

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
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Civilian Personnel
TRAINING AND CAREER DEVELOPMENT PLANS FOR INTERN
AND INTERMEDIATE LEVEL ARCHITECTS

1. Purpose. This Engineer Pamphlet (EP) provides policy, guidance, and procedures concerning the development of training and career development plans for intern and intermediate level personnel in the occupational series of GS-0808-Architecture (architects) within the U.S. Army Corps of Engineers (USACE).

2. Applicability. This pamphlet applies to all Headquarters, U.S. Army Corps of Engineers (HQUSACE) elements, major subordinate commands (MSC), districts, laboratories, and field operating activities (FOA).

3. References. References and additional information resources are listed at Appendix A.

4. Background.

a. Architectural positions at the intern (GS-0808-5/9) and intermediate (GS-0808-11/12) levels are included in the Engineers and Scientists (Resources and Construction) (ESRC) career program. Training and development plans for the ESRC career program have been developed along functional lines rather than by occupational series. The six functional areas include engineering, Civil Works planning, construction, operations, facilities, and research and development. However, in the occupational series of GS-0808-Architecture, more specific training and development planning are necessary for intern and intermediate level career program employees/individual due to unique requirements imposed by state architectural registration boards which explained at Appendix B.

b. Chapter 11 of AR 690-950 defines a Master Intern Training Plan (MITP), and postintern training and development for all individuals in the ESRC career program. MITP requires interns to complete rotational assignments of approximately four months each in the functional areas of engineering, planning, construction, and operations. In addition, a facilities engineering orientation of at least four weeks is required. Interns in research and development activities are required to complete rotational assignments within their research specialties. Postintern training and

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development at the intermediate level (specialist and intermediate levels per AR 690-950) stress the development of technical proficiency through extensive on-the-job experience. Postintern training at the intermediate level also includes appropriate training and developmental assignments in selected technical and functional areas, and encourages individuals to take job-related courses on their own time at nearby colleges and universities.

c. Since the MITP is general in nature, the servicing Human Resources Office/Civilian Personnel Office (HRO/CPO) and the activity Career Program Manager (CPM) must prepare specific training plans for each intern based upon the education and experience of the intern. These plans should ensure that interns will receive the appropriate rotational on-the-job experience, formal training, and individual self-paced study to develop their knowledge, skills and abilities in order for them to perform competently in their specialty.

d. During an individual's intermediate level training and development, his/her supervisor is required to develop an Individual Development Plan (IDP) with the individual. The IDP should systematically continue the individual's professional career development to assure that he/she receives the training and development necessary to fill key positions within USACE, and to assure that USACE receives maximum productivity with limited human resources.

5. Objectives. The overall objectives of this pamphlet are to provide guidance for management and career program employees/individuals in the GS-0808-Architecture occupational series to develop specific intern training plans and IDP to bridge the gap between formal education and professional registration, and to professionally develop architectural personnel to fill key positions within USACE. All training and development plans should be comprehensive in design to allow individuals to reach their desired career goals, and to contribute to the professional development of competent registered architects who can provide excellence in architectural services for USACE and our customers. Comprehensive plans are necessary to recruit, develop and retain quality personnel within USACE and to reinforce the discipline, integrity, judgement, knowledge, skills, abilities, and quest for learning that must serve the registered architect and USACE professional for a lifetime. Specific objectives include the following:

a. Define the areas of architectural practice in which intern and intermediate level career program employees/individuals in the 0808-Architecture series should acquire basic knowledge and skills to qualify for professional registration.

b. Provide greater access to developmental assignments and supplementary education opportunities designed to enrich the architect's training and professional development within USACE, and to obtain broader career skills and knowledge which will help prepare them for progression.

c. Encourage additional training in the broad aspects of architectural practice within the USACE organization, and provide opportunities to strengthen field knowledge, experience and operations management capabilities.

d. Provide the highest quality information and advice concerning opportunities to strengthen the USACE architect's technical, professional, policy development, supervisory, managerial and leadership skills.

6. Organization and Responsibilities. The organization and responsibilities for developing specific intern training plans and IDP for architects build upon the existing line management, career program management, and personnel office organizations. The ESRC FCR, with the assistance of the ESRC Career Planning Board, will guide the operation and advise the ESRC FC on needed changes.

a. Human Resources Offices/Civilian Personnel Offices (HRO/CPO). Servicing HRO/CPO are responsible for the effective administration of the training and career development program for intern and intermediate level architects as part of the ESRC career program. Specific responsibilities are listed in AR 690-950.

b. Activity Career Program Managers (CPM). Activity CPM are responsible to give functional advice and assistance to the activity commander and the servicing HRO/CPO. Activity commanders may also appoint a registered architect within the activity to assist the activity CPM. Specific responsibilities, in addition to those listed in AR 690-950, are as follows:

(1) Coordinate individual intern training programs and IDP for intermediate architects with The American Institute of Architects (AIA) and the National Council of Architectural Registration Boards (NCARB) state and local coordinators of the AIA/NCARB Intern-architect Development Program.

(2) Coordinate individual intern training programs and IDP for intermediate architects with appropriate state architectural registration boards.

(3) Encourage all intern and intermediate level architects to participate in the program and to seek professional registration.

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c. Supervisors/Sponsors. Each intern and intermediate level architect should have a sponsor who is a registered architect within his/her activity (as required by state architectural registration boards). If the individual's immediate supervisor (or possibly the activity CPM for an intern) is a registered architect, he/she will serve the individual's sponsor. If the individual's supervisor is not a registered architect, a sponsor who is a registered architect should be assigned to support the supervisor. As the individual's responsibilities change over time, different people may assume the supervisor's/sponsor's role. Specific responsibilities, in addition to those listed for supervisors in AR 690-950, include the following:

(1) Supervise the career program employee/individual on a daily basis. The sponsor may, or may not, be the intern or intermediate architect's, project or design team leaders, group leaders, etc., may serve as sponsors. However, the sponsor should interact with the individual on a regular basis concerning the assignments and activities that the individual is tasked to accomplish.

