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	<u>ENGINEERING AID AND TECHNICIAN SERIES</u>	7.516

This is a composite general series in the Engineering and Allied Occupational Group, and includes all non-professional technical positions, not specifically classifiable in other series, which perform work subordinate to, in support of, in conjunction with, or related to professional engineering functions.

Positions in this series require the application of some of the principles, methods and techniques in a specific or limited area of engineering, and a practical knowledge of the construction, application, properties, operation and limitations of engineering systems, processes, structures, machinery, devices or material, and as required, related manual, craft, instrument operation, mathematical, graphic or management skills and abilities. The knowledge and skills required at the higher levels are typically obtained through a background of experience and/or technical training such as is acquired in post-high school courses and programs in vocational-technical schools, college extension courses; community and junior colleges, etc., but do not require a full four-year accredited course at a college or university leading to a degree in engineering. The professional engineer, on the other hand, is concerned with the application of basic principles and theories of higher mathematics and physical and engineering sciences in the solution of engineering problems, and the ability to organize, analyze, interpret, evaluate and produce original solutions to technical engineering problems.

A number of specialized classes of positions which perform work in support of, in conjunction with, or related to professional engineering activities, including draftsman, land surveyor and construction inspector classes, are retained in separate series, since specialized knowledge, abilities, skills and experience need to be considered in recruitment and since these have generally been recognized as distinctive occupations.

Non-professional positions which involve a combination of inspection, testing, surveying, drafting, design and other such engineering-oriented functions, where any one function is not primary, are properly classifiable in the Engineering Aid and Technician Series.

Grade level distinctions are based upon difference in scope and complexity of the following classification factors:

(1) Nature and variety of work:

In certain types of survey positions (e.g., those engaged in geodetic control or construction surveys), the degree of precision and accuracy, usually referred to as the “order of accuracy,” is one of several considerations in evaluating the level of difficulty; this element is of less significance in topographic mapping and other types of surveys. There are four orders of accuracy ranging in decreasing stringency from the first to the fourth. Surveys of the first and second orders are more precise, requiring special instruments and procedures, and generally represent higher level assignments than work of the third and fourth orders of accuracy; however, work of the third and fourth orders of accuracy performed under unusual conditions, such as rugged, inaccessible terrain, may be equivalent in difficulty to work of the first and second orders. The following definitions, adapted from definitions published by the Federal Government, may be used as general guides in evaluating survey positions:

<u>Orders of Accuracy</u>	<u>Units of Accuracy</u>
First order	1 foot in 25,000 lineal feet
Second order	1 foot in 10,000 lineal feet
Third order	1 foot in 5,000 lineal feet
Fourth	Anything less than 1 foot in 5,000 lineal feet

- (2) Supervision received
- (3) Guidelines available
- (4) Originality required
- (5) Personal work contacts
- (6) Recommendations, decisions, and commitments made
- (7) Supervision exercised
- (8) Knowledge and abilities required

This series replaces the following State of Hawaii classes:

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Engineering Aid II	7.510
Engineering Aid III	7.515
Engineering Aid IV	7.520
Supervising Engineering Aid	7.530
Traffic Survey Aid I	1.435
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Materials Inspector I	8.100
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/s/ Edna Tavares Taufaasau
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Director of Personnel Services

ENGINEERING AID I

7.502

Duties Summary:

As a trainee, under immediate and continual supervision, performs simple and repetitive tasks incidental to engineering functions; and performs other duties as required.

Distinguishing Characteristics:

This is the entry trainee level in the Engineering Aid and Technician series, and is limited to positions which are part of a career ladder to positions of higher level in one of the engineering-support series. Thus, while many of the duties assigned at this level resemble those of blue-collar laboring positions, or beginning level clerical positions, such duties are assigned as part of a developmental process, and are for the purpose of acquainting the incumbent with some of the processes, terminology and techniques of the various engineering areas, by providing an opportunity for him to participate in a variety of engineering operations at an elemental level. Depending on demonstrated aptitude and interest, an incumbent at this level may advance into surveying duties, become a trainee draftsman, or engineering aid assigned to other engineering-support functions. The work is performed under immediate and continual supervision; detailed instruction in work methods and procedures is provided, and review is made during all phases of work.

