PD-ABK-268
92650

EVALUATION AND RECOMMENDATIONS
FOR
CONSTRUCTION RELATED TRAINING
FOR AFGHANISTAN

CONSTRUCTION SUPERVISOR TRAINING

CONSTRUCTION ENGINEERING TRAINING

REFRESHER & PROFESSIONAL DEVELOPMENT COURSES

OCTOBER 21, 1990

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FOR IRC

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SUMMARY OF RECOMMENDATIONS

1. 9-month Construction Supervisory Program should be retained substantially as it is.

2. 18-month Supervision Program should be consolidated to a 12-month program through modifications of the curriculum.

3. $6,000 of additional equipment and $5,000 in training aids and special resources should be procured to enhance the Construction Supervision Program.

4. A course in Engineering Economics should be added to the Construction Engineering curriculum, and computer use and programming should be taught in the first year.

5. An existing course should have a unit added to elaborate on stochastic concepts in construction planning and hydrology, so graduates will have greater awareness of and have tools to deal with the paucity of basic data in Afghanistan.

6. Additional graduate assistantships should be obtained through UNO for Afghan faculty in all CRTA programs.

7. At least $15,000 in additional laboratory, surveying, and drawing equipment is necessary.

8. A vehicle for assignment to visiting faculty and eventual use by CRTA faculty is already on order. Cost: $6,000.

9. Engineering Economics and Stochastic Concepts & Methods textbooks are needed, as is an up-dated text on analysis of construction management systems and engineering management. A selected expansion of the reference library is also necessary. Estimated cost: $6,000.

10. 8 IBM-compatible lap top computers with battery packs and three printers are an urgent need to bring computer fluency to the faculty and engineering students. Estimated cost: $20,000. The necessary engineering software would cost another $2,500.

11. Efforts should be made through a survey to find how many former Kabul students now in Pakistan failed to complete their fourth year in engineering. If the magnitude warrants, additional funds should be sought to enable these aspiring engineers to complete their studies through CRTA.

12. Based on a widely circulated questionnaire with 151 responses from Afghan engineers in the Peshawar area, it is recommended that courses in Engineering Management and the Design & Construction of Roads & Bridges be given as Professional Development Courses by visiting faculty in Fall 1990. It is also recommended that a Refresher Course in Reinforced Concrete Design and a Professional Development Course in Design & Installation of Pre-cast Concrete be offered in Spring 1991.

13. For the Fall 1990 courses, it is recommended that Dr. Norman Bolyea and Mr. Louis A. Cohen be brought in by UNO as visiting faculty, and that these visiting faculty members join in team teaching of other selected courses in the on-going programs.

14. The English teaching component for the programs should be strengthened and a strategy adopted to meet the needs of potential candidates for the Refresher & Professional Development Courses who have weak English skills.

INTRODUCTION

During the past decade Afghanistan has been ravaged by a brutal war. The Soviet invaders and the Afghan communist government have engaged in intensive artillery attacks and aerial bombing, as well as the dispersal of millions of land mines. The fragile infrastructure which existed in 1978 has been dealt devastating blows. More than five million refugees have fled areas where villages, roads, and irrigation systems have been destroyed or severely damaged. The successful return of these refugees requires a massive undertaking in rehabilitation and reconstruction of the physical infrastructure.

Rehabilitation and reconstruction of irrigation systems, roads, bridges, houses and public buildings will demand a pool of personnel trained in construction related skills and professions. Specifically, trained civil engineers, architects, construction supervisors, foremen, and craftsmen, such as masons, carpenters, welders, and electricians, will be required in significant numbers. Properly trained Afghan engineers and architects can execute the needed planning, design, and implementation of rural reconstruction at a fraction of the cost necessitated by expatriate professionals.

Recognizing the significant advantage associated with the utilization of Afghan professionals in the rehabilitation and reconstruction of their country, the Construction Related Training for Afghanistan (CRTA) project is expanding the effective pool of trained engineers and architects, as well as technical supervisory personnel who will be needed to work in close support of the professionals.

<u>IRC's Construction Related Programs.</u> Several agencies operating in Pakistan have responded to the problem by training Afghans in manual skill areas, including masonry, carpentry, and welding. O/AID/Rep is supporting the IRC response with several training programs for refugees, including the sole activities focused on the top of the construction related employment structure, i.e. construction supervisors and construction engineers. These programs, presented by Afghan instructors, are complemented by training programs such as the UNO Manpower Training Program (MTP). O/AID/Rep has funded MTP, which is now in its second year of implementation.

The CRTA project provides funding from O/AID/Rep for continuation, improvement and expansion of the IRC Construction Supervision and Construction Engineering training programs.

WHERE WE ARE AND HOW WE GOT THERE

Kabul University's Faculty of Engineering was established in the mid-1950s as a project of the United States government's foreign assistance program of ECA and ICA (predecessor agencies to USAID). It went on to serve the country for about 30 years, turning out graduates who were considered among the elite professionals in the most desirable fields. Instruction was in English and degrees were awarded in five year programs in civil, mechanical, and electrical engineering and in architecture.

When established in 1953, most of the teaching was carried out by professors provided by the University of Wyoming under a contract funded by ICA. From 1964 to 1973, support for the teaching staff was provided through a consortium of U.S. universities, led by Stevens Institute of Technology. In 1974, the USAID contract was awarded to the University of Nebraska. Gradually, as the Afghan staff was built, expatriate teaching staff was reduced; however USAID funding and American visiting professors were continuous through 1978.

As a result of the close relationship with American universities, the program, curriculum, and the text books used at the Kabul Faculty were very similar to those at accredited engineering schools in the U.S. The U.S. college credit hour system was used and most courses had content similar to American engineering courses. Laboratory equipment and most commodities were from the U.S. Since all lectures remained in English, the first year of study was devoted largely to English and remedial mathematics.

When the Soviets moved into Afghanistan in December 1979, the Afghan regime began to produce propaganda indicating that the engineering faculty was not in compliance with the aims of the revolution.

In the spring of 1980, medical and engineering students at the Kabul University demonstrated against the Soviet occupation and during that incident some students were killed and others were jailed. At that time there were about 2,800 students in the Engineering Faculty, nearly half of the student body at the university. Some students eventually quit school and joined the Jihad against the occupation, and today a number of commanders in the war are engineers from the Kabul University.

In late October 1980, the then Minister of Education, Gul Dad, is reported to have visited some of the engineering professors and told them that the Engineering Faculty was eliminated. The excuse given was a duplication in program content with the Polytechnic College, built by the Soviets in the mid-1960s. Classes continued, but no new freshman class was allowed to enter, so the program was finished in 1985.

The 1979 Soviet occupation and the subsequent massive resistance by Afghans triggered a huge emigration of Afghan

refugees that has created the largest single refugee population in the world - perhaps more than five million persons. Among these refugees were many educated Afghans who left Kabul and came to Peshawar. Over time, many of this reservoir of skilled and trained professionals migrated to the developed countries of the West, taking their talents with them. For a short while donors sent refugees to the West for higher education, but most of these programs have been discontinued when students did not return to Peshawar after completing their studies.

With few opportunities for higher education for refugees, no young generation of Afghans in Pakistan was being trained to replace those who left. It was in this climate that IRC first began to consider the establishment of a program for engineers. In 1986, Dr. A. Washed Hassani, an Afghan engineer employed in a senior position with IRC initiated discussion of IRC support for engineer training in Peshawar. There were several purposes: higher education for refugees in Pakistan, creation of a group who could work in refugee reconstruction programs, avoiding the problem of refugees not returning when trained abroad - and for the same funding to support one refugee at a Western university many students could study here.

Since the initiation of the program, the goals have broadened with the possibility, now that Soviet troops have withdrawn from Afghanistan, that graduates are likely to have the opportunity to participate in the reconstruction of Afghanistan. The school may also provide a base from which the Faculty of Engineering could be reestablished at Kabul University.

In 1987, after a series of meetings of engineers working with various refugee programs in Pakistan, IRC was able to help form an advisory board with members drawn from the former staff of the Engineering Faculty. This Board prepared a curriculum and wrote outlines for courses. Policies and procedures and an entrance examination were also prepared. The school was set up under IRC's Experimental School of the Sciences, a secondary school for boys. It was not administered independently because the Pakistan authorities were hesitant about a highly visible higher education program for Afghans, fearing the same kind of politicization that occurs in local universities.

The program was inaugurated on 22 November 1987.

On 30 July 1990, IRC signed a Cooperative Agreement with U.S.AID under the U.S.AID PVO Support Project for Construction Related Training Activities for Afghanistan (CRTA). The project aims at a two-fold purpose, to enable Afghan graduate engineers and architects to play leading roles in the rehabilitation and reconstruction of devastated Afghanistan and simultaneously to expand the present pool of Afghans training in construction related fields. All of the activities to be undertaken by the project comprise technical assistance and AID funding support to the following:

1) Refresher and Professional Development Courses

2) Construction Supervision Program (9-month sequence)

3) Construction Engineering Program (third year)

The Cooperative Agreement is effective for two years, with funding provided for the first year. Provision is made for a sub-contract with the University of Nebraska/Omaha for visiting faculty support.

The expected project outputs for CRTA during the first year are:

1. Refresher and Professional Development

   a. Surveys of interest in and readiness for refresher and professional development classes completed and candidates identified.

   b. Report issued for program guidance.

   c. One refresher and three professional development courses designed. Course outlines submitted to IRC and courses taught in Fall 1990 and Spring 1991.

   d. Recommendations for future activities and funding levels submitted to IRC.

2. Construction Supervision

   a. Forty 9-month graduates will complete studies and enter the work force in December 1990. IRC will assist in placement of these graduates.

   b. Sixty new students will begin their studies in early 1991.

   c. Curriculum and practical training procedures improved by visiting faculty.

   d. Recommendations for program improvement, future activities, and funding levels submitted to IRC by visiting faculty.

3. Construction Engineering

   a. Nine graduates will complete studies and enter work force in January 1991, with placement assistance by IRC.

   b. Second year students become third year and students start the main program in 1991.

c. Two regular curriculum courses presented to students by visiting faculty. Skills of counterpart faculty upgraded.

d. Curriculum and practical training procedures improved by visiting faculty.

e. Weber scholarship recipient identified from the graduating class.

f. Recommendations for future activities, program improvement and funding levels submitted to IRC by visiting faculty.

The preparation of this report constitutes the first activity under the CRTA project that has utilized the UNO subcontract. The scope of work for the study and report is in Annex IX.

EVALUATION OF EXISTING PROGRAM

A. Construction Supervision Program

When the Afghan refugees return to their homeland, there will be a tremendous demand for qualified personnel to supervise the wide variety of construction related activities in the rehabilitation and reconstruction programs and future projects. There will be a critical need for technical staff to supervise small engineering projects in villages, such as road construction, public buildings, water supply, and irrigation systems, culverts and bridges.

In conjunction with the construction engineering program, IRC established a construction supervisor program in 1988, which consists of a 9-month and an 18-month duration of course work and practical training. Classes for both sequences started in February 1989. Both course sequences are subdivided into 12 week academic modules alternating with six week practical training modules. They are presented in Dari and Pashto by faculty mostly made up of graduates of the Kabul University Faculty of Engineering.