(2) Regularly assess the quality of work performed by the individual. If the sponsor is not the individual's immediate supervisor of record, he/she should provide input to the individual's immediate supervisor of record concerning the intern's Annual Career Appraisal (DA Form 4428-R) and the individual's Civilian Performance Rating (DA Form 5398-R).

(3) Periodically certify the individual's record of training and supplementary education in order to verify requirements of state architectural registration boards.

(4) Make arrangements with an on-site registered professional (i.e. registered architect, professional engineer, interior designer, or landscape architect) to assist in assuring that the individual is receiving appropriate training and to certify that the training is in accordance with state registration criteria while the individual is detailed to another location, such as an area or resident engineer's office.

(5) Confer, if needed, with the individual's advisor. Telephonic conference with the advisor is authorized to preclude any travel expenses.

d. Advisors. In addition to the normal ESRC career program organization, it is recommended that each intern and intermediate level architect have an advisor who is a registered architect. Registered architects who have been appointed to assist activity CPM may serve as advisors. The same person should not serve as an individual's sponsor and advisor unless absolutely necessary due to lack of available registered architects. Advisors are responsible for periodic reviews of the individual's

training progress and discussions concerning the individual's career objectives. Specific responsibilities include the following:

(1) Meet at least once every four months with the individual to review progress and acknowledge the individual's training and professional development assessment report.

(2) Suggest additional training and supplementary education activities.

(3) Provide guidance to enhance the individual's professional growth.

(4) Confer, if needed, with the individual's supervisor/sponsor. Telephonic conference with the supervisor/sponsor is authorized to preclude any travel expenses.

e. Career Program Employees/Individuals. Persons in the ESRC career program within the occupational series of GS-0808-Architecture at the intern (GS-0808-5/9) and intermediate (GS-0808-11/12) levels are encouraged to participate in the training and development plan for architects. The career program employee/individual is the prime beneficiary of the plan. To gain the greatest benefit from application, the individual should pursue it as a cooperative arrangement with USACE. The individual should recognize that a commitment of time apart from normal working hours is often necessary to ensure that office assignments and due dates are maintained while training is being acquired. Individuals must also understand that specific areas of training is being acquired. Individuals must also understand that specific areas of training may not always be available at a specific time or even at the current location where the individual is employed. Specific responsibilities, in addition to those listed in AR 690-950, include the following:

(1) Select an advisor who can make a long-term commitment to his/her professional growth (if his/her state registration board an advisor, if the individual desires to have an advisor).

(2) Schedule and meet with his/her advisor at least every four months. While the individual's immediate supervisor, may, or may not, allow an appropriate amount of time for the individual to meet with his/her advisor during normal working hours, travel expenses are not authorized to attend meeting with an advisor. The individual should keep this in mind when selecting an advisor.

(3) Utilize supplementary education resources.

(4) Select state they will be seeking registration from and coordinate specific training or other requirements with that registration board.

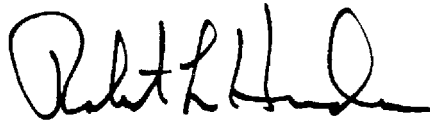
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(5) Prepare employment verification/training reports (on forms acceptable to their state registration board) every four months until all training requirements are satisfied. Individuals with NCARB/Intern-architect Development Program Council records must submit reports to the Council office on 1 January, 1 May, and 1 September.

7. Training and Professional Development Requirements. Individual development plans for intern and intermediate level architects should be developed to satisfy the training requirements at Appendix B through on-the job, developmental, and rotational assignments. Obviously, the requirements of the individual's development plan should coincide with the mission and workload requirements of USACE. Specific areas of training may not be available to individuals when or where individuals wants.

8. Supplementary Education. Supplementary education serves two primary functions, i.e., to expand upon knowledge, skills and abilities acquired through training, and to keep abreast of new information affecting architectural practice. Formal training is not designed to substitute for training required at Appendix B, but rather to supplement day-to-day experience. Supplementary education sources are listed at Appendix C. The courses listed are not intended to be required, nor is the Government obligated to allow an individual to take all of the courses.

FOR THE COMMANDER:



ROBERT L. HERNDON
Colonel, Corps of Engineers
Chief of Staff

3 Appendices

APP A - References and Additional Resources

APP B - Training Requirements

APP C - Supplementary Education

APPENDIX A

REFERENCES AND ADDITIONAL RESOURCES

Department of the Army.

- a. AR 415-17, Cost Estimating for Military Programming.
- b. AR 690-400, Chapter 410, Training.
- c. AR 690-950, Career Management.
- d. DA Pamphlet 690-43, A Supervisor's Guide to Career Development and Counseling for Career Program Employees.
- e. Army Civilian Training, Education and Development System (ACTEDS) for Engineers and Scientists (Resources and Construction) as issued by Army-wide memorandum dated 3 December 1990. Additional copies are available from the Secretary, ESRC Career Planning Board, ATTN: CEHR-ZE, 20 Massachusetts Ave., N.W., Washington, DC 20314-1000.

U.S. Army Corps of Engineers.

- a. ER 350-1-414, Proponent Sponsored Engineer Corps Training (PROSPECT) Program.
- b. ER 350-1-416, Headquarters, U.S. Army Corps of Engineers (HQUSACE) Centrally and Locally Sponsored Long-Term Training (LTT) Program.
- c. ER 415-345-42, Costs, Cost Estimating, and Reserves for Contingencies.
- d. ER 690-1-958, Army Civilian Career Development Program for Engineers and Scientist (Resources and Construction).
- e. CEHND Pamphlet 350-1-1, The Purple Book, Managers and Supervisors Training Handbook.