Examples of Duties:

On a land survey party, performs simple, repetitive, manual tasks such as shielding, carrying or erecting equipment, clearing underbrush, and other obstacles from

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transit lines, and marking and driving stakes; receives training in work typical of higher level engineering aid positions.

Under close supervision, assists employee of higher level with such tasks as making tracings and simple pencil lettering, collecting samples for laboratory tests, making traffic counts and weighting vehicles, carrying instruments to testing or gaging sites, running errands, compiling data for reports, and performing incidental clerical duties.

Knowledge and Abilities Required:

Knowledge of: Basic arithmetical and verbal skills.

Ability to: Follow oral and written instructions, learn standard engineering terminology and routine procedures, make simple arithmetical computations, use common hand tools and perform manual tasks.

ENGINEERING AID II

7.504

Duties Summary:

Under close supervision, performs routine tasks in support of engineering functions; and performs other duties as required.

Distinguishing Characteristics:

An incumbent of this class performs simple operations under close supervision and following prescribed procedures. The supervisor, or another higher level employee, provides detailed instructions for accomplishing assignments and work is checked frequently in progress and upon completion for accuracy. A position at this level is typically an advanced trainee position characterized by learning to operate instruments and following procedures characteristic of higher level engineering aid functions. Guidelines exist in the form of governing policies and procedures, technical directives, technical and engineering tables, handbooks, manuals, textbooks, manufacturers catalogs, bulletins and reports, standard criteria, plans, specifications and exhibits. At this level an engineering aid is encouraged to become acquainted with standard guides, and is given instruction and assistance in their use. The principal distinction between the advanced and beginning trainee levels is that the Engineering Aid II is expected to have some, although limited, knowledge of engineering terminology and processes, and

ability to use basic mathematical skills in the solution of simple problems; whereas the Engineering Aid I level presumes no knowledge or training beyond that typically acquired in the basic high school curriculum. Person-to-person contacts at this level are usually limited to fellow workers to give and receive factual information.

Examples of Duties:

Takes and records instrument readings when indicators are simple in nature; performs simple arithmetic computations, and routine measuring, weighing and counting operations; collects samples and assists with routine laboratory tests on materials; performs specified manual tasks in the assembly, installation and operation of equipment and instruments. The following are illustrative of specific assignments at this level:

1. On a survey party, under close supervision, serves as rodman or rear chainman on routine surveys not requiring special procedures or precision; assists in establishing line and grade by operating a rod, tape or flag; keeps simple field notes, records data, does routine plotting and tracing, and makes simple calculations; performs manual tasks such as clearing underbrush and other obstacles from transit lines, and clearing and oiling equipment and tools.
2. In water resources work collects water samples, records simple measurements of rain gages, staff gages and water levels. Makes simple calculations; compiles hydrologic data for filing and assists in compiling data for publications. Assists in changing charts on recording instruments; and in the installation of recorders and gages, and assists in minor repair work on defective instruments.
3. In traffic survey work reads traffic counting meters; records data of traffic and pedestrian volume and movement; measures and weighs commercial vehicles; assists with the installation and adjustment of traffic survey devices and equipment.

Knowledge and Abilities Required:

In addition to the knowledge and abilities required at the previous level, this level requires:

A working knowledge of basic mathematics and some knowledge of engineering terminology and processes.

The ability to learn standard techniques and practices, and the use and care of engineering tools and equipment; make simple mathematical computations; take accurate measurements and make accurate recordings, and keep records.

ENGINEERING AID III

7.506

Duties Summary:

Performs a variety of routine technical, non-professional engineering tasks under general supervision; and performs other duties as required.

Distinguishing Characteristics:

At this level, an engineering aid works on assignments of a frequently recurring nature, where detailed procedures are established. The supervisor or other higher level employee provides specific instructions concerning methods of accomplishing tasks, observes work performance, and reviews completed work for accuracy and adequacy. On repetitive operations, incumbent works with more independence, with work spot-checked in process, and reviewed for accuracy on completion. Although guides are substantially the same as the preceding levels and are usually directly applicable, incumbent is expected to exercise more independence than is required at the next lower level in locating and referring to texts and manuals. Work at this level is more limited in variety and mental demands than that at the Engineering Aid IV level, involving simpler, more repetitive tasks, and under closer supervision. Person-to-person contacts are usually with fellow workers, to give or receive information. The use of original thinking, and commitments and decisions made, are not significant factors at this level.

