (P&D), South Zone,
Buildings Lahore.
34. Mr. Tahir Mahmood,
XEN, Buildings, Lahore.
35. Mr. Shahid Javed,
SDO, Buildings, Lahore.
36. Mr. Abid Faheem Khan,
SDO, Buildings, Lahore.

S. NO. NAME & DESIGNATION

37. Mr. Tahir Hussain,
SDO, RR & M.T. Institution, Lahore.
38. Mr. Imran Ashraf Maan
SDO, Buildings, Lahore.
39. Mr. Noor Iqbal,
SDO, Buildings, Lahore.
40. Mr. Abrar Sultan,
XEN, C&W (PEC), Lahore.
41. Mr. Muhammad Azeem Gill,
SDO, PEC, C&W, Lahore.

MEMBERS ADMITTED ON 22ND MARCH, 1997**S. NO. NAME & DESIGNATION**

1. Engr. Muhammad Faryad
SDO, Buildings, Sheikhpura.
2. Engr. Muhammad Naeem Khan
SDO, Irrigation, UCC, Sheikhpura.
3. Engr. Mumtaz Hussain
DGPR, IEP, H/Qrs. Gulberg-III, Lahore.
4. Engr. Khalid Mahmood Mughal
C/o Abdullah Tehseen Trading
Company, 67-G.T. Road, Lahore.

S. NO. NAME & DESIGNATION

5. Engr. Arbab Waleed Ahmad
Asstt. Engineer, Dr. A. Q. Khan
Research Institute Kahuta (Rawalpindi).
6. Engr. Muhammad Maqsood
Water Management Officers,
Agriculture Department, Lahore.
7. Engr. Naveed Iqbal
Planning Engineer,
Habib Rafiq (Pvt) Limited, Lahore.
8. Engr. Muhammad Zameer
House No. 867/21, Mahmoodabad
Colony, Khanewal Road, Multan.

MEMBERS ADMITTED ON 28th APRIL, 1997**S. NO. NAME & DESIGNATION**

1. Syed Athar Hussain Bukhari,
SDO, Buildings, Arifwala.
2. Mr. Muzaffar Ahmad
SDO, 4th Building Sub Division,
Gujranwala.
3. Mr. Muhammad Iqbal Javaid,
Asstt. Director (Engg) Civil,
LDA/FDA, Lahore.
4. Mr. Shahid Butt,
ADO, P&D Directorate,
Highways Deptt. Lahore.
5. Mr. Ali Rabbani,
73-G/I, Model Town, Lahore.

S. NO. NAME & DESIGNATION

6. Mr. Muhammad Aslam Randhawa,
Mechanical Engineer,
19/B-D-I, Gulberg-III, Lahore.
7. Syed Shahid Hussain,
Deputy Director, WAPDA
134-Gulshan Block, Allama Iqbal town,
Lahore
8. Mr. Mahboob Hasan Shafiq,
B-115, Staff Colony, Engineering
University, Lahore.
9. Mr. Maqsood Alam Shafiq,
P-115, Staff Colony,
Engineering University, Lahore.
10. Mr. Muhammad Irfan Azhar,
Planning Engineer, Builders Associates,
Lahore.

S. NO. NAME & DESIGNATION

- Mr. M. Sana-ullah,
34-Post Office Scheme,
P.O. Moghalpura, Lahore.
12. Mr. Azam Anjum,
XEN. Highway Division, Sheikhpura.
13. Mr. Shahzad Suhail Mashood,
79-Jinnah Park, Awan Town,
Multan Road, Lahore.
14. Mr. Muhammad Aslam
XEN, C&W
St. No. 5, 25 Asif Block,
Allama Iqbal Town, Lahore.
15. Mr. Muhammad Nauman,
117-Tariq Block, New Garden Town,
Lahore.

S. NO. NAME & DESIGNATION

16. Mr. Nasrumin Allah
Junior Engineer NDC,
62-M, Gulberg-III, Lahore.
17. Main Khalid Hafiz,
Assistant Engineer
Mott Machdonald (Pvt) Ltd,
Lahore Cantt.
18. Syed Jalal Hyder
Chief Engineer (R&D),
Building Department, New Campus,
Lahore.

MEMBERS ADMITTED ON 26TH MAY, 1997**S. NO. NAME & ADDRESS**

1. Mr. Muhammad Amer,
16-N, Model Town Extension, Lahore.
2. Mr. Fayyaz Ahmad,
Asstt. Director, DSO, WAPDA, Lahore.
3. Mr. Muhammad Saleem Akhtar,
Director, Telephones-I, Lahore.
4. Mr. Mohammad Tahir Saleem,
H. No. 36, St. No. 2, Ahbab Colony,
P.O. Niaz Beg, Lahore.
5. Major (R) Zial-ul-Islam
90/3, Arif Jan Road, Lahore Cantt.
6. Mr. Muhammad Naveed Khalid Butt
281-A/I, Gulberg-III, Lahore.
7. Mr. Muhammad Kashif Mufty,
S/8, Wahdat Colony, Lahore.
8. Mr. Salman Aizad,
House No. 1, Street No. 60,
Islampura, Lahore.

S. NO. NAME & ADDRESS

9. Mr. Qaider Raza,
SDO, PHE Sub Division-IV,
Burewala.
10. Mr. Javaid Akhtar Janjua
Civil Engineer, 76-H, Gulberg-III,
Lahore.
11. Mr. Muhammad Tayyeb Javed,
255-P, Model Town Extension,
Lahore.
12. Mr. Shahzad Amin,
10-A-S-7, Muslim Colony, Shalimar
Link Road, Lahore.
13. Mr. Ahmad Wasim Rafi,
ADE, (WW) CRBC Design Cell,
Model Town, Lahore.
14. Mr. Muhammad Ishaque,
Electrical Engineer, Jinnah Hospital,
Lahore.
15. Syed Mohammad Haris,
59-Canal Bank, Railway Officers Colony,
Lahore.

MEMBERS ADMITTED ON 24TH JUNE, 1997**S. NO. NAME & ADDRESS**

1. Major Muhammad Nasir,
170-H, LCCHS, Lahore Cantt.
2. Mr. Zafar Iqbal,
XEN, Housing & Physical Planning
Division, Jhang.
3. Mr. Eram Iqbal,
Civil Engineer, D-28,
Jinnah Hospital Colony, Lahore.
4. Mr. Imtiaz Tashid,
Lecturer, Civil Engg, UET, Lahore.

S. NO. NAME & ADDRESS

5. Mr. Abdul Ghafoor,
Civil Engineer,
209-Hall Road, Lahore.
6. Mr. Ashfaq Ali,
Structural Engineer,
M/s Arif & Tanveer Associates, Lahore.
7. Mr. Muhammad Tahir,
House No. 4, Street No. 4,
Habeb Park, Moghalpura, Lahore.
8. Mr. Farooq Saleem Chaudhry,
Trainee Engineer, Sui Gas, 187-B, Shah
Jamal Colony, Lahore.