The American Institute of Architects (AIA). The following resources are available free of charge from the Education Services Center, The American Institute of Architects, 1735 New York Avenue, N.W., Washington, DC 20006.

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- a. Listings of Intern-architect Development Program state coordinators, local coordinators, and educator coordinators.
- b. Intern-architect Development Program slide show (available on loan).
- c. "Guide for Intern-architect Development Program Implementation in the Office."
- d. "Guide for Intern-architect Development Program Implementation in the Component."
- e. "Guide for Intern-architect Development Program Introduction in the School."
- f. "SupEdGuides" brochure and price list.
- g. "Professional Development Resource Catalog" which includes a listing of all AIA-approved supplementary education resources.
- h. "Syllabus for an Intern-architect Development Program Supplementary Education Seminar Series for Intern-Architects" which includes AIA approval procedures.

The National Council of Architectural Registration Boards (NCARB). The following resources are available free of charge from the National Council of Architectural Registration Boards, Suite 700, 1735 New York Avenue, N.W., Washington, DC 20006.

- a. NCARB "Member Board Requirements Chart."
- b. Application (form 112) and instructions (111) for an NCARB Council record.
- c. NCARB "Circular of Information No.1", NCARB organization, services, procedures, examinations, and certification requirements.
- d. NCARB "Circular of Information No.2", Architect Registration Examination (A.R.E.).
- e. NCARB "A.R.E. Handbook" order form.
- f. NCARB "Circular of Information No. 3", NCARB education requirements.
- g. "Inter-architect Development Program Guidelines" (explaining the AIA/NCARB Intern-architect Development Program).

APPENDIX B

TRAINING REQUIREMENTS

1. Background.

a. One of the key USACE professional development policies is that professional registration, participation in professional societies, and other evidence of continued self development are marks of excellence and indicators that an individual has made a personal effort to keep abreast of advances and changes in his/her profession. Continual support and leadership are required to encourage USACE personnel to seek professional registration in those disciplines where it is available.

b. The education of today's architects typically begins in schools of architecture, is augmented by training in architectural offices, and is refined through continuing education and practice. An intern-architect in the private sector has a structured Intern-architect Development Program which is administered by The American Institute of Architects (AIA) and the National Council of Architectural Registration Boards (NCARB).

c. Regulation of the profession or architecture, including the registration of practitioners, is a function of each state. All fifty states, the District of Columbia, Guam, the Northern Mariana Islands, Puerto Rico, and Virgin Islands have established registration boards. Each board has established a set of registration requirements that, when satisfied, results in the granting of an architectural license. State of registration requirements establish the minimum criteria to legally practice architecture.

d. Every state registration board requires that intern-architects acquire experience under a registered architect's supervision. Many state boards also accept some experience acquired under the supervision of other professionals, e.g., professional engineer, interior designer, landscape architect, planner or general contractor. The specific amount and quality of experience constitutes a state board's training requirements.

e. All state boards require a minimum period of training. Most boards that require a professional degree from an accredited program (or equivalent education) require three years of training. For state boards with different education requirements, the training period varies considerably. In addition to the specific training period, a growing number of state boards are requiring the training to be in specific areas of architectural practice.

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2. Purpose of the AIA/NCARB Intern-architect Development Program. The AIA/NCARB Intern-architect Development Program was created in order from the intern-architect to bridge the gap between formal education and architectural registration through a training/experience plan designed to meet the training requirements adopted by most state registration boards. The program is a comprehensive internship plan that contributes to the professional development of competent architects who can provide excellence in architectural services.

3. Training Requirements. To satisfy the AIA/NCARB Intern-architect Development Program training requirements, career program employees/individuals must complete specific period of training in three major categories, i.e., design and construction documents, construction administration, and office management. Each of these categories is further subdivided into training areas and a specific minimum period of training must be completed in each training area. The training is measured in value units where value unit equals eight hours of acceptable experience. The career program employee/individual must acquire a total of 700 value units (5,600 hours of experience) to satisfy the training requirements. There are minimum requirements for each category which total 465 value units (3,720 hours of experience). The difference (235 value units) between the sum of the minimum requirements for each category and the total requirement can be acquired from any of the three major categories as well as from a fourth category, i.e., related special activities.

Category A - Design and Construction Documents

A minimum of 360 value units (2,880 hours of experience) are required in the design and construction category. The difference between the minimum of 360 value units for this category and the sum of the minimums on each training area must be acquired by earning additional value units from training areas within the design and construction documents category. The following training areas and minimum value units are required.

a. Programming - Client Contact. Programming is the process of setting forth the user's requirements for a given project in writing. Steps in this process include establishing goals; considering a budget; collecting, organizing and analyzing data; isolating and developing concepts; and determining needs in general. The project will also be affected by funding limitations; scheduling limitations; Department of Defense (DoD), DA, and USACE health, welfare and safety criteria; and input from the Major Army Commands (MACOM), the people who will work in the built environments (the users), and cost-sharing or other partners (local sponsors) on Civil Works projects. All of this input at the programming stage is essential in order to maintain an orderly design process.

(1) A minimum of 10 value of units (80 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Participate in conferences with MACOM, installation, user, and cost-sharing or other partner representatives regarding programming, periodic reviews and formal presentations, and assist in preparing minutes or reports for future reference.

(b) Assist with presentations at zoning and variance hearings, and at meetings with the MACOM and installation, or cost-sharing and other partners concerning specific projects.

(c) Assist in preparing the summary and evaluation of data and requirements obtained from all sources. The summary is the basis for the final written programs.