Examples of Duties:

Reads instruments and records data when instruments, indicators or measuring objects, such as, dials and meters vary in type and operation; records factual data in tests and observation studies; assembles and operates testing equipment which varies in type for different test purposes, but where instructions are explicit; performs arithmetic computations, using standard tables and formulas; plots data or results and draws simple curves; abstracts and compiles specified data from records and other sources such as specifications and drawings. The following are illustrative of specific assignments at this level:

1. In survey work, serves as chainman or rodman on surveys of the third and fourth orders of accuracy; records data, and does routine plotting and tracing.
2. In water resources work, records flow measurements of tunnels, springs, streams and wells; installs recorders and gages and does minor repair work on defective instruments; makes computations from charts and readings collected in the field; assists with the installation and maintenance of hydrologic equipment and instruments.
3. In traffic survey work, as senior member of a field survey crew making routine traffic counts, and checking, classifying and weighing vehicles, assists with instruction and supervision of lower level engineering aids. Participates in specific traffic studies, such as travel time and speed and delay studies, and in the installation and adjustment of traffic survey instruments and equipment; records data, and makes related computations; assists with the minor servicing and maintenance of traffic counting devices.

Knowledge and Abilities Required:

In addition to the knowledge and abilities required at the previous level, this level requires:

A practical knowledge of standard terminology, techniques, practices and equipment used in the area of engineering to which assigned.

The ability to carry out, under general supervision, simple or routine tasks in support of higher-level professional and sub-professional engineering work.

ENGINEERING AID IV

7.508

Duties Summary:

Performs a variety of standardized, non-professional, technical engineering functions, under general supervision; may serve as leadman for a small group of lower level engineering aids in the performance of routine tasks; and performs other duties as required.

Distinguishing Characteristics:

An engineering aid at this level performs a variety of standardized or prescribed operations under general supervision. Assignments which involve conditions, concepts and standard methods familiar to the incumbent are made in terms of the objectives to be achieved and with suggestions as to methods; such assignments are spot-checked in process and reviewed on completion for technical adequacy. Assignments involving unfamiliar conditions, methods or concepts are accompanied by explicit instructions, and are reviewed in process and on completion for technical accuracy and adequacy. Guides are substantially the same as at lower levels, except that positions at this level use judgment and resourcefulness in locating and referring to texts, manuals, tables and other data, and selecting and applying standard procedures. Work contacts are usually with fellow workers, except in the case of field positions requiring some contact with the public to obtain information, answer questions regarding work being done, and request permission to work on private property.

Examples of Duties:

Performs a variety of tests and studies in accordance with established methods; prepares test specimens, adjusts and operates equipment, and records instrument readings. In data analysis and presentation assignments, extracts data from a variety of prescribed engineering sources, processes the data according to well-defined methods and designated formulas using arithmetic, elementary algebra, and geometry; compiles and presents the data in prescribed tabular and graphic form. The following are illustrative of specific assignments at this level:

1. In materials testing, performs standard tests of soils and construction materials, such as field compaction tests and sieve analysis, which involve the application of simple and repetitive test procedures; assists a higher level employee in conducting phases of more involved and complex tests and in inspecting and testing materials and mixes in concrete and asphaltic concrete batching plants, quarries, and manufacturing and fabrication plants.
2. In survey work, operates a level for the purpose of learning, and serves as head chainman on surveys of the third and fourth orders of accuracy, or as chainman or rodman on surveys requiring special chaining and rodding procedures, such as surveys of the first or second order of accuracy or surveys for the precise setting of mechanical and electrical equipment and other precise construction controls; reduces and plots field notes; performs simple calculations involving distances, angles, closures, areas, earthwork quantities, cross-sections, grades and slopes.