QUALITY AT ALL COSTS

Congress call to Pakistani Engineers

Pakistan Engineering Congress (PEC), the oldest body of professional engineers, has called upon all engineers working in Pakistan in different positions to ensure quality control at all on-going construction projects and nation-building schemes and that no compromise should be made at any cost on quality of work and standards. This is necessary to dispel the adverse impression about the profession created by vested quarters.

At a meeting of the Executive Council of PEC, held here recently under the chairmanship of its President, Engr. Khalid Latif Khawaja, the Council Members stressed upon the engineering community that undue pressure from politicians and non-professional bosses should be strongly resisted in the national interest and in the fair name of the community of technocrats.

The Engineering Congress Executive Council also

appealed to the engineers that all pressures from any quarters, which can adversely affect the quality of work and which are in conflict with the laid down principles and specification, should be promptly reported in confidence to the PEC Council which has formed a Vigilance Committee to examine all such cases and to take up the matter with the highest authorities for corrective measures.

The Executive Council also asked the engineers executing various projects that they should make all out efforts for timely completion of their projects. In the case of delays on account of non-availability of allocated funds, they must take up the matter with concerned Secretaries to the Government and the concerned Ministers and ensure that these funds are released without unnecessary delays so that the engineers do not get the blame of delays, on account of the

mistakes of others nor they are harassed or victimized for no fault of their own.

The Engineering Congress members appreciated the assurance given by the Prime Minister Mian Nawaz Sharif that his Government will fully protect the interests of the professionals and look after their welfare. The PEC Council assured the Prime Minister and the Provincial Chief Ministers of their full cooperation in their efforts to rid the country of all anti-social practices and appealed to them for appointing right men for right jobs so that the privileges of the professionals are not usurped by the non-professionals.

The PEC Council also decided to hold a mid-term Seminar on "The Challenges of 21st Century and the role of Engineers" where various problems facing the engineering community will be discussed in details.

P.E.C. COMPUTER CENTRE

CONTRIBUTING WELL TO COMPUTER LITERACY

The Computer Centre of the Pakistan Engineering Congress has been active in imparting computer training to professionals, young engineers & engineering students. The centre has made following achievements and imparted training to the following personnel.

ACHIEVEMENTS OF PEC COMPUTER CENTRE

- All 17 computers are in working order.
 - One LAB with 8 workstations, Manager's Computer and PEC Library is attached with networking.
 - "Internet" facility for the PEC Members is working.
 - Developed a reference library for the Computer Centre and have purchased few books for instant references.
 - Currently 96 students are studying in different courses. An overall 26 students are willing to join our coming advance courses like SAP-90 Advance, AutoCAD Advance and Primavera.
 - Computer Centre also introduced an exclusive Special Summer Session for Ladies & Children of PEC Members in morning session with a strength of 28 students. Timing are from 11:00 a.m. to 1:00 p.m. purely on subsidized rates.
- Planning to introduce following courses from July 1997:
- * An introduction to Internet & E-Mail (2 Weeks Duration)
 - * Certificate Course on Local Area Network (4 Weeks Duration)
 - * Hands on Primavera - 1 (Project Scheduling Programme).
(4 Weeks Duration)
 - * SAP-90 Advance Course (6 Weeks Duration)
 - * AutoCAD Advance Course (4 Weeks Duration)

Very nominal fee as compared to the market rates is charged from the students and trainees which makes it almost free education.

PEC COMPUTER CENTRE STEPS UP TRAINING PROGRAMME

LIST OF COURSES & NUMBER OF PASSOUT STUDENTS FROM JULY 1995 TO JUNE 1997

Courses	Duration	Total # of students	# of Pass students	Courses	Duration	Total # of students	# of Pass students
Auto CAD	09-05-95 to 03-08-95	9	8	M.S. Excel	22-09-96 to 14-11-96	6	4
	20-09-95 to 24-10-95	23	20		20-11-96 to 27-12-96	3	3
	24-12-95 to 18-01-96	14	13		12-02-97 to 20-03-97	14	9
	25-02-96 to 24-03-96	11	5		22-03-97 to 10-05-97	15	9
	12-05-96 to 13-06-96	4	4		12-05-97 to 21-06-97	17	14
	14-07-96 to 20-08-96	7	6		10-09-95 to 05-10-95	6	5
	18-08-96 to 03-10-96	10	8		10-02-96 to 01-03-96	8	7
	10-11-96 to 16-12-96	8	8		09-06-96 to 04-07-96	1	1
	22-12-96 to 29-01-97	16	13		14-07-96 to 08-08-96	4	4
	15-02-97 to 29-03-97	29	22		24-11-96 to 27-12-96	3	3
	20-04-97 to 24-05-97	18	12		12-02-97 to 20-03-97	10	9
	26-05-97 to 28-06-97	15	15		22-03-97 to 03-05-97	5	5
M.S.Dos,	09-05-95 to 03-08-95	6	5	FOX Pro	27-08-95 to 21-09-95	5	4
Windows &	09-09-95 to 05-10-95	9	7		11-08-96 to 03-10-96	7	4
Windword	26-11-95 to 21-12-95	5	4		21-04-97 to	3	1
	24-12-95 to 18-01-96	8	7	SAP - 90	25-02-96 to 24-03-96	9	9
	07-04-96 to 09-05-96	6	6		22-09-96 to 14-11-96	12	11
	12-05-96 to 13-06-96	5	5		11-01-97 to 26-02-97	14	9
	16-06-96 to 18-07-96	15	15		22-03-97 to 04-05-97	16	15
	21-07-96 to 20-08-96	10	9		12-05-97 to 21-06-97	16	15
TOTAL						333	

OBITUARIES

THEY LEFT US FOR GOOD!

The following engineers/members of the Pakistan Engineering Congress died in recent months. Pakistan Engineering Congress lauded their services to the profession and condoled their sad demise in the Council Meetings.

1. Engr. Hussain Ali Mirza, Retd. G.M. WAPDA
2. Engr. Ch. Khushi Muhammad, XEN. I&P.
3. Engr. Mian Imran Afzal, AEE/SDO, I&P.
4. Engr. Malik Muhammad Naeem, XEN. I&P.
5. Engr. Abdul jalil Tariq, Retd. C.E. I&P.
6. Engr. Abdul Sattar Chohan, S.E. Highways.
7. Engr. Ghulam Ahmad Sheikh, Retd. C.E. Highways.
8. Engr. Ch. Ejaz Ahmad, S.E. C&W Department.

May Allah bestow 'Maghfirat' to the departed souls & grant fortitude to the bereaved families to bear the loss.

TRANSFORMING PROVINCIAL IRRIGATION DEPARTMENTS INTO AUTONOMOUS BODIES

* *Engr Khawaja Saleem ud Din*

Recently many reports in the National press have appeared regarding privatising or transforming into autonomous bodies the Irrigation Departments in the four Provinces. The common citizen of the country or the farmer in particular is in the dark regarding background of the scheme & the proposal so mentioned. There has been much agitation from the various associations of the agriculturists, farmers or the zamindars in the country about these reports. The following article which is a technical one will also suggest its solution.