(d) Research current literature pertaining to architectural programming.

b. Site and Environmental Analysis. Site analysis includes land planning, urban design, and environmental evaluation. Land planning and urban design are concerned with relationships to surrounding areas and involve consideration of the physical, economic, and social impact of proposed land use on the environment, ecology, traffic and population patterns. Documentation may be required on the results that construction will have on the surrounding environment, e.g., environmental impact studies. Decisions relating to site analysis must involve the selection, organization, and evaluation of pertinent data that will lead to the resolution of the user's program while conforming to legal requirements.

(1) A minimum of 10 value units (80 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Assist in analyzing several sites to assess the feasibility of their use for a proposed project.

(b) Help to analyze the feasibility of using the site for the project.

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(c) Assist in the analysis of the impact of specific land use and location for a project.

(d) Assist in the formulation of the most appropriate land use strategy to achieve a desired environmental impact.

(e) Research site restrictions such as zoning, easements, utilities, etc.

(f) Participate in public hearings and meetings about land use issues and prepare reports for future reference.

c. Schematic Design. From the user's approval program, the architect develops alternative solutions to satisfy technical and aesthetic requirements. Preferred schemes are presented until the user and architect can agree, and all other DoD, DA, and USACE criteria are met.

(1) A minimum of 15 value units (120 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Participate in the development and preparation of preliminary design concepts to determine the spatial relationships that best satisfy the user's program (functional and operational requirements).

(b) Participate in the development and coordination of program requirements with consultants (other disciplines).

(c) Assist in the preparation of presentation drawings and models.

(d) Assist in the analysis and selection of engineering systems.

(e) Participate in design review and approval meetings with MACOM, installation, user, and cost-sharing or other partner representatives.

d. Building and Cost Analysis. An important responsibility of the architect is to evaluate the probable project construction costs. Accurate estimates are crucial to all parties involved with the project. Estimates influence decisions involving basic design, selection of building products and systems, and construction scheduling. Long-term maintenance, as well as the impact of material and systems selection (value

engineering), are additional factors which bear on project development. Preliminary cost analysis for a project is normally computed based on area and/or volume related to historical costs, e.g., the initial DD Form 1391 for military projects, or the Legislative Maximum Project Cost Limitation (LMPCL) or Administrative Maximum Project Cost Limitation (AMPCL) for Civil Works projects. Cost estimates provided later during the design process, e.g., the DA Form 3086 for military projects or the Project Cost Increase Fact Sheet for Civil Works projects, are determined on the basis of labor and material requirements (quantity surveys) which require a more specialized knowledge of construction costs.

(1) A minimum of 10 value units (80 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Calculate the costs of a project based on area/or volume in accordance with AR 415-17 for the initial DD Form 1391 for a military project or, calculate a LMPCL or AMPCL for a Civil Works project.

(b) Make a simplified quantity take-off of selected materials and prepare comparative cost analyses.

(c) Assist in the preparation of cost estimates at each stage of a project, i.e., initial DD Form 1391, LMPCL or AMPCL, DA Form 3086, Project Cost Increase Fact Sheet, and the final Government estimate.

(d) Review various references and texts utilized in cost estimating, e.g., AR 415-17, ER 415-345-42, and commercial sources (Means and Dodge construction cost data).

(e) Assist in the preparation of cost analyses for current projects using a variety of indices, e.g., cost per square foot, cost per cubic foot, other unit measurements, etc. Participate in a value engineering study for an ongoing project.

(f) Conduct a survey of current costs per square foot of various types of projects.

e. Code Research. Building inspectors, as well as officials in zoning, environmental and other agencies relating to health, welfare, and the safety of the public, oversee the enforcement of federal, estate, and local regulations relating to building design and construction. Codes and regulations have a direct bearing on the

total design process. Thorough knowledge of all requirements is essential to the satisfactory completion of any project.

(1) A minimum of 15 value units (120 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Assist in searching and documenting codes, regulations, ordinances, etc., for limited or more specific projects.

(b) Assist procedures necessary to obtain relief or variances from particular requirements as they relate to a project.

(c) Calculate certain variables (e.g., number and size of exits, stair dimension, public toilet rooms, and ramps) that satisfy various code requirements.

(d) Determine a project's allowable land coverage as well as maximum areas in compliance with zoning and any other related ordinances.

f. Design Development. Based on the user-approved schematic design, the architect revises and details, for the user's further approval, the character of the entire project, including the selection of materials and engineering systems (i.e., full concept design level).

(1) A minimum of 40 value units (320 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Participate in the preparation of detailed development drawings (concepts design level) from schematic design documents.

(b) Assist in developing various schedules and outline specifications for materials, finishes, fixed equipment, fixtures, construction time, and construction cost.

(c) Help to coordinate engineering systems proposed for the project.

(d) Participate in design review and approval meetings with MACOM, installation, user, and cost-sharing or other partner representatives.

g. Construction Documents. The working drawing phase of construction documents preparation constitutes the major activity in an architect's office. These drawings describe, in graphic form, all of the essentials of the work to be done, i.e., the location, size, arrangement, and details of the project. As the successful and timely execution of these documents directly relates to the office's budget and the quality of the project, architects must constantly search for more efficient ways to produce construction documents. Regardless of the method of preparation, it is extremely important that the documents be accurate, consistent, complete, and understandable. This requires thorough quality control including constant review and cross-checking of all documents. In addition, effective coordination of the drawings from other disciplines is essential to avoid conflicts between the various trades during construction.

(1) A minimum of 155 value units (1,240 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Work in the preparation of detail drawings, developing technical skills in drafting accuracy, completeness, and clarity. Both manual and computer-aided drafting and design (CADD) experience are recommended.

(b) Assist in the coordination of all architectural documents and documents produced by the other disciplines.