3. In water resources work, performs water sample tests; inspects well drilling operations to insure compliance with standard procedures; compiles and computes data collected from automatic gage charts; records and (forwards data to proper authorities; assists engineers in the preparation of reports.
4. In traffic survey work, serves as leadman for a small field survey crew making routine and special traffic studies; is responsible for the repair and maintenance of traffic counting instruments and equipment, and for the installation and checking of permanent and control counting stations; records survey data, and makes related computations.

Knowledge and Abilities Required:

In addition to the knowledge and abilities required at the previous level, this level requires:

A good knowledge of mathematics, including algebra, geometry and trigonometry, and the standard terminology, sources of information, techniques, practices and the use of equipment and instruments relating to the area of assignment.

The ability to perform mathematical computations, prepare reports and charts, and deal tactfully and, effectively with others.

ENGINEERING TECHNICIAN V

7.509

Duties Summary:

Under general supervision, performs moderately difficult sub-professional, technical functions in support of higher level professional and/or sub-professional engineering activities; or supervises and works with a small group of engineering aids performing work at, the I to IV levels; and performs other duties as required.

Distinguishing Characteristics:

An engineering technician at this level is responsible for carrying out a sequence of standardized or prescribed operations typically requiring a practical background knowledge of engineering methods and practices in the specialization or area of assignment. Recurring routine technical problems are resolved on the basis of previous

experience without reference to the supervisor; such work is reviewed on completion for technical adequacy. On problems involving unfamiliar conditions, methods or concepts, instructions are provided by the supervisor; and work is reviewed in process and on completion for technical accuracy and adequacy. Available guidelines are similar to those at previous levels, except that the engineering technician at this level exercises more judgment in interpreting and applying applicable portions of standard guides, and is familiar with sources and application of related reference material. Person-to-person contacts are similar to, but more extensive than those at previous levels, especially in positions requiring field work, which may require contacts with contractor personnel, consultants, or the public to give and obtain information.

A supervisory position at this level is usually a working supervisor, under the supervision of a higher level engineering technician or professional engineer, who provides technical and administrative advice and direction, and spot-checks the work of the group for accuracy, completeness and compliance with departmental policies, procedures and objectives. Originality and judgment are required in determining the best of standard methods for accomplishing assignments, recognizing deviations in test data, and recommending minor changes in methods and procedures.

Examples of Duties:

Does testing work, requiring the performance of a variety of tests in accordance with established methods; prepares test specimens, adjusts and operates equipment and records instrument readings, including instruments with fluctuating indicators, and in conditions involving instability or poor responses; determines if test results are within specified limits. Extracts technical data from a variety of sources, recognizing and reporting errors, inconsistencies and other deficiencies in data; performs appropriate computations and selects the best method for presenting data in technical reports by use of tabular, graphical or other statistical means. The following are illustrative of work performed by an engineering technician at this level:

1. In materials testing, tests soils and construction materials such as cement, bituminous materials and aggregates, for conformance with specification requirements; inspects and tests manufactured items such as concrete culvert and sewer pipes for defects and bearing strength; and inspecting crushing plants to check wear of equipment and methods of crushing and stockpiling.
2. In survey work, operates a level, and serves as head chainman and rodman in all phases of surveying including boundary, topographic, construction and location surveys of varying complexity; operates a transit or electronic survey

- instruments for the purpose of learning; reduces and plots field notes, and adjusts and computes traverses and simple triangulation nets; computes closures, coordinates, areas and simple curves; prepares worksheets of cross-sections and profile details; and assists with the supervision and training of subordinate engineering aids.
3. In water resources work, analyzes hydrologic data to determine water resources of area; makes field investigation to evaluate hydrologic data collection network; performs skilled work in the preparation of maps, charts, graphs and other material of hydrologic data to present findings to be used by professional engineers; and prepares narrative and tabular statistical reports.
 4. In traffic survey work, supervises a field crew of engineering aids engaged in making traffic counts, checking the classification of vehicles, weighing vehicles, making special traffic studies and installing adjusting and making minor repairs to, traffic survey instruments and equipment.
 5. Performs a combination of two or more of the above functions, as well as drafting and survey functions equivalent to this level or below, report writing, or other special projects as assigned, in support, of, higher level engineering functions.
 6. As a trainee, performs duties characteristic of the Engineering Technician VI level under close supervision.