The 9-month sequence primarily is for somewhat older students who, although educated to only the 10th grade level, have demonstrated technical and social aptitude. Serving as foremen, they are expected to supervise crews of craftsmen or to manage small rural projects. Indeed, the program addresses an historic problem of the region, in which trained engineers and technicians are reluctant to accept work assignments in isolated areas far from their home village or town, because of the physical and social hardships of rural life. The 9-month supervisory students are recruited according to a quota system which assures that they originate from widely dispersed rural areas and that they intend to return to their home areas. Of the 43 students enrolled in the initial 9-month sequence, 36 graduated on 14 December 1989. The employment record reveals that 20 of these graduates are now employed by various NGOs and the Interim Government of Afghanistan. Course listings and descriptions, as well as a list of faculty and a summary of graduate employment is found in Annex I. At present, there are 28 students enrolled in the 9-month sequence who will graduate in December.

The 18-month sequence, funded entirely by IRC, is intended to train 12th grade graduates as supervisors capable of managing entire projects of small to medium size. They are also equipped to serve as engineering technicians or assistant engineers. They will be able to collect data and perform a variety of time consuming tasks, thus freeing engineers and allowing them to devote their energies to more creative endeavors or to manage more projects simultaneously. For the first six months of each year, two classes of the 18-month sequence will be under way at the same time. 11 students graduated in October, and 24 enrolled

last February. Some 18 more are expected to graduate in August 1991. Course listings and descriptions and faculty are also found in Annex I.

The two construction supervision training sequences have been in great demand and the graduates also seem to be sought by both the ministries of the Interim Government and the many NGOs working with donor-funded programs for the Afghan refugees. Because the program is an established success and there is no generally accepted standard by which to accredit construction supervisor curricula, there does not appear to be any firm basis upon which to make significant changes in the curriculum of either sequence. Several supervisors of the graduates were interviewed and even more supervisors of the practical training assignments for students, and there seemed to be unanimity in satisfaction with the results of the training. One of the strongest points in favor of the programs was the English capability of the graduates, which enhanced their employability. At the present time there are a total of 39 students enrolled in the two sequences and there are six faculty members. This is certainly an adequate student to faculty ratio; however, if there should be additional sequences enrolled at the same time , there should be additional faculty to share the teaching load.

Experience to date shows that the 18-month sequence has too high a drop-out rate, because of the lure of job opportunities and other attractions after completion of the first academic year, to justify continuing that sequence in its present form. After reviewing the two sequences' curricula, it is suggested that the 18-month sequence be shortened to 12-months, or three terms with two months of practical training between each term. This would be accomplished by the following modifications in the curriculum:

A. Combine masonry and concrete construction into one 5 credit course.
B. Combine quantities & cost estimates with project management into one 5 credit course.
C. Cut back layout surveying, road construction & drainage to a 3 credit course.
D. Also cut back rural water supply, sanitation & irrigation to a 3 credit course.
E. Combine third and fourth semester English into one 4 credit course.
F. Combine architectural drawing with second term construction drawing as a 5 credit course.
G. Reduce construction operation safety & mine clearing to a 1 credit course.

This would make the 12-month sequence three terms of 22, 21, and 22 credits plus practical training. It would also provide a curriculum that, while shorter, is thorough and more apt to provide a higher percentage of trained construction supervisors.

Since the two programs then would have fewer differences in academic content, an alternative that might be considered would

be to have all students in construction supervision take the same 9-month program and then only those who chose to go on to an assistant engineer level continue for the additional term.

In order to continue to upgrade the quality of these programs, it is necessary to procure about $6,000 of additional equipment and furniture and approximately $5,000 in training aids and special resources for the program.

B. Construction Engineering Program

The initial class of the construction engineering program started its studies in early 1988 and will graduate in January 1991. A second class began in early 1989 and is now in the 2nd semester of its second year. No class was begun in early 1990, because of funding shortage, so the class just selected for its three month pre-engineering study will comprise the third class when it begins studies in January 1991.

There have been some minor revisions in the curriculum over time, primarily slight changes in the courses taught in order to accommodate changes in faculty. The program has, however stuck meticulously close to the original Nebraska curriculum as used at the Engineering Faculty of Kabul University, so the class time, subjects, examinations, and the end product of the program is highly comparable to the civil engineering graduate of most American land grant colleges. Moreover, the practical training plus the three-month pre-engineering remedial English and Math actually brings total academic/practical training up to a full four year program. This is true for the technical engineering content of the curriculum; however, the final year that is absent from this program is essentially the liberal arts and non-technical content of the American university curriculum, which, thus, is completely missing for the graduates of this program. While U.S. educators are arguing, as usual, whether American engineering curricula should be five years for a B.Sc. degree, in order to expand the technical content or to provide more economics and liberal education content, it is believed that for the purposes of contributing to the rehabilitation and reconstruction of Afghanistan this curriculum is largely on target and it is warranted to be authorized to grant a Baccalaureate of Science in Civil Engineering. The faculty and the curriculum are of sufficiently high caliber that it could, at some appropriate future time, be used to re-establish the Faculty of Engineering of Kabul University at a level comparable to that of 1977.

The medium of instruction is English. After intensive English during the pre-engineering, there is an English course each semester, so the graduates have a fluency that is unusual among Third World B.S. holders for whom English is not their first or second language. This competence should enhance the demand for such engineering graduates.

As a result of the survey of Afghan engineers in the Peshawar area, discussed later in this report, and an examination of the existing curriculum, it is recommended that an additional course in engineering economics should be added to the fifth semester curriculum. The present 3 credit hour course in Quantities and Cost Estimating would be expanded to 4 credit hours, of which 3 would be for engineering economics and 1 for Quantity and cost estimating. This would enable the graduates to have a stronger impression that sound engineering must be economically sound, and would strengthen their management instincts by giving them a better grounding in cost effectiveness. It is also recommended that the hydrology course have expanded units added on stochastic concepts and methods for construction engineers and hydrologists in order to give the graduates recognition of and tools for overcoming the paucity of basic data on which designs must be based in Afghanistan. These concepts and methods would be noted again in the economics and engineering management courses.

The actual interviews of respondents to the questionnaire that have been conducted to date bear out the need to have such interviews prior to accepting students for the proposed professional development courses in order to ascertain their bona fides as engineering graduates and English competence suitable for enrollment.

In view of the demand expressed by the respondents to the survey and in recognition of the time-saving and accuracy available through the use of computers it is suggested that an introduction to computers be made a part of the first semester training. A more sophisticated course in introduction to computer use and programming and the use of some of the civil engineering software now available would be a valuable addition to the curriculum, also.

The permanent staff of the Construction Engineering Program is well-trained and qualified both academically and through practical work experience for teaching in the program. Several of the Afghan staff, including those teaching in the Construction Supervision Sequences, could greatly benefit from the opportunity to have both post-graduate study and teaching experience at overseas universities; therefore, efforts will be made through visiting faculty and UNO, the subcontractor to support visiting faculty, to obtain graduate assistantships for them. It is understood, of course, that upon completion of such opportunities, the faculty member would return to Peshawar or to Afghanistan.

The senior permanent staff have been able to provide both research and consultancy capability to the local NGO community and the Afghan Interim Government. Not only is this capability providing useful service to the Afghan refugee community, but the high quality of such services is also enhancing the reputation of the program.

The investment to date in non-expendable equipment for laboratories, engineering drawing/drafting, and surveying has, of necessity, been modest. Since the quality of the training in both construction supervision and construction engineering is to a large extent dependent upon laboratory and drawing table hands-on experience and field demonstration in surveying and other disciplines, additional items are most desirable. Thus, it is recommended that at least $15,000 in additional items to supplement equipment already on hand be procured to upgrade laboratory, surveying and drawing hands-on instruction.

In order to get maximum benefit from the limited time the visiting faculty will be available, it is fortuitous that the project has already ordered a new vehicle for the exclusive use of the visiting faculty during the life of CRTA and then to revert to use for the CRTA facility. (cost is $6,000)

In general, the text books utilized in the CRTA programs are appropriate and up to date. It will be necessary to obtain a good textbook on engineering economics and an appropriate text on stochastic concepts and methods in civil engineering should be purchased: the textbook used in Purdue University's Junior Year course and the American Water Resources publication on stochastic methods in hydrology are both good. It would also improve the level of instruction to obtain a current textbook on analysis of construction management systems and engineering management. Such additional textbooks and selected expansion of the reference library would total $6,000.

Finally, it is evident that with the new generation of portable computers, even in rural Afghanistan it is virtually indispensable for construction engineers to be computer literate and have familiarity with programs for quick, accurate design and analysis of the civil engineering undertakings in which they will be involved in the reconstruction of their country. It is recommended that in order to provide such computer familiarity the construction engineering program be equipped with 8 IBM-compatible portable (lap top) computers with at least 20MB hard disk and battery packs so both faculty and classroom can become computer fluent. For the faculty and for use in demonstration, a math co-processor to enhance the capacity of desk-top computers on hand should also be obtained. The estimated cost for such procurement is $20,000. In order to maximize the utility of these computers, another $2,500 in engineering software should be obtained. The selection of software should be made by the visiting faculty teaching the Fall 1990 courses.

It is recommended that two hours of recitation be added to Islamiat first semester, Physics I, Math II, Physics II, Statics, Math III, Physics III, Strength of Materials, Math IV, Physics IV, Fluid Mechanics, and Dynamics to strengthen the curriculum and increase contact hours to:

Semester	Contact Hours
First	27
Second	29
Third	31

Fourth	29
Fifth	23
Sixth	23

This additional time would be in the afternoon, giving full academic work days to the students.

An illustrative list of imported commodities recommended for procurement through the CRTA project is in Annex VII.

SPECIAL CONSIDERATION FOR STUDENTS WHOSE STUDY WAS INTERRUPTED BY WAR

Efforts should be made through a survey and other enquiry to locate up to 20 Afghans who have had their civil engineering study interrupted at the Kabul University Faculty of Engineering, and who wish to obtain a certificate indicating engineering competence. Such students should be ones who have only one additional year or less to complete their course work to qualify for their BSc in Civil Engineering. On a space-available basis, enrollment of these students will be permitted in designated courses in the regular construction engineering program to be supervised by the visiting faculty. Those who take such courses and pass the final examination will be given a certificate. It is recommended that this selection of students needing a year or less of academic work and their admission to courses be established as policy.

A questionnaire should be developed and circulated to determine the numbers of such students in the Peshawar area and their interest in taking such courses. If the magnitude justifies it, this should be considered for additional budget during the project review in early 1991.

Arrangements will also be made for CRTA faculty , who so desire, to audit courses taught by the visiting faculty so they can broaden their own teaching horizons.

NEW ELEMENTS PROVIDED THROUGH CRTA FUNDING

RESULTS OF QUESTIONNAIRE

A questionnaire was designed by staff of CRTA, in conjunction with University of Nebraska/Omaha consultants, and distributed to Afghan engineers in the Peshawar area. The questionnaire (a copy is in Annex III) was intended to solicit interest in three levels of courses from graduate engineers who either had been away from the practice of their profession

because of the war and needed basic engineering (engineer-in-training level) or fundamentals of civil engineering (professional engineer level) refresher courses, or practicing engineers who desired professional development courses.

There were 152 respondents to the questionnaire who filled in the forms and returned them to CRTA. The breakdown of respondents by their reported source of engineering education is:

SCHOOL	NUMBER
Kabul University, Engr.Faculty	58
Polytechnic	54
Nangarhar Faculty, Jalalabad	10
BSc from Universities Abroad	14
Graduate Degrees from Abroad	4
Technical School Abroad	2
Electrical Engineering Abroad	2
Afghan Technical Schools in	
Telecommunications	1
Cartography	2
Cadastral Survey	1
Civil Aviation	1
Construction	2
Question Not Answered	1

Whether all of the respondents are, indeed graduate engineers, and whether their English, particularly that of students whose language of instruction was other than English, is of a sufficient level to participate in classes taught by visiting American professors is yet to be determined. Should language prove to be the primary constraint on enrollment, strategies should be adopted to remedy this problem.