The Irrigation Departments in the four Provinces supply canal or tube well water to the farmers. Water rate or 'abiana' in Punjab & N.W.F.P. is assessed by the canal patwari on the area so irrigated while the same in Sindh is done by a Revenue or Civil patwari.

Till 1973-74 the total expenditure for maintenance & repairs or operation & maintenance & establishment in Punjab was less & receipts from water rate or 'abiana' were more. Similar conditions prevailed in Sindh. More than 9000 Tube wells installed by WAPDA were transferred to Punjab as Scarp tubewells in 1974. Irrigation Department had to spend large

amounts of sums for maintaining these tube wells. 80% of the expenditure on these tube wells went to power sector as electric charges. These tube wells caused huge expenditure (about half) in the budget of the Department which resulted in meagre funds for the maintenance of canal system. In this way the condition of canal system became bad to worst. Similar conditions prevailed in other Provinces. In 1980 Govt. of Pakistan approached International Development Association (World Bank) for loans in order to maintain the canal system in Pakistan. Maintenance of canals under Irrigation System Rehabilitation Project came into being under Development Credit Agreements in 1980 & 1988 which continued for about 15 years. Under Loan Agreement No. 2986 PAK of 1988 the International Bank for Reconstruction & Development required to revise the water rates periodically in order to fully recover the cost of operation & maintenance (O&M) for canals by 1/7/1997 through water rates or 'abiana' as service charges. It recommended raising of water rates 6 to 12 times in these documents.

World Bank Proposals

Under the terms of these agreements & covenants, the World Bank studied the problems faced by the Irrigation Departments. Its suggestion is contained in Green Cover Draft Report No. 11884-PAK "Pakistan Irrigation & Drainage Issue & Options" 25 March 1994, generally called as "Grey Report".

The Bank criticizes that Govt. treats irrigation water as a public good where as it is a private trade able good. Pakistan's total area=796000 km² (196.7 million acres), population = 116 millions, literacy rate = 35% per capita income \$ 400, culturable area=78.2 million acres, 51.9 m.a. (60%) is under cultivation each year. 40 m.a has irrigation facilities 11.9 m.a. is rain fed. Rain fall is 6" annual river flow is 147 million acre feet out of which 106 is diverted to 43 canal systems. 39 m.a.f. of ground water is pumped. Length of main canals & distributaries exceed 60000 kilo meter, it serves over 14 million hectares of culturable commanded area through 107000 outlets in 43 main canal system. Storage capacity is less than 10% of annual river flow. It has identified, water logging & salinity, deterioration in land and order situation responsible for theft and stealing of canal water, over-exploitation of fresh ground-water, low efficiency in

* Consulting Irrigation Engineer

delivery & use, in-equitable distribution, in-adequate maintenance & in sufficient cost recovery as the main problem of Pakistan's Irrigation system. Bank has suggested commercialization, privatization & financial independence of the departments". It considers that the Depts. are poorly equipped for the staff. For privatization-Farmer Organization (F.O) will be constituted. F.O. members will be responsible for distribution of water share, arrange cost of maintenance, construct works, collect water charges & then pay public utility to Provincial Water Authority to be nominated by Provincial Regulation Commission. This has been suggested on the pattern of Mexico & Gazira in Sudan where it has worked well successfully.

Decision of Pakistan Govt.

A meeting at Awan-e-Sadar was held on 20/8/1995 under the chairmanship of President of Pakistan on the subject of "Accelerated Water Management Plan". It was attended by the P.M., C.M.s, Ministers & concerned Secretaries. Under "Institutional Reforms" it was decided that the provincial Irrigation Dept. (PIDs) shall be transformed into autonomous bodies namely, Provincial Irrigation & Drainage Authorities (PIDAs) under statutory arrangements, having independent revenue collection & spending authority. The process would be completed by the provinces in a manner that the PIDAs become functional by

1st July 1996 at the latest. Below the PIDAs, financially self accounting Area Water Boards (AWBs) on the pattern of AEBs of WAPDA shall be created, preferably around canal commands. Below AWB level, farmers shall be encouraged to form Water Users Formations at the distributary & minor level on a pilot concept basis. These formations would play an important role in the operation & maintenance of distributaries & minors using participatory approach. Based upon the results of such pilot projects, a workable model would be evolved for adoption on a country wide basis. The newly created PIDAs shall not increase staff strength till such time as they have attained financial self-sufficiency. It was also decided that since the existing PIDAs will be converted into financially & operationally autonomous bodies, it would be for the provinces and the proposed provincial autonomous authorities to formulate a schedule of annual increases in 'abiana', such that the gap between water charge recoveries & the O&M in its entirety. The meeting authorised the Federal Govt. (ministry of Water & Power) to issue the policy letter to the World Bank immediately after incorporating the aforementioned modifications.

Concluding Comments

World Bank proposals

Agriculture sector employs 52% of labour force &

contributes about 26% in the national G.D.P. If irrigation Departments are privatized then 52% of labour force will be unemployed as below:

55% of farms are owner operated & farmers work themselves in the field. Proposal for privatization of World Bank is for a group of only 3% of the farmers of country acquiring land more than 20 hectare size covering 23% cropped area of total irrigated agriculture of country. 26% of farms are tenant operated. 19% are owners/tenant operated. They will fight for their water rights & go to the courts. Mexico has a small medium size irrigation system with a literacy rate of 87% & due to share of agriculture in G.D.P. is 9% with an independent flexible system where Pakistan has large system with 35% literacy rate & share of agriculture in G.D.P. is only 26%. In Mexico the canals are lined where as they are unlined in Pakistan. Mexican Irrigated Agriculture spends 50% establishment charges of total revenue where as this country spends 33% establishment charges/administration charges of the total spending of G.D.P. P.I.Ds are faced with new water resources such as construction of new dams in view of annual growth of population of 3.1% which the World Bank has miserably failed to mention or suggest their construction in their reports. The Depts. are equipped with experienced & qualified Engineers. The change over the administration & transfer to the Water Users will not solve the problem. The cooperative running of an institution has

failed miserably like the fate of "panchayat" system. Education in rural areas is less than 15%. Problem of Depts. are (1) Less funds (2) Less water rate (3) inequitable distribution of water (4) poor management (5) expenditure on flood fighting wrongly debited to P.I.D.s instead of cities they protect except irrigation works (6) expenditure on running & maintaining scarp tube wells which should be disinvested as decided in 1974 & chalked out & advised in scarp transition programmes.