Knowledge and Abilities Required:

In addition to the knowledge and abilities required at previous levels, this level requires:

A thorough knowledge of the techniques, practices, tools, and equipment used in the area of assignment; and knowledge of related standard terminology, sources of information, and regulatory issuances.

The ability to interpret and apply general instructions and guides in the performance of engineering assignments; conduct tests, operate equipment, use tools and instruments and perform other technical operations relating to area of assignment; compile data and prepare technical reports; learn the more technical functions and processes characteristic of the specialized area of assignment, and for some positions, the principles and practices of supervision.

ENGINEERING TECHNICIAN VI

7.512

Duties Summary:

Under general supervision, performs a variety of complex sub-professional technical duties in support of professional engineering functions; may supervise a small group of engineering aids and technicians of lower level; and performs other duties a required.

Distinguishing Characteristics:

A position at this level is characterized by the responsibility for carrying out a variety or sequence of technical operations that are not completely standardized or prescribed. The work requires the use of a variety of standard references, guides, and precedents to obtain needed information and to select and adapt methods and procedures. Assignments at this level typically require a background knowledge of engineering principles and practices based on sub-professional training and experience in the area of specialization. Work assignments, which involve concepts and methods familiar to the technician, are made in terms of the objectives to be achieved and without explicit instructions as to work methods; technical problems of the type previously encountered by the technician in the course of the work are typically resolved independently, but may be referred to higher level technicians or professional engineers in unusual cases; technical problems involving unfamiliar methods or concepts are referred to a supervisor for advice or assistance; and completed work is reviewed for technical adequacy. A supervisory position at this level is typically a working supervisor, under the supervision of a higher level engineering technician or professional engineer who furnishes technical and administrative direction, handles personnel management functions and spot-checks work of the group for accuracy, completeness and compliance with agency and departmental policies, regulations and objectives. Guides are essentially the same as at lower levels, but the Engineering Technician VI is required to interpret and adapt standard guides to new or unusual situations, and to exercise knowledge of sources of related reference materials. The use of judgment and resourcefulness is required in applying a practical knowledge of engineering concepts and processes to the solution of problems assigned, and in selecting the most appropriate guides and independently planning the details to accomplish assignments governed by established procedures. Most of the personal work contacts are with personnel within the organization, but may extend outside the agency, such as contacts with contractor representatives or consultants to discuss compliance with specifications, structural plans, or State regulations. Responsibilities at

this level do not usually include making commitments; however, recommendations are made on such matters as the acceptability of construction materials and processes; the best methods to use in accomplishing assignments in the absence of specific guides, and minor changes in procedures and operational methods.

Examples of Duties:

Conducts tests and inspections of a variety of construction materials and processes for conformance to specifications and plans, prepares test specimens; adjusts and operates equipment, records instrumental readings; evaluates test data and prepares test reports. Prepares technical correspondence, compilations and reports, requiring selections, interpretation and analysis of data from a wide variety of sources. Works in close alliance with professional personnel in research and development projects, requiring follow-through by incumbent, such as supplementing through experiments or further research the ideas presented by professional engineers.

May serve as supervisor of an organizational unit of engineering aids and other personnel of lower level performing engineering-support duties such as testing, measuring, drafting, surveying, making traffic studies, preparing engineering reports, etc. Makes work assignments, gives instructions and assistance as needed, and reviews completed work for accuracy and adequacy.

Knowledge and Abilities Required:

In addition to the knowledge and abilities required at previous levels, this level requires:

A good practical knowledge of engineering principles and practices based on a background of sub-professional training and experience in the area of specialization; and a basic working knowledge of regulatory and procedural issuances and of sources of technical information.

The ability to relate and apply knowledge of engineering techniques and practices to the solution of engineering problems; conduct tests and inspections of, equipment, systems and materials; compile and evaluate data and prepare reports; and supervise and work effectively with others.