The courses proposed for possible offering and the number of respondents who said they would like to take such a course was as follows (the effort to have the respondents prioritize their preferences failed, with 75% not doing so):

KEY	SUBJECT	NO.SELECTING
A1	Applied Math	21
A2	Statics	19
A3	Dynamics	16
A4	Strength of Materials	29
A5	Fluid Mechanics	17
A6	Structural Analysis	23
A7	Engineering Economics	27
B1	Route Surveying	48
B2	Intermediate Structures	31
B3	Reinforced Concrete Design	63
B4	Masonry Structures	45
B5	Concrete Mix Design	51
B6	Hydraulic Design/Channels	29
B7	Water Supply & Sanitation	28
B8	Storm Drainage Design	21
B9	Soil & Foundation Engr.	49

C1	Pre-cast Concrete	55
C2	Water Resources	52
C3	Engineering Management	89
C4	Building Sys. for Afghanistan	65
C5	Design & Construction/Roads	74
C6	Earthquake Engineering	47
C7	Electric Power Generation	33
C8	Advanced Structures	44

A: Basic Engineering Refresher
B: Civil Engineering Refresher
C: Professional Development

The replies to the last question concerning other courses that would be helpful to engineers in their present jobs produced mixed results. Only about two-thirds of the respondents filled in this answer. Many respondents simply listed some of the course titles in the section on courses that might be offered. Of the useful responses, the most requests were for design and construction of roads and bridges; all aspects of management, including administration, supervision, technical management, and accounting; building systems for rural Afghanistan; computer training and programming; irrigation and water systems for rural Afghanistan; and pre-cast concrete design and installation. A number of requests were also made for town planning, electrical engineering, and technical English. There was even one request for social science courses so engineers would be able to help in social reconstruction as well as the physical side.

Actual interviews with the respondents revealed, unfortunately that about ten percent were not actually graduates of the university faculty that they had claimed and a slightly lower percentage did not possess even a fair comprehension of spoken or written English. Thus, such interviews will be needed prior to completing enrollment for future courses, too.

RECOMMENDED PROFESSIONAL DEVELOPMENT/REFRESHER COURSES AND EXPATRIATE STAFF

Based on the above response, it is clear that the only course sought by more than half of the respondents is Engineering Management, which is proposed for offering in Fall 1990. Also proposed for Fall 1990 is Design and Construction of Roads and Bridges, which appealed to nearly half of the respondents. It is proposed that the visiting professors for the Fall be Dr. Norman Bolyea, transportation engineer, who taught for six months at Kabul University and Louis A. Cohen, the author of this report. Their resumes are in Annex V. The visiting professors will teach the two professional development courses proposed for this fall and will join in team teaching of regular courses, as selected by the project coordinator, Dr. Hassani.

While Dr. Bolyea's recruitment is completed and he is on his way to Peshawar, Mr. Cohen and a faculty committee will complete the interview of the 89 respondents who selected Engineering Management and the 74 who selected Road Design & Construction to select up to 30 students for each class. A similar interview by team process will be conducted to select students for the Spring 1991 courses. The names and contact for the respondents to be interviewed for selection are listed by course in Annex IV.

Recommendations for the courses to be given in the Spring of 1991 are a bit more complex to select. One course that is recommended is the fourth most popular title, a refresher course in Reinforced Concrete Design. The next most popular course title with the respondents was Building Systems for Rural Afghanistan. It is believed that it is not feasible to find a visiting professor with sufficient knowledge of the building styles and available materials in the various cultural and geologic regions of Afghanistan to present such a course to a standard needed to be worthwhile for the Afghan engineers. It could be a survey of possibilities and details of how to make use of a variety of materials, new techniques, and styles; however, while interesting and useful for stimulating innovative approaches, this would be unlikely to make a significant contribution to the capability of the students to operate successfully in their native country.

The second course for the Spring can be selected from the next three most popular titles, which were all virtually the same in popularity: Pre-cast Concrete, and Water Resources (both professional development courses), and Concrete Mix Designs (a refresher course). Water resources could be taught very capably by Dr. Hassani, who holds a PhD in this discipline, or Mr. Hamidi, who has a MSc in the same discipline. If for any reason funds are not available for a visiting professor, this subject should be selected, but the present work load of these two experts is extremely great and they should not be burdened with such additional strain. Another possibility for such a course would be Dr. Maurice Albertson, an internationally-recognized authority in this field, who is believed available for the period needed. Concrete Mix Design is a routine subject that also could be properly handled by one of the existing senior faculty members if funding is short. The choice, however, and actually the most popular of the alternatives is Pre-cast Concrete. A brief description of the courses recommended for both the Fall 1990 and Spring 1991 offerings is in Annex VI.

ANNEX I

CONSTRUCTION SUPERVISION PROGRAM

A. CURRICULUM

9 Month Program

First Term

Islamiat (not funded by CRTA): 1 credit, 1 contact-hour

English I: Active English & Intercom I - 3 credits, 3 contact-hours

Basic Applied Mathematics: 3 credits, 3 contact-hours. Real Numbers, percentage, ratio and proportions, units of measurement, geometry (area and volume), exponents and roots, algebraic expressions, linear equations in one and two unknowns, quadratic equations, rectangular coordinate system, trigonometric functions and sine and cosine laws

Drawing and Sketching: 4 credits, 8 contact-hours. Graphic language, drawing equipment and lines, scale, and lettering, geometric construction, sketching and sectioning, dimensioning

Construction Materials: 3 credits, 5 contact-hours. Introduction, rock, building stone, bric , lime and mortar, cement and concrete

Site Surveying: 4 credits, 8 contact-hours. Basic Concepts of surveying, errors and mistakes in measurement, distance measurement, layout by chain, leveling, stadia or tacheometry, angles and directions

Basic Water Supply and Plumbing: 3 credits, 5 contact-hours. Introduction to water supply, sources of water, water quality, water quantity, means of utilization of water from rivers, from wells, and from karezes, plumbing and jointing, rural sanitation

Practical Training I: One and one-half months with an NGO

Second Term

Islamiat (not funded by CRTA): 1 credit, 1 contact-hour

English for Technical Students: Intercom I and Intercom II - 3 credits, 3 contact-hours.

Construction Operation, Safety, & Project Management: 3 credits, 3 contact-hours. Safety rules; machinery and their working areas; mine clearing; process of management; manager and performance; fleet, material, labor, and time management; communication process; work group

Quantities and Cost Estimates: 4 credits, 6 contact-hours. Basic concept of cost estimating, types of estimates, basic construction work specifications, types of contracts, estimates for different types of buildings, estimates of road and irrigation works

Working and Construction Drawing: 4 credits, 8 contact-hours. Identifications, architectural working drawing, civil engineering working drawing, interior (electrical, plumbing, mechanical, and water supply) drawings

Surveying and Basic Road Construction: 3 credits, 5 contact-hours. Traverse, topographic surveys, route surveys, construction layout

Construction of Concrete and Masonry Structures: 5 credits, 7 contact-hours. Construction of masonry structures, stone masonry, brick masonry, tile, plain cement concrete, reinforced concrete, forms for concrete structures, methods of construction

Practical Training: One-and one-half month with an NGO

First Term

SUBJECT	CREDIT	THEORY	PRACTICE
Islamiat (not AID-funded)	1	1	-
English	3	3	-
Basic Applied Math	3	3	-
Drawing & Technical Sketching	4	2	6
Measuring & Site Surveying	4	2	6
Construction Materials	3	2	3
Basic Water Supply & Plumbing	3	2	3
Total	21	14	18
Percentage		45%	55%

Practical Training 1 1/2 mo.
Theory: 29% Practice: 71%

Second Term

Islamiat (not AID-funded)	1	1	-
English for Technical Students	3	3	-
Constr. Operation & Mines	3	3	-
Quantities & Costs	4	3	3
Working & Constr. Drawing	4	2	6
Surveying & Road Constr.	3	2	3
Concrete & Masonry Constr.	5	4	3
Total	23	17	15
Percentage		54%	46%

Practical Training 1 1/2 mo.
Theory: 40% Practice: 60%

18-Month Program

First Term

Islamiat (not funded by CRTA): 1 credit, 1 contact-hour

English I: Intercom I - 4 credits, 4 contact-hours

Mathematics: 5 credits, 5 contact-hours. Basic algebra operations, equations containing one unknown, plane analytic geometry, system of equations, sequence and series, geometry (areas and volumes), trigonometric functions, sine and cosine laws

Basic Drawing: 4 credits, 4 contact-hours. Use of drawing equipment and techniques, scale and measurement, symbols, geometric construction, views of an object

Surveying I: 4 credits, 8 contact-hours. Basic concepts of surveying, errors and mistakes in measurement, distance measurement, measurement of angles, passing obstacles with the use of tape, leveling

Construction Material I: 4 credits, 6 contact-hours. General properties of materials, soil mechanics, brick and tile, cement, mortar, aggregate, concrete

Practical Training I: One and one-half month with an NGO

Second Term

Islamiat (not funded by CRTA): 1 credit, 1 contact-hour
English II: Intercom 3 - 4 credits, 4 contact-hours

Electric Wiring: 3 credits, 5 contact-hours. Basic electricity, magnetism, power and energy, simple electric circuits, a.c. loads, loaded lines, poly-phase system, domestic wiring

Construction Drawing: 4 credits, 8 contact-hours. Identification, working drawing, civil engineering drawing, interior (electric, plumbing and mechanical) drawings, major structural analysis

Surveying II: 4 credits, 8 contact-hours. Stadia and tacheometry angles and directions, traverse, computation and adjustment of traverse, plane table, topographic surveying

Construction Materials II: 4 credits, 6 contact-hours. Building stone, timber, steel bars, lime and plaster, road and paving materials, roofing materials

Practical Training II: One and one-half month with an NGO

Third Term

Islamiat (not funded by CRTA): 1 credit, 1 contact-hour

English and Technical Communication: Intercom 4 and technical writing - 4 credits, 4 contact-hours

Architectural Drawing: 4 credits, 8 contact-hours. Architectural graphic symbols, drawing project - private building, architectural drawings, details, architecture elements, types of building drawings for villages, village planning, landscaping

Construction of Masonry Structures: 4 credits, 6 contact-hours. Introduction, stone masonry, brick masonry, composite masonry, partition walls, ground floors, stairs, lintels and arches, roofs, roof coverings

Construction Operation Safety and Mine Clearing: 3 credits, 3 contact-hours. Safety rules, public safety, safe-guarding machinery and their working areas, accidents and their prevention, mine clearing

Layout Surveying, Road Construction, & Drainage: 4 credits, 8 contact-hours. Route surveying, design of horizontal curves, vertical curves, earth work, structural layout

Practical Training III: One and one-half Month with an NGO

Fourth Term

Islamiat (not funded by CRTA): 1 credit, 1 contact-hour

Technical English and Seminar: Intercom 5 and technical seminar - 4 credits, 4 contact-hours

Quantities and Cost Estimates: 5 credits, 7 contact-hours. Types of estimates, basic construction work specifications, different types of contracts, estimates of different types of buildings, estimates of road and irrigation works

Project Management: 3 credits, 3 contact-hours. Managers and management, managers and their environments, project cycle, construction planning, construction documents, material and equipment management, operation analysis

Construction of concrete structures: 5 credits, 9 contact-hours. Methods of construction, deterioration of concrete in structures, joints in reinforced concrete structures, forms for concrete structures, basic structural loads, flexural members reaction - shear and bending moment, flexural analysis of beams, reinforcement for flexure

