

**CALIFORNIA DEPARTMENT OF TRANSPORTATION  
POSITION DUTY STATEMENT**

<b>CLASSIFICATION TITLE</b> Materials & Research Engineering Associate	<b>OFFICE/BRANCH/SECTION</b> Central Region Construction 501, District# <u>930</u>	
<b>WORKING TITLE</b> Materials and Research Engineer	<b>POSITION NUMBER</b> 929- <u>501</u> -3381	<b>EFFECTIVE DATE</b> _____

**As a valued member of the Caltrans team, you make it possible for the Department to improve the mobility across California by being innovative and flexible; reporting to work as scheduled; working cooperatively with team members and others; and treating others fairly, honestly and with respect. Your efforts are important to each member of the team, as well as those we serve.**

**GENERAL STATEMENT:**

Under general direction from a Senior Transportation Engineer, incumbent performs difficult materials and research engineering work. Incumbent is responsible for coordinating independent Sampling and Testing Program. With minimum supervision, incumbent works independently on judgment, resolutions and documentation systems related to the technical testing of construction and other materials purchased by the State.

**TYPICAL DUTIES:**

Percentage  
E=Essential  
M=Marginal

- 60% (E) Operates the Independent Sampling and Testing Program. As a certified representative of the Materials functions, certifies other private testing facilities and personnel engaged in testing of materials used in State highways. Maintains a data base of certified testers.
- 20% (E) Provides technical support in the area of quality assurance. The support includes:  
Acts as the Region Weights and Measures Coordinator  
Acts as the Region Materials Plant Specialist  
Certification of Personnel Performing Acceptance Tests
- 10%(E) Conduct Plant Inspections, as per California Test Method 109, to ensure calibration of instruments used in the production of products used in the construction of state highways and bridges. Reviews project plans and specification specifications or

other requirements for any specialized testing needs. Monitors the contractors operation for compliance to a various test procedures

10% (E) Confers with project engineers and resident engineers on materials assurance problems.

### **SUPERVISION EXERCISED OVER OTHERS**

None. Incumbent may serve as lead worker for construction materials testing laboratory staff. May be called upon to act in absence of the supervisor for a short duration. May serve as lead for functional guidance in training and assisting less experienced staff.

### **KNOWLEDGE, ABILITIES, AND ANALYTICAL REQUIREMENTS**

Incumbent must have the ability to: test the quality and suitability of engineering construction and other materials; do research work on engineering construction and other materials; evaluate physical environmental impact assessment and mitigations.

Must be able to analyze and evaluate test results and analyze testing equipment to ensure that it is within accepted tolerances. Incumbent is required to know methods, materials, equipment and tools used in inspecting and testing a wide variety of construction and other materials. Knowledge of: physical environment impact assessment evaluations and mitigation processes; physical properties and uses of engineering construction materials; fabrication of construction materials; methods of proportioning and handling Portland cement and asphalt concrete; safety practices, policies and procedures; Cal/OSHA safety regulations.

Must be able to evaluate test results of independently performed tests and, without benefit to direct observation, decipher reasons for disagreements between acceptance test results and independent assurance test results. Must approve or reject commercially manufactured materials based upon the standard specifications.

Knowledge of: principles and practices involved in utility relocation; Storm Water Pollution Prevention Plans (SWPPP); Standard Specifications and Standard Plans; current design standards; soil mechanics and ASTM State Test Method procedures; mathematics; civil engineering.

Must be familiar with FHWA policy relating to sampling and testing of materials and construction in federal-aid highway projects and Department policy on quality assurance for construction.

Must have a thorough understanding of the principles of quality control and quality assurance. Must have a thorough grounding in the purposes and procedures of physical tests applicable to construction materials and workmanship.

Good communicative skills are essential in carrying out the duties. Must be able to communicate effectively in both verbal and written form. Must be able to use and understand computers. Must have knowledge of the Construction Manual, Standard Specifications, and Special Provisions. Must be able to prepare reports and correspondence.

Incumbent is required to have a moderate degree of analytical skill to determine if construction work meets specification requirements and to interpret plans and specifications correctly

Must have the ability to: make neat and accurate mathematical calculations and engineering notes; make sound decisions in the implementation of contract plans, specifications and various engineering activities; demonstrate the potential to assume progressive technician journey level responsibility; organize/arrange data to produce effective work products without repetitious direction; and possess interpersonal skills necessary to be an effective team member.

Knowledge of: highway construction material; highway construction methods; basic principles of physics, chemistry, and mathematics as applied to civil engineering; stress analysis; mechanics; strength of materials; properties and uses of engineering materials; methods and equipment of engineering construction; engineering economics; hydrology and hydraulics.

Ability to: read and write English at a level required for successful job performance; prepare correspondence and clear comprehensive engineering reports; analyze situations accurately and take effective action; prepare reports. Ability required to perform technical studies and investigations independently or as a team member. Must possess disciplined observation skills. Must be able to complete multi-tasks but also achieve Department's goals. Must be able to communicate well orally so as to impart information, inspire confidence, and convey authority.

Must have the ability to evaluate work methods and traffic conditions closely, both before and during the work, to assure safety.

### **CONSEQUENCE OF ERROR**