ENGINEERING TECHNICIAN VII

7.514

Duties Summary:

Performs a variety of difficult and complex sub-professional technical duties in support of professional engineering functions; or supervises a small group of Engineering Technicians V and VI, or a larger group of engineering aids, technicians, draftsmen or other non-professional personnel of lower levels in the performance of routine, standard engineering-related functions; performs other duties as required.

Distinguishing Characteristics:

Work at this level is characterized by individual responsibility for carrying out assignments of a fairly difficult and complex nature, requiring familiarity with and proficiency in application of established methods, procedures and techniques in the specialized field to which assigned. An Engineering Technician VII operates at the same level of difficulty and responsibility as a professional Engineer II, but the work of the technician is characterized by greater emphasis on operational and practical problems than on theoretical concepts. Except for those positions involved with highly technical research, design and specifications work, or the use and operation of specialized instruments and equipment, the engineering technician at this level typically combines supervisory responsibility with technical functions, serving as a first-line supervisor in the assignment, direction and control of engineering aids, technicians and/or other non-professional personnel performing tasks of limited complexity and scope, as described at lower levels, and, for which specific guidelines and precedents are available, or a small group or team of engineering technicians performing more difficult and technical work typical of the V and VI levels. Supervision is general; work assignments which involve concepts and methods familiar to the technician are made in terms of the objectives to be achieved and without explicit instructions as to methods or procedures; on unusual or unprecedented problems, the supervisor furnishes specific instructions and assistance; completed work is checked for technical adequacy. Work operations involving new processes, procedures, or lines of approach are reviewed during various stages of accomplishment to assure proper application of methods and techniques. Originality and judgment are required in independently planning the details to accomplish assignments governed by established procedures, utilizing reference sources, selecting and making minor modifications in test procedures, methods, equipment or instruments, and analyzing and interpreting technical data and test results. Guides are essentially the same as at the previous level, with an engineering technician at the VII level exercising progressively more independence in the selection, interpretation and application of guides to assigned projects. Person-to-person contacts are similar to, but more extensive than those at the previous level. An engineering

technician at this level makes decisions in independently applying established policies and procedures, pertinent precedents, and standard engineering practices, methods and techniques to accomplish typical assignments in the functional specialization involved. He makes recommendations on such matters as acceptance of contractors' methods, allowable deviations, and approval of materials and workmanship.

Examples of Duties:

Performs tests, for which procedures have been developed but not completely standardized, requiring the selection and substantial modification of test equipment and test procedures, in accordance with test programs developed by others; or supervises an organizational unit of lower level engineering technicians in the performance of a variety of standardized tests and inspections; prepares test specimens, adjusts and operates equipment, records instrumental readings, evaluates test data, and prepares test reports. Illustrative of testing assignments at this level is the supervision and participation in the inspection and testing of materials used in the construction of highways, bridges and buildings, to assure conformance to specifications and plans.

In research, development and design work, an engineering technician at this level conducts experiments or tests; sets up, calibrates, and operates instruments, and makes calculations; may assist professional engineers in design work, writing and review of specifications, estimating material and labor costs, doing computations involving the use of algebra, trigonometry and higher mathematics, and preparing technical reports.

In a supervisory position at this level, the engineering technician acts as supervisor of an organizational segment of sub-professional personnel engaged in engineering-support activities; the size of the group supervised varies with the difficulty and complexity of such work. Incumbent schedules and assigns work to subordinates, giving instructions as to work methods and procedures, reviewing work in progress and on completion for accuracy and adequacy, and coordinating work of the organizational segment with other units or functions. Problems of an administrative nature, such as those involving budgetary or policy matters, as well as technical problems where no precedents exist, are referred to superior. Some supervisory positions at this level have personnel management responsibility, such as recommending personnel changes, and initiating requests for personnel actions; in other cases the supervisory responsibility is as a working supervisor over the functional aspects of the work, with personnel management responsibilities retained at a higher supervisory level.

Knowledge and Abilities Required:

In addition to the knowledge and abilities indicated at the previous level, this level requires:

Knowledge of supervisory principles and techniques for certain positions.

The ability to select most appropriate guides from those suggested by supervisor and progressive ability to recognize limits of selected methods and to recommend deviations. Must also have the ability to carry out simple design projects under general supervision, make cost estimates, write specifications, and develop specific work details within the framework of established methods and practices; select and conduct tests of equipment, materials and systems; analyze and evaluate data obtained; supervise and work effectively with others.