Rural Water Supply, Sanitation, & Irrigation: 4 credits, 6 contact-hours. Sources of water supply, water quantity,

conveyance of water, water quality, water treatment, general protection of the environment, introduction to and definition of irrigation

Practical Training IV: One and one-half month with an NGO

First Term

SUBJECT	CREDIT	THEORY	PRACTICE
Islamiat (not AID-funded)	1	1	-
English	4	4	-
Mathematics	5	5	-
Drawing I	4	2	6
Surveying I	4	2	6
Construction Materials I	4	3	3
Total	22	17	15
Percentage		53%	47%

Practical Training 1 1/2 mo.
Theory: 35% Practical: 65%

Second Term

Islamiat (not AID-funded)	1	1	-
English II	4	4	-
Electric Wiring	3	2	3
Construction Drawing	4	2	6
Surveying II	4	2	6
Constr. Materials II	4	3	3
Total	20	14	18
Percentage		44%	56%

Practical Training 1 1/2 mo.
Theory: 29% Practical: 71%

Third Term

Islamiat (not AID-funded)	1	1	-
Technical Communication	4	4	-
Architectural Drawing	4	2	6
Masonry Structures	4	3	3
Constr.Safety & Mines	3	3	-
Road Constr. & Drainage	4	2	6
Total	20	15	15
Percentage		50%	50%

Practical Training 1 1/2 mo.
Theory: 33% Practical: 67%

Fourth Term

Islamiat (not AID-funded)	1	1	-
Technical English Seminar/	4	4	-
Quantities & Cost Est.	5	4	3
Project Management	3	3	-
Concrete Structures	5	3	6
Water Supply, Sanitation, & Irrigation	4	3	3
Total	22	18	12

Percentage	60%	40%

Practical Training 1 1/2 mo.
Theory: 40% Practical: 60%

B. FACULTY

Dr.A. Wahed Hassani
Former staff member Kabul University Faculty of Engineering. Currently, administrative coordinator IRC Science and Technology (CRTA).

PhD - Water Resources Development & Soil Mechanics
Roorkee University, India, 1984
MSc - Water Resources Development & Soil Mechanics
Roorkee University, India, 1981
BSc - Kabul University, Civil Engineering, 1975

Prof. Zabihullah Hamidi
Formerly professor and Coordinator of Civil Engineering Department's Research Assistance at University of Cincinnati, Visiting Lecturer at Cornell University, Member of Center for Engineering and Applied Research (CECSAR) at Kabul University.

MSc - Hydraulic and Water Resources Engineering
Roorkee University, India
BSc - Civil Engineering, Kabul University

Mr. Jamal Noorzaie
Former design engineer at Flexible Technologies, Inc. of Richardson, Texas.

BSc - Mechanical Engineering
Texas University, Arlington, Texas, USA
3 Yrs. - Mechanical Engineering
Kabul University

Mr. Mohammed Zafar Sharifi
Former professor and academic director, Faculty of Engineering, Kabul University and member of CECSAR at Kabul University

BSc- Civil Engineering, Kabul University

Mr. Yar Mohammed
Previously construction engineer for H.C.C.Kockcha project of the Ministry of Public Works.

BSc - Civil Engineering, Kabul University

Mr.Lutuf Rahman
Three years in construction Department of Kabul Polytechnic, graduate of Iben-sena Lycee (12) grade, teacher at Jamiat-e-Islami Army University (Hazrat Ali [K] University)

Cert - Construction, Kabul Polytechnic
Cert - Construction Supervision 18-month Program, 1990

C. SUMMARY OF EMPLOYMENT OF GRADUATES

Employment record for 9-month graduates:

Institution	No. of Graduates
DACAAR	2
IRC/CRTA	1
IRC/RPA	2
Jamiat-e-Islami	2
Hezb-e-Islami	1
VITA	1
Ministry of Mines & Industry	2
Ministry of Reconstruction	2
Ministry of Defence	1
Quetta	3
Swedish Committee	1
Mine Awareness	2
TOTAL	20

ANNEX II

CONSTRUCTION ENGINEERING

A. ENROLLMENT HISTORY

The Construction Engineering Program was formally begun on 22 November 1987:

130 students registered for the entrance exam
30 students passed
28 students enrolled
after six weeks of pre-engineering training,
25 students passed
18 students registered as regular students
9 students are expected to graduate on 15 January 1991
(2 drop-outs, 1 emigrated, 2 received scholarships abroad, and 1 arrested in Afghanistan)

In September 1988, the second class was started:

Over 300 students registered for the entrance exam
48 passed
33 students were registered for pre-engineering training
25 passed
17 students are currently studying in the second semester of the second year
(4 drop-outs, 1 emigrated)

No class was begun in 1989, because of funding shortage.

In August 1990, a third class was started:

531 students registered for the entrance exam
494 students took the examination
39 students passed and are attending the 3-month pre-engineering courses that began on 7 October

B. STUDENT COMMITMENTS & UNDERTAKINGS

1. Whereas IRC is a neutral volunteer agency, any kind of party discussion that is against the Alliance and unity of the Mujaheeden and Muhajareen is strongly forbidden. Whoever takes part in such party discussions could be expelled upon recommendation of two-thirds of the Teacher's Council.

2. Offending and disobeying Islamic laws and traditions are absolutely forbidden. The perpetrator, according to the decision of two-thirds of the Teacher's Council, could be expelled.

3. When a student is absent for more than 20% of the total teaching period, he is not allowed to take the final examination.

4. Carelessness towards regulations and any kind of disorder in either the school or field environment is forbidden and the

perpetrators will be punished by the Teacher's Council.

5. During their vacations the students will have to go for practical work to various camps in N.W.F.P., or if possible inside Afghanistan. No objection or excuse from the students' side will be accepted.

6. Practical work is a part of the curricula and the students have to write technical reports about their work and deliver these to the office for evaluation.

7. a. Any student in the 9-month program who receives 45% of the total score in one subject and 50% overall is passed.

b. Any student in the Construction Engineering or 18-month course who receives 50% of the total score in one subject and 55% overall is passed.

8. Educational arrangements, the establishment of new courses and the curricula are decided by the Teacher's Council.

9. Every teacher will decide how to evaluate the academic performance of a student in his own subject, based on standards set by the Board of the Teacher's Council.

10. The final result of a semester is determined by homework, at least three announced tests, unannounced quizzes, technical reports, the result of practical work, and the final examination.

11. A second chance will be given to students whose score is less than 50% in a maximum of three subjects and whose overall average is 55% in the 18-month program and the engineering program. In the 9-month program, a second chance will be given to students whose score is less than 45% and whose overall average is 50%.

12. If a student doesn't complete the minimum overall average of 55% in two consecutive semesters, he will be considered dropped from the engineering program. Any student with less than 40% of the total score is not allowed to continue in the construction supervisor program.

13. Any student with less than 45% of the total score is not allowed to continue in the engineering program.

14. The students can take one semester over once, provided that they are able to complete the three year program in five years. In the 9-month course, students can repeat one semester once, provided that they are able to finish the program in three semesters (13-1/2 months). Students in the 18-month course can repeat one semester once, provided that they are able to finish in six semesters (27 months).

15. The Teacher's Council is authorized to implement these regulations while the Board can adjust them.

C. CURRICULUM

1. The medium of instruction is English.

2. Teaching hours:
   a. Lectures - 20 hours per week
   b. Field Work - 40 hours per week (practical classes for drawing will be accounted for here)

3. For summer vacation the students will join various projects for practical work over three months time. There will also be two months of practical training between each semester.

4. During winter vacations the students will attend short course such as computer, management, etc.

5. The overall program is about 50% theoretical academic study and 50% practical work, not including the summer vacation 3-month practical training.

First Year

1st Semester

Islamiat (not funded by CRTA): - 1 credit, 1 contact-hour

Math I: 5 credits, 5 contact-hours. Review of basic algebraic operations, equations and inequalities, graphs and functions,polynomial functions and theory of equations, exponential and logarithmic functions, systems of equations and inequalities, matrices and determinate, sequences and series, an introduction to probability

Physics I: 4 credits, 4 contact-hours. Units & standards of measure, density, kinematics of linear motion, vectors, motion in a plane, Newton's law of motion,Physical idealizations and friction, work and kinetic energy, potential energy and conservation of energy

Surveying I: 2 credits, 4 contact-hours. Introduction and definitions, theory of measurements, linear measurement, leveling

Drawing I: 2 credits, 4 contact-hours. Mechanical drawing, lettering, geometric constructions, technical sketching and shape description, multiview projection, sectional views, auxiliary views, dimensioning

Introduction to the Technologic World: 2 credits, 2 contact-hours. Definition of technology and professional ethics, technical communications, dimensions and units, measurement and calculations, calculating devices, engineering techniques in problem solving, elementary mechanics, energy concepts, optimization methods and use, engineering drawing,practical projects

English I: Intercom 2 - 3 credits, 3 contact-hours

Two months Practical Training

2nd Semester

Islamiat (not funded by CRTA): - 1 credit, 1 contact-hour

Math II: 5 credits, 5 contact-hours. Calculus, functions, increments and differentiation, the integral and its application, natural logarithmic functions, exponential function, trigonometric and hyperbolic functions, centeroids, indeterminate forms

Physics II: 4 credits, 4 contact-hours. Linear momentum and systems of particles, rotation and angular momentum, the momentum of rigid bodies, forces in equilibrium, gravitation and planetary motion, fluids, oscillatory motion,mechanical waves

Chemistry: 3 credits, 3 contact-hours. Introduction to chemistry, standards for measurement, properties of matter, elements and compounds, atomic theory and structure, the periodic arrangement of the elements, chemical bonds, inorganic compounds, quantitative composition of compounds, the chemical equation, gaseous state of matter, water and properties of liquids, solutions

Drawing II: 2 credits, 4 contact-hours. Descriptive geometry; orthographic projection; lines and planes; point, line, and plane problems; revolution; development

Statics: 3 credits, 3 contact-hours. What is mechanics, statics of particles, statics of rigid bodies in two dimensions, statics of rigid bodies in three dimensions, distributed forces, analysis of structures,forces in beams and cables, friction, moments of inertia

English II: Intercom 3 - 3 credits, 3 contact-hours

Three month Summer Practical Training

Second Year

1st Semester

Islamiat (not funded by CRTA): - 1 credit, 1 contact-hour

Math III: 3 credits, 3 contact-hours. Calculus, Infinite sequence and series, ratio and root tests, conics, vectors in the plane and in space, vector valued functions, functions of several variables, double integration, vector field line integrals, the divergence theorem

Physics III: 3 credits, 3 contact-hours. Sound, temperature and heat, behavior of gases, kinetic theory,first law of thermodynamics, second law of thermodynamics, electric charge, electric field

Surveying II: 2 credits, 4 contact-hours. Angle measurements, stadia measurement, topographic surveys, route surveying

Hydrology: 3 credits, 3 contact-hours. Definition, precipitation, evaporation and transpiration, run-off, surface flow hydrograph, empirical formulae and envelope curves, ground water

Strength of Materials: 4 credits, 4 contact-hours. Tension, compression & shear; axially loaded members; torsion; shear force and bending moment; stresses in beams; analysis of stress and strain; deflection of beams; columns

Concrete I: 4 credits, 4 contact-hours. Materials, ultimate strength design concept, reinforced concrete beams - ultimate strength vs working strength and serviceability, axially loaded reinforced concrete columns, eccentrically loaded columns and yield-line analysis, reinforced concrete slabs and yield-line analysis, design of reinforced concrete buildings

