THE INTERNATIONAL RESCUE COMMITTEE
PROGRAM FOR AFGHANS

Closing Report

CONSTRUCTION RELATED TRAINING PROGRAM FOR AFGHANISTAN
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Presented to:

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

I. INTRODUCTION

Fourteen years of war and neglect have caused major deterioration in the infrastructure needed to sustain and develop Afghanistan's post-war economy. Seventy percent of paved roads and 25 percent of Afghanistan's secondary roads have been damaged and 300 bridges have been destroyed. More than one-third of the villages that existed in Afghanistan before the war and more than 60 percent of health facilities in rural Afghanistan have been destroyed.[1] In many cases, no water flows through the traditional irrigation tunnels (*karez*) and canals that form Afghanistan's rural irrigation system.

Rehabilitation and reconstruction of irrigation systems, roads, bridges, houses and public buildings in post-war Afghanistan 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.

To address these needs, IRC instituted the Construction Related Training for Afghanistan (CRTA) program in November 1987. Initiated with Norwegian and Dutch donor support, USAID began co-funding the project in August 1990. The goal of the program is to expand the present pool of Afghans trained in construction-related fields and to enable Afghan graduate engineers to participate in construction-related endeavors.

There are three primary components of the CRTA program:

- Refresher and Professional Development Program,
- Construction Engineering Program, and
- Construction Supervision Program.

In all, over 700 students have been enrolled in these three program components since 1987. The following section of this report provides an overview of the program's major achievements during the USAID grant period of August 1990 to April 1993.

II. CONSTRUCTION RELATED TRAINING FOR AFGHANISTAN: PROGRAM ACHIEVEMENTS

A. Refresher and Professional Development Program

The Refresher and Professional Development Program (RPD) which was started in October 1990, offers experienced engineers an opportunity to enhance and update their technical knowledge with the provision of two-month specialized engineering courses. From November 1990 to April 1993, the RPD program offered a total of eight technical courses to 231 participants from 31 different organizations.

In 1991, 107 engineers from 22 professional programs participated in one of four refresher courses. Prior to the start of the program, a questionnaire was administered to determine the areas that Afghan engineers felt they needed improvement. As a result, the following courses were offered to selected candidates in 1991:

The *Engineering Management* Course was conducted by Mr. Louis Cohen, a civil engineer with extensive experience managing and directing USAID projects. The course was held between November 1990 and mid-January 1991. Twenty-seven engineers from ten organizations completed the course. Because of security concerns related to the Gulf War, all American teaching staff were prohibited from working with the program from January to April. Subsequently, contacts were made with engineering professors from universities in Peshawar, Lahore, as well as from the Asian Institute of Technology (AIT) in Bangkok. A delegation of staff from AIT came to visit the program. The team actively supported the program and agreed to accept CRTA engineering graduates for AIT's master's degree program.

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[1]Fazel-ur-Rahman, *Afghanistan and the Re-Construction Problems after the War* (unpublished paper presented at the seminar "The Future of Afghanistan": Taiwan, 1989),p.6.

Dr. A. Saboor Rahim, an engineering consultant and former professor from the United States, joined the program from June 16 to July 25 to teach *Design and Construction of Roads and Bridges*. The course, which was offered to 29 students working for 13 different organizations, focused on design of roads and bridges. Other topics covered include geometric design of highways, highway materials and highway drainage.

Twenty-seven students from ten organizations enrolled in and completed the *Design and Reinforced Concrete Structures* course which was taught by Dr. J. McDonough, Associate Dean of Engineering at the University of Cincinnati. The course which was held from July 9 to August 5, focused on designing columns, beams, slabs and other structures used in constructing building bridges, buildings and roads.

Dr. Maurice Albertson, a professor of engineering from Colorado State University, conducted a course for 24 engineers from 13 organizations entitled *Water Resources and Irrigation Engineering*. The course commenced on October 13 and ended on December 5. Topics addressed in the course include the fundamentals of fluid mechanics, flow measurement, hydrology, appropriate technology, pipeline design, bridge works, reservoirs and dams, ground water, drainage, diversion works, irrigation flood control, hydraulic machines and hydropower. A joint research project was also performed on the development of a wheel turbine for rural Afghanistan, which involved staff members from Peshawar University and the CRTA program along with Dr. Albertson.

The program continued to provide refresher courses to qualified engineers in 1992. A total of 124 qualified engineers from 26 non-governmental organizations working with Afghan refugees participated in one of four courses offered by the program. The following courses were given between January and December 1992:

Engineering Economy, instructed by Dr. Bolyea from the University of Nebraska at Omaha, was held from February 9 to March 11. Forty-four engineers successfully completed the course, which covered topics on basic computational skills, decision concepts, cash flow diagrams, economic factors of engineering and evaluations of multiple alternatives.

Dr. Albertson taught the *Water Supply and Sanitary Engineering* course from April 9 to May 10, with 35 engineers participating from 14 organizations. Dr. Albertson designed the course to include lectures on water supply and sanitation, slide shows and a field trip to a hand pump factory sponsored by the Danish Committee for Aid to Afghanistan (DACAAR). Experiments on water flow measurements were also performed.

From June 1 through July 15, the *Engineering Management* course was taught by Professor Avery Schwer from the Faculty of Engineering at the University of Nebraska at Omaha. Twenty-five engineers participated in the course from nine construction-related organizations based in Peshawar.

The eighth refresher course was given by Dr. Bolyea from October 17 to December 10 and was titled *Construction Engineering Management*. Twenty engineers from nine organizations completed the course in December. The course covered topics on construction environment, project funding, management materials and processes, construction equipment and safety and health.

For a summary of enrollment statistics and participating organizations, please refer to Appendix I, Table A.

Unfortunately, the Refresher and Professional Development Program was forced to officially close in March 1993 due to a lack of sufficient funding.

B. Construction Engineering Program

Started in 1987, the Construction Engineering Program is derived from and parallels the curriculum of the university-level program offered at Kabul University prior to the war. The course was initiated to fill the void created by the closure of Kabul University's Engineering Department. Prior to official enrollment in the course, new students participate in a pre-engineering module, which provides remedial work in English, mathematics and physics. Upon completion of the eight-semester program, graduates are qualified to design and manage construction projects related to building roads, canals, bridges, public buildings and other facilities.

Student Enrollment

The Construction Engineering program has admitted 145 students in five academic year groups between February 1988 and April 1993. Twenty-four students have successfully completed the program and graduated.

The first group of 18 students were admitted in the spring of 1988. By September 1990, nine students were continuing their studies in the seventh semester of the program. These students went on to fulfill all the necessary academic requirements and completed the program in January 1991.

Twenty-five students were accepted in February 1989 as the second group of students to take part in the engineering program. By the start of the USAID grant period in August 1990, 17 students had completed three academic semesters and were enrolled in the fourth semester. Fifteen students went on to complete the fifth, sixth and seventh semesters as well as the practical training component by the end of January 1992.

In August 1990, a third group of 39 engineering students were selected to participate in the program after an entrance exam was administered to 531 interested twelfth grade high school graduates. The selected students were required to pass a three-month pre-engineering course between October and December 1990. Of these students, 32 completed the course and passed a second screening exam, which promoted them to the first semester of the engineering program. By January 1993, the third group of students completed the first, second, third and fourth semester classes and two practical training sessions in 1991 and 1992. Since enrolling in 1990, a total of 13 students either failed semesters, immigrated to other countries or were unable to continue the program for other reasons. Nineteen students are currently attending the fifth semester classes and are scheduled to graduate in April 1994.

A fourth group of 35 students were admitted to the first semester of the program in November 1991 after completing a pre-engineering course in October 1991. These students were selected from among 485 interested candidates, who registered to take part in the entrance exam in July 1991. By January 1993, 26 students from the fourth group had completed the first, second and third semesters and are presently continuing their fourth semester of studies. Nine students left the program to enroll in medical faculties at other universities.

In August 1992, 426 students participated in an entrance exam, of which 40 students were eligible to participate in the one-month pre-engineering course in September 1992. Upon completion of the course, 35 students were required to take a second screening exam which promoted them to the first semester of classes. The fifth group of students completed the first semester and 25 students are attending second semester classes.

Practical Training

Since August 1990, two groups of semester students have completed the practical training component of the engineering program.

From June to August 1991, 44 students from the second and third group of students admitted to the program, participated in a two-month practical training session with eight different NGOs working in Pakistan and Afghanistan. The students worked on construction-related projects, including repair and construction of a school, repair of a hospital, repair of bridges, construction and repair of roads, and construction of water supply systems.

From June to August 1992, 19 students from the third group participated in the two-month practical training component. They worked with six NGOs based in Peshawar and assisted with reconstruction projects in Pakistan and Afghanistan. The participants were engaged in a variety of construction tasks, including the following:

- Design of roads, bridges, and public buildings
- Highway construction
- Water supply systems
- Construction of school buildings
- Soil testing

Graduates

Of the first group of students admitted in 1988, nine graduated from the engineering program in January 1991. Fifteen students from the group admitted in 1989 graduated in January 1992. The results of a follow-up study on engineering graduates showed that 22 graduates have found work with construction-related organizations and two graduates have pursued their education at the graduate level in the United States. Refer to Appendix I, Table B for details on the number of graduates from the Construction Engineering Program and a list of their employers.

