

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.