English III: Intercom 4 - 3 credits, 3 contact-hours

Two Months Practical Training

4th Semester

Islamiat (not funded from CRTA): 1 credit, 1 contact-hour

Math IV: 3 credits, 3 contact-hours. Differential equations, first order differential equations, basic concepts, property of solutions, power series, orthogonal sets of functions, ordinary and higher order differential equations

Physics IV: 3 credits, 3 contact-hours. Electrical potential, capacitance and di-electric, d.c. circuits, magnetic field, sources of magnetic fields, electromagnetic induction, inductance and magnetic materials, circuits with time-varying currents

Fluid Mechanics: 3 credits, 5 contact-hours. Concept of a fluid, pressure distribution in a fluid, integral relations for volume control, dimensional analysis and similarity, viscous flow in pipes, open channel flow, turbo machinery

Structures I: 3 credits, 3 contact-hours. Definitions and introductory concepts, deflections, approximate methods of structural analysis, method of consistent deformation, three-moment equation, moment - distribution method, moving loads
Concrete II: 4 credits, 4 contact-hours. Reinforced concrete footings and foundations, practical problem in retaining wall design, design of composite sections, reinforced concrete

bridges, roads and paving, design of water tanks, design of beams curved in plan, prestressed simple and continuous beams, practical design and detailing, structural design using lightweight aggregate

Quantities and Cost Estimates: 3 credits, 3 contact-hours. Description of cost; quantities; specifications; rates of different items of work and schedule; estimates for buildings and bridges; estimates for steel, wood, and earthwork; estimates for water tanks, septic tanks, dams, reservoirs and lakes; estimates for roads, water lines, sewerage, and surface drains; valuation and compensation for lands, buildings, machinery, and other properties; preparation of schedule for inviting tenders and indenting materials

English IV: Intercom 5 - 3 credits, 3 contact-hours

Three Month Summer Practical Training

Third Year

5th Semester

Islamiat (not funded by CRTA): 1 credit, 1 contact-hour

Dynamics: 3 credits, 3 contact-hours. Kinematics of particles, kinetics of particles, work & energy, impulses and momentum, kinematics of rigid bodies, kinetics of rigid bodies

Design Project: 3 credits, 3 contact-hours. Design of a structural concrete framed structure, design of a timber roof truss, design of a steel gabled frame, design of a roadway pavement, design of plate girder bridge, design of an elevated rectangular water tank, design of a simple bus stop shelter frame

Soil Mechanics: 4 credits, 5 contact-hours. Soil and soil engineering, preliminary definitions and relationships, determination of index properties, classification of soils,soil structure and clay mineralogy, soil water, permeability, 15 laboratory experiments, seepage analysis, stress distribution, one dimensional consolidation, three dimensional consolidation, compaction, stability of slopes, 18 laboratory experiments
Highway Technology: 3 credits, 3 contact-hours. Importance of transportation, highway planning, highway alignment, highway geometric design, highway materials, design of pavements, drainage, economics and finance

Water Supply and Sewerage: 3 credits, 3 contact-hours. Sanitary engineering, quantity of water and sewerage, collection and distribution of water, quality of water supplies, treatment of water, treatment by filtration, other treatment methods, design of sewer systems, characteristics of sewage, sewage disposal, preliminary treatment systems

Technical Communication: 3 credits, 3 contact-hours. Written, oral, and visual means of communication
Two months Practical Training

6th Semester

Islamiat (not funded by CRTA): 1 credit, 1 contact-hour

Geology: 3 credits, 3 contact-hours. Rocks of the earth's crust, structural geology, physical geology, historic geology, building stone, ground water, preliminary geologic exploration, landslides and slope stability, tunnels, dams and reservoirs
Foundations: 3 credits, 5 contact-hours. Standard soil and other foundation testing, bearing capacity of soils, foundation settlement, improving site soils for foundation use, factors to consider in foundation design, spread footings, special footings and beams on elastic foundations, mat foundations, lateral earth pressure, retaining walls

Earthquake Engineering: 3 credits, 3 contact-hours. Afghanistan as a seismic region, Characteristics of earthquakes, analysis, design, steel structures, concrete structures, masonry, foundations, nonstructural elements, seismic requirements codes with specifications and standards, design for blast and shock
Structures II: Moving loads (continued), moment - distribution method, slope - deflection method, method of column analogy, arches, computer methods of structural analysis, topics in structural analysis

Engineering Management: 3 credits, 3 contact-hours. Definition of management terms, responsibilities of management, functional areas of management, strategic planning, project scheduling and management

Seminar: 4 credits, 6 contact-hours. Preparation and presentation of technical reports

First Year

1st Semester	Cr.	Lect.	Lab.	C.Hr.
Islamiat (not AID)	1	1	-	1
Math I	5	5	-	5
Physics I	4	4	-	4
Surveying I	2	1	3	4
Drawing I	2	1	3	4
Intro to Eng.	3	3	-	3
English I	3	3	-	3

Two Months Practical Training

2nd Semester				
Islamiat (not AID)	1	1	-	1
Math II	5	5	-	5
Physics II	4	4	-	4
Chemistry	3	3	-	3
Drawing II	2	1	3	4

Statics	3	3	-	3
English II	3	3	-	3

Two months Practical Training

Second Year

3rd Semester	Cr.	Lect.	Lab.	C.Hr.
Islamiat (not AID)	1	1	-	1
Math III	3	3	-	3
Physics III	3	3	-	3
Surveying II	2	1	3	4
Hydrology	3	3	-	3
Str. of Materials	4	4	-	4
Concrete I	4	4	-	4
English III	3	3	-	3

Two Months Practical Training

4th Semester				
Islamiat (not AID)	1	1	-	1
Math IV	3	3	-	3
Physics IV	3	3	-	3
Fluid Mechanics	3	3	-	3
Structures I	3	3	-	3
Concrete II	4	4	-	4
Estimates & Costs	3	3	-	3
English IV	3	3	-	3

Two Months Practical Training

Third Year

5th Semester				
Islamiat (not AID)	1	1	-	1
Dynamics	3	3	-	3
Design Project	3	1	6	7
Soil Mechanics	4	3	3	6
Highways	3	3	-	3
Water Supply & San.	3	3	-	3
Tech. Communication	3	3	-	3

Two Months Practical Training

6th Semester				
Islamiat (not AID)	1	1	-	1
Geology	3	3	-	3
Ground Water	3	3	-	3
Foundations	5	3	6	9
Hydraulics	3	2	3	5
Management	3	3	-	3
Seminar	3	3	-	3

D. POLICY FOR PRACTICAL TRAINING (FIELD WORK)

1. A questionnaire is sent to apprenticeship organizations for the evaluation of practical training students.

2. The students technical reports on their practical training must be graded and a seminar must be presented by the students about their reports. Grades will be evaluated by adding technical report grade + seminar grade = apprenticeship organization report.

3. Students who do not successfully complete the practical training program will be failed in that course.

4. The practical training program takes place each year during the two months between the first and second semesters; moreover, the grade for the practical training program will be averaged with the grades for the second semester.

5. For each two month practical training program, 7 credits weight will be assigned.

E. FACULTY

Dr. A. Wahed Hassani
Formerly lecturer in Civil Engineering at Kabul University Faculty of Engineering; Geotechnical researcher at University of Roorkee, India; Management Advisor with UNHCR, Peshawar; teacher in various refugee programs, Peshawar; manager, then coordinator for science and technology training programs for IRC, Peshawar.

Diploma - Afghan Institute of Technology, Kabul, 1969
B.E. - Faculty of Engineering, Kabul University, 1975
M.E. - Water Resource Development, Roorkee, India, 1981
Ph.D. - Water Resources Development, Roorkee, 1984

Mr. Zabihullah Hamidi
Previously professor and coordinator of civil engineering research assistants, University of Cincinnati; visiting lecturer at Cornell University; Member of Center for Engineering Consulting and Applied Research (CECSAR), Kabul University.

B.SC. - Civil engineering, Kabul University
M.Sc. - Hydraulic and water resources engineering, University of Roorkee, India

Mr. Ghulam Qadir
Formerly site engineer, SMS Construction Company of Iran; cost estimator for Sarash Construction Company of Iran.

B.Sc. - Civil engineering, Kabul University

Mr. Mohammed Daud
Former professor , Faculty of Engineering, Kabul University.

B.Sc. - Faculty of Engineering, Kabul University
M.Sc. - Management, University of Nebraska

Sayed Aqa

B.Sc. - Mechanical engineering, Kabul University, 1979
M.Engg. - Energy Technology, Asian Institute of Technology, Bangkok, 1990

Mr. Bahadur

Former design engineer, Ministry of Water & Power.
B.Sc. - Civil engineering, Kabul University, 1982

Mr. Nasser Ali

Previously engineer at Naghlow Power Plant; and involved in electric design works for Afghan reconstruction consultant, ARCON, Peshawar.
B.Sc. - Electrical engineering, Kabul University, 1982

Mr. Jamal N. Noorzaie

Previously maintained large residential facility for the elderly, Arlington, Texas; design engineer for Refrigeration Valves & Systems Corp., Bryan, Texas; Quality control engineer for Metl-Span Corp in Lewisville, Texas; Design engineer for Flexible Technologies, Inc. Richardson, Texas. 1982 -1990
3-years - Mechanical engineering, Kabul University, 1978-1980.
B.Sc. - Mechanical Engineering, University of Texas/Arlington

ANNEX III

QUESTIONNAIRE FOR REFRESHER AND PROFESSIONAL DEVELOPMENT COURSES

INTERNATIONAL RESCUE COMMITTEE
SCIENCE AND TECHNOLOGY TRAINING PROGRAMS
G.P.O 504
Peshawar, PAKISTAN

CONSTRUCTION RELATED TRAINING FOR AFGHANISTAN (CRTA)

Refresher and Professional Development Program
offered by IRC

During 1990 and 1991, IRC is pleased to offer an opportunity for Afghan engineers to attend Refresher and Professional Development Courses in the engineering field. These courses are designed to enable Afghan nationals graduating either from the Faculty of Engineering of Kabul University or the Polytechnic Institute to participate more effectively in the future reconstruction and rehabilitation of Afghanistan. The program will be conducted in cooperation with US Universities and is to be financially supported by the US Agency for International Development.

The program curriculum foresees a two-month Refresher and graduate-level Professional Development course presented within the frame of the Construction Engineering Program. After completion of these courses the students will be given a certificate which will enhance future employment prospective and provide an up-dating of existing knowledge, an important factor after 12 years of war. Furthermore, students will receive a monthly stipend during the period of attendance.

Interested candidates are requested to fill the enclosed questionnaire which is to determine, as accurately as possible, their interest and qualifications in order to design and schedule the courses. All of the following questions should be answered to the best of one's ability. If there are doubts as to the meaning of any question, please obtain clarification from the IRC enumerator before completing the questionnaire.

page 1.

QUESTIONNAIRE
for candidates of IRC Refresher & Professional Development Program

Name:.....Father's Name.....

Place of Birth:.....Date of Birth:.....
Date of Emigration.....Party Affiliation.....

Years of Study.....

Graduate of:.....Date of Graduation.....

Present Employment:.....

Last Employment:.....

Years of Working Experience:.....

Days of week you can attend:.....

Check the times that you expect to be available for course-work during most weeks of the year:

	Sat.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.
Morning	...	...	...	....	...	.....	...
Afternoon	...	...	...	....	...	.....	...

page 2.

Command of English Language:

	Listening	Speaking	Reading	Writing
Fluent	.....	.....	.....	.....
Good	.....	.....	.....	.....
Poor	.....	.....	.....	.....