(c) Develop a knowledge of professional responsibilities and liabilities arising out of the issuance of construction documents.

(d) Participate in the mechanics of reproducing and assembling the finished construction documents.

(e) Assist the project team leader (or equivalent) in routine administrative/control tasks.

h. Specifications and Materials Research. Well-founded knowledge of specification writing principles and procedures is essential to the preparation of sound, enforceable specifications. Unless these skills are properly developed, expert

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knowledge of materials, contracts, and construction procedures can not be communicated successfully. A cardinal principle of specification writing requires the architect to understand the relationship between drawings and specifications, and to be able to communicate in a logical, orderly sequence, the requirements of the construction process. Many factors must be considered in the selection and evaluation of materials or products to be used in a project, e.g., appropriateness, durability, aesthetic quality, initial cost, maintenance, etc. To avoid future problems, it is extremely important that the architect recognize the function of each item to be specified. The architect must carefully assess new materials as well as new or unusual applications of familiar items, regardless of manufacturer representations, to be certain no hidden deficiencies exist that might create problems for the MACOM, installation, user, or cost-sharing partner.

(1) A minimum of 15 valve units (120 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Review construction specifications organization, purpose, and format, and assist in writing specifications. Review and analyze bidding forms, insurance and bonding requirements, liens, supplementary and special conditions.

(b) Research and evaluate data for products to be specified, including information regarding product availability, cost, code acceptability, and manufacturer's reliability. Attend or participate in sales presentations in connection with this research.

(c) Research industry standards and guidelines for specific classes of products (e.g., curtain walls or aluminum windows) as they affect various manufacturers' items being considered for acceptability on a project. Research construction techniques and systems, and understand workmanship standards such as poured-in-place concrete, and masonry construction.

(d) Use USACE Guide Specifications (CEGS) in a project specification, including procedures needed to adapt individual sections for the specifics of the project.

i. Document Checking and Coordination. Close coordination between drawings and specifications is required when preparing construction documents. The work of each discipline must be reviewed regularly and checked against the architectural drawings as well as the drawings of the other disciplines to eliminate conflicts. Before

final release of documents for construction purposes, the drawings must be checked and cross-checked for accuracy and constructibility.

(1) A minimum of 15 value units (120 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Assist in cross-checking products, materials, and methods called for in the specifications for consistency with corresponding terminology and descriptions on the working drawings.

(b) Check drawings prepared by others for accuracy of dimensions, notes, abbreviations, and indications.

(c) Assist in developing a schedule of lead time required for proper coordination with other disciplines.

(d) Check drawings by other disciplines with architectural drawings and the drawings between other disciplines for possible conflicts, including interferences of plumbing lines, ductwork, electrical fixtures, etc.

(e) Assist in the final project review for compliance with applicable codes, regulations, etc.

Category B - Construction Administration

A minimum of 70 value units (560 hours of experience) are required in the construction administration category. The difference between the minimum of 70 value units for this category and the sum of the minimums on each training area must be acquired by earning additional value units from training areas within the construction administration category. The following training areas and minimum value units are required.

a. Bidding and Contract Negotiation. The architect assists in establishing and administering bidding procedures, issuing addenda, evaluating proposed substitutions, reviewing the qualifications of bidders, analyzing bids or negotiated proposals, and making recommendations for the selection of the prime contractor. The construction contract and related documents are the formal instruments which bind the major parties together in the construction phase. They detail the desired

product and the services to be provided during construction, as well as the consideration to be paid for the product and the services.

(1) A minimum of 10 value units (80 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Carefully review the bidding/award stages of previous projects. Develop an understanding of problems encountered and how they were solved.

(b) Prepare sample bids using quantity take-offs from the building cost analysis.

(c) Assist in the pre-qualification of bidders.

(d) Assist in the receipt, and evaluation of bids, including any alternatives or additives.

(e) Learn what information and submittals are required prior to issuance of a notice to proceed.

(f) Assist in evaluating equal product considerations in preparing addenda.

(g) Meet with contractors and material suppliers to better understand problems they encounter with bid packages and construction contract documents. Understand the role of funding limitations during the bidding process.

(h) Assist in the preparation and negotiation of construction contracts, and become familiar with the conditions of the contract for construction in order to identify the roles of the architect, contractor, user, bonding company and insurer, and the contracting officer in the administration of the construction phase.

b. Construction Phase - Office. During the construction phase of a project, there are many related tasks which do not directly involve field observations, e.g., processing contractors' applications for payment, changeorders, shop drawings and samples, and adjudicating disputes. The handling of these matters will usually have a direct bearing on the smooth functioning of the work in the field. For example, prompt processing of the contractors' application for payment, including the review of any substantiating data that may be required by the contract documents, helps the contractor maintain an even flow of funds. Items such as shop drawings, samples,

and test reports submitted for the architect's review must be acted upon promptly to expedite the construction process. Changes in the work which may affect the time of construction or modify the cost are accomplished by change orders. Interpretations necessary for the proper execution of work must be promptly given in writing even when no change order is required.

(1) A minimum of 15 value units (120 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Assist in processing applications for payment and preparing certificates of payment.

(b) Assist in checking shop drawings and evaluating samples submitted by construction contractors, and maintaining records of the evaluations.

(c) Assist in evaluating requests for changes (including value engineering proposals), interpreting the documentation, and preparing change orders.

(d) Participate in the resolution of disputes and the interpretation of conflicts relating to the contract documents.

(e) Participate in the assembly of evidence and the preparation of testimony to be used before an arbitration panel or in court.

(f) Research the legal responsibilities of the Government, construction contractor, and contract architect-engineer (AE) firms by attending seminars and using other supplementary education sources.