Transforming Irrigation Deptt into Autonomous Bodies

This will also not solve the problem except that the water rates will be raised which will result in high cost of living of the common man of the country & rise in prices of all commodities of daily use. A properly organized Deptt. for carrying out Public Works was formed originally in Punjab in 1849 & the successful administration of this body led to the creation of regular Public Works Deptt. in all the provinces under the control of central Govt. The Deptt. have worked well over 147 years but circumstances require some change & improvement in the approach & methodology of the Deptt. instead of winding it. We should learn some lesson from WAPDA where the cost of a unit of power has touched a figure of Rs. 4/-. The senior Pakistani Engineers (Irrigation) working with World Bank have strongly opposed any change in the Deptt. Even Pakistan Engineering Congress & Pakistan Engineering Council

have strongly reacted to any change in the system which if implemented will cripple it completely. In 1964 system of farming of 'wara-bandis' (turn of water of farmer) was entrusted to chairman of union councils but it did not work & failed miserably & reverted back to be framed & implemented by the Irrigation Deptt. This will prove that any system relying completely on farmers association is bound to fail. Instead of this the system of Canal Advisory Committees prevalent in Punjab since 1928 & revised in 1974 be revived again which includes representatives of farmers.

Suggested Solution

In a survey conducted in 1989-90 under the directions of Federal Govt. & advice of World Bank it came to light that there was about 5% concealment in booking of irrigation of area in Punjab causing loss in collection of water rate. The booking of irrigated area in Sindh should also be entrusted to Irrigation Deptt. as suggested in a report of Mr. M. H. Soofi Member Board of Revenue in 1969. He recommended that more revenue can be realised if the system of assessment which is in vogue in the Punjab & N.W.F.P. provinces is adopted.

Scarp tube wells be disinvested & handed over to the farmers for their running & maintenance. Expenditure on maintaining & repairing flood bunds meant for protecting cities & towns except for irrigation works should be debited to social works & not Irrigation Deptt. A drainage cess should be levied in

areas served by the drainage system maintained by the Deptt. & credited to it. Similar cess be imposed on the owners of tube wells who have tube wells in the draw down zones of canals. In order to maximise agriculture output use of sprinkle irrigation be encouraged besides proper management in irrigation practices. In order to discourage unauthorized irrigation the special charges be enhanced from 6 to 20 times on those who misuse canal water in addition to enhancing punishment under criminal act.

Further, scheme for crop insurance may be introduced which will enable the Deptt. to stop remission of 'abiana' for failed crops ('kharaba') which is now a days allowed under the canal act.

It has also been complained that influential farmers do not pay 'abiana' to the Govt. To ensure its payment sections 81 to 90 of Revenue Act as revised in 1967 will have to be suitably amended to introduce a clause indicating to levy surcharge if the 'abiana' is not deposited with the 'lamber dar' by the specified date.

In order to reduce expenditure under establishment, all the offices of Zonal Chief Engineers should be closed & C.E.s posted at Lahore/KAR be made Secretaries as per practice in vogue before 14-10-1955. At present their offices are functioning as post offices. This is a great burden on Deptt. The superintending Engineers should directly correspond with the Secretaries/C.E.

LARGE RESERVOIRS INESCAPABLE IN ARID REGIONS TWO CASE STUDIES

★ENGR. BASHIR A. MALIK

INTRODUCTION

Water the life-blood of all human, animal and plant kingdom and its support systems, had never been under such a sharp focus globally, as in the later half of the twentieth century which began rich in water resources and low demand. By the concluding decade, because of the rise in world population from 2.8 billion (1955) to 5.3 billion (1990), usable global annual water availability dropped from 4800 to 2300 m³ per capita. But such an illustrative global indicator could be highly misleading. Neither population nor water is spread over the globe evenly. For instance annual water availability in arid Kuwait is 75 m³/person as compared with Iceland's 667000 m³. In aridic regions water has always been in high demand but short in supply. It is in these regions that man-made storage reservoirs have been in service of humanity since the dawn of civilisation.

The earliest recorded reservoir mentioned in the Scriptures, was created circa 700 B.C. by the construction of Marib Dam east of Sana'a in Yemen. Agriculture flourished in the otherwise arid region by irrigation water from the Marib Dam. The reservoir at Marib had led to

Yemen's unprecedented prosperity and golden era of Sebaen civilisation characterised by the reign of legendary Queen of Sheba. Sequel to advancement in technology and growing demand, primarily for water and power, there has been tremendous increase in number and size of storage reservoirs especially during the second half of the 20th century. In 1950 there were 5270 dams. Their number rose close to 37000 by 1990. World's 12 largest reservoirs of capacity 25 million-acre-feet (maf) or above, came into operation in the same period. In 1995 there were 264 large dams (200 feet high or above) under construction in the world.

However, large reservoirs inspite of their immense socio-economic benefits, have fallen from favour; mostly in the developed countries because of exaggerated albeit biased projection of a few disasters. A keen awareness of environmental concerns has arisen in the recent decades. Improvement and protection of the environment is of vital importance to maintain general health and integrity of the planet. Environmental concerns in some respects however, appear to have gone over board impending development initiatives in some fields.

One such target is large reservoirs as instruments of development in many a country. A strong lobby has appeared against large reservoirs notably in the industrialised countries. The United States Bureau of reclamation-famous for building some of the world's largest dams e.g. Hoover and Glen Canyon, has moved away from "hard-solution" or structural to "Soft-solution" or non-structural solution policy. Bilateral aid agencies and the financial institutions, such as the World Bank, have linked grant of aid/loans only for environmentally acceptable projects.

Indiscriminate use of this policy, disregarding otherwise some unavailable imperatives of certain situations, could prove disastrous, particularly for the developing countries. The paper will present case studies of two large reservoirs at Mangla and Tarbela in Pakistan with a passing reference to the world's second largest at Aswan in Egypt. The paper will inter alia show that these storage provide not only of immense socio-economic value but were inescapable without which the two countries, like scores of others in the arid regions, could survive economically nor could sustain their sovereignty.

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THE SETTING

Pakistan is mostly an arid country where no crops can be raised without irrigation using 90% of her renewable water. Irrigated agriculture is the mainstay of her economy. The Indus and its tributaries-each a large river by itself, constitute the main source of irrigation supply. The Indus Basin hosts world's largest integrated irrigated irrigation system. It comprises 3 storage dams (live capacity 15 maf), 19 diversion barrages, 43 canal commands and 12 inter-river link canals. Overall length of irrigation channels is about 37000 miles and that of field water courses exceeds 1.0 million miles. Some 89000 outlets supply water to field channels. Canals withdraw annually 106 maf (1993). There are 3,000,000 tubewells. They pump groundwater for irrigation. Some 32 maf of groundwater is used for irrigation conjunctively with canal supplies. Area irrigated is 40 million acres.

WHY PAKISTAN NEEDS RESERVOIRS?

Pakistan's rivers carry seasonally varying flows-high in summer and disproportionately low in winter. The total river flow also varies from year to year. The average is 140 maf. The maximum was 163 maf (1959-60) and the minimum 104 maf (1974-75). The irrigation canals withdraw, as noted earlier, 106 maf. Some 34 maf wastes to the sea every year for want of storage reservoirs. Having tapped the

dependable run-of-the -river flows by the mid-twentieth century, further development to meet growing demand, could be possible only by conserving surplus river flows by building large storage reservoirs.