Courses you want to register for:
(Please number the course of your first, second, third choice, taking into account that A. and B. are determined for fresh graduates, whereas C. is exclusively reserved for professional engineers possessing some years of recent engineering work)

A. BASIC ENGINEERING REFRESHER COURSE

Applied Mathematics .....

Statics .....

Dynamics .....

Strength of Materials .....

Fluid Mechanics .....

Structural Analysis .....

Engineering Economics .....

B. FUNDAMENTALS OF CIVIL ENGINEERING REFRESHER COURSE

Route Surveying .....

Indeterminate Structures .....

Reinforced Concrete Design .....

Masonry Structures .....

Concrete Mix Design .....

Hydraulic Design of Channels .....

Basic Water Supply & Sanitation .....

Storm Water Drainage Design .....

Soil & Foundation Engineering .....

C. PROFESSIONAL DEVELOPMENT COURSE

Pre-cast Concrete .....

Water Resources .....

Engineering Management .....

Building Systems for Afghanistan .....

Design and Construction of Roads .....

Earthquake Engineering .....

Electric Power Generation .....

Advanced Structures .....

What kind of engineering and other professional development courses do you feel would be most helpful to you in your present job:

.....

.....

Address and Telephone:.....

.....

Please return filled questionnaire to:

IRC Engineering Program
17 C Gulmohar Lane
G.P.O. 504
Peshawar
Tel: 44621, 41944

ANNEX IV

RESPONDENTS TO BE INTERVIEWED FOR ADMISSION TO REFRESHER/DEVELOPMENT COURSES

C3 Engineering Management

ID NUMBER	NAME	CONTACT
OA001	Khalilullah	GTZ, 42462
OA004	Sayd Naser	MRA, 42670
OA005	Khoj. Qudratullah	GTZ, 45417
OA006	Naqiburahman Fa.	RAFA,44867
OA008	Sayed Sharif Sh.	RAFA,44867
OA009	Amir Mohammad	RAFA,44867
OA010	Abdul Rahmin	RAFA,44867
OA011	M. Nain	DACAAR,40731
OA012	Alim Jan Ahmadi	DACAAR,40731
OA013	Mohammad Raza	RPA/RC,41845
OA014	Hekmatullah Ayub	IRC/RPA,41845
OA015	Gul Amini	DACAAR, 40731
OA016	Zabihullah	UN/OPS, 45274
OA020	Sargand Fahim	none
OA021	Rahimullah Mehz.	ISAAE
OA024	Hafizullah	VITA, 44518
OA025	M. Asif	VITA, 44518
OA027	Eng. Ahmad Seyar	VITA, 44518
OA029	Bismellah	DACAAR, 40731
OA031	A. Razaq	G.H.Plaza,310
OA034	Mohammed Khan	VITA, 44518
OA035	Mir A. Saboor	VITA, 44518
OA038	Jan Agha	START,45321
OA039	Saddodin	START,45321
OA044	Shamsudin	START,45321
OA047	Shenwari Ahmadzi	ARCON,42241
OA049	M. Hammad Hassan	ARCON,42241
OA055	M. Tahir Samit	MRA, 4267
OA057	Hafiz Rahman	ATC, 41582
OA061	Gh. Sediq	ACLU, 50817
OA062	Ali	ARCON,42241
OA063	Medhat	ARCON,42241
OA068	Semeyllah	HIA, P.W.
OA069	Khaledudden	REFA, HIA
OA070	Hamidullah	none
OA071	Shah Moeen	ACLU, 44578
OA072	Zerghoon	ACLU, 44578
OA073	Sayed Rafiq	STCUK,44732
OA075	Noorullah	HIA, P.W.Dept.
OA077	A. Razag	HIA, P.W.Dept
OA078	Farid Farzad	UNDP, 41213
OA082	Gula Jon	AIG, 42670
OA083	Abdullah	MRA, 42670
OA085	Eng. S.Bariali	MRA, 42670
OA086	Abdul Ali	MRA, 42670
OA087	Ahmad Hussain	MRA, 42670
OA088	Gh. Sakhi Ghazi	MRA, 42670

OA089	M. Yousuf	AIG, 42670
OA090	Baz Mohammad	AIG, 42670
OA091	Sharafeddin	MRA, 42670
OA092	M. Qahir	MRA, 42670
OA093	Khan Mohammad	AIG, 42670
OA094	Alla Gul	MRA, 42670
OA095	Eng. Shaectagul	MRA, 42670
OA096	A. Baqi	MRA, 42670
OA098	Gul Ahmad	MRA, 42670
OA099	Friedoon Qurishi	MRA, 42670
OA100	Mohd. Azim	MRA, 42670
OA101	Abdul Qader	MRA, 41213
OA102	Bismillah	MRA, 41213
OA103	Engr. Zalmi	Swd. Com.44286
OA104	Abdul Bari	GTZ, 45417
OA105	Noor A. Mojaddadi	GTZ, 45417
OA106	Niaz Mohammad	MRA, 41912
OA108	Ahmad Shah Nazir	RPA/IRC,41845
OA112	Nessar Ah. Nasser	UAAR,41579
OA118	A. Ghafar Massoom	GTZ, 45417
OA119	Shah Faqir Meya	GTZ, 45417
OA121	Jamrouz	GTZ, 45417
OA122	A. Hasib Latify	GTZ, 45417
OA123	Abdul Rahim	GTZ, 45417
OA124	Sayed Qasem	UN/OPS,45321
OA125	M. Daud Sultani	SCF, 42462
OA126	Mohd. Yama	SCF, 42462
OA127	Sayd Sadequ	MTP/UNO,42103
OA130	Zekrullah	none
OA131	Mohd. Shah	UN/OPS,45321
OA132	Abdul Sattar	SCF, 42462
OA134	Mir Mohd. Nawab	SCF, 42462
OA138	Abdul Samad	SCF, 42462
OA140	S. Esmatullah	VITA, 42979
OA141	Alumgul	TTP, 60638
OA142	Mohd. Hashem	TTP, 60638
OA143	Mohd. Qayuem	TTP, 60638
OA144	Shah Nazar	TTP, 60638
OA146	Lal Mohammad	TTP, 60638
OA147	M. Hoamayun	GTZ, 45417

Design and Construction of Roads & Bridges

ID	NAME	CONTACT
OA002	M. Shafi	MRA, 42670
OA004	Sayd Naser	MRA, 42670
OA009	Amir Mohammad	RAFA,44867
OA010	Abdul Rahim	RAFA,44867
OA011	M.Naim	DACAAR,40731
OA013	Mohammad Raza	DACAAR,40731
OA015	Eng. Wazir Ahmad	see form
OA017	Mohammad Yasin	IRC High School
OA018	Zabihullah	UN/OPS,45274
OA019	Abdul Basir	DACAAR,40731
OA020	Sargand Fahim	none

OA024	Hafizullah	VITA,44518
OA025	M. Asif	VITA,44518
OA026	Nabiulah	VITA,44518
OA027	Eng. Ahmad Seyar	VITA,44518
OA028	Mir Ahmad	DACAAR,40731
OA029	Bismellah	DACAAR,40731
OA030	Sayed Modasir	IRC, 05242
OA034	Mohammed Khan	VITA,44518
OA036	A. Saboor	VITA,44518
OA038	Jan Agha	START,45321
OA041	Mohd. Dediq	START,45321
OA042	Abdul Jamil	START,4532'
OA045	Habibullah Wassi	SA, 41124
OA048	Mir Mohd. Qaseem	UN/MTP,42103
OA050	M. Shafi	MRA, 42670
OA)51	A.M. Sadeq Hamidi	MRA, 42670
OA053	Ah. Shakib	MRA, 42670
OA057	Hafiz Rahman	ATC, 41582
OA058	Mohd. Sharif	ACLU,44578
OA060	Rohullah	ACLU,50817
OA061	Gh. Sediq	ACLU,50817
OA064	Assadullah	MRA, 42670
OA065	Shir Mohd.	MRA, 42670
OA066	Abu Mahmoud	ARCON,42241
OA067	Sayed Rafiq	none
OA068	Semeyllah	HIA, P. W.
OA070	Hamiddulah	none
OA071	Shah Moeen	ACLU,44578
OA072	Zerghoon	ACLU,44578
OA073	Sayed Rafiq	STCUK,44732
OA077	A. Razag	HIA,PW Dept.
OA081	Farid Ahmad	MRA, 43693
OA082	Gula Jon	AIG, 42670
OA083	Abdullah	MRA, 42670
OA085	Eng. S. Bariali	MRA, 42670
OA086	Abdul Ali	MRA, 42670
OA087	Ahmad Hussain	MRA, 42670
OA088	Gh. Sakhi Ghazi	MRA, 42670
OA089	M. Yousuf	AIG, 42670
OA091	Sharafeddin	MRA, 42670
OA092	M. Qahir	MRA, 42670
OA095	Eng. Shaectagul	MRA, 42670
OA096	A. Baqi	MRA, 42670
OA097	A. Samad Kazezada	MRA, 42670
OA100	Mohd. Azim	MRA, 42670
OA101	Abdul Qader	MRA, 41213
OA102	Bismillah	MRA, 41213
OA108	Ahmad Shah Nazir	RPA/IRC,41845
OA113	Mohd. Amin	Swd Com.44286
OA114	Said Omar	Swd Com.44286
OA115	Omarakhan	Swd Com.44286
OA116	Abdul Raqib	Swd Com.44286
OA119	Shah Faqir Meya	GTZ, 45417
OA128	Jan Mohammad	MTP/UNO,42103
OA130	Zekrullah	none
OA132	Abdul Sattar	SCF, 42462

OA139	Mohd. Shah	START,45321
OA140	S. Esmatullah	VITA,42979
OA141	Alumgul	TTP, 60638
OA142	Mohd. Hashem	TTP, 60638
OA143	Mohd. Qayuem	TTP, 60638
OA144	Shah Nazar	TTP, 60638
OA147	M. Hoamayun	GTZ, 45417

Reinforced Concrete Design

OA004	Sayd Naser	MRA, 42670
OA005	Khoj. Qudratullah	GTZ, 45417
OA006	Nakiburahman Fa.	RAFA,44867
OA007	Sayd Zewaroddin	RAFA,44867
OA008	Sayd Sharif Sh.	RAFA,44867
OA009	Amir Mohammad	RAFA,44867
OA010	Abdul Rahim	RAFA,44867
OA018	Zabihullah	UN/OPS,45274
OA022	Eng. M. Ibrahim	VITA,41563
OA023	Eng. Ahmad Farid	VITA,41563
OA024	Hafizulah	VITA,44518
OA025	M. Asif	VITA,44518
OA026	Nabiulah	VITA,44518
OA029	Bismellah	DACAAR,40731
OA031	A. Razaq	G.H.Plaza 310
OA032	Zabih Ahmed	VITA,44518
OA033	Abdul Qayum Adil	ATEC,42853
OA041	Mohd. Dediq	START,45321
OA045	Habibullah Wassi	SA, 41124
OA046	M. Tariq	HIA, 71594
OA048	Mir Mohd. Qaseem	UN/MTP,42103
OA056	A. Hameed Rahmany	VITA,44518
OA058	Mohd. Sharif	ACLU,44578
OA059	A. Mobin	ACLU,44578
OA060	Rohullah	ACLU,50817
OA067	Sayed Rafiq	none
OA068	Sameyllah	HIA, P.W.
OA069	Khaledudden	REFA, HIA
OA071	Shah Moeen	ACLU,44578
OA072	Zerghoon	ACLU,44578
OA073	Sayed Rafiq	STCUK,44732
OA075	Noorullah	HIA,P.W.Dept
OA077	A. Razag	HIA, P.W.Dept
OA084	Abdul Malek	MRA, 42670
OA085	Eng. S. Bariali	MRA, 42670
OA095	Eng. Shaectagul	MRA, 42670
OA096	A. Baqi	MRA, 42670
OA100	Mohd. Azim	MRA, 42670
OA103	Eng. Zalmi	Swd Com.44286
OA108	Ahmad Shah Nazir	RPA/IRC,41845
OA110	Talib Khan	RPA,DARSAMAND
OA111	Ali Marjan	RPA,DARSAMAND
OA112	Nessar Ah. Nasser	UAAR,41579
OA113	Mohd. Amin	Swd Com.44286
OA114	Said Omar	Swd Com.44286

