

STATE OF ALASKA

COMPETENCY SPECIFICATION

Occupational Group: LABOR, TRADES AND CRAFTS

CAREER AREA: *ENGINEERING TECHNICIAN* 9571
 9571-59
 9571-57
 9571-55
 9571-54

Definition: Monitors discrete components of large heavy construction projects, or the entirety of smaller ones to ensure and document conformance of the construction to project specifications and details, as well as acts as an observer documenting the contractor's technique and productivity. May perform technical work in support of engineering studies.

Levels:

Competencies are the required knowledge, skills, abilities and work behavior demonstrated and required for the on-going essential functions of the job. Possession of competencies alone *will not* automatically advance an incumbent; rather, the incumbent must utilize and demonstrate the competency in the on-going performance of *assigned* duties.

SUB JOURNEY ENTRY: Worker is under close supervision and review. The work is designed to provide orientation, training and familiarization with the processes of the occupational field; reinforces and supplements previous experience and education; and allows the trainee to carry out progressively more difficult and responsible tasks.

9571-59 **I** This is the entry level, which works under direct supervision; assists more senior technicians and engineer assistants in inspection, office engineering, materials testing, construction and surveying. Competencies include linear measurements, operation and observation of truck scales, calculation of yields from weigh tickets and computing area and performing field material test for 100 lb. soil/concrete samples.

SUB-JOURNEY: Worker provides assistance to others by performing the more routine, non-specialized and repetitive tasks that do not require the more specialized skills. Basic tasks are performed independently and those of progressive difficulty are performed under direct supervision until proficiency is demonstrated. The designation of Sub-journey does not infer that the work must be always in the company of another and/or higher level employee.

9571-57 **II** This level in addition, performs basic office engineering calculations and field inspections on minor structures; participates in field materials testing. May collect traffic data.

9571-55 **III** This level in addition, performs inspection of all construction activities on less complex structures; inspects a particular aspect or distinct component of a heavy construction project; performs survey line, grade, and quantity calculations; checks field materials testing. Prepares and schedules annual traffic studies programs for a region and may lead others in collection of traffic data.

JOURNEY: Worker is fully proficient. Work is performed independently, using standard methods and techniques, and consists of assignments that are typical of the occupational field. Journey workers can use a variety of interrelated skills to independently complete work that conforms to industry standards. The work may require proof of competence, training or certification.

9571-54 This is the project engineer's representative on heavy construction projects.

Essential Core Competencies: "Common or typical" to the career area and required for all levels as appropriate to the specific position. *These are included in the position description and performance evaluation review process.*

ENGINEERING TECHNICIAN

CORE

incorporated into

Sub-Journey I 9571- 59

Knowledge of:

- oral and written communication in order to communicate effectively with a variety of people
- basic unit weights and measures and metric units and conversions
- mathematics to calculate, record and interpret computations
- concepts of volume, ratio and proportion
- traffic safety rules to provide traffic control assistance on-site
- terminology, definitions in common use in the physical sciences
- personal and site safety practices and procedures encountered in the work

Ability to:

- follow oral and written technical direction
- read, understand and interpret technical material in the use of formulas, plans, specifications and topographic maps
- learn nomenclature and use of standard equipment in basic surveying, drafting or material testing
- perform repetitive tasks to obtain consistent results
- work cooperatively with those encountered
- prepare accurate and legible notes, messages, reports or summaries
- understand and apply principles and laws of physical sciences
- measure and weigh liquids and solids accurately
- care for tools and equipment in safe manner
- use standard calculators and office equipment
- learn and apply principles, techniques and processes applicable to the job

Skill in:

- safety awareness and correct safety protocols at all times and in response to emergencies
- appropriate and efficient use of time and equipment
- appropriate selection of equipment, clothing, and safety tools applicable to the task
- working cooperatively as a team member in a variety of settings

Work behavior

- handle conflict and aggressive people
- comply readily with contractor work hours

Essential Technical Competencies:

SUB-JOURNEY level workers will be required to meet the following

TO:

- have the aptitude to develop, practice and use needed skills and work behaviors
- apply verbal and written instructions to individual and grouped tasks
- perform routine tasks with consistent results
- recognize situations requiring additional supervision or instruction in order to request assistance
- apply acquired skills, knowledge and abilities to new tasks
- learn proper usage and care of tools and equipment of the trade or craft

EXAMPLES OF DUTIES:

Calculates asphalt spread yield for engineer and contractor for material quantity control.

Checks weigh station operations of trucks hauling materials for payment by the ton. Writes tickets and keeps scale diary. Checks tickets against computer summary sheets and field books.

Assists in computing earthwork quantities and daily material tonnage.

Engineering Technician Sub-journey II 9571- 57
in addition

Knowledge of:

- applicable portions of the standard specifications for highway/aviation construction and traffic manuals
- construction techniques for minor structures
- basic equipment operation and maintenance
- minor field materials testing
- occupational hazards and safety procedures
- documentation requirements for Federal Aid projects
- traffic site control and safety procedures

Ability to

- interpret basic sketches, plans and specifications
- recognize questionable results
- communicate effectively in written and oral communications

Skill in

- mathematics
- use of hand calculators and computers which may include specific software
- use and care of equipment

EXAMPLES OF DUTIES:

Measures temperatures of asphalt mix, computes percent of aggregates used; computes yields and maintains diary. Maintains diary of activities in assisting with field inspections on minor grading, paving, guardrail, culvert installations, etc. Assists in bridge and structural inspections.

Collects materials samples and performs minor materials testing under supervision. Performs density and gradation tests as directed. May act as materials inspector on smaller projects.