Another unavoidable imperative reason for large reservoirs arose from the Indus Waters Treaty of 1960. It settled canal water dispute between India and Pakistan which was the source of ever present threat to peace between the two countries. The Treaty allowed diversion by India of the total flow of the three eastern rivers namely the Ravi, the Beas and the Sutlej. Pakistan was left with three western rivers viz, the Chenab, the Jhelum and the Indus. The western rivers were not only to meet present and future requirements of Pakistan but also to replace 10 maf of irrigation supply lost to India. In order to meet these replacement requirements, surplus flows were to be conserved and regulated by building dams at Mangla and Tarbela on the Jhelum and the Indus rivers respectively.

MANGLA RESERVOIR

It was created by the construction of dam at Mangla on the river Jhelum. The dam is 380 feet high. Lake is spread over an area of 100 square miles. Initial storage capacity of the reservoir was 5.88 maf gross (live 5.35 maf). It is a multi-purpose reservoir primarily for irrigation, hydropower and flood control. It came into operation in 1968.

Variable flows of the Jhelum river regulated by Mangla lake, are released to supplement western river and to replace eastern river regulated by Mangla lake, are released to supplement western river and to replace eastern river irrigation supplies. Releases from Mangla lake are of immense value. Besides generating power, water from Mangla Dam, released in late summer is used for maturing rice and cotton crops and sowing of wheat and rye winter crops and in spring for maturing of winter and sowing of summer crops. Regulated supplies released from Mangla reservoir, in the period 1968-94, were 125 maf. Hydro power produced in the same period was 108,100 million kilowatt hours (mkwh). Power generated at Mangla is fed into the national grid for meeting domestic, industrial and agricultural requirements.

TARBELA RESERVOIR

It is located on the river Indus at Tarbela behind the 485 feet high dam. The lake has an area of 100 square miles. Its storage capacity gross is 11.3 maf (live 9.4 maf). It was commissioned in 1975. Like Mangla reservoir water stored in Tarbela lake is used for supplementing irrigation supplies and partly for replacement of water of eastern rivers. Total volume of water released from Tarbela, during the period 1975-95, was 164 maf. Hydro power generated during the same period was 135,525 mkwh. Tarbela power is also fed into the national grid for meeting

domestic, industrial and agricultural load.

SIGNIFICANCE OF THE TWO RESERVOIRS

By 1994 both Mangla and Tarbela reservoirs had supplied 289 maf of water for supplemental irrigation and replacement supplies. Without dependable run-of-the-river flows and without Mangla and Tarbela reservoirs, there was no scope of expansion in irrigated crop land to meet the food and fibre needs of the fast growing population which increased from 44 million in 1955 to 122 million by 1990. Nor there could have been any other viable alternative to replace irrigation supplies of the eastern rivers. Similar is the situation with power supply. Both the reservoirs at Mangla and Tarbela had supplied 243,626 mkwh of hydro energy up to the year 1994. Water from the two storages boosted Pakistan's agricultural and industrial production remarkably.

Importance of water for replacement supplies by Mangla and Tarbela reservoirs, is not only of socio-economic significance but of country's stability and security as well. Since India stopped flow of water into the canals with their headworks located in her territory, on April 1, 1948, the two newly established neighbouring countries were engaged in a serious conflict over the canal water dispute. It had the potential of turning into a war. The former Chairman of TVA (USA) Mr. Lillianthal, after paying a

visit to the area, had termed the tense situation prevailing between India and Pakistan, over the sharing of waters as the "Punjab Power Keg". The Punjab is the province which fell partly in India and partly in Pakistan. After 8 years of protracted negotiations between the two countries, under the good offices of the World Bank, the dispute ended in the signing of Indus Waters Treaty in September 1960 for construction of Mangla and Tarbela dams and some barrages and canals for transfer of water to eastern river lands.

It is quite evident that, but for the construction of Mangla and Tarbela Dams, there was no way to provide water for replacement of the irrigated supplies. In other words without these large reservoirs, the two countries would have remained in a state of constant tension and conflict, over the canal water - the source of wherewithal, food, fibre and subsistence for about then 10 million people sustaining on the affected irrigated lands in Pakistan.

It may be added that the creation of two large lakes of Mangla and Tarbela, besides water-the life-blood of Pakistan's economy, provided facilities for flood control, recreation, tourism and fish production. They had positive environmental impact too. There has been improvement of local flora and fauna, human habitat and catchments through watershed management programmes.

Existence of vast lakes, in otherwise dry and barren landscape and bare hill, has rendered the local climate considerably mild.

However, that is not the end of the story of large reservoirs being inescapable in Pakistan. Pakistan's population is increasing by 3.1% the second highest in the world. Her usable annual water availability has already fallen below the 1000 m³ per capita threshold, as pointed out by the writer, in his paper "Pakistan on the verge of a Disastrous Water Crisis" presented at the World Water Day Symposium at Lahore in 1995.

Pakistan's water requirements, for the projected population, have been estimated by the writer for the years 2000 and 2013. Against the requirements of 149 and 215 maf, water availability would be 109 and 107 maf causing a huge shortfall of 40 and, of far greater magnitude, 107 maf in the two years respectively. Shortfall in agricultural production of 23 and 48 Mt. respectively, would appear to be unavoidable for want of water.

Pakistan's rivers carry heavy sediment loads. Their deposition, in the Mangla and Tarbela reservoirs, is reducing storage capacity considerably. By the year 2000 four years hence, the loss in capacity would be 4.67 maf, exceeding present live capacity of Mangla Reservoir. It would reduce water availability;

both for supplemental irrigation and for replacement supplies. Besides power generated at the two dams would drop as well. Compensation of loss in storage capacity and to meet rising requirements, would need more large storage dams. There is a project for ready-to-build, 260 feet high dam, on the Indus river at Kalabagh with live storage capacity of 6.1 maf. Unfortunately, despite its imperative need, it is being held hostage to a political quagmire.

HIGH ASWAN DAM (EGYPT)

It would be more than evident that Pakistan could not do without storage reservoirs. Pakistan is among scores of countries, particularly in the arid zones, where large reservoirs are inescapable. Egypt is another such country. She has the second largest reservoir in the world, behind 336 feet high Aswan Dam. Surface area of the lake extends over 2400 square miles. Reservoir capacity is 132 maf. With the high Aswan Dam, Egypt has converted her traditional practice, since ancient times, of non-perennial into perennial irrigation in the Nile Valley and the northern Delta. The country could develop new lands, with additional supplies from Aswan lake and with the help of Aswan power, to run multi-lift pump stations for irrigation of high lands. Egypt's agricultural and industrial production has increased many fold.

Another important redeeming aspect of Aswan lake is its large carry-over capacity. The Nile is subject to low discharges for protracted periods upto 9 years or so. Because of its large capacity, the lake can store surplus flows during periods of high discharges, to be released when river flows were low. Egypt has just been out of such a 9 year low flow cycle. Doomsday sayers were predicting all sorts of dismal scenarios of food and power shortages and industrial outages. Egypt could have experienced conditions, reminiscent of her biblical past, but for her large carry-over reservoir at Aswan. Like Pakistan, Egypt too could not meet growing requirements of water, food, fibre and power nor could ensure her security and sovereignty, without her large storage reservoir at Aswan.