OA115	Omarakhan	Swd Com.44286
OA116	Abdul Raqib	Swd Com.44286
OA117	Mohd. Ehsan	Swd Com.44286
OA118	A. Ghafar Massoom	GTZ, 45417
OA121	Jamrouz	GTZ, 45417
OA126	Mohd. Yama	GTZ/MTC,50421
OA127	Sayd Sadequ	MTP/UNO,42103
OA128	Jan Mohammad	MTP/UNO,42103
OA133	Habiburahman	SCF, 42462
OA135	Said Azim	SCF, 42462
OA136	Mohd. Nadir	SCF, 42462
OA137	Ghulam Dastagir	SCF, 42462
OA138	Abdul Samad	SCF, 42462
OA142	Mohd. Hashem	TTP, 60638
OA147	M. Hoamayun	GTZ, 45417
OA148	Homayun	ARC, 42592
OA149	Rehullah	ARC, 42592
OA150	A. Basir	MRA, 41213

Pre-cast Concrete

OA004	Sayd Naser	MRA, 42670
OA011	M. Naim	DACAAR,40731
OA015	Eng. Wazir Ahmad	see form
OA018	Zabihullah	UN/OPS,45274
OA019	Abdul Basir	DACAAR,40731
OA024	Hafizulah	VITA,44518
OA025	M. Asif	VITA,44518
OA027	Eng. Ahmad Seyar	VITA,44518
OA028	Mir Ahmad	DACAAR,40731
OA029	Bismellah	DACAAR,40731
OA031	A. Razaq	G.H.Plaza 310
OA034	Mohammad Khan	VITA,44518
OA035	Mir A. Saboor	VITA,44518
OA048	Mir Mohd. Qaseem	UN/MTP,42103
OA057	Hafiz Rahman	ATC, 41582
OA061	Gh. Sediq	ACLU,50817
OA062	Ali	ARCON,42241
OA063	Medhat	ARCON,42241
OA066	Abu Mahmoud	ARCON,42241
OA068	Sameyllah	HIA, P.W.
OA069	Khaledudden	REFA, HIA
OA070	Hamiddullah	none
OA071	Shah Moeen	ACLU,44578
OA072	Zerghoon	ACLU,44578
OA073	Sayed Rafiq	STCUK,44732
OA075	Noorullah	HIA, PW Dept
OA077	A. Razag	HIA, PW dept
OA078	Farid Farad	UNDP,41213
OA079	Obaidullah	MRA, 42670
OA082	Gula Jon	AIG, 42670
OA083	Abdullah	MRA, 42670
OA085	Eng. S. Bariali	MRA, 42670
OA086	Abdul Ali	MRA, 42670
OA087	Ahmad Hussain	MRA, 42670

OA089	M. Yousuf	AIG, 42670
OA091	Sharafeddin	MRA, 42670
OA092	M. Qahir	MRA, 42670
OA095	Eng. Shaectagul	MRA, 42670
OA100	Mohd. Azim	MRA, 42670
OA101	Abdul Qader	MRA, 41213
OA102	Bismillah	MRA, 41213
OA112	Nessar Ah. Nasser	UAAR,41579
OA113	Mohd. Amin	Swd Com.44286
OA114	Said Omar	Swd Com.44286
OA115	Omarakhan	Swd Com.44286
OA116	Abdul Raqib	Swd Com.44286
OA119	Shah Faqir Meya	GTZ, 45417
OA121	Jamrouz	GTZ, 45417
OA122	A. Hasib Latify	GTZ, 45417
OA128	Jan Mohammad	MTP/UNO,42103
OA132	Abdul Sattar	SCF, 42462
OA140	S. Esmatullah	VITA,42979
OA141	Alumgul	TTP, 60638
OA143	Mohd. Qayuem	TTP, 60638
OA144	Shah Nazar	TTP, 60638

ANNEX V

RESUMES OF PROPOSED VISITING FACULTY

LOUIS A. COHEN, P.E.
2939 Van Ness Street NW, # 414
Washington, DC 20008
(202)364-8410

EDUCATION: Purdue University, B.S.C.E., 1948

Additional Study: Mississippi State College, Mechanical Engineering courses, 1944; Army Engineer School, Map Reproduction Certificate, 1944; American University (D.C.) Graduate studies in International Relations, 1967-70; North Carolina University, Environmental Engineering Certificate, 1974.

PROFESSIONAL LICENSES: Professional Engineer: Indiana, 1951 to present; New York, 1957 to present. Professional Land Surveyor: Indiana, 1952 to present.

AREAS OF SPECIALTY: Projects: Formulation, Design, Implementation, and evaluation. River Basin Development Planning, Development Administration. Civil Engineering: surveying, map making, highways, hydrology. Area Specialist: Southeast Asia, East and Southern Africa.

PROFESSIONAL EXPERIENCE

a. **1987 - Present:** Consultant on International Development Projects. Conducted three courses on project implementation for the Department of Agriculture, Government of the Republic of the Philippines through Pragma Corp., Falls Church, VA. Liaison with the World Bank for Jennings O'Donovan, Sligo, Ireland. Proposal preparation for: Education Development Center, Newton, MA.; Camp, Dresser & McKee, Boston; EBASCO, New York; Environmental Research & Technology, Inc.,Pensacola, FL. Consultant to Business Council for International Understanding, Washington, DC. Lecturer for three days each at six New Entry Training Course for Agency for International Development through Pragma Corp. Consultant to Jennings O'Donovan, Dublin Corp, & ESB Intl. for Mogadishu Water Supply Loan. Adjunct staff for International Agriculture at University of Wyoming, Laramie, WY, 1987 to present.

b. **1959 - 1987:** United States Agency for International Development

1983 - 1987: Director, USAID/Mogadishu, Somalia. largest program in Africa. 27 direct- hire Americans, 9 direct-hire nationals, and 185 contractors. $90 -100 million per year, including cash transfers, commodity imports, food aid, refugee

assistance, and a broad range of innovative projects, e.g. education sector analysis and management training, field support of contractors, rural development, port rehabilitation, refugee settlement, labor-intensive rural roads, range management, and river basin management for irrigation.

1982 - 1983: AID/ Washington. Directed task force for AID Administrator to evaluate the role and function of engineers in AID and recommend future action. Member of FS-1 Selection Out panel.

1979 - 1982: Director, USAID/Gaborone, Botswana. First Mission Director in country: established Mission. 13 direst-hire Americans, 12 nationals, 115 contractors. $11-16 million per year. Established first field support office to provide logistic support for all contractors. Innovative projects in rural development, primary education, agricultural college, public administration training, highway improvement, indigenous private sector development, alternative energy, and rural sanitation.

1976 - 1979: Director, REDSO/ESA (Regional Economic Services Office for East & Southern Africa), Nairobi, Kenya. Supervised a staff of 35 professionals: project officers, lawyers, engineers, economists, social scientist, commodity management, contract management, and food specialists to 19 country programs in the region. Also administered a small portfolio of about $5 million per year of projects.

1976 (January - April): Water resources engineer on the Sahel Long-term Planning Task Force for AID. Preparation of a report to the US Congress that culminated in Secretary of State Kissinger's Dakar speech on aid to the Sahel countries. Examined needs of basin commissions for Senegal River, Niger River, and Lake Chad in Chad, Mali, Mauritania, Niger, Senegal, and Upper Volta, as well as the energy and telecommunications sectors.

1974 - 1976: Deputy Director, Regional Economic Development Office, RED/Bangkok, and U.S. Liaison Officer with the Mekong Coordinating Committee. Worked with nine developing countries, ten regional organizations, representatives of international donor community. Acting Director for nine months. Program $5 - 17 million per year.

1972 - 1974: Senior Advisor to the Director of the Engineering Division of the Committee for Coordination of Investigations of the Lower Mekong Basin, United Nations Economic and Social Commission for Asia & the Pacific (ESCAP) on detail from RED/Bangkok. Also Senior Advisor to the Director of RED on water resource activities in the region.

1970 - 1972: Director of the Engineering Division and Planning Unit of the Mekong Coordinating Committee Secretariat. Senior technical advisor to the Executive Agent and the National Mekong Committees of Cambodia, Laos, Thailand, and Vietnam. $250 million in on-going activities and international staff of 34 professionals. Seconded to UN ESCAP. Activities included dams, dikes, hydro-electric plants, transmission lines, irrigation and flood control.

1965 - 1970: AID/Washington. Mekong Basin Development Coordinator and Capital Projects Officer for East Asia Regional Development Office. Earlier, Capital Development Officer, Office of Southeast Asia Affairs (Burma, Cambodia, Laos, and Thailand). Acting Thai Desk Officer for two years. Helped prepare capital project portion of program to implement the Eugene Black Mission to Southeast Asia, 1965.

1964 - 1965: Six month temporary duty as Acting Assistant Director for Capital Development and Private Enterprise of USOM/Bangkok. Loan and grant portfolio of $150 million.

1961 - 1965: Chief Engineer, USAID/Burma, Rangoon. Projects included $5 million inland waterway fleet improvement, $12.5 million irrigation program, $4 million hardwood mill construction, $25 million Rangoon to Mandalay highway, and university construction, telecommunications, water & sewerage rehabilitation, and rural resettlement.

1959 -1961: Chief of Highways & Bridges Section of USOM/Saigon, Vietnam. $95 million project program.

c. **1952 - 1959:** Consultant, Engineer of Special Assignment for A.L.Dougherty Co.,Inc. - international heavy construction contractor. Prepared bids for work in Ethiopia and U.S. Trouble shooter for engineering problems during construction.

d. **1954 -1959:** Associate/partner in consulting civil engineering firms in Englewood, NJ, and Poughkeepsie, NY.

e. **1951 - 1953:** President and Chief Engineer of small excavating and grading company in Indianapolis, IN

f. **1948 - 1951:** Project Engineer, Indiana State Highway Commission. Supervising engineer for bituminous and reinforced concrete highway and bridge construction and reconstruction.

g. **1942 - 1946:** U. S. Army Corps of Engineers. Military service in the 30th Engineer Topographic Battalion. Technical sergeant at honorable discharge. Asian- Pacific Theater. Specialist in map reproduction and in personnel.
HONORS: Meritorious Service Award from the Ministry of Public Works of the Republic of Vietnam, 1972. Meritorious Service Award from the U.S. Department of State, 1987. Who's Who in the World, 6th through 10th Editions (1982 - 1990); Who's Who in Engineering, 5th Edition; International Who's Who in Engineering, 5th Edition; Men of Achievement, 1978 - 1987; Dictionary of International Biography, 1981 - 1990.