Performs basic office engineering calculations either by hand or by computer. Computes daily tonnage of earthwork and asphalt quantities; calculates and posts pay estimates; files documentation. Checks information against field inspectors' information.

Collects traffic data to include traffic volume counts, vehicle class counts, vehicle turning movements, speed studies, pedestrian movement and delay studies. Installs, repairs data collectors. Assists in field traffic sign reviews; assists in layout of passing zones. Collects pavement condition data.

Engineering Technician Sub-Journey III 9571- 55
in addition

Knowledge of:

- construction techniques applicable to more complex projects
- effective project administration practices
- field survey practices
- applicable materials or traffic specifications and manuals
- applicable standards, tests and methods of data collection

Ability to:

- prepare preliminary drawings, traces and sketches
- plot data from field notes
- inform contractor, agency representatives and project engineer of problems and suggest solutions within applicable procedures, guidelines, project practices and specifications.
- maintain and review project files for compliance with standards and procedures

EXAMPLES OF DUTIES:

Inspects and documents construction contract administration in office engineering, inspection and materials testing for culverts, retaining walls, utilities, etc.

Assists in grade, asphalt surfacing, bridge and structure inspections.

Performs and checks field and laboratory materials testing and maintains material records. May set up and maintain materials laboratory on small projects.

Performs and checks survey line, grade, drafting and quantity calculations within applicable procedures.

JOURNEY level workers will be required to meet the following

TO:

- have the required skills to handle difficult problems encountered
- have comprehensive knowledge of the subject or occupational area
- use judgment in determining actions
- exercise independence in determining actions
- plan and lay out work (i.e. determine how to do one's own work)
- make appropriate choice among alternatives
- complete work with only limited instruction and/or little or no advice
- proceed with work without having results or products generally reviewed in progress

Engineering Technician Journey 9571-54
in addition

Knowledge of:

- construction technique for, blasting, drainage systems, piling, welding, major structures, bridges, retaining walls, earth embankments, paving, electrical and utility systems
- standard surveying practices

Ability to:

- substantiate and defend decisions
- set priorities and determine sequence of action
- accept and reject work according to established standards and within assigned authority
- manage multiple assignments
- review and verify the work of others
- explain and demonstrate concepts and procedures
- recognize variant work results and determine of cause
- make changes within applicable guidelines and engineering liability implications
- dispatch work and equipment efficiently
- develop workable partnerships with those encountered in the work
- represent project engineer in a professional manner
- set up, maintain and review project files for compliance with standards and procedures

Skill in:

- traffic safety control
- use of survey instruments to determine gross elevations, localized topographical and bridge lines, line and grade and blue tops
- fair and equitable treatment of contractors, agencies and employees

EXAMPLES OF DUTIES:

On a small project may do all of project inspections duties, or on a larger project may concentrate in one area for a season.

Monitors work of lower level technicians to verify work progress; checks their calculations. Coordinates equipment effectively.

Inspects and documents all construction operations from grade, electrical, culverts to bridge and structural concrete items. Advises project engineer on potential problems.

Sets up and maintains project field office to include setting up the books and preparing contractor progress payments.

Performs field and laboratory testing for concrete, asphalt and, aggregates. Sets up and maintains field material laboratory and maintains records.

Reviews and inspects traffic control; administers the approved traffic control plan.

Competencies and Certifications:

CORE:

Alaska Drivers license

TECHNICAL:

first aid/ CPR certificate

May be required to pass designated examinations as competencies progress

American Traffic Safety Services Association (ATSSA) certificate

American Traffic Safety Services Association (ATSSA) Traffic Supervisor certificate

NRC nuclear densometer certificate

Environmental Conditions and Physical Requirements :

Exposure to

dirt, dust and fumes

hazardous materials and toxic chemicals

heavy equipment and vehicular traffic

heights, trenches, steep slopes

high voltage electricity

inclement and seasonal weather conditions

insects and wildlife

ionizing radiation

moving vehicles, equipment, machinery and tools

noise

ovens up to 1000 degrees F. and heated materials

- sharp edges and instruments
- traveling public
- work in remote areas for long duration

Physical stamina to

- stand or walk for long periods
- lift 100 pounds regularly

Equipment:

[] Brushing tools

- brush ax
- brush hook
- chain saw
- digging bar
- ice auger
- maul
- machete
- post-hole digger
- shovel
- sledge hammer

[] Data collectors

- AMP clamp
- ball bank indicator
- computerized profilometer
- digital multimeter
- electronic distance measurer
- electronic turning board
- megohmmeter
- pavement cutting saw
- photolog and videolog machine
- portable radar equipment
- rut measurer

[] Office:

- hand radio
- PC computer using Dbase, SuperCalc, Lotus 1,2,3, Wordperfect
- plotter
- printer
- scanner
- hand calculator
- still or video camera

[] Safety:

- ear protection
- eye protection
- hard hat
- vests

[] Survey:

- cloth tape
- field calculator
- hand level
- level
- plumb bob
- prism pole
- rod
- steel tape measure
- theodolite
- total stations
- compass

[] Vehicles:

- all - terrain vehicle
- pick up truck or van
- small boats
- snow machine

[] Hand tools

- ax
- masonry saw
- sledge hammer
- scythe

[] Materials testing:

- aggregate splitters
- air meter
- asphalt gauge
- Atterberg limit apparatus
- electronic scales
- sieve shakers
- Nuclear asphalt content gauge
- Nuclear densometer
- Nuclear oil content gauge
- Proctor density standard
- Proctor hammer
- propane and electric ovens
- slump cone
- Thermolyne furnace

- thermometers
- unit weight bucket
- weigh scales
- Other
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