SOFT SOLUTION ALTERNATIVE

The proponents of environmental protection and opponents of large dams and reservoirs, are in favour of the "soft-solution" approach such as adopted by the US Bureau of Reclamation which is "No longer primarily a construction agency, but rather a water management agency". The policy in essence is predicated on "demand side management, water pricing, and conservation". The "approach is to link the social, economic and environmental elements of integrated water resources management".

In a highly developed country, with literate and responsible society, unencumbered by scarce resources, without the urgency to meet requirements of a fast growing; mostly illiterate population, with little respite for training and moulding of attitudes of a largely illiterate populace and limitations of physical and financial resources, nothing but dams and reservoirs would be the answer at least in the short run.

Water availability is dwindling in most of the arid/semi-arid countries. But demand is rising fast with burgeoning population. Without enough water even reservoirs would be of little use. There must therefore, be emphasis, as an integral part of the structural approach, on demand management, conservation and efficient utilisation of the available resources. Demand management, though extremely pertinent, is a long term measure. Nevertheless initiatives need be taken at the earliest stages to reduce human needs in balance with the resources. These must be an integral component of water resources development process in particular, in the present and potential water deficit countries.

CONCLUSION

Large reservoirs, notwithstanding their immense value have come under increasing criticism albeit biased by the proponents of

environmental protection and 'soft-solution' approach.

Two case studies of Mangla and Tarbela reservoirs in Pakistan, more than confirmed that in order to meet the rising demand of water and power and for replacement of water lost to India, there could have been no other viable alternative except for construction of these dams.

Similarly Egypt, without her Aswan reservoir, could neither have introduced perennial irrigation in the old, nor bring new lands under irrigation. Nor could she have met industrial agricultural and domestic energy requirements without Aswan hydro power. Furthermore, carry-over capacity of Aswan lake has minimised the risk of water crises during the protracted low-flow periods of the Nile.

There is need for efficient water conservation and optimum production per unit water use, and demand management by stabilising population in balance with sustainable resources. These measures should be an essential part of water resources development process.

Environmental protection and improvement, must be given due weightage in any storage reservoir project, by a rational assessment of its impact. Measure should be taken to mitigate any negative effects.

To sum up large reservoirs remain inescapable in many a

situation. Environmental protection and non-structural aspects of water resources development could remain integral component of water resources development. In most situations in the third world countries however, for a water resources planner, faced with the survival of human and the security of animal and plant species, his/her professional choice would be obvious.

World's Largest Reservoirs
(Capacity 50 Million acre feet maf or above)

S. No.	Reservoir	Country	Capacity (maf)	Year
1.	Owen Fall	Uganda	166	1954
2.	Bratsk	USSR (F)	137	1964
3.	High Aswan	Egypt	132	1970
4.	Kariba	Zimbabwe	130	1959
5.	Akosombo	Ghana	120	1965
6.	Daniel John.	Canada	115	1968
7.	Guri	Venezuela	110	1986
8.	Krasnoyarsk	USSR F)	59	1967
9.	W.A.C. Bennet	Canada	57	1967
10.	Zeya	USSR (F)	56	1978
11.	Cahora Bassa	Mozamb	51	1974
12.	La Grand 2	Canada	50	1978

Source: ICOLD-1988

* Partly man made by dam rest natural lake.

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UNDERSTANDING PROJECT SUCCESS: A MULTIDIMENSIONAL PERSPECTIVE

**Engr. Tahir Naeem*

ABSTRACT

The increased cost of money, time and resources and advances in technology have increased the responsibilities of policy planners manifold. Today's evaluation of past projects is essential to future success. The projects thus need to be examined from a number of perspectives; the question of objectives and their hierarchy, stockholders and their interests, project classification, political and community concerns, schedule matters, finance, legal and contractual affairs, etc. These essentially represent the strategic issues which management must address, in order to improve the success rate of projects, particularly the major ones.

INTRODUCTION

Project-based work tends to be very different from other organizational activities. Projects usually have a specific goal or goals, a defined beginning and end, and a limited budget. Often developed by a team of individuals with special expertise, projects usually consist of complex tasks requiring high levels of co-ordination. Although a project is different from other organizational tasks, it can in its own right be a major business activity which often requires the

rapid build up, control and then run down of diverse resources, and in this respect, it is different from an ongoing business enterprise (Duffy, Thomas 1989).

There are a number of definitions available but a generalized and more nearly agreed upon states that project is a specific, finite task to be accomplished. It is usually a one time activity with well defined set of desired end results (Meredith, Mantel, 1989).

Significant advances in technology have raised the expectations of most people of the world. This is just as true in the developed countries, where maintaining the level of prosperity is the priority, as it is in the underdeveloped countries where survival is the priority. However severe economic strains have developed in international trade over the last decade, resulting in difficulties in capital markets and with levels of external debt. The resulting high cost of money puts a special premium on the time it takes to complete a project and how well it is managed afterwards. Delays and poor management may substantially reduce the effective benefits and quality of a project. Not only this but in forcing a poor project to completion, money and other resources will be drawn

away from more vital and necessary project opportunities. This has necessitated a serious concern, for how projects, especially the major projects are brought to success.

RATIONALE OF THE PAPER

The study of completed projects or performing an intermediate or post completion audit is thus a valuable exercise; not so much to determine in absolute terms the success or failure but to identify what went wrong and why, in order to apply the lessons learnt on subsequent projects, if appropriate.

It is in this backdrop that "project success" is looked at from a number of perspectives. But, before embarking upon the discussion on project success it is perhaps important at this early stage to differentiate between the success of a project and the project management success. This will prevent any confusion which may arise because the two look very closely related in the first instance.

PROJECT VS PROJECT MANAGEMENT SUCCESS

Why should a distinction be made between project and project management success? If

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one define success in terms of the achievement of objectives, then the answer depends on whether the objectives for the project and for the project management activity are the same or not.

Literature advocates that project management has three major objectives: a project must be managed on time, within budget and to quality/performance specifications. By doing so, the project would be successful but is it really that simple?

There are examples of projects which have not been completed on time and within budget and are nevertheless considered to be successful projects e.g. North Sea Project (U.K.) in the 1970s which suffered from substantial cost and time overruns were not considered successful at that time. The enormous increase in the price of oil in 1973 and 1979 prevented disaster and made them very profitable.

The measurement of progress, cost and quality is no doubt an essential part of project control but this activity should certainly not be confused with measuring success. Therefore while defining success, one must always draw distinction between project success and the success of the project management effort, as the two although related, may be very different.

DIFFERENT PERSPECTIVES AFFECTING PROJECT SUCCESS

It would be appropriate now to study the different perspectives on the basis of which a project can either be a success, or otherwise.

Project Objectives

One of the most often cited criteria for success are the "project objectives". The degree to which these objectives have been met determine the success of the project. This looks simple. However, the problem arises when one tries to list the objectives of a project and discovers that there are quite a few more objectives involved in a project than just simply cost, time and quality. This is particularly true when one considers all stockholders in a project. The objectives also tend to change for each major phase in the project life cycle. Additionally there is a hierarchical dimension to success as the primary objectives also vary for each level of management in the organization.

