



CIVIL ENGINEERING SPECIALIST 1

3136

GENERAL DESCRIPTION OF CLASS

The CIVIL ENGINEERING SPECIALIST 1 applies civil engineering or surveying procedures and practices or construction project administration methods to one or more specialty areas. Employees do advanced technical engineering or surveying work. They work independently in drafting, field or laboratory inspection, construction contract administration, surveying, materials testing, investigations and data analysis and mapping. The Civil Engineering Specialist 1 frequently participates as a member of a team, project or specialty program and leads some elements of the work of others, or portions of projects.

DISTINGUISHING FEATURES

This is the first of a three level series. Assignments are similar, and typically a phase of a broader project or portions of a broader process. Employees select appropriate guidelines to solve operational problems. Changing priorities or differing situations require employee latitude to consider which among many procedures to follow. Employees may revise standard work methods and procedures. Employees in this class take actions or recommend action based on preliminary interpretation of data or results of analysis.

The more limited project scope, the level of supervision, and lack of lead responsibility for complex projects, distinguishes this class from the higher levels. The lesser complexity or scope of subject matter covered in representing the program outside the agency further distinguishes it from the higher levels.

The nature of assignment and level of responsibility distinguish this class series from the Engineering Technician class series. *Nature of Assignment:* For the Engineering Technician class series the work involves primarily the application of established practices. Employees at the highest level do minor modification and analysis for a portion of the time. The Civil Engineering Specialist has broader assignments, requiring greater skill and engineering or surveying judgment. *Level of Responsibility:* Employees in the Engineering Technician class series use available, specific and detailed, established procedures. Employees typically do not independently plan and execute projects. The Civil Engineering Specialist has the freedom to plan and execute assignments and independently coordinates the project or assigned specialty program with other individuals and groups.

The Civil Engineering Specialist class series does engineering or surveying work not requiring professional registration as an Engineer or Land Surveyor. It is distinguished from the Professional Engineer or Professional Land Surveyor series by the absence of final responsibility for design, design analysis, surveys, or the prediction of the character and safety of structures which is signified by applying a professional engineer's or professional land surveyors seal to final designs or documents; providing direction, supervision and control on technical matters of policy and design; and exercising professional judgment in engineering or surveying matters embodied in the plans, design, specifications, studies, surveys, research, or other documents involved in the work.

Some training positions within the Professional Engineer or Professional Land Surveyor series do similar work to this class series when the assignments are designed primarily to give practical experience to prepare the academically trained employees for the full range of professional work and responsibility; or there is a direct line of promotion to registered professional engineer or professional land surveyor positions in the agency.

DUTIES AND RESPONSIBILITIES

The duties listed below are characteristic of the type and level of work associated with this class. Individual positions may do all or some combination of the duties listed below as well as other related duties.

1. Lead Drafter and Development of Construction Plans and Specifications

Draw contract plans for bridges, roadway, and other related structures including conceptual, preliminary and advanced project design drawings. Do drawings and standard designs from rough sketches, notes, or Computer Assisted Draft Design (CADD) files. Lead others on complex structures or projects coordinating the work of several drafters. Review project plans for meeting drafting standards, consistency and to assure continuity and completeness. Direct the revision of contract plans to "As Constructed" status.

Lead drafting-related specialty areas such as cell library, specialized computer programs, standard drawings, and computer-aided drafting. Train and give advanced-level drafting advice on proper layout, use of associated programs, file management, symbols and drafting standards and guidelines to other technicians, new designers, consultant personnel, and field personnel. Mentor and coach other drafters to increase their drafting skills and productivity. Recommend solutions to problems with computerized drafting programs.

2. Field Crew

Inspection: Lead other inspectors and coordinate inspection activities on multiple, complex construction projects. Monitor construction work and documentation to verify compliance with contract plans and specifications. Direct the work of lower level personnel and train them on project inspection. Review contract plans and specifications for roadway and bridge construction to identify potential problems. In coordination with others, develop possible solutions for contract document problems. Check grade, alignment, size, shape, placement and quantities of reinforcing steel; storm and sanitary sewer pipe; concrete and concrete form; fencing; earthwork; landscaping; signing; illumination; structural coating; barrier and grout; rock; guardrail; striping; etc. Prepare, or lead preparation of project photos; Daily Progress Reports; pay notes; reconciling Inspector's Estimate; Force Account Sheets; correspondence to contractor, technical reports, project semi-final narrative; interview contractors and subcontractors to verify compliance with wage and hour laws, OJT programs, EEO or Civil Rights rules and regulations.

Assesses the condition of bridge elements and determine the urgency of deficiencies.

Identify procedures or materials that are inconsistent with the contract documents. Notify contractor for corrective action and follow-up until inconsistency is resolved. Suspend non-specification procedures until Project Manager can be notified.

Survey: Lead field location and construction surveying activities on a crew. Establish control points and preliminary alignments. Locate property corners. Gather and record physical topography and other related data. Prepare maps from survey data. Set slope stakes, control alignment and grades for work activities. Use plans and drawings to verify and set-up horizontal and vertical controls, construction centerline, right-of-way lines and monuments. Establish land survey controls using surveying instruments. Calculate surveying computations using hand held calculators and computers. Review data from contractor's surveyors and engineers for completeness and accuracy.