Semester Classes

Each semester is conducted for a duration of four-and-a-half months. During this period, students cover various engineering, science, math and English courses. Experiments, projects and field work are also performed by the students in the related courses. Students are evaluated based on their homework assignments, reports on experiments, quizzes, tests and a final examination, which is conducted during the last fifteen days of the semester. For a complete program curriculum, refer to Appendix I, Table C. Standardized textbooks were purchased from the United States for all the courses mentioned in the curriculum.

The instructors were also evaluated regularly throughout the semester by the program manager, who discussed the strengths and weaknesses of his observations with each instructor. As a result, significant improvements were achieved by the teachers in their teaching methodologies.

Laboratories

The engineering program has developed ten laboratories for engineering and science courses since August 1990. The laboratories compliment the courses in hydraulics, physics, chemistry, electrical, material testing, soil mechanics, asphalt testing, computers, drawing and surveying. All of these labs are functional and used by students and staff to perform experiments and to conduct research.

Program Evaluation

In November 1991, the Construction Engineering Program revised the academic curriculum of the program. Dr. Albertson, a visiting professor from the United States, analyzed the details of the program, studying the course arrangement, required number of credits, course descriptions, practical training reports and the course content for specific subjects. As a result of the evaluation, Dr. Albertson concluded that the program curriculum is equivalent to civil engineering programs at American universities.

Research and Consultant Work

The CRTA staff and Dr. Albertson engaged in a 1991 research project, which examined the possibility of utilizing undershot water turbines found in flour mill water chutes to generate electricity in Afghanistan. They constructed a model from locally available materials to assist them in the research and conducted tests with the model at the hydraulics laboratory at Peshawar University.

In addition, the engineering program launched the Afghan Engineering Services and Applied Research Center (AESAR) in 1991 to provide technical expertise to agencies involved in the reconstruction and rehabilitation of Afghanistan. Several soil tests for reconstruction projects inside Afghanistan have been completed. Other research projects such as solar and biogas energy, microhydro power and standardization of fire bricks for Afghanistan are awaiting funding. A major objective for the development of AESAR is the restoration of the former Center for Engineering Consulting Services and Applied Research (CECSAR) at the Faculty of Engineering of Kabul University.

C. Construction Supervision Program

Established in 1989, the Construction Supervision Program offers two nine-month programs: the Construction Supervisor and the Assistant Engineer Programs. The Construction Supervisor Program trains construction foremen to supervise construction work sites and manage small rural projects. To be eligible for admission, candidates must have completed twelfth grade. As assistant engineers, students are capable of managing entire projects of small to medium size and can perform a variety of technical tasks.

Both programs have a course sequence that begins with a three-and-a-half-month theory session, which is followed by a two-month practical training session. During the last three and a half month session, the courses focus again on theory. The courses are taught in Dari and Pushto by faculty composed mostly of graduates of the Kabul University Faculty of Engineering. Seven groups with a total of 360 students have been admitted to the Construction Supervision Program since February 1989.

Student Enrollment

A total of 129 Construction Supervisor students have completed the first half of the Construction Supervision Program and 39 Assistant Engineer students have graduated from the program between February 1989 and January 1993. Presently, 38 Construction Supervisor students are enrolled in the nine-month program and 26 Assistant Engineer students are attending the second half of the supervision program.

Competition to enter the Construction Supervisor Program has been quite fierce. In January 1989, two entrance examinations were administered for both the nine-month and 18-month programs. A total of 421 potential candidates participated in the exams; 202 students took the nine-month program exam and 219 students took part in the 18-month program exam. Consequently, two groups of students were admitted to both programs in February 1989; 58 students enrolled in the nine-month program and 25 students enrolled in the 18-month program. Thirty-six students completed their requirements for the nine-month program in November 1989, while 10 students finished the 18-month program in September 1990.

In February 1990, another two groups of students were admitted to both programs after passing an entrance exam in January 1990. Of the 242 students interested in the nine-month program, 54 students were admitted. Of the 364 interested candidates for the 18-month program, 30 students were admitted to the 18-month program. After fulfilling all the necessary criteria, 27 nine-month students completed their program in November 1990 and 11 assistant engineers finished in September 1991.

At the end of 1990, the Construction Supervision Program decided to revise the curriculum so that only those students who completed the nine-month program were eligible for enrollment in the 18-month program. As a result, the fifth group of 63 students, who were admitted to the Construction Supervisor Program in February 1991, were eligible to enroll in the Assistant Engineer Program after the successful completion of their first nine-months. These 63 students were selected after passing an entrance exam in January 1991 which was administered to 480 prospective students. Of these students, 32 completed all the nine-month course requirements at the beginning of November 1991 and 26 graduates went on to enroll in the Assistant Engineer portion of the program at the end of November 1991. Eighteen assistant engineers completed all the necessary criteria of the 18-month program in September 1992.

At the end of December 1991, a sixth group of 63 Construction Supervisor students were admitted to the program after being selected from among 312 registered candidates, who took part in the entrance exam in the first week of December. Thirty-four students completed the program in September 1992 and 29 graduates enrolled in the Assistant Engineer Program at the end of the month. Presently, 26 assistant engineers are attending classes and are scheduled to graduate from the program in July 1993.

Finally, in August 1992, an entrance exam was administered to 426 potential candidates for the Construction Supervisor Program and 67 students were selected and admitted in September 1992. Thirty-eight students are currently enrolled in classes and these students are scheduled to complete their program in July 1993.

Practical Training

The practical training component is an integral part of the Construction Supervision Program. Both nine-month groups are required to engage in a two-month practical field-work apprenticeship in cooperation with organizations involved in construction projects in Pakistan and Afghanistan. A total of 232 students have participated in 11 practical training sessions between June 1989 and April 1993.

Two practical training sessions took place in 1989 for students from both programs. From June to July 1989, 36 nine-month students and 14 eighteen-month students participated in a practical training with eight organizations in Pakistan. A second practical training session was held in November 1989 for 36 nine-month students and eleven

18-month students. Ten 18-month students continued their practical training in 1990 between March and April and from July to August. Generally, all of the students worked on projects that included road surveys and construction, masonry, brick-making, roofing, plastering, the use of construction maps and layout of site work.

From May through June and from September through November 1990, 13 eighteen-month students and 37 nine-month students performed two practical assignments with ten non-governmental organizations in Pakistan and Afghanistan. From February through March and from July through August, 11 18-month students went on to complete two additional trainings with ten NGOs. All the practical trainings concentrated on irrigation projects, road and building construction and water supply systems.

Due to revisions in the program curriculum, as of 1991, both programs only hold one practical training session during the academic year. However, the duration of the training was extended from one-and-a-half-months to a full two-months of practical work. Thirty-three students from the Construction Supervisor Program completed the first half of their semester studies in 1991 and engaged in a practical training component during March and April. The students performed their training with NGOs working on construction-related projects in Pakistan and Afghanistan such as repair and construction of a school and hospital, architectural drawing of a college building, construction and repair of roads and canals, karez repair and general carpentry.

From April to June 1992, eight Peshawar-based NGOs sponsored 51 Construction Supervisor students during the practical training component. Twenty-three Assistant Engineer students conducted their practical training with five different NGOs. Twenty-seven students worked in Pakistan and 47 worked in Afghanistan on various construction projects, including road construction, irrigation systems, rural water supply systems, drawing, planning and cost estimation, plumbing, masonry work and building maintenance.

Between January and March 1993, 43 Construction Supervisor students and 25 Assistant Engineers completed their practical training with 12 Peshawar-based NGOs in Pakistan and Afghanistan. For greater details on the practical training assignments, refer to Section III of this report which discusses the Construction Supervision Program's activities from January to April 1993.

Graduates

Since the program began in February 1989, five of the seven groups of students admitted to the program have successfully completed all the requirements and graduated from the course.

Prior to the revision of the enrollment criteria for Assistant Engineer students, the 36 students who graduated in November 1989 and 27 students who graduated in November 1990 from the Construction Supervisor Program did not go on to complete the 18-month program. However, beginning in November 1991, successful nine-month students were eligible for the Assistant Engineer Program. Thus, in November 1991 and September 1992, 55 of the 66 Construction Supervisor graduates enrolled in the Assistant Engineer Program.

A total of three groups of Assistant Engineer students have successfully completed the program; 10 students graduated in September 1990, 11 graduated in September 1991, and 18 graduated in September 1992. Of these three groups, the 18 students who graduated in September 1992 also successfully completed the first nine-month portion of the Construction Supervisor Program. Twenty-six of the 39 graduates have found work with construction-related organizations. For more details on the number of employed Assistant Engineer graduates and their employers, refer to Appendix I, Table D.

In conclusion, 129 students have completed the Construction Supervisor Program and 39 students have completed the Assistant Engineer Program between February 1989 and January 1993. Presently, there are 38 Construction Supervisor students enrolled in the nine-month program and 26 Assistant Engineer students attending the second nine-month program.

III. ACTIVITY REPORT: January through April 1993

The following section of this report reviews the activities that occurred during the from January through April 1993. The objectives and planned activities which were outlined in the proposal to USAID are highlighted in *italics*.