The concept of hierarchy of objectives is useful for the understanding of the relationship between organization objectives and project objectives. Each objectives is linked to the others in a mean end chain. In this process, every objective or end requires a decision about the means or strategy by which it will be attained in such a chain, the strategy for accomplishing the

next higher level objectives becomes the objectives of the level below.

In a Commercial project, the lower level objectives of the project execution phase (e.g. cost, time & quality) are sub-ordinate to the objective at a higher level (e.g. profitability). This explains why projects which ought to be considered disaster in project management terms, are perceived as successes, simply because the higher level objective was met.

Suppose the ultimate objective is to modernize a country's agriculture to export the same for monetary benefits. The intermediate objectives in this case would be guided by a strategy coherent to these objectives. If the strategy is to increase the crop yields and through the increased number of qualified agriculture specialists and better use of fertilizers, then the intermediate objective would become improved crop yields/qualified agriculture specialists/fertilizer manufacturing plants, etc. It is worth while to note at this stage that achievement of the intermediate objectives does not guarantee that the ultimate (national) objective will be reached.

Certain environmental factors could again affect planning process, such as (price and marketing conditions) / (emigration of trained staff) towards achieving the higher level objectives. The causative relationship between the

different level of objectives, therefore, needs to be presented as a hypothesis, with the environmental factors influencing them and these, later on, need to be identified and the hypothesis is to be validated again.

In certain situations it is inherently hard to describe precisely or to achieve consensus on project goals, as in many social programs for example (Kozmetzky, G. 1980). The worst situation perhaps, is where the objectives of the project change imprecisely during the project execution without proper recognition of the new situation. Unrecognized change is the classic cause of catastrophic failure (Begnell, V. & Fortune, J. 1984). Major projects, because of their long duration and size are more susceptible to changes in the socio-economic environment affecting fundamentally, the appropriateness of the project's original definition.

A primary problem arises out of the situation where the point of origin of objectives is not appropriate. This results in the lack of top management commitment and is a fundamental weakness. Some projects specially the public sector projects are simply driven as political thrust. There is no objective of profitability or even cost or schedule. This lack of detail in the project definition later allows critics to question, the

enormous cost and time over-runs so occurred.

Project Life-Cycle Phases

The perception of project success shifts as the project moves through its life cycle. Strategic issues are most important at the beginning, tactical issues gain in importance towards the end. There should off course, be continuous interaction and testing between the two. Strategy often changes in a dynamic environment and so is the tactics. Nevertheless, a successful project needs to make a smooth transition from tactical to strategic issues. In a study of more than 400 projects (Pinto, 1986) the strategic and tactical issues are seen to changing balance between them. During the early stage viz. conceptualization and planning, strategy is significantly more important to project success than tactics. As the project moves toward the final stage (execution and termination), they achieve almost equal importance. Throughout the process, initial strategies and goals continue to "drive or shape tactics".

The emphasis on what is important in a project, changes from one phase of the project to the next. In addition, the cost, time and quality trade-off varies for each phase of the project. This is shown in Fig.2.

During the early phase of the project, schedule is of primary

importance, while cost takes second place and quality third. Later in the project, cost becomes the controlling interest, with schedule taking a secondary role. After the project has been completed, schedule and cost problems are easily forgotten and quality becomes the key. (Avots, I., 1984).

It is generally recognized that quality can be enhanced at the expense of cost or time or both. But in fact the successful projects are the one's that does not allow none of the three (cost, time and quality) to dominate. The optimum should be the objective: a project built in a reasonable time, economic in terms of cost and adequate so far as qualities is concerned. In looking for a successful project, it will therefore be misleading to look for any single attribute only.

The characteristics of project and the components of project management form a relationship which may be viewed as three dimensional. This relationship may be represented as shown in Fig. 3. The figure shows functions which are to be managed, the processes which are used by management and their variation in terms of effort required, as the project progresses from beginning to end.

Success is thus to be seen on every side as there are a number of successful projects. Success has to be earned. It does not come fortuitously. There are many elements

involved in success but dominance of one criterion is not one of them.

Two important factors which help in realizing the adequate balance among the different criteria include good management and know-how. The good management includes good project management, whilst the know-how must be largely the sound application of experience, in itself a significant element of good management.

Project Classification

Changing market conditions and legal and statutory obligations, advanced technology and environmental and social awareness have had far-reaching and un-expected effects on projects. A complex series of factors - financial resources, systems of management, the qualifications of personnel involved, etc. must be taken into consideration while classifying the projects. The importance of such factors vary with the complexity of the projects and affects the execution and cost of the work.

Some method is therefore required to obtain an objective differentiation among projects so that the best methods may be applied for each degree of complexity.

Santana, G. (1990) classifies the (construction) projects keeping in view their characteristics and conditioning factors and this classification may

be used in other sectors with a little modification. According to him, suitable management and technical systems are then to be applied in order to reduce the overall costs significantly. The classification considers three categories:

- * normal
- * complex
- * singular

In the class of normal construction are projects such as buildings, roads and earthwork. One type of engineering predominates, and the plans and technical specifications can be completed before the work is undertaken. This is entrusted to a single contractor and the period of execution is relatively short.

Complex projects may be defined as industrial projects, major public works, town development schemes etc. They are not unique and the problems are better known. The construction methods and techniques adopted are numerous and are carried out in diverse geographical areas often a long distance away from town and supply centres. The effect of the work is felt not only in the surroundings: the influx of workers and of heavy investment has social and economic repercussions on the area.

Singular refers to unique constructions carried out sporadically, with very long periods of planning and execution. Normally they pertain

to governmental or multinational institutions and required enormous investments and complicated systems of management and execution. The most advance technology is used, and a great number of specialists, consultants and contractors are employed. Such projects create a great impact economically, socially and ecologically.

Another way of classifying projects is by

- * public sector projects, i.e. space, defence, education and research projects.

- * commercial projects, i.e. all private sector projects and some government projects.

The objectives of public sector projects tend to be political, military or social, whilst commercial projects have primarily economic objectives.

A third classification owes to the project motive. It is

- * Necessity
- * Opportunity
- * Prestige
- * Research

Of course, major projects have a mixture of motives, objectives and disciplines involved. However, it is essential to decide which is the dominant factor.

The understanding-to which category a project belongs

and the identification of the ranking of objectives can help provide a basis for the determination of success.

Project Stakeholders

The two most obvious parties having a stake in any project are the client and the contractors. But what is often overlooked is that there are however, other stakeholders that have a key interest in the outcome of the project as well. Successful projects are those which keep a balance of all the parties. The objectives of the stakeholders involved in a project are unlikely to be congruent. The stakeholders involved in a project include the owner/client, consultants/engineers, contractors, users, social organizations (environmental groups), regulatory agencies, financiers, etc. It becomes difficult to please all the stockholders, especially when a number of them are involved and they are in position to interfere. Political skill provides a remedy to address the diverse and often conflicting objectives. The public sector projects are more likely to be affected by the coercive power of the stakeholders and the 'success' require skills in bureaucratic politics to resolve conflicts.