Contract Compliance Documentation: Lead field and office personnel to document quantity and quality of construction materials, verify proper payments to contractors, and assemble project records for final acceptance; recommend approval and payment on monthly progress estimate.

Prepare or review contract change orders, extra work orders, state force orders, cost estimates and supporting data. Coordinate semifinal completion of project documents and track project progress. Assist in auditing project documentation and final acceptance. Check quantity documents for accuracy.

Quality Control/Compliance: Coordinate quality control or quality compliance work on a construction crew to verify that the quality of materials complies with construction contracts.

3. Materials Testing

Do complex and specialized tests on construction materials such as aggregates used in transportation projects. Evaluate test results for compliance with specifications and recommend acceptance, rejection or alternative uses of construction materials. Maintain records of received materials samples and test results. Conduct research studies on materials. Give expert technical information or advice to customers in the application of a variety of construction materials.

Assign and review work, compute and analyze test results, and track samples sent to the centralized laboratory for testing. Train technicians in proper testing procedures and safety protocol, and monitor their tests to verify the accuracy of test results.

4. Traffic and Transportation Engineering

Do or review speed zone investigations and reports. Analyze traffic conditions for construction projects and high accident locations including traffic signal warrant analysis and recommend traffic controls. Collect data in areas such as traffic safety corridors and prepare required reports. Investigate and gather data pertaining to tort litigation involving traffic engineering, right of way, and other issues.

Develop and analyze data used in transportation analysis for planning, project selection, environmental analysis and operations.

5. Data Analysis and Mapping

Lead the production and maintenance of transportation inventory database and mapping or GIS products. Operate computer-aided drafting programs, geographic information systems and database management functions' including mileage control processes and calculating mileages. Query databases. Interpret engineering or survey data and do engineering or survey computations to add contract plan, legal document and field data to transportation inventory systems. Train and give advanced technical advice to other agency technicians, consultants and staff.

RELATIONSHIPS WITH OTHERS

Employees in this classification have frequent contact with agency staff and regular in-person contact with contractors and their employees, property owners, representatives of the FHWA, or employees of local governments to explain their work, agency requirements or State projects. Employees may contact angry or upset people outside the agency to complete project work. They represent the agency at meetings to provide factual information.

SUPERVISION RECEIVED

The Civil Engineering Specialist 1 works under the general supervision of a manager, registered engineer, or land surveyor. They plan and complete work tasks independently. Standard practices, manuals, procedures and general agency guidelines requiring judgment and interpretation guide the

work. Employees have clear but varied practices and procedures. Work is regularly reviewed through discussions and periodic review of work products. Work is reviewed for conformance to standards and for quality and timeliness.

GENERAL INFORMATION

Positions in this class are located throughout the State and require the willingness to work under the conditions associated with the environment of the job. Some positions in the class may require the ability to climb, kneel, stoop, or walk over rough terrain when on a field inspection. Some positions are exposed to adverse environmental conditions and heavy traffic.

KNOWLEDGE AND SKILLS (KS)**Extensive knowledge of:**

Computer software programs typical to the engineering or surveying area of assignment.
Equipment and materials applicable to the area of assignment.
Algebra, plane geometry, and trigonometry used for doing engineering or surveying calculations in the assigned area.

General knowledge of:

Practices, and methodologies of civil engineering or land surveying applicable to the area of assignment, such as research, planning, design, survey, construction, project design and development, or traffic.
Methods and techniques of technical report writing and correspondence.
Presentation techniques for explaining technical information to general audiences.
Engineering or surveying guidelines, technical manuals and procedures used which are typical to the area of assignment.

Basic knowledge of:

Principles and methods of leading, training, and reviewing the work of others.
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Skill to:

Read, understand and apply specific instructions found in technical manuals, specifications, contract plans and other guidelines applicable to the job assignment.
Compute moderately complex engineering or surveying mathematical and statistical calculations in the context of one or more technical specialties.
Communicate orally and in writing with a variety of people; answer questions; and explain technical information, regulations and decisions in an understandable manner.
Evaluate facts and apply general policies, work methods and procedures to specific work situations.
Establish and maintain effective working relationships with the public, contractors and personnel from other government agencies.
Use tact and diplomacy to gain cooperation of others.
Assign and review the work of others to decide accuracy and adequacy of identified conditions, criteria, recommendations and supporting materials.
Coordinate activities with other departmental programs and staff.
Manage multiple tasks over an extended period.
Operate typical engineering or surveying software to analyze data.
Analyze engineering or surveying problems and identify corrective action.
Write clear and concise written reports.

Some positions require:**Basic knowledge of:**

Material testing procedures.
Practices of construction contract administration.
Practices and equipment used to construct transportation facilities.

Physical characteristics and properties of construction materials.
Survey techniques and field procedures.
Techniques and methods of typical automated survey equipment and software.

Skill to:

Operate engineering test equipment.
Draft maps, details, or plans using computer-aided drafting or design software.
Interpret and record field and laboratory data.
Perform field project development, right-of-way monumentation, and construction surveys.

NOTE: The KNOWLEDGE and SKILLS are required for initial consideration. Some duties performed by positions in this class may require different KS's. No attempt is made to describe every KS required for **all** positions in this class. Additional KS requirements will be explained on the recruiting announcement.

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Revised

STATE OF OREGON
 Dept. of Administrative Services
 Human Resource Services Division