(g) Participate in the preparation of record documents at project completion (contract closeout).

c. Construction Phase - Observation. In administering the construction contract, the architect's function is to determine if the contractor's work generally conforms to the requirements of the contract documents. To evaluate the quality of materials and workmanship, the architect must be thoroughly familiar with all of the provisions of the contract documents and contract. Periodic reports on the stage of the completion of scheduled activities are collected and compared to the overall project schedule at job site meetings. These meetings facilitate communication between the contract parties

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and produce a detailed progress record. The architect must determine, through observation, the date of substantial completion and receive all data, warranties, and releases required by the contract documents prior to final inspection and final payment. Dissatisfaction can lead to arbitration or the courts.

(1) A minimum of 15 value units (120 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Visit the job site and participate in observation of the work in place and materials stored, and prepare field progress reports of such routine inspections.

(b) Review and analyze construction time schedules. Understand the various network methods (e.g., critical path method) potentially available to the construction contractor.

(c) Develop an awareness of the contractual obligations related to the observation of construction by review of the construction contract documents and through professional development programs.

(d) Attend periodic job-site construction meetings and assist in recording and documenting all actions taken and agreed to at such meetings.

(e) Participate in the substantial completion inspection and assist in the punch list verification.

(f) Participate in the final acceptance inspection with the installation, the user, and other involved parties.

Category C - Office Management

A minimum of 35 value units (280 hours of experience) are required in the office management category. The difference between the minimum of 35 value units for this category and the sum of the minimums on each training area must be acquired by earning additional value units from training areas within the office management category. The following training areas and minimum value units are required.

a. Office Procedures. Although architecture is a creative profession, current techniques of practice require that the architect's office operate in the same manner as

a commercial enterprise. An architectural section, or a section or branch including architecture, within USACE must operate in a similar fashion. Steady income or cost accountability must be maintained, and expenses and charge numbers must be carefully budgeted and monitored so that economic stability can be maintained. Accurate records must be maintained for budgetary purposes and for use in future work. Established office requirements, policies, and regulations are essential in maintaining a smooth operation. Profitable use of manpower requires budgeting of time and adhering to schedules. The architect's relationship to the MACOM, installation, user, or cost-sharing partner establishes the duties and obligations of the participants in a project. There must be a mutual agreement between the competent parties that can be accomplished within an estimated time frame. Effective public relations plays an essential role in the creation of the architect's image. This is important in bringing new customers and work to USACE, as well as attracting qualified people for the USACE professional staff. The architect must participate in marketing activities if the profession is to succeed within USACE. On the other hand, the USACE architect's marketing activities (unlike those of merchants, manufacturers, private sector architects, and others in commerce) are subject to professional constraints as well as Governmental constraints. The architect must learn marketing techniques which are affective while remaining within legitimate rules of professional conduct.

(1) A minimum of 15 value units (120 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Review the process of internal accounting and cost control systems for the operation of the architectural branch or section related to USACE activities.

(b) Participate in the allocation of time to elements involved in a total project from preliminary design through construction.

(c) Review professional service contracts for their structure, content, determination of responsibility, and enforcement procedures.

(d) Review the compensation structure as related to types of services rendered by the office.

(e) Review current contractual relationships with AE firms and their consultants.

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(f) Research legal obligations, limitations, and liabilities (responsibilities) of professional services contracts.

(g) Review the USACE professional liability (responsibility) policy, and develop an awareness of potential practices and procedures which are not covered by the policy.

(h) Assist in the development of programs to publicize USACE professional services and expertise.

(i) Participate in the USACE program for securing new work through assisting in market research, developing a list of prospective new clients, and information gathering activities.

(j) Assist in developing brochures and presentations as elements of promotion for USACE.

(k) Accompany office staff on visits to installations and other Government agencies to inquire about additional projects.

(l) Participate in presentations to MACOM, installation, cost-sharing partners, and other prospective customers concerning reimbursable work.

(m) Participate in the development of the annual budget for the MSC, district, laboratory, or FOA.

b. Professional Activities. To strengthen professional development and the image of the architectural profession, the architect must participate in public service programs. The architect must also maintain a supportive role with others involved in the construction industry. The various professional societies and other public service opportunities offer viable means of serving the profession and the community. Meaningful involvement requires participation beyond attendance at regular meetings during working hours.

(1) A minimum of 10 value units (80 hours of experience) are required for this training area.

(2) Possible career program employee/individual activities include, but are not limited to, the following:

(a) Participate in the work of professional societies through committee activity, e.g., the Society of Military Engineers (S.A.M.E.), The American Institute of Architects (AIA), and the Construction Specifications Institute (CSI).

(b) Provide service by contributing expertise toward environmental, planning, zoning, housing, and codes.

(c) Participate in civic organizations.

Category D - Related Special Activities

The training requirements are not intended to be narrow or restrictive, but to bring into proper perspective the broad aspects of architectural practice. In addition, new areas of concern and involvement which do not fall within more traditional practice are opening to architects. This category of related activities will allow the career program employees/individuals, while developing basic practice skills, to develop expertise in allied areas.

a. Though there are no minimum requirements in this category, the career program employee/individual may gain value units towards his/her training requirements, e.g., a post-professional degree in architecture may earn 235 value units (1,880 hours of experience) as supplementary education in this category. Individuals gaining a considerable portion of their training in this category should determine from their state registration board how much of this time is acceptable in accordance with the board's requirements.

b. Possible related activities in this category include energy conservation, computer applications, planning, interior design, landscape architecture, construction management, environmental and structural engineering, applied research, teaching, historical restoration, and professional delineation.