ENGINEERING TECHNICIAN VIII

7.516

Duties Summary:

Supervises and works with a small group of engineering technicians, some of whom are at the VI and VII levels, or a large group or section of lower level non-professional personnel performing less difficult technical tasks in support of professional engineering functions; or, may work independently on highly difficult and responsible technical-administrative functions, such as projects involving surveys of operations or processes to recommend more efficient and economical methods, better utilization of personnel and equipment etc., or assisting professional personnel with technical, sub-professional aspects of planning, budgeting, contracts management and/or design functions; and performs other duties as required.

Distinguishing Characteristics:

An incumbent of this class usually works under the general administrative and technical supervision of a professional engineer of higher level, who gives assignments in terms of broad, general objectives, and provides advice and assistance as needed on unusual, critical, or highly technical and theoretical problems, such as those requiring significant deviations from standard engineering principles and practices, or where distinctly new criteria or techniques are involved. Methods employed are seldom reviewed, but review is made for technical adequacy, for conformance to established policies and for adherence to completion and cost schedules. The same guides are

available at this level as at preceding levels, and consist of pertinent regulatory material, established policies and procedures, plans and specifications, engineering manuals, technical directives, drawings, manufacturers' catalogs, and precedent situations. Originality and judgment are required in the effective application, interpretation, adaptation and correlation of pertinent guide material, precedent situations, and own background of experience, to organize, plan and guide the work efforts of subordinates, and/or to coordinate and integrate personnel, management and technical functions of the organizational unit with those of other organizational units or functions. Personal contacts are primarily to exchange information and coordinate the work of the unit with that of personnel in related activities. Some contacts are made with persons outside the agency such as contractors' representatives and architect-engineer firms to exchange information, to advise as to discrepancies found in meeting contract terms, to consider recommendations for acceptable substitutes, and to promote adherence to State standards, and requirements.

Examples of Duties:

1. A supervisory position at this level includes the following typical supervisory duties irrespective of the area of specialization or assignment: Plans and directs the work of subordinate personnel engaged in specific projects to which established methods and techniques are directly applicable, or in subordinate segments of a broader, more complex project, for which guidance is provided as required; problems of a highly technical nature are referred to professional engineers. Makes work assignments, outlines requirements, furnishes general instructions and determines priorities and work schedules. Reviews work in progress and on completion for technical adequacy and accuracy, and coordinates the activities of the organizational segment with the professional engineering functions of the department. Performs such personnel management functions as training new employees, evaluating work performance, approving leave, recommending personnel actions and handling disciplinary problems. May personally perform the more difficult and technical duties of the unit; prepares technical and administrative reports and correspondence.
2. As an individual worker, with considerable latitude for independent action, completes special assignments involving either a complete project, or segments of a broad, complex project which is the responsibility of a high-level professional engineer. Such assignments may include: (a) highly technical, sub-professional aspects of contracts management, planning or budgeting functions; (b) special surveys of operations or processes, to detect bottlenecks, poor manpower and equipment utilization, or other

malfunctioning parts of the operation, and to recommend more efficient or economical utilization of personnel, space, equipment and facilities; or (d) design of minor structures or facilities, in which the technician reviews standard and precedent designs and makes necessary selections and adaptations to meet specific requirements; applies prescribed design criteria and standard and precedent specifications, and searches for current information or related design as developed by industry. May evaluate and make recommendations on the suitability of new materials, equipment and construction methods.

Knowledge and Abilities Required:

In addition to the knowledge and abilities required at previous levels, this level requires:

A thorough knowledge of regulatory material, established procedures and policies, pertinent precedents and sources of information related to area of assignment, and for certain positions, knowledge of the principles and techniques of supervision.

The ability to visualize objectives and analyze problems; to independently locate, select and apply established guides, choosing the best alternative where there are several possible methods; discern when established guides are inadequate and guidance of a professional engineer is needed; plan, coordinate, evaluate and review the work of lower level sub-professional personnel, and prepare technical reports and correspondence.