PROFESSIONAL MEMBERSHIPS: National Society of Professional Engineers, Life Member; American Society of Civil Engineers, Life Fellow; American Water Resources Association; U.S. Commission on Large Dams; International Water Resources Association; African Studies Association; Association for Asian Studies; American Foreign Service Association; American Philatelic Society; World Affairs Council of Washington, DC

PUBLICATIONS:

Somalia Country Development Strategy Statement, 1987 USAID/Mogadishu, 1985.

Status & function of Engineers in AID, for AID, 1983

Briefing Notes: USAID Botswana, Gaborone, 1981

The Water Resource Sector and Energy & Telecommunications Sectors for AID Task Force on Long-term Planning for the Sahel, AID, 1976

Overview of Southeast Asia Regional Economic Development Program: FY 1975 and FY 1976, for AID, Bangkok, 1976

Annual Field Submission, East Asia Regional Economic Development Program, for AID, 1976

"Burma and Thailand: Their Responses to the Arrival of the West and its Relationship to their Post-World War II Politics", Sawaddi Magazine, Bangkok, 1974

The Mekong Project - 1972, for the Mekong Committee, Bangkok, 1972

"International Cooperation for Development: The Mekong Project" in Alice Taylor, ed. FOCUS on Southeast Asia, Praeger, New York, 1972

Articles on travel in South and Southeast Asia in Sawaddi Magazine, Bangkok, 1971 - 1976

Technical Review of Pa Mong Stage I Feasibility Study, for AID, Bangkok, 1970

Loan papers for Lomsak-Saraburi Highway (Thailand), Lam Nam Oon Irrigation Project (Thailand), Feasibility Studies (Thailand) for AID, 1964 - 1966

NORMAN F. BOLYEA
Box 290
Rye Beach, NH 03871
(603) 964-6069
(603) 926-2222

EDUCATION:

Ph.D. -Transportation Engineering, Rensselaer Polytechnic Institute, Troy, NY (1970)

M.S. - Management, Rensselaer Polytechnic Institute, Troy, NY (1967)

B.S. - Civil Engineering, Worcester Polytechnic Institute, Worcester, MA (1961)

PROFESSIONAL EXPERIENCE:

1978-Present Bolyea Enterprises, North Hampton, NH - President

Real estate developer and operator. Supervise the planning, design and construction of multi-family housing units, hotels and motels.

1978-1986 University of Lowell, Lowell, MA
Visiting /Assistant Professor

Presented courses in Transportation, Construction, Mechanics, Surveying, Economics, Statistics and Operations Research.

1976-1978 University of Kabul, Kabul, Afghanistan
Engineering Advisor to the Center for Engineering Consulting Services and Applied Research.

Employed by the U.S. Department of State to develop a management engineering curriculum at the University of Kabul. Assisted the faculty in design and construction of over 200 projects, including vocational schools for the World Bank, health centers for USAID, and waste disposal systems for the Afghan Government.

1973-1976 University of Nebraska, Omaha and Lincoln, NE
Associate Professor of Civil Engineering (Tenured)

Developed curriculum and research in Transportation, Construction and Engineering Management.

1970-1973 Rensselaer Polytechnic Institute, Troy, NY
Chairman of the Interdisciplinary Transportation Program

Formulated and administered an interdisciplinary engineering program involving civil and systems engineering courses integrated with architecture, urban and environmental studies, management, computer science, sociology, and economics offerings.

1971-1972 Creighton, Hamburg Transportation Planners, Albany, NY - Associate

1970-1971 Computer Applications, Inc. Albany, NY
Senior Staff Consultant

1969-1971 Union College, Schenectady, NY
Adjunct Assistant Professor/Civil Engineering

MILITARY SERVICE: U.S. FORCE: Civil Engineering Officer

1962-1963 Chief of Planning and Programming for construction of the Minute Man Missile System support facilities.

1964 Senior Design Engineer for construction of facilities at Thule Air Force Base, Greenland. Conducted research into the effect of cold weather on construction practices.

1965-1966 Chief Engineer - runway construction contract. Designated Base Civil Engineer, in charge of all engineering activities.

RESEARCH ACTIVITIES:

- Computer simulation development for the quality control of construction materials for New York State Department of Transportation.
- Modular housing planning design and construction the for the United States Air Force Building Block Project.
- Comprehensive transportation planning for the City of Cohoes, NY.
- Transportation program development for an Urban Mass Transit Administration University Research and Training Grant at Rensselaer Polytechnic Institute.

- Consultant, Peter Kiewit Construction Co. Omaha,
- Consultant, City of Bismarck, ND
- Traffic and parking plan preparation for several universities.

PROFESSIONAL AFFILIATIONS: (partial list)

Registered Professional Engineer (NY -1965)
American Society of Civil Engineers
Institute of Transportation Engineers
Society of Automotive Engineers (Section V.P.)
American Society of Engineering Educators
Seacoast Area Chamber of Commerce
Seacoast Board of Realtors

HONORS AND AWARDS:

- Video Teaching Award: Presented by the University of New Mexico for innovative instruction through the use of videotape presentations.
- Burggraf Award: Presented by the Transportation Research Board to the young author of the best research paper at their annual meeting.
- Teetor Award: Presented by the Society of Automotive Engineers to outstanding young educators for research and academic accomplishments.
- U.S. Air Force Commendation Medal: For outstanding engineering accomplishment.
- Epsilon Sigma Delta: Management Honorary
- Chi Epsilon: Civil Engineering Honorary

ANNEX VI

BRIEF DESCRIPTION OF COURSES SELECTED

The professional development courses selected for Fall 1990 presentation are both presented four times a week for two hours for nine weeks. Thus, they are equivalent to 4 credit hour courses with a total contact time of 54 hours. Although some employers have told their engineers they must take the courses after four in the afternoon, it is recommended that teaching be at either 2 p.m. or 3 p.m.

Engineering Management & Project Planning. (FALL) Although there are many trained Afghan engineers and sufficient time has passed for many of them to advance to management positions, neither training nor opportunity to practice their profession has been available to them. They have been unable to acquire the management skills needed to facilitate what would normally have been their natural progression. The only course proposed that more than half of the respondents opted to take was this one, which will enable qualified engineering graduates to acquire the skills to accept management roles in reconstruction. Through seminar-like techniques involving students with local managerial experience, the course will highlight the unique managerial challenges raised by the special situation in today's Afghanistan. Topics will include:

* Consideration of the impact of management objectives
* Management styles and procedures
* Labor supervision
* Cost effectiveness and cost control
* Budget development
* Benefit/cost analysis
* Maintenance planning
* Capital resource management
* Project management organization & development
* Construction scheduling & network analysis
* Delegation of authority as a management tool

Design and Construction of Low-volume Traffic Roads and Bridges. (FALL) Many of the secondary and tertiary roads of Afghanistan have been destroyed or are in such poor condition as to be impassable much of the year. The movement of supplies into the country is essential, and the volumes that can be moved and the cost of movement are a direct function of road conditions. This course will include topics such as the following:

* Use of basic surveying instruments
* Layout of road alignment and grade
* Geometric design of low-volume traffic roads
* Vital importance of roadway drainage. Special structures needed to minimize erosion of unpaved roads.
* Design of drainage structures (including necessary hydrology to size culverts).
* Retaining walls and gabion structures.

* Estimation of quantities and costs of construction.
* Design of simple bridges and low-water crossings.
* Seminar sessions on construction techniques.
* Use of stochastic methods for design & hydrology.

Reinforced Concrete Design. (SPRING) This is an advanced refresher course for graduate engineers.

- Beams: ultimate strength vs working strength and serviceability.
- Axially loaded columns.
- Eccentrically loaded columns.
- Slabs and yield-line analysis.
- Building design.
- Footings and foundations.
- Retaining walls.
- Composite sections.
- Bridges.
- Roads and paving.
- Water tanks.
- Curved beams.
- Prestressed simple and continuous beams.
- Practical design and detailing.
- Using lightweight aggregate.

Pre-cast Concrete. (SPRING) A critical set of constraints will hamper the rehabilitation and reconstruction of Afghanistan. One of the most serious is the lack of many natural resources, particularly timber, necessary to build homes and small public facilities. The cost of importing the needed wooden beams and plywood sheets would be extremely great. Pre-cast concrete comprises a cost-effective alternative to timber as a primary structural element. For bridges and larger public buildings, the use of pre-stressed/pre-cast units may prove to be appropriate. Such elements are made up of concrete mixtures and normal reinforcing rods, along with a high-strength steel strands, either cast in-place, or prepared at a central point and hauled to the site. The course will include benefit/cost analysis to determine if pre-casting and/or pre-stressing is cost effective for a given project and introduction to the techniques of design and fabrication.

An understanding of design, fabrication, and construction techniques is essential to the successful utilization of these units. The practical training phase of this course will include the design, fabrication, and testing of both pre-cast and pre-stressed structural elements.

ANNEX VII

ILLUSTRATIVE LIST OF COMMODITIES PROPOSED FOR PROJECT PROCUREMENT

Materials Testing lab Equipment	1-	Universal compression/tension machine for conc./steel, with all accessories	
	1-	Consolidation machine	
	1-	Single batch concrete mixer, 1/2cyd	
	1-	Soil permeability apparatus a. constant head b. falling head	
	4-	Point gauges	
	1-	Tri-axial testing apparatus	
	1-	Reynolds number apparatus	
	1-	Set, CBR testing equipment	
	1-	Lab. concrete mixer, 2cft +/-	
	4-	Magnetic holder for gauges	
	1-	Moveable channel for hydraulics lab	
	2-	Strain gauge for measuring steel rod's strain	5,000
Materials Testing Library	1-	Set, ASTM Standards, Books on Testing a. soil & aggregate b. concrete & cement c. timber & steel d. asphalt	
	1-	Catalog, soil testing	800
Training Aids	1-	Projector, overhead	600
Library References	50-	Titles to be selected	2,500
Textbooks	30-	Engineering Economics	750
	30-	Stochastic concepts & methods (same text used by Purdue)	750

	30-	Analysis of Construction Management Systems	700
	30-	Engineering Management	750
Computer Hardware	8-	IBM-compatible lap-top computer, with 20MB hard disk, battery pack	
	3-	Proprinter III XL, or equal, printers	
	2-	VEGA color monitors	$20,000
Computer Software	1-	set, engineering software	2,500
Office Equipment	1-	Photocopier, with collator	800
	2-	Sets, office furniture (desk, chair, file, table, lamp, & visitor chair)	700
		TOTAL $35,850	

ANNEX VIII

U.S. UNIVERSITIES FORMERLY AFFILIATED WITH KABUL UNIVERSITY FACULTY OF ENGINEERING

University of Wyoming (1955-1964)
Consortium (1965-1973)
- Stevens Institute of Technology
- University of Cincinnati
- Purdue University
- Illinois Institute of Technology
- Massachusetts Institute of Technology

University of Nebraska (1974-1977)
Colorado State University
South Dakota School of Mines
Washington University of St.Louis
Carnegie-Mellon Institute

All of these universities were in some way funded by U.S.AID (or predecessor agencies) for the period 1955-1977.

ANNEX IX

SCOPE OF WORK FOR THIS CONSULTANCY

1. Evaluate existing program - general setup, duration, practical training, etc.

2. Review curriculum of:
   - Construction Engineering Program
   - 9-month Construction Supervisor Program
   - 18-month Construction Supervisor Program

3. Recommendations for survey form & selection of engineers to be enrolled in refresher & professional development courses.

4. Selection of refresher & professional development courses for 1990/1991.

5. Recruitment of expatriate staff for refresher & professional development courses, October 1990.

6. Recommendations on reporting system for U.S.AID. There should be a report which summarizes the status of three existing programs and provides recommendations regarding their development, as well as that of the refresher & professional development program.