APPENDIX C

SUPPLEMENTARY EDUCATION

Supplementary Education. Suggested sources of supplementary education include, but are not limited to, the following:

a. AIA "SupEdGuides" and AIA-approved professional development programs available from the Education Services Center, The American Institute of Architects, 1735 New York Avenue, N.W., Washington, DC 20006. SupEdGuides are self-study resources designed to meet interns' special needs and interests. The SupEdGuides focus on topics pertinent to architectural practice, and each guide presents fundamental issues, asks probing questions, and suggests ways to develop analytical skills and make design and management decisions.

b. USACE Proponent Sponsored Engineer Corps Training (PROSPECT) Program and PROSPECT Exportable Training Program courses including, but are not limited to, the following:

(1) Advanced Construction Contract Administration. This is a new course which replaces the "Advanced Construction Management" course. This course will increase the effectiveness of the student by developing a keener insight into the problems created by the ever-changing methods and procedures utilized in construction contracts and management.

(2) Aesthetic Resources: Identification, Analysis, and Evaluation. This course will provide the student with an in-depth working knowledge of the current policies, procedures, and acceptable methods for assessment and evaluation of the impact that projects may have on the aesthetic quality of the urban and rural environments.

(3) Architect-Engineer Contracting Procedures and Negotiations. This course will provide the student with a working knowledge of applicable laws and regulations governing AE contracts, and provides a concentrated look at all aspects of AE contracting from project authorization, through selection, negotiation and contract award, to contract close-out.

(4) Architectural Concrete. This course provides the student with the specific knowledge required to assure the quality design and construction of architectural concrete.

(5) Architectural Hardware Quality Verification. This course will develop new skills oriented to the quality verification (inspection) of hardware used in building construction and will update the student's knowledge of current industry practices and standards, including changes in hardware specifications.

(6) Architectural Hardware Specifications. This course is designed to develop skills oriented to specifying or approving builder's hardware used in building construction, to update the student's knowledge of current industry practices and changes in specifications, to relate the problems involved in scheduling hardware, and to provide training that will result in a more effective quality assurance team.

(7) Automatic Fire Extinguishing Systems. This course provides basic knowledge and skills necessary for the design, calculation, and review of automatic fire extinguishing systems, i.e., sprinklers (water spray and foam water), dry chemical, CO , and Halon.

(8) Comprehensive (Master) Planning. This course will provide the student with an overview of the comprehensive planning process and a general guide to prepare comprehensive plans. Material covered includes definitions of comprehensive planning, organization needed to prepare comprehensive plans, benefits of planning, consequences of not planning, planning environments, the relationship to surrounding communities, and the principles of planning.

(9) Computer-Aided Cost Estimating System (CACES) Course. This course will provide students with instructions to prepare and execute a cost estimate using CACES in accordance with ER 415-345-42, Construction Cost Estimating and Reserve for Contingencies.

(10) Computer-Aided Design for Buildings. This course will introduce students to computerized methods of structural design and analysis of buildings. Practical applications of computerized techniques will be demonstrated through the use of a 2-D frame analysis program (CFRAME), a 3-D Building Systems Analysis Program (CTABS80), and the General Purpose (STRUDL) Structures Computer Program.

(11) Concrete I - Quality Verification. This is a PROSPECT Exportable Training package that will provide the student with the technical knowledge, both theoretical and practical, to inspect concrete construction with a degree of competency that assures quality construction.

(12) Concrete Materials. This course will instruct the student on all aspects of advanced concrete materials technology.

(13) Concrete I - Quality Verification. This course will provide the student with the specific knowledge of materials, techniques, and procedures for inspecting on-site concrete construction.

(14) Construction Contract Administration. This is a new course which replaces the "Introduction to Construction Contract Management" course. The course will assist the student in translating academic knowledge to competent application in the construction setting. Additionally, it will provide the student with an overview of USACE operations with an emphasis placed on construction contract management.

(15) Construction Contract Engineering With Microcomputer-Aided Cost Estimating System (M-CACES). This course provides the student with instruction and ready-reference material to assist in improving his/her ability to follow USACE policies and procedures for preparing Government estimates for construction projects.

(16) Construction Quality Management. This course is designed to educate the student on the objective of construction quality management related to establishing quality requirements, controlling quality during construction, and taking necessary measures to assure quality. This course will also provide the student with the opportunity to discuss problems associated with the implementation of the quality control and assurance system.

(17) Construction Quality Management. This is a PROSPECT Exportable Training package with provides the student with construction quality management policies, requirements, and procedures.

(18) Contracting Overview. This is a PROSPECT Exportable Training package that is intended to educate the student with a focus on contracting concepts rather than execution. It will provide the student with a basic understanding of the contracting system emphasizing what is involved and why things are done, not how they are done. This course is a prerequisite for taking courses in the curriculum of the PROSPECT Construction Contract Administration Training Program.

(19) Design Quality Management, Military Projects, Procedures and Feedback. This course will present a practical approach toward improving design reviews and will support the student in understanding the design review process. Policies, principles, procedures, and various techniques used in reviewing designs and cross-checking drawings and specifications will be covered.

(20) Electrical Quality Verification. This course will provide the student with the requirements and techniques of electrical quality verification (inspection) in order to

assure compliance with construction contract requirements. It also will provide the student with an increased knowledge of electrical materials, equipment, installation, and inspection techniques. The student will receive additional training in the interpretation of electrical plans and specifications, and the National Electric Code.

(21) Electrical Quality Verification. This is a PROSPECT Exportable Training package that trains students with limited experience or knowledge in USACE requirements in order to assure compliance with electrical requirements of the construction contract. Additionally, it introduces students to electrical terminology, materials, equipment, installation, and inspection techniques.

(22) Energy Conservation Design for New Buildings. This course will provide the student with detailed treatment of design and analysis techniques to ensure an energy conscious, cost-effective design for new buildings. Additionally, this course will aid students in implementing all new and existing conservation criteria.