Since a large number of parties are generally involved in projects, their different interests need to be recognized: not

doing so, e.g. through weak legal arrangements or in-appropriate contract policies, can lead to project failure.

We might therefore believe that a project's viability should be evaluated on an objective basis in the light of the different participants' objectives, strategies and resources.

Financial, Legal & Contractual Matters

One biggest single challenge on major projects is that of assembling the required finance. But perhaps, the extent of this problem is much lesser than usually what it is perceived in the initial stance. The discipline of having to define what the actual final cost will be, including an allowance for cost escalation and contingencies, forces the project sponsors to undertake a most rigorous and comprehensive risk analysis of the project. For in effect, financial risk analysis is an analysis of all the risks of the project - technical, organizational, managerial, political as well as the specific financial factors such as exchange rate, risks, bad debt and so on.

Cost escalation and exchange rate fluctuations had a near catastrophic effect on the viability of certain large, major projects. Cost is perhaps the only factor that can be quantified and interpreted without involving any

personal prejudices and hence is more widely publicized both by supporters and the critics of a project. The personal prejudices may still creep in, and they may present different pictures of the same project but the fact lies somewhere between the two. Einstein once said, "Cost is supposed to be based on facts, but-the facts are wrong!"

Legal agreements among the parties should be clear and equitable. They should reflect properly the parties' key objectives, financial provisions, problems of sovereignty, taxation, rights and responsibilities and the respective assessment of risks.

The form of contract used for engaging services, particularly of the main contractor, has a direct influence on the financial and organizational basis upon which the project is undertaken. As such it clearly influences the likelihood of project success or failure. The contracting strategy adopted also depends considerably upon the experience, resources and preferences of the owner, the nature of the project, the extent of involvement of different interest groups, etc.

An essential aspect of contracting is to ensure the motivation of contractors. The choice of a type of contract viz fixed-price, lumps sum, cost reimbursable, unit-rate, etc.

depends upon the scope and magnitude of the project, the characteristics of the client, the technical uncertainty involved, the motive of profit maximization, etc. One important aspect of motivation is to provide the financial incentives for the attainment of the key milestones. Financial security to make it certain that at least the cost of the work done would be re-imbursed to the contractor is essential. Fig 4 provides guidance in the choice of type of contract under different conditions of information available and the extent of control of the owner/sponsor on the overall process.

Political Support

Political support has an important impact on projects through funding, sponsorship and legislation over fiscal, safety, employment and other matters. This influence can be direct or indirect. Political consideration invariably dominates decision making in Third World development projects as well as in developed world projects, in or affecting the public domain, particularly in infrastructure and high-technology. Indeed political sponsorship is viewed by many as one of the single most "critical success factor" for such projects. Though political over dominance generally reduces managerial efficiency, government commitment to a project can be

an essential pre-condition of success in large and public funded projects. According to Paul, S. (1983), in a study of six large Third World projects, governments must provide clear objectives, allow flexibility of management approach, monitor progress and provide stability, commitment and continuity. However, there is a tendency often observed, that governments in the Third World, tend to exaggerate the cost-benefit for otherwise expensive public sector projects. The drive is of course political and not economic returns are considered in the first place. The political climate of market based economies must surely therefore, have merit, in this regard. But still it is wrong to assume that government can simply absent itself from the sponsorship of major projects altogether. Even in a healthy market driven economy, government has a de facto sponsoring role as regulator, champion or owner.

Schedule Duration and Urgency

Major projects' success can be jeopardized by their long schedule duration. The success of lengthy projects is hostage to changes in output prices, demand, regulation, technical developments and changes in government, corporate organization, staffing, personnel

or policy-almost everything, in fact.

There is a problem for those major projects which are dependent upon political support. It is often only after a government has been in power for some time that the decision is taken to commence such a project; by the time the necessary preparatory work has been done and the project is at its most vulnerable stage, with finance having to be raised and planning objections met, only by then the government is likely to be facing a re-election. In deed it is a feature of major projects that their implementation may span the duration of two or three elected governments. One obvious way of coping with this problem is to undertake major projects where possible in stages, phased to the internal development of the project and the external events outside the project (Paul, S. 1983).

Teamwork

Teamwork is an important constituent of success. But it is interesting to note as Denton, D.K: (1988) put it, "You do not need a team to have teamwork, but you do need teamwork to have a team. "Team may be defined as a group of people with specific roles and responsibilities, organized to work together towards common goals or objectives, in which each member depends on others to

carry out responsibilities to reach those goals and objectives i.e. teamwork. The necessary pre-requisites include team leadership, feedback, common goals and clear objectives.

Two important elements that build people together in the form of team are good communication and the trust prevalent among the members. All this requires ample time in advance, to plan suitably. People with similar backgrounds and in line but diverse experience are essential to build a coherent team that can ensure the desired performance and achievement of goals.

Technology

Adoption of technology, unknown earlier to a particular environment without adaptation poses threat rather than opportunity. As with everything else, technology has to conform with the surroundings and environment to render meaningful results. The industrial projects located in the developing countries using high technology developed in the West have to invest in adaptation of the same, in order to make the venture, a success. There is historically a common trend of time and cost overruns in the developing countries for projects employing high technology. This may probably be explained through argument presented by Schumacher, E.F. (1973). He

says, "Let us at least recognize that to build plants incorporating the latest in technology in developing countries is almost invariably a wrong choice of project, time and place. That is why the fourth element, cost, which is the direct responsibility of the cost engineer, also goes wrong. And there is just nothing that he can do about it, as shall be seen. The first three elements are pre-requisite to the fourth". This explains to a certain extent, the probable reasons of project failures in developing countries that are employing high-technology. The reason simply being the fact that the technology does not suit the local requirements in its existing form.

Design

Design philosophies should be flexible; unnecessarily burdensome specifications should be avoided. Once agreed upon design should be frozen and changes made only in the most controlled of circumstances. Studies by Rand Corporation (Alexander, A.J. 1976) have indicated the important effect of technical uncertainty on the likelihood of projects suffering overruns. The amount of technical innovation in a project can pose enormous challenges to budget and schedule estimating and ultimately compromise the very attainment

of the desired technical performance. The situation of innovative design however, should be distinguished from that of mere technical uncertainty. The basic rule applies in both situations, however, the novelty should be kept to the point such that beyond "key terminal points", tasks can be allocated and carried out without unforeseen repercussions (Gott, H.H. 1969).

Technical Uncertainty

Introducing new technology can also produce quality control and assurance problems which may seriously affect the ability to achieve targets within budgets and schedules.

The special difficulty of projects, of course is their temporal nature. Once the decision to commit is made, things are in many ways easier. But prior to the decision to commit, the question of timing can have a crucial effect on the degree of technical difficulty.

Nowadays organizations involved in major projects having technological uncertainty, where possible, reduce this uncertainty to almost predictable dimensions through pre-feasibility, feasibility and design studies before final commitment is given and the project is then reviewed at each such stage during execution.