A. Refresher and Professional Development Program

OBJECTIVE #1: *Between October 1992 and September 1993, provide construction engineering refresher courses of one to two months which update and improve the technical skills of 125 Afghan graduate engineers in rural rehabilitation and reconstruction design so that they may participate more effectively in the rehabilitation of Afghanistan's infrastructure. Courses may include:*

- *Irrigation Structures*
- *Pre-cast, Pre-stressed Concrete*
- *Bridge Design and Construction*
- *Foundation Engineering*
- *Construction Management*

Planned Activity #1: The program manager and teaching staff will select qualified Afghan engineers for each of the refresher courses.

- *Twenty days prior to each course, send letters to organizations informing them of the course topic, dates, and eligibility requirements.*
- *Ten to 15 days prior to each course, administer questionnaires to screen qualified engineers for proficient English skills and arrange and conduct interviews with the qualified candidates.*
- *One week prior to each course, select 25 engineers for enrollment based on eligibility.*

January to April Activity: The program did not offer a refresher course in 1993.

Planned Activity #2: The STT coordinator, assistant coordinator and the RPD manager will recruit an expatriate with expertise in relevant engineering courses for each two-month course that will be offered in 1992/93. This will be coordinated through the Academy for Educational Development (AED).

- *Early in the academic year, submit to AED a list of courses to be taught with a request for recruitment of candidate professors.*
- *Select a list of candidates based on eligibility and availability, and request that AED negotiate contracts.*
- *Develop a course schedule and circulate announcements.*
- *At least one month prior to the course, inform the candidate through AED that he has been selected to teach the course and send him the course description and other pertinent information.*
- *Confirm the date of arrival of the instructor through AED at least two weeks before arrival.*
- *Upon the instructor's arrival, introduce and orient him to IRC and to the CRTA program, staff and students.*

January to April Activity: The program did not offer a refresher course in 1993. The program was suspended with the end of the University of Nebraska's sub-contract for providing visiting professors.

Planned Activity #3: From October 1992 to September 1993, expatriate instructors will teach a total of 125 graduate engineers in five different one to two-month specialized courses designed to upgrade construction engineering skills. The courses, which will meet two hours per day, five days per week, may include the following:

- *Pre-cast Pre-stressed Concrete*
- *Irrigation Structures*
- *Design and Construction of Bridges*
- *Foundation Engineering*
- *Construction Management*

- *Deliver lectures and use handouts, reference books and other instructional materials to supplement the theory covered in class.*
- *Assign and grade homework on a weekly basis and use laboratory work, field trips, and audiovisual equipment to enhance the learning process.*
- *Evaluate the students based on their homework assignments and the results of two tests.*

January to April Activity: The program did not offer a refresher course in 1993.

Planned Activity #4: The participants and program staff will conduct ongoing monitoring and evaluation of each course to ensure that the quality of instruction is clear, relevant, and is occurring in a positive learning environment.

- *The program manager will monitor classes once a week to observe the teacher's methods, the materials used, and student participation. The program manager will write down his observations and share them with the instructor at the end of the class.*
- *At the end of each course, students will fill out an evaluation. The evaluation solicits impressions on teaching style and methodology and overall effectiveness in upgrading the skills of the engineers. The evaluations are processed and discussed in staff meetings and are used in designing future courses.*

January to April Activity: The program did not offer a refresher course in 1993.

OBJECTIVE #2: Develop a proposal which integrates the Refresher and Professional Development Program into the plans for moving CRTA to Afghanistan.

Planned Activities: See Section D, Transfer of Programs to Afghanistan.

January to April Activities: There were no activities conducted regarding the transfer of the program to Afghanistan due to continuing insecurity in Kabul.

OBJECTIVE #3: Provide administrative and managerial supervision and support for the program staff in order to achieve the objectives and implement the planned activities that have been outlined in this proposal.

Planned Activities: The program manager will enhance the educational process through administration, observation, management, and assessment of their programs. Specific activities that will be undertaken in 1992/93 include the following:

- *Prepare a list of participants and the stipends that they should receive as they attend courses. Stipends are paid at the end of each month.*
- *Produce and purchase necessary equipment and instructional materials.*
- *Coordinate program activities in order to avoid schedule conflicts.*
- *Supervise the program budget expenditures and accounting.*
- *Prepare monthly, quarterly, and annual reports and submit them to the STT coordinator on a timely basis.*
- *Attend STT monthly managers' meetings.*
- *Arrange weekly staff meetings with teaching staff throughout the year.*
- *Maintain building and equipment so that the program runs smoothly.*
- *Supervise and support staff and provide them with written and oral feedback.*
- *Hire and terminate staff as necessary so that the program runs smoothly.*
- *Participate in IRC and AED workshops.*
- *Take care of graduation ceremonies at end of each course.*
- *Prepare workplan and budget for 1993/94.*

January to April Activities: During the first quarter, the program manager prepared two monthly reports and one quarterly report on the program's activities. He also revised the budget for April 1993 to May 1994 and submitted it to the IRC Main Office for approval.

The program received a memo from the IRC Country Director on February 18, 1993, stating that due to USAID funding reductions, the Academy for Educational Development (AED) proposed to eliminate the Refresher and

Professional Development Program. Accordingly, the CRTA budget was revised and submitted to the IRC Main Office with no further budget allocations for the RPD program. The program's activities were concluded by the end of February 1993.

B. Construction Engineering Program

OBJECTIVE #1: From November 1992 to August 1993, train 90 Afghan refugees who have completed at least the twelfth grade, in an eight-semester bachelor of science-level civil engineering program that parallels the civil engineering curriculum of Kabul University.

Planned Activity #1: In July and August 1993, the Construction Engineering Program staff will select students for September 1993 classes.

- *Prepare a screening exam which tests skills in math, physics, chemistry, Islamic studies and English.*
- *Register candidates for the screening exam, arrange the necessary facilities and materials, and administer the exam in August.*
- *Identify eligible candidates for enrollment who both graduated from the twelfth grade and passed the screening exam.*
- *Choose a student body that is both qualified and regionally diverse.*

January to April Activity: This activity will take place in July and August 1993.

Planned Activity #2: In August 1993, enroll all incoming first-year students in a one-month intensive pre-engineering course that focuses on upgrading the students' skills in math, physics and English.

- *Offer eight hours of math, six hours of physics and ten hours of English per week during the one-month pre-engineering course.*
- *Administer proficiency exam in math, physics and English and require all students to pass before progressing to the formal courses of the Construction Engineering Program.*

January to April Activity: This activity will take place in August 1993.

Planned Activity #3: From September 1992 to August 1993, former professors of the Engineering Faculty of Kabul University will instruct first, second and third year students according to the Construction Engineering Program curriculum (see Appendix IV).

- *Deliver lectures and use laboratory work, field trips, and audiovisual equipment to enhance the learning process.*
- *Distribute monthly stipends of Rs. 1,000 to students.*
- *Evaluate the students based on the results of weekly homework and laboratory assignments and on the results of tests given in each subject three times per semester.*
- *Administer final exams at the end of each semester.*
- *Announce the timetable for the exams will be announced ten days before the exams begin.*
- *At the end of the semester give each student a form with the results.*
- *For those who failed their final exam, offer a second-chance exam in the first week of the next semester.*

January to April Activity: Engineering students who enrolled in the program in February 1991, completed their fourth semester classes in December 1992 and took the final exams between January 3 and January 17, 1993. Of the 18 students who participated in the exams, 17 students passed and were promoted to the fifth semester. One student passed his second chance exam during the first week of February and was also promoted to the next semester. The results of the exams were very good. The lowest score, average score, and highest score were 58, 71, and 96 percent respectively. One student who is repeating the fifth semester from last year, rejoined the engineering program in January.

Nineteen students are attending fifth semester classes which began on January 24 and continued through April. The students are covering the following topics:

Hydraulics: Open channel flow, closed conduit flow, dams and reservoirs, hydraulic structures, hydraulic machinery.

Soil Mechanics: Soil properties, soil water, soil stresses, compressibility, consolidation and settlement, shear strength, lateral pressure and retaining structures, slope stability analysis, and improving soil conditions and properties.

Concrete: Frame analysis (KANI method), concrete-producing materials, plain concrete, reinforced concrete, flexure in beams, shear and diagonal tension in beams, torsion, serviceability of beams and one-way slabs, bond development of reinforcing bars, design of two-way slabs and plates, and earthquake forces.

Electrical Engineering: Definitions and units, experimental laws and simple circuits, some useful techniques of circuit analysis, inductance and capacitance source, free RL and RC circuits, the application of the unit-step forcing function, the RLC circuit, the Sinusoidal Forcing Function, and the phaser concept.

Geology: Minerals, rocks, weathering and rock cycles, the hydrologic cycle, and the mechanical properties of rocks.

Students also study technical writing in English. Various experiments are performed by students in soil mechanics, concrete, electrical engineering and hydraulics. In April, students were assigned three separate projects in the concrete course; to identify and measure the distribution of frames for three story buildings which will ensure that the buildings do not collapse, to design one-way slabs and beams, and to design two-way slabs and beams. The students are required to write reports on the experiments and submit them to their teachers for grading.

Students admitted to the program in November 1991, took final exams for third semester classes between January 3 and January 17. Of the 26 students who took the exams, 18 students passed and eight students failed. The eight students passed their second chance exams in February and were promoted to the fourth semester along with their classmates. The overall results of the exams ranged from a low score of 55 percent, an average score of 66 percent, to a high score of 81 percent.

Twenty-six students are attending fourth semester classes which concentrate on the following topics:

Fluid Mechanics: Nature of fluids, viscosity of fluids, pressure measurement, forces on submerged plane and curved areas, bounce and stability, flow of fluids, general energy equation, reynald number, laminar flow and turbulent flow.

Physics III: The electrostatic field, Gaus's Law, potential, circuit elements, and DC-circuits.

Structure: Introduction, reactions, shear and bending moment, plane and space frame work, influence line, bridges, roof trusses and long span structures, and indeterminate structure analysis.

Differential Equations: differential equations in general, first order and simple higher order differential equations and their applications, linear differential equations and their application, laplace transform and matrix method for system of linear differential equations.

The students also study advanced English grammar. Students in Physics III performed several experiments and recorded the results in reports which were submitted to their instructors.

First semester final exams for students admitted in September 1992, were administered between February 2 and February 14, 1993. The exams covered the following subjects:

Mathematics: Equations and inequalities, sets, graphs and functions, theory of equations, exponential and logarithmic functions, matrices and determinant, sequence and series, trigonometric functions and graphs.

Surveying I: Linear measurement, line and angles, stadia, profile leveling, differential leveling, precise leveling, angle and direction using theodolate.

Introduction to Engineering: Engineering fields, statistics, statics, preparing monograms, energy, types of curves and graphs, technical reports, and laboratory techniques.

Technical Drawing: Instrumental drawing, lettering, dimentioning, geometrical construction, sketching and sectioning.

Chemistry: Properties of matter, elements and compounds, atomic theory, periodic arrangement of the elements, chemical bonds, inorganic compounds, quantitative composition of compounds, chemical equations and calculations, the gaseous state of matter, water and liquids properties and solutions.

English language was also covered on the exams.

Of the 26 students who took the final exams, 21 students passed and enrolled in the next semester. One student will repeat the semester in September 1993 because he failed to achieve a combined average score of 55 percent on his exams. Four students failed one of their final exams and took second chance exams on February 28. All four students passed their second-chance exams and were promoted to second semester classes. Twenty-six students are attending second semester classes which commenced on February 21. Three students who failed their exams last year, rejoined the engineering program in the second semester. Three students left in April due to personal reasons. During the second semester, students are covering the following topics:

Calculus: Pre-calculus, limits of functions, derivatives, application of derivatives, anti-differentiation, definite integrals, applications of integrals, and logarithmic and exponential functions.

Surveying II: Angles and directions, traverse, topographic maps preparation, road survey, highway alignments and construction.

Statics: Statics of particles, statics of rigid bodies in two and three dimensions, distribution of forces, and analysis of structures.

Drawing II: Orthographic projections and descriptive geometry, points and lines in space, auxiliary views, planes, parallel and perpendicular lines, intersecting and non-intersecting lines, plane relationships, revolution, developments.

Physics :: Physical quantities, body at rest, uniformly accelerated motion, Newton's law of motion, linear momentum, and work and energy.

Students are also studying English grammar and Islamic studies. During the first quarter and April, students performed field work for Surveying II classes once a week outside of Peshawar, conducted various experiments in Physics I, and completed projects in the drawing laboratory.

Refer to Appendix II, Table A for details on the number of students who took final exams and passed and who were promoted to the next semester.

All engineering students participate in three tests on each of their subjects and several quizzes on various topics during one semester. The students also complete class work and homework on a weekly basis.

Planned Activity #4: The program staff and participants will conduct ongoing monitoring and evaluation of each course to ensure that the quality of instruction is clear, relevant, and is occurring in a positive learning environment.

- ***The program manager will monitor classes once a month to observe the teacher's methods, the materials used, and student participation. The program manager will write down his observations and share them with the instructor at the end of the class.***
- ***At the end of each course, students will fill out an evaluation. The evaluation solicits impressions on teaching style and methodology and overall effectiveness in upgrading the skills of the engineers. The evaluations are processed and discussed in staff meetings and are used in designing future courses.***

January to April Activity: In addition to monitoring final exams during January and February, the program manager also monitored four engineering classes in March and April and made the following observations:

Strengths:

- The teachers used lesson plans.
- The teachers performed experiments.
- The teachers evaluated the students by giving class quizzes, tests, and homework.
- The teachers solved exercises for students.

Weaknesses:

- The teachers did not relate the new lessons with old ones.
- The teachers seldom answered students' questions during the lecture hours.
- The teachers did not evaluate students' comprehension by asking questions on previous lectures.

Overall, the program manager observed that many of the engineering teachers have improved their teaching skills significantly as compared to previous monitoring visits. He noted also that the students seemed enthusiastic about their teachers' performances.

Planned Activity #5: Provide two-month practical training from the middle of June 1993 to the middle of August 1993, by arranging field work with organizations engaged in construction projects such as buildings, bridges, roads, and irrigation structures. These projects are located both inside Afghanistan and in refugee camps in Pakistan.

- *In the last half of May 1993, have students contact engineering-related NGOs for whom they would like to work during the two-month practical training session.*
- *During the last week in May, the CRTA program will also contact NGOs by letter and in person in order to arrange field-work positions.*
- *Field-work sessions will start in the middle of June 1993 and continue to the middle of August.*
- *The program manager and three teachers will visit work-sites to observe and monitor the practical training activities of the students.*
- *At the end of the practical training session, the supervisor of the NGO will evaluate the students and the results will be reported to the program manager.*

January to April Activity: This activity will take place in June and August 1993.

Planned Activity #6: Assess, develop, and purchase curriculum materials and equipment that will assist the teachers and improve the quality of instruction.

- *The program manager will evaluate the program's need for textbooks and reference books and procure them for the following topics in December 1992:*
  - *Mechanics for Engineers (statics)*
  - *Sanitary Engineering*
  - *College Algebra*
  - *Technical Drawing*
  - *Surveying*
  - *Water Supply and Sanitation*

- *Textbooks will be lent to students at the beginning of each term and collected at the end of the final term.*
- *Reference books will be housed in the Construction Engineering Program library.*
- *In January 1993, the teaching staff will evaluate the program's need for laboratory equipment and other teaching aids and will procure them for the following courses: Sanitary Engineering, Hydraulic Engineering and Fluid Mechanics.*
- *Between January and April 1993, the program staff will develop laboratory manuals for the following courses: Introduction to Engineering, Hydraulics, and Concrete.*

January to April Activity: Fifteen copies of highway engineering books arrived from the United States during the first quarter and will be used in a future course on highway engineering. The books will be lent to students for the next semester. The program approved the purchase of 57 additional textbooks after receiving a price list from the United States.

Approximately 40 percent of the students enrolled in the Construction Engineering program used the library during the quarter. Over 330 textbooks were lent to students for their course work in engineering during the current semesters. Because of a shortage of reference books, students are allowed to use the books in the library only for a short period and are not allowed to check the books out.

The program received the Compression and Tension Testing Machines along with its accessories through RONCO from the United States on March 16. The equipment will be used during the current semester to test various samples of concrete, steel and other materials which are essential for construction engineering.

An engineering book entitled "*Fundamentals of Fluid Mechanics*" was written and compiled in Dari by Professor Zabihullah Hamidi, CRTA's Assistant Coordinator and Engineer Sayed Aqa, the Construction Engineering Program Manager. The book was published in April and produced for CRTA's Construction Engineering and Construction Supervision students. The text can also be referred to by other university level engineering programs instructed in Dari.

The program manager, the assistant coordinator and an engineering instructor made a trip to Afro Asian International Limited and Iqbal Scientific Store in Lahore this month for the purpose of purchasing electrical equipment for use in the engineering laboratory. The total cost of all the equipment purchased was Rs. 83,378. The new equipment was used by fifth semester students to conduct eight experiments in the Electrical Engineering course.

OBJECTIVE #2: In collaboration with the Academy for Educational Development (AED), explore the possibility of expanding the existing program into other fields such as mechanical, electrical, architectural and environmental engineering.

Planned Activity: From January to August 1993, study the need and feasibility of initiating new fields of engineering studies and develop a proposal to implement the most feasible programs.

- *Conduct a needs assessment to ascertain which areas of engineering instruction are most needed.*
- *Conduct studies of the costs and benefits of the engineering programs which are the most needed.*
- *Construct preliminary budgets and workplans for the most feasible engineering programs.*

January to April Activity: This activity has been postponed due to budget cuts.

OBJECTIVE #3: In 1993, develop proficiency exams and offer credit courses for students who were unable to complete their engineering education due to the 14 years of war in Afghanistan.

Planned Activity: Starting in January 1993, evaluate the skills of students who were unable to complete their engineering education.

- *Make announcements and hire a surveyor to conduct a needs assessment survey.*
- *Develop a procedure for screening the applicants through applications, exams and interviews.*
- *Register the students.*
- *Prioritize the courses to be taught and hire teaching staff accordingly.*

January to April Activity: This activity has been postponed due to budget cuts.

OBJECTIVE #4: Develop a proposal which integrates the Construction Engineering Program into the plans for moving CRTA to Afghanistan.

Planned Activities: See Section D, Transfer of Programs to Afghanistan.

January to April Activity: No activities were carried out in the first quarter and April regarding the transfer of the engineering program to Kabul.

OBJECTIVE #5: Provide administrative and managerial supervision and support for the program staff in order to achieve the objectives and implement the planned activities that have been outlined in this proposal.

Planned Activity #1: The program manager will enhance the educational process through administration, observation, management, and assessment of their programs. Specific activities that will be undertaken in 1992/93 include the following:

- *Prepare a list of students and the stipends that they should receive as they attend courses. Stipends are paid at the end of each month.*
- *Produce and purchase necessary equipment and instructional materials.*
- *Coordinate program activities in order to avoid schedule conflicts.*
- *Prepare the results of final exams and announce them to the students.*
- *Supervise the program budget expenditures and accounting.*
- *Prepare monthly, quarterly, and annual reports and submit them to the CRTA coordinator on a timely basis.*
- *Attend CRTA monthly managers' meetings.*
- *Arrange weekly staff meetings with teaching staff throughout the year.*
- *Maintain building and equipment so that the program runs smoothly.*
- *Supervise and support staff and provide them with written and oral feedback.*
- *Hire and terminate staff as necessary so that the program runs smoothly.*
- *Participate in IRC and AED workshops.*
- *Take care of graduation ceremonies at end of each course.*
- *Prepare workplan and budget for 1993/94.*
- *Meet with students and assist them with problems related to academic affairs.*
- *Maintain student records and documents.*

January to April Activity: The program manager prepared monthly and quarterly reports, monitored the final examinations in January and February and observed four classes in March and April. He also revised the CRTA budget for the fiscal year from May 1993 to April 1994. An updated inventory list of engineering laboratory equipment on the CRTA campus was prepared and submitted to the IRC main office. The manager met with almost 80 percent of the engineering students, in order to assist them with academic, class and personal problems.

A staff meeting was held on January 19, to assign the teaching load for second, fourth, and fifth semester classes to 14 instructors. During the meeting, the results of the third and fourth semester final exams were discussed.

The coordinator for the CRTA program, Dr. Hassani, immigrated to the United States in February.

Four new part-time instructors were hired to teach Islamic studies, geology, soil mechanics, and Physics III.

CRTA's English language teacher, Veronica Stencel, left the program in March and has been replaced by a qualified Afghan English language teacher with an engineering background.

An instructor was hired on a full-time basis for the Soil Mechanics course in April. Dr. Jahangeer holds a Ph.D. in Structure from Roorki University in India and has over 16 years of design and research experience.

Other Activities:

Mr. John Tucker, USAID Representative for Afghanistan, visited the program on January 11, 1993, and observed various engineering classes and facilities, including the laboratories and the library.

A delegation from the Afghan Government's Ministry of Education visited the CRTA program in February. The purpose of their visit was to observe various refugee education programs in Peshawar, especially those related to primary education. The delegation was also interested in learning about the CRTA program and was briefed by Professor Hamidi on the program's activities.

The President and Chief Executive Officer for the Academy for Educational Development (AED) and the Chief of Human Resources (AED), met with the Construction Engineering Program Manager and CRTA's Assistant Coordinator on April 7, to discuss the existing situation of the program and future funding possibilities. The AED representatives also visited several program facilities including classrooms and the library.

On April 22, the program was visited again by AED's Chief of Human Resources along with the Vice President of AED. Participating in the meeting to discuss program activities and donor funding, were IRC's Director and Deputy Director, CRTA's Assistant Coordinator and the Construction Engineering Program Manager.

C. Construction Supervision Program

1. Construction Supervisor Program (Nine Months)

OBJECTIVE #1: From April, 1993 to May 1994, train 103 Afghans who have a minimum of a twelfth grade education to supervise construction projects in plumbing, surveying, concrete laying, masonry, and road construction.

Planned Activity #1: In August 1993, the Construction Supervisor Program staff will select students for September 1993 classes.

- *Prepare a screening exam which tests skills in math, physics, chemistry, Islamic studies and English.*
- *Register candidates for the screening exam, arrange the necessary facilities and materials, and administer the exam in September.*
- *Identify eligible candidates for enrollment who both graduated from the twelfth grade and passed the screening exam.*
- *Choose a student body that is both qualified and regionally diverse.*

January to April Activity: This planned activity will be performed in August 1993.

Planned Activity #2: Six instructors will teach two three-and-a-half month Construction Supervisor courses, according to the current curriculum.

- *The proposed dates for the course are as follows:*

First semester	*October 1, 1992 - January 15, 1993*
Practical training	*January 19, 1993 - March 18, 1993*
Second semester	*March 22, 1993 - July 7, 1993*

- *Conduct classes six hours a day, five days a week using student-centered teaching techniques.*
- *Deliver lectures and distribute handouts, reference books and other instructional materials to supplement the theory covered in class.*
- *Assign and grade homework on a daily basis and use laboratory work, field trips, and audiovisual equipment to enhance the learning process.*
- *Provide feedback on student performance.*
- *Evaluate students based on homework, monthly tests and final exams.*
- *Invite professionals with expertise in the field of construction to share their experience and knowledge with students through lectures and non-formal discussion.*

January to April Activity: The first semester final examinations for students in the Construction Supervisor Program began January 3 and ended on January 14, 1993. Forty-five supervisor students participated in the final exams. Of these students, 36 passed their final exams, seven took second chance exams in April, one student will repeat the semester next year and one student dropped out of the program. The results were announced on January 18 to the students. The students' final grade for the semester was based on two to three tests given during the semester (40 percent), five to six quizzes (10 percent), laboratory work and homework (10 percent) and a final exam given at the end of the semester (40 percent). Students must achieve a combined average of 50 percent or above in all their subjects in order to be promoted to the next semester.

Second chance exams were administered from March 31 to April 6 with six students passing their exams and one student, who did not attend the examination, will be required to repeat the semester next year.

From January 19 to March 18, classes were not in session due to the students' practical training work. Second semester classes resumed on March 21 with 42 students attending. One of last year's students rejoined the program in order to repeat the semester. Six students left the program in April; two students immigrated to Canada, three students enrolled in the medical faculty at Nangarhar University and one student left the program for personal reasons.

During the second semester, 38 students are studying the following subjects:

Construction Drawings: Symbols of construction material, abbreviations, scales, foundation, dimensions, floor plan, elevation, section, site plan, stairs, roofs, walls and practice.

English II: Grammar, speaking, listening and writing.

Construction Operation Safety: Safety control, elimination of safety hazards, planning and scheduling for safety program, the safety programs, and self-evaluation of safety program.

Quantities and Cost-Estimation: Basic concept of estimation, type of estimation, specification, contracts, and estimates of buildings.

Plane Concrete and Masonry Construction: Plane cement concrete, concrete mixing, transporting placing, competing and curing of concrete, stone masonry and brick masonry.

Surveying II: Leveling, stadia, directions, angles, and traverse.

Rural Road: Historical development and classification of roads, highway alignment and survey, highway material, construction of different roads and highway machinery.

Three tests and several quizzes were administered in every subject to students throughout the semester. Homework and class work was assigned on a weekly basis by the teachers. In Construction Drawing classes, two assignments were given each week to students to draw and design sections of buildings. One project per week was assigned to students in Quantities and Cost Estimation class which usually involved calculating the quantity and total cost of materials for building constructions. Students in Plain Concrete and Masonry Construction performed one experiment each week in the laboratory. Also, two practical field work assignments were completed in Surveying II by students.

Planned Activity #3: The participants and program staff will monitor and evaluate each course to ensure that the quality of instruction is clear, relevant, and is occurring in a positive learning environment.

- ***The program manager will monitor classes once a week to observe the teacher's methods, the materials used, and student participation. The program manager will write down his observations and share them with the instructor at the end of the class.***
- ***Students will fill out an evaluation at the end of each course. The evaluation will solicit student impressions on pedagogical style and the effectiveness of the curriculum. Suggestions will be incorporated into future planning.***

January to April Activity: During the semester, the program manager monitored all eight Construction Supervisor classes once a week. The manager observed that the teachers and the students were on time to class, that the teachers assigned weekly homework to the students and that lesson plans were prepared by the teachers and followed accordingly. Teachers were knowledgeable about the subjects they were lecturing on and students were interested in the material which was presented in class.

Planned Activity #4: Between January 19 and March 18, provide a two-month practical field-work apprenticeship program in cooperation with organizations engaged in construction projects such as buildings, bridges, roads, and irrigation structures.

- *In December, the program manager will contact Afghan and international NGOs to arrange practical training for students.*
- *The program manager and two teachers will visit work-sites to observe and monitor the practical training activities of the students.*
- *At the end of the practical training session, the supervisor of each NGO will evaluate the students and report the results to the program manager.*

January to April Activity: Forty-three Construction Supervisor students began their two-month practical training component on January 19 and completed the session on March 18. The students worked with eleven Peshawar-based NGOs on various construction-related projects in Pakistan and Afghanistan. The students worked on projects that included road construction and cost estimation, water supply and irrigation systems, and field observation. See Appendix II, Table B for details on the NGOs which participated in the workshop, the site locations and type of work that students performed.

On February 2 and 9, the program manager and one instructor monitored students at four practical training sites in Pakistan. They observed students at Pak-German projects in Nowshera and Tehkal and at the German Agency for Technical Cooperation (GTZ) project in Hayatabad. The staff also visited students with IRC's Self Reliance Program in Hangu. The students were involved with work on building construction, water supply projects and soil testing in the laboratory. The program manager and the instructor were pleased with the student's work at the training sites and felt that the experience and knowledge that students were gaining was relevant to their course work in the Construction Supervisor Program.

Following their practical training session, 43 students submitted 20 to 25 page written reports on their experiences to a committee comprised of three program instructors. Based on the reports, the instructors reviewed the practical work and evaluated the students' performances. The students gave detailed descriptions of their assignments, the projects they worked on, the objectives of the training session and a summary of what they learned. The committee members gave the reports a mark of good, very good or excellent. The students made positive comments regarding their work and felt that the practical training was very effective. According to the students' reports, many of the theories taught in class, were applied during the practical training work. Overall, the students were pleased with their practical training experience and felt that the component was beneficial to their studies.

2. Assistant Engineer Program (18 Months)

OBJECTIVE #1: From April 1993 to May 1994, train 55 Afghans who have a minimum of a twelfth grade education in an additional nine month program so that they may work as assistant engineers and manage small to medium-size construction projects related to plumbing, surveying, concrete laying, masonry, and carpentry.

Planned Activity #1: In July 1993, the Construction Supervisor Program staff will select students for new classes.

- *Screen for and select 30 students who are both top graduates of the nine-month Construction Supervisor Program and who come from diverse provinces within Afghanistan.*

January to April Activity: This planned activity will be performed in July 1993.

Planned Activity #2: Six the instructors will teach two, three-and-a-half month construction supervisor courses, according to the current curriculum.

- *The proposed dates are as follows:*

First semester:	*October 1, 1992 - January 15, 1993*
Practical Training:	*January 19, 1993 - March 18, 1993*
Second Semester:	*April 22, 1993 - July 7, 1993*

- *Conduct classes six hours a day, five days a week using student-centered teaching techniques.*
- *Deliver lectures and distribute handouts, reference books and other instructional materials to supplement the theory covered in class.*

- *Assign and grade on a daily basis and use laboratory work, field trips, and audiovisual equipment to enhance the learning process.*
- *Provide feedback on student performance.*
- *Evaluate students based on homework, monthly tests and final exams.*
- *Invite professionals with expertise in the field of construction to share their experience and knowledge with students through lectures and non-formal discussion.*

January to April Activity: The first semester final exams for students in the Assistant Engineer Program began January 3, and ended on January 14, 1993. Of the 27 students enrolled in the program, 25 students participated in the final examination. Twenty-two students passed their exams and three students took second-chance exams in English. Two students were absent during the exams because they returned to Afghanistan with their families. The exam results were announced to students on January 18. The students' final grade for the semester was based on two to three tests given during the semester (40 percent), five to six quizzes (10 percent), laboratory work and homework (10 percent) and a final exam given at the end of the semester (40 percent). Students must achieve a combined average of 50 percent or above in all their subjects in order to be promoted to the next semester.

Second-chance examinations in English, were administered to students on April 1. All three students passed their exams.

From January 19 to March 18, classes were also not in session due to the two-month practical training work. Fourth semester classes for the Assistant Engineering students resumed on March 21 with 26 students attending. One of last year's students rejoined the program in order to repeat the semester.

During the fourth semester, students are studying the following topics:

Technical English Seminar: Technical terms, writing technical papers, grammar and practice.

Electrical Wiring: Basic electricity, resistance of wire, magnetism, electric power and work, loaded lines, house wiring, electric lighting, and simple electric circuits.

Project Management: Who is a manager, manager and performance, material management, labor management, time management, interpersonal and organizational communication, understanding and improvement of communication, work groups and performance.

Construction Concrete Structure: Moment of inertia, shear stress and bending stress, flexural analysis of beam, design of rectangular beams, design of one-way and two-way slabs, design of columns and design of footings.

Irrigation: Water resource, rainfall drain off, surface water, ground water, the necessity of irrigation, irrigation practice in Afghanistan, irrigation systems' operation and maintenance, flow measurement, crop water requirements, and design of channels, design of irrigation structure.

Highway: Geometry design of highways, drainage of highways, subgrade soils, bituminous materials, bituminous mixes and mix designs, cement concrete roads, and construction of road formations.

Three tests and several quizzes in every subject were administered to students throughout the semester. Teachers also assigned homework and class work on a weekly basis. In the Electrical Wiring class, two experiments were conducted each week by students in the electrical laboratory. One experiment each week was performed by students in the Construction Concrete Structure class. In addition, students were also asked in the class to design a steel frame for a one story building.

Planned Activity #3: The participants and program staff will monitor and evaluate each course to ensure that the quality of instruction is clear, relevant, and is occurring in a positive learning environment.

- *The program manager will monitor classes once a week to observe the teacher's methods, the materials used, and student participation. The program manager will write down his observations and share them with the instructor at the end of the class.*

- *Students will fill out an evaluation at the end of each course. The evaluation will solicit student impressions on pedagogical style and the effectiveness of the curriculum and suggestions will be incorporated into future planning.*

January to April Activity: The program manager monitored seven Assistant Engineer classes on a weekly basis during the semester and noted the same observations that he made while monitoring the Construction Supervisor classes. Specifically, he observed that the teachers and the students were on time to class, that the teachers assigned weekly homework to the students and that lesson plans were prepared by the teachers and followed accordingly. Teachers were knowledgeable about the subjects they were lecturing on and students were interested in the material that was presented in class.

Planned Activity #4: Provide two-month practical training between January 19 and March 18, 1993, by arranging field work with organizations engaged in construction projects such as buildings, bridges, roads, and irrigation structures.

- *In February 1993, have students contact engineering-related NGOs for whom they would like to work during the two-month practical training session.*
- *Teachers from the CRTA program will also contact NGOs by letter and in person in order to arrange field-work positions.*
- *The program manager and two teachers will visit work-sites to observe and monitor the practical training activities of the students.*
- *At the end of the practical training session, the supervisor of the NGO will evaluate the students and report the results to the program manager.*

January to April Activity: Twenty-five Assistant Engineer students began their two-months of practical training with seven Peshawar-based NGOs on January 19 and completed the session on March 18. The students worked on construction-related projects in Peshawar and Afghanistan. The participating NGOs were Afghan Construction and Logistics Unit (ACLU), Volunteers in Technical Assistance (VITA), Pakistan-German Training Program and the German Agency for Technical Cooperation, CARE International, Danish Committee for Aid to Afghan Refugees (DACAAR), and Reconstruction Authority for Afghanistan (RAFA). See Appendix II, Table C for details on the type of work performed by the students and their site locations.

The program manager and one instructor monitored Assistant Engineer students at two practical training sites in Pakistan on February 2 and 9. They observed students at Pak-German projects in Nowshera and Tehkal and one student with a German Agency for Technical Cooperation (GTZ) project in Hayatabad. The students were involved with plumbing and masonry work and soil testing in the laboratory. As with the Construction Supervisor students, the program manager and the instructor were pleased with the student's work at the training sites and felt that the experience and knowledge that students were gaining was relevant to their course work in the Assistant Engineer Program.

Following their practical training session, all the students submitted 20 to 25 page written reports on their experiences to a committee comprised of three program instructors. Based on the reports, the instructors reviewed the practical work and evaluated the students' performances. The students gave detailed descriptions of their assignments, the projects they worked on, the objectives of the training session and a summary of what they learned. The committee members gave the reports a mark of good, very good or excellent. The students made positive comments regarding their work and felt that the practical training was very effective. According to the students' reports, many of the theories taught in class, were applied during the practical training work. Overall, the students were pleased with their practical training experience and felt that the component was beneficial to their studies.

Other Activities:

A follow-up survey conducted by the Construction Supervision staff found that two of the 1992 Assistant Engineer graduates were employed in February and April with CARE International and Afghanistan Rehabilitation Organization (ARO).

3. CONSTRUCTION SUPERVISION PROGRAM: TRANSFER OF PROGRAMS TO AFGHANISTAN

OBJECTIVE: At the earliest appropriate opportunity, explore the possibilities of transferring the Construction Supervision Program to Afghanistan.

Planned Activity #1: Explore the options for transferring the Construction Supervision Program with the other CRTA programs to Kabul University or another suitable site in Afghanistan, under the assistance of an NGO.

- *Contact and arrange meetings with representatives of the Ministry of Higher Education in Kabul and secure permission for transferring the CRTA program to Afghanistan.*
- *Determine alternative sites in Kabul and visit, survey and evaluate each location.*
- *Select a site and secure permission for transfer of the CRTA programs from all necessary local authorities.*
- *Develop a proposed budget and work plan for the transfer of the program for presentation to donors.*

January to April Activity: There were no activities conducted regarding the transfer of the program to Kabul due to continuing security problems.

Planned Activity #2: If a direct transfer with the CRTA program to a government agency is not possible, explore the possibility of transferring the Construction Supervision Program to the Afghan Institute of Technology (AIT) or other appropriate institution.

- *Contact and conduct meetings with representatives from the Ministry of Higher Education and/or other institutions.*
- *Visit AIT or other potential facilities to survey the staff, buildings and facilities.*
- *Develop a comparative feasibility study of integrating the Construction Supervision Program with a potential institutional partner. Conclude the study with a recommendation of the best option.*
- *Develop a proposed budget and work plan for the transfer of the program for presentation to donors and potential implementing partners.*

January to April Activity: There were no activities conducted regarding the transfer of the program to Kabul due to continuing security problems.

4. CONSTRUCTION SUPERVISION PROGRAM: ADMINISTRATIVE ACTIVITIES

OBJECTIVE: Provide administrative and managerial supervision and support for the program staff in order to achieve the objectives and implement the planned activities that have been outlined in this proposal.

Planned Activity #1: The program manager will enhance the educational process through administration, observation, management, and assessment of their programs. Specific activities that will be undertaken in 1992/93 include the following:

- *Prepare a list of students and the stipends that they should receive as they attend courses. Stipends are paid at the end of each month.*
- *Produce and purchase necessary equipment and instructional materials.*
- *Coordinate program activities in order to avoid schedule conflicts.*
- *Prepare the results of final exams and announce them to the students.*
- *Supervise the program budget expenditures and accounting.*
- *Prepare monthly, quarterly, and annual reports and submit them to the CRTA coordinator on a timely basis.*
- *Attend CRTA monthly managers' meetings.*
- *Arrange weekly staff meetings with teaching staff throughout the year.*
- *Maintain building and equipment so that the program runs smoothly.*
- *Supervise and support staff and provide them with written and oral feedback.*
- *Hire and terminate staff as necessary so that the program runs smoothly.*
- *Participate in IRC and AED workshops.*
- *Take care of graduation ceremonies at end of each course.*
- *Prepare work plan and budget for 1993/94.*
- *Meet with students and assist them with problems related to academic affairs.*

- ***Maintain student records and documents.***

January to April Activity: CRTA's senior instructor, Mr. Buhadur Khan, was appointed Program Manager of the Construction Supervision Program. During the first quarter and April, the program manager wrote monthly and quarterly activity reports, assigned teaching loads to instructors, assisted students with academic matters and devised the new time table for the semester. He also revised the program's budget for 1993/1994 and arranged for the students' practical training stipends to be prepared and distributed along with their stationary requirements. In March, the program purchased approximately Rs. 23,000 for second semester supplies such as stationery, notebooks, pencils, pens, sharpeners and erasers.

A meeting for all Construction Supervision teaching staff was held on January 17 to discuss the results of the first semester's final exams and second chance exams. The exam results were prepared by the staff and announced to the students on January 18. The staff also met to discuss the distribution of students to sponsoring NGOs for the two-month practical training session which began on January 19.

The Afghan coordinator for the Science and Technology Training (STT) Program left IRC during the first quarter. Prior to his departure, the STT Program encompassed both the Construction-Related Training Program for Afghanistan (CRTA), the Teacher Training and Textbooks (TTT) Program and the Experimental School. The Construction Program is now operating separately from the latter two programs. The assistant coordinator for CRTA has assumed the responsibilities of coordinator.

The program's physics instructor resigned and left the program in February. The program manager hired a part time physics instructor to replace him. In addition, in March, the program hired a part-time instructor to teach the Islamic studies course.

The Construction Engineering Program received a compression and tension testing machine with accessories in March which will also be made available to Construction Supervision students for use in engineering-related laboratory experiments.

In April, certificates were distributed individually to 18 Assistant Engineer students and 34 Construction Supervisor students who graduated in September 1992.

Other Activities:

A surveying textbook for Construction Supervision students was prepared by Dr. Hassani, the CRTA Coordinator, and Professor Azim Bahramy during the first quarter. The textbook was published by IRC's Printing Press in April.

IV. CONCLUSION

During the USAID grant period from August 1990 and April 1993, the Construction Related Training for Afghanistan Program (CRTA) provided 736 Afghan students and engineers with training in mathematics, science, computers, civil engineering, engineering economics and management and a range of other topics. The Refresher and Professional Development Program offered a total of eight technical courses to 231 Afghan participants from 31 different organizations. A total of 360 students have been enrolled in the Construction Supervision Program with 129 graduates of the Construction Supervisor Program and 39 graduates of the Assistant Engineer Program. In addition, the Construction Engineering Program enrolled 145 students in five semester groups, with 24 students graduating from the program.

Presently, 70 students are attending classes in the Construction Engineering Program and 64 students are participating in both Construction Supervision Programs. Due to lack of sufficient funding, the Refresher and Professional Program was officially closed in March 1993.

USAID has played an important role in supporting the Construction Related Training for Afghanistan Program since August 1990. Funds from USAID have enabled CRTA to train qualified craftsman, supervisors and engineers who posses the skills necessary for reconstructing Afghanistan's destroyed infrastructure. Whether building bridges, or constructing roads, public buildings and other structures, the graduates of this program will play a pivotal role in rebuilding post-war Afghanistan.

APPENDIX I

REFRESHER AND PROFESSIONAL DEVELOPMENT

Table A
Total Number of Participants in Seven Courses Since 1989

Courses / NGOs	I Engineering Management	II Construction of Roads and Bridges	III Reinforced Concrete	IV Water Resource	V Engineering Economy	VI Water Supply	VII Engineering Management2	VIII Construction Engineering Management	TOTAL
VITA	1	2	3	2	0	1	1	1	11
ACLU	3	3	4	2	6	2	0	3	23
RAFA	3	2	4	2	0	1	0	0	12
IRC/ELP	2	1	0	0	0	0	0	0	3
AIG	6	1	0	0	4	0	0	0	11
DACAAR	0	1	2	1	3	4	0	0	11
GTZ	5	2	1	0	1	0	1	0	10
CAR	0	1	0	0	0	0	0	1	3
SCF	2	0	0	0	2	0	0	0	4
START	1	0	0	2	0	3	0	1	7
CRTA STAFF	1	3	3	4	2	2	4	1	20
MTP	1	2	0	1	3	0	4	2	13
IRC/CE	0	1	0	4	7	0	0	1	13
PAK-GER	0	0	0	0	4	0	0	0	4
SWED COM	0	2	0	1	1	2	0	0	6
IRC/RPA	0	0	1	0	0	0	0	0	1
IMC	0	0	1	0	0	0	0	0	1
HIA	0	0	1	0	0	0	0	0	1
IIA	0	0	0	1	3	4	2	0	10
COAR	0	0	0	1	1	3	0	1	6
IRC/RAP	0	0	0	1	0	0	0	0	1
CARE INT	0	0	0	2	1	0	0	0	3
IRA	0	0	0	0	2	0	1	0	3
ASMATI	0	0	0	0	1	0	0	0	1
ACRD	0	0	0	0	0	1	0	0	1
PRS	0	0	0	0	0	1	0	0	1
CBR	0	0	0	0	0	1	3	0	4
AVICEN	0	0	0	0	0	1	0	0	1
IAAAE	0	0	0	0	0	2	0	1	3
ARC	0	0	0	0	0	0	1	0	1
ADA	0	0	0	0	0	0	1	0	1
UNEMPLOYED	2	8	6	0	3	7	7	8	41
TOTAL	27	29	27	24	44	35	25	20	231

APPENDIX I

REFRESHER AND PROFESSIONAL DEVELOPMENT PROGRAM

Table A (cont) : The Following Organizations are Represented by Acronyms Used Above:

ACLU:	Afghan Construction and Logistics Unit
ACRD:	Afghan Center for Rural Development
ADA:	Afghan Development Association
AIG:	Afghan Interim Government
ARC:	Austrian Relief Committee
ASMATI:	ASMATI Association
AVICEN:	Afghan Vaccination and Immunization Center
CAR:	Coordination for Afghan Relief
CARE INT:	CARE International
CBR:	Consultant Bureau for Reconstruction
COAR:	Coordination of Afghan Relief
DACAAR:	Danish Committee for Aid to Afghan Refugees
DAI:	Development Alternatives Incorporated
ESAR:	Engineering Services for Afghan Rehabilitation
GTZ:	German Agency for Technical Cooperation
HIA:	Hezb-i-Islami Afghanistan
IAAAE:	Islamic Association of Afghan Architects and Engineers
IIA:	Ittehad-i-Islami Afghanistan
IMC:	International Medical Corps
IRA:	Islamic Relief Agency
IRC/CE	IRC's Construction Engineering Program
IRC/CRTA	IRC's Construction Related Training for Afghanistan Program
IRC/ELP:	IRC's English Language Program
IRC/RAP:	IRC's Rural Assistance Program
IRC/RPA:	IRC's Rehabilitation Program for Afghanistan
MTP:	Manpower Training Program (part of Academy for Educational Development)
PAK-GER:	Pakistan - Germany Training Program (GTZ)
PRP:	Paktia Reconstruction Program
PRS:	Paktia Reconstruction Service
RAFA:	Reconstruction Authority for Afghanistan
RCA:	Reconstruction Consultant for Afghanistan
SCF:	Save the Children Fund-US
START:	Short Term Assistance to Rehabilitation Team
SWED COM:	Swedish Committee for Afghanistan
VITA:	Volunteers in Technical Assistance

APPENDIX I

CONSTRUCTION ENGINEERING PROGRAM

Table 8
Employment of 1991 and 1992 graduates

No.	Employment Organization	Graduates in 1991	Graduates in 1992
		9	15
1	Construction Related Training for Afghanistan (CRTA/IRC)	1	
2	English Language Program (ELP/IRC)	1	
3	South West Farmer Assistant Development (AWFAD)	1	
4	CARE International (CARE)	1	3
5	Afghan Construction and Logistic Unit (ACLU)	3	4
6	Danish Aid Committee for Afghan Refugees (DACAAR)		1
7	Reconstruction and Rural Development of Afghanistan (RDA)		1
8	Jehad Consultant Engineer (JCE)		1
9	Reconstruction Consultant for Afghanistan (ARCAN)	1	2
10	German Agency for Technical Cooperation/ Domestic Energy Saving Project (GTZ)		1
11	Swedish Committee for Afghanistan		1
12	Scholarship to the USA	1	1
TOTAL		9	15

APPENDIX I

CONSTRUCTION ENGINEERING PROGRAM

Table C
Construction Engineering Eight Semester Curriculum (Revised 1991)

First Semester	Credit	Theory	Practice
Islamic Studies	1	1	-
Math I	5	5	-
Chemistry	4	3	2
Drawing I	2	1	3
Introduction to Engineering	2	2	-
Computer	3	1	2
English	3	3	-

Second Semester	Credit	Theory	Practice
Islamic Studies	1	1	-
Math II	4	4	-
Physics	4	3	2
Drawing II	2	1	3
Statics	3	3	-
Surveying I	3	2	4
English	3	3	-

Third Semester	Credit	Theory	Practice
Islamic Studies	1	1	-
Math III	4	4	-
Physics II	4	3	2
Strength of Materials	4	3	2
Surveying II	3	2	4
English	3	3	-

APPENDIX I

CONSTRUCTION ENGINEERING PROGRAM

Table C
Construction Engineering Eight Semester Curriculum (Revised 1991)

Fourth Semester	Credit	Theory	Practice
Islamic Studies	1	1	-
Math IV	4	4	-
Physics III	4	3	2
Concrete I	4	3	2
Fluid Mechanics	4	3	2
English	3	3	-

Fifth Semester	Credit	Theory	Practice
Islamic Studies	1	1	-
Geology	3	3	-
Structural Analysis	3	3	-
Concrete II	4	3	2
Technical Communication	2	2	-
Electrical Engineering I	3	2	2
Hydraulic	4	3	2

Sixth Semester	Length of Time	Credit
Practical Training: Between 4th and 5th Semesters	Nine Weeks	2
Practical Training: Between 7th and 8th Semesters	Nine Weeks	2

APPENDIX I

CONSTRUCTION ENGINEERING PROGRAM

Table C (Continued)
Construction Engineering Eight Semester Curriculum (Revised 1991)

Seventh Semester	Credit	Theory	Practice
Islamic Studies	1	1	-
Hydrology	3	3	-
Soil Mechanics	4	3	2
Engineering Management	3	3	-
Water Supply	4	3	2
Dynamics	3	3	-

Eighth Semester	Credit	Theory	Practice
Islamic Studies	1	1	-
Sanitation Engineering	4	3	2
Project Design	3	1	4
Foundation	4	3	2
Engineering Highway	4	3	2
Engineering Economy	3	3	-

Note: To graduate from the program, a student must successfully complete a total of 140 credits of course work and two practical trainings of nine weeks duration each.

APPENDIX I

ASSISTANT ENGINEER PROGRAM

Table D
Employment Record of Assistant Engineer Graduates

Employment Organizations	Assistant Engineer Graduates:		
	1990	1991	1992
	10	11	18
CRTA (IRC)	1		
RPA (IRC)			1
HIA	1		
PRP		1	
ARCON		2	2
START			1
SRP (IRC)			1
SCA			2
ViTA	1	2	
ACLU	4	2	
RDW/UNDP			1
DACAAR		1	
ARO			1
DAI	1		
CARE			1
TOTAL EMPLOYED	8	8	10
CONTINUED STUDIES			
IMMIGRATED	2	1	
UNEMPLOYED			4
UNKNOWN		2	4

The following organizations are represented by acronyms used above:

IRC/CRTA:	IRC's Construction Related Training for Afghanistan
IRC/RPA:	IRC's Rehabilitation Program for Afghanistan
HIA:	Hezb-i-Islami Afghanistan
PRP:	Paktia Reconstruction Program
ARCON:	Afghanistan Reconstruction Consultants

APPENDIX I

ASSISTANT ENGINEER PROGRAM

Table D (Continued)
Employment Record of Assistant Engineer Graduates: Acronyms Used in the Previous Table

IRC/SRP:	IRC's Self Reliance Program
START:	Short Term Assistance to Rehabilitation Team
SCA:	Swedish Committee for Afghanistan
VITA:	Volunteers in Technical Assistance
ACLU:	Afghan Construction and Logistics Unit
RDW/UNDP:	Rural Development of Wardak/UN Development Program
DACAAR:	Danish Committee for Aid to Afghan Refugees
ARO:	Afghanistan Rehabilitation Organization
DAI:	Development Alternatives Incorporated
CARE:	CARE International

APPENDIX II

CONSTRUCTION ENGINEERING PROGRAM

Table A
Number of Students Participating in the Construction Engineering Program During the First Quarter and April 1993

Number of students in January who:	First Semester	Third Semester	Fourth Semester
Participated in final exams	26	26	18
Passed exams	21	18	17
Took second chance exams	4	8	1
Will repeat next year	1	0	0
Rejoined program	3	0	1
Promoted to next semester	28	26	19
Number of students from February to April who:	**Second Semester**	**Fourth Semester**	**Fifth Semester**
Left the program	3	0	0
Currently enrolled	25	26	19

APPENDIX II

CONSTRUCTION SUPERVISOR PROGRAM
Table B
1993 Practical Training Session for Construction Supervisor Students

NGOs	Location	Students	Total	Type of Work Performed
ACLU	Peshawar	2	3	Road construction and cost estimation
	Nangarhar	1		
VITA	Logar	1	6	Irrigation and road construction
	Paktia	2		
	Kunar	3		
PAK-GER	Peshawar	5	5	Plumbing and masonry work
IRC/SRP	Peshawar	5	5	Water supply
START	Paktia	2	4	Road construction and irrigation
	Nangarhar	2		
DACAAR	Nangarhar	4	4	Irrigation and rural water supply
ESAR	Laghman	5	5	Road construction and precast beams
RAFA	Kunar	2	2	Road construction and irrigation
COAR	Peshawar	1	1	Road construction and irrigation
ERSA	Nangarhar	3	3	Irrigation systems
GTZ	Peshawar	5	5	Soil lab and stabilized brick
Total	Pakistan	18	43	
	Afghanistan	25		

The following organizations are represented by the acronyms above:

ACLU:	Afghan Construction and Logistics Unit
COAR:	Coordination of Afghan Relief
DACAAR:	Danish Committee for Aid to Afghan Refugees
ERSA:	Engineering Reconstruction Service for Afghanistan
ESAR:	Engineering Services for Afghan Rehabilitation
GTZ:	German Agency for Technical Cooperation
IRC/SRP:	IRC's Self Reliance Program
PAK-GER:	Pakistan - Germany Training Program (GTZ)
RAFA:	Reconstruction Authority for Afghanistan
START:	Short Term Assistance to Rehabilitation Team
VITA:	Volunteers in Technical Assistance

APPENDIX II

ASSISTANT ENGINEER PROGRAM

Table C
1993 Practical Training Session for Assistant Engineer Students

NGOs	Location	Students	Total	Type of Work Performed
ACLU	Paktia	2	5	Road construction and cost estimation
	Nangarhar	3		
VITA	Kundahar	1	3	Irrigation and road construction
	Paktia	1		
	Kunar	1		
PAK-GER	Peshawar	4	4	Plumbing and masonry work
CARE	Paktia	4	4	Road construction
DACAAR	Kunar	2	6	Irrigation and rural water supply
	Nangarhar	4		
RAFA	Kunar	2	2	Road construction and irrigation
GTZ	Peshawar	1	1	Soil lab and stabilized brick
Total	Pakistan	5	25	
	Afghanistan	20		

The following organizations are represented by acronyms used above:

ACLU:	Afghan Construction and Logistics Unit
CARE:	CARE International
DACAAR:	Danish Committee for Aid to Afghan Refugees
GTZ:	German Agency for Technical Cooperation
PAK-GER:	Pakistan - Germany Training Program (GTZ)
RAFA:	Reconstruction Authority for Afghanistan
VITA:	Volunteers in Technical Assistance

Tlx : 52448 IRC PE PK
Tel : 41845-41274-43242

International Rescue Committee

G.P.O. 504, PESHAWAR - PAKISTAN

John Tucker
Human Resource Development Project Officer
USAID - O/AID/REP
Peshawar

17 June, 1993
Re: CA# 306-0211-A-00-0967-00: IRC CRTA
closing report

Dear John,

Attached please find IRC's closing narrative report detailing the activities of the Construction Related Training Program for Afghanistan (CRTA) funded under the aforementioned USAID cooperative agreement. The report details the significant achievements of the program during nearly three years of USAID support. Since the inception of USAID funding in August 1990, CRTA has provided technical training for 736 Afghan students and engineers. CRTA's Refresher and Professional Development Program offered a total of eight technical courses to 231 engineers from 31 organizations. 360 students have attended the nine-month Construction Supervision Program or subsequent nine-month Assistant Engineer Program. CRTA's flagship program, the 36-month Construction Engineering Program, enrolled 145 students during the five semesters of USAID funding.

As you know, CRTA is continuing with IRC funding and a sub-agreement with AED. Presently, there are 70 students attending classes in the engineering program with 64 more attending the Construction Supervision Programs. The Refresher and Professional Development Program has been closed due to insufficient funds.

Please contact us with any questions or comments you may have on the attached reporting. IRC greatly appreciates USAID's generous support for this important project.

Kind Regards,

Randolph Martin
Director

cc: NY, CRTA, Toc>f74

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