(23) Energy Conservation in Existing Buildings. This course will provide students with a capability to select, analyze, evaluate, and design energy conserving measures for implementing energy reduction programs in existing buildings. Additionally, this course will aid students in implementing all new and existing conservation criteria.

(24) Environmental Impact Assessment of Projects. This course will provide the student with a working knowledge of the environmental assessment process and the procedures to follow in preparing an environmental impact assessment document or an environmental impact statement.

(25) Environmental Laws and Regulations. This course will provide the student with the ability to list major federal statutes designed to protect the environment, summarize the major provisions of each federal environmental law and the relationship to USACE projects, and identify and understand the legal requirements for environmental protection as related to specific projects.

(26) Estimating for Construction Modifications. This course will provide the student with instructions and ready-reference material to assist in improving his/her ability to prepare an estimate for a construction contract modification in accordance with USACE policies and procedures.

(27) General Construction Quality Verification. This course provides the student with the basic technical knowledge required for the quality verification (inspection) of all elements of building construction. The course is based on guide

specifications (CEGS) and identifies the quality assurance representative's (construction inspector's) role as it relates to construction quality management.

(28) Human Resource Management I, II, III, and IV. These courses develop and refresh human resource (personnel) management skills of the student which are vital in design team leadership, management, and supervisory roles of the professional architect.

(29) Interior Design and Administration. This course will inform the student of current interior design policies, responsibilities, operating procedures, and criteria. It provides procedures and techniques necessary to effectively implement and manage interior design from initial planning through furniture installation. The course defines the overall requirements for producing quality interior design and the specific tasks of various key personnel, e.g., the project manager, technical reviewer, estimator, designer, procurer, installation staff, and the using agency coordinator.

(30) Masonry Structures Design. This course will reinforce the student's knowledge in design and construction practices including criteria, procedures, and specifications for masonry structures. In addition to covering techniques of masonry structural design, the course also covers seismic design for masonry buildings.

(31) Mechanical I - Quality Verification. This course will provide the student with information, procedures, and problem area solutions that must be known to effectively perform mechanical engineering quality assurance duties. The course specifically addresses preparatory, initial, follow-up, and final inspection techniques concerning mechanical equipment, materials, and testing requirements common to most building construction.

(32) Mechanical Quality Verification. This is a PROSPECT Exportable Training package that provides the student with a basic knowledge of the fundamentals of mechanical systems inspection. Additionally, it acquaints the student with mechanical engineering guide specifications (CEGS), repetitive design and construction deficiencies, and inspection materials and procedures.

(33) Military Construction Project Management. This course will provide the student with the management procedures, tools, and techniques necessary to effectively manage projects from design authorization through construction completion.

(34) National Electric Code (NEC). This course, though designed for electrical engineers, will increase the intern's understanding and abilities concerning the design of interior electrical systems which meet the requirements of the NEC.

(35) Negotiating Construction Modifications. This is a new course that replaces the "Construction Contract Negotiating" course. The course will provide instruction concerning policies and procedures that will provide the student with knowledge in negotiating construction contract modifications. It will also provide practice in effectively analyzing all changes in connection with contractors' proposals and Government estimates.

(36) Paint Quality Verification. This course is designed to reduce painting deficiencies by providing the student with quality verification (inspection) techniques and the basic concepts of paint composition, coating selection, safety, and the construction quality management necessary to administer the painting requirements of the construction drawings and specifications.

(37) Roofing Technology. This course will provide the student with an advanced understanding of roofing techniques which can be applied during design, constructibility reviews, technical reviews of roofing submittals, reviews of plans and schedules of roofing applications, testing and inspection during roofing applications, and during maintenance and repair activities on existing roofs.

(38) Security Engineering. This course will provide the student with an introduction to the security engineering design process. The course provides the methodology leading to the determination of protective measures for a facility against terrorists and other peacetime threats. The course also includes guidelines, specifications, standards, and building hardening information to aid in this process.

(39) Seismic Design for Buildings. This course will train students who are not thoroughly familiar with seismic design.

(40) Solar Active Energy System Design. This course is designed to provide the student with an introduction to solar energy use in buildings and the processes to address detailed treatment of active solar energy systems design and installation for heating, hot water, and cooling.

(41) Solar Energy Systems Quality Verification. This course will provide the student with information, procedures, problem areas, and a familiarity with solar energy systems in order that he/she might effectively perform quality verification (inspection) duties during, and at the end of, building construction. The course provides a detailed description of active solar energy systems and proper installation procedures to assure high performance and reliability.

(42) Solar Passive Energy Design for Buildings. This course will provide the student with an introduction to passive and hybrid solar energy use in buildings and acquaint him/her with the principles of integrating passive design into standard architectural practice.

(43) Specification Writing for Construction Contracts. This course will provide the student with instruction concerning the preparation of effective specifications for construction projects. The course covers basic principles of specification writing, procedures, and techniques as well as the relationship of the specifications to the construction drawings and other elements of the construction system.

(44) Structural Engineering Civil Works Design Criteria. This course reviews the latest civil works structural design criteria and provides training in its use.

(45) Structural Engineering Military Design Criteria and Applications. This course reviews the latest structural design criteria governing military construction and provides training in its use.

(46) Urban Environment. This course provides the student with a broad spectrum of awareness concerning the environmental factors that have a direct and indirect affect on USACE projects in urban areas.

(47) Value Engineering Workshop. This course will provide the student with the requirements, policies, and procedures necessary to recognize areas of potential for value engineering (VE) studies that will enable him/her to perform effectively as a value engineering study team member.

(48) Water Supply Design and Rehabilitation. This course will familiarize the student with analytical techniques needed to develop facility designs and make cost estimates for planning studies, analyze water distribution systems, and analyze the economics of rehabilitating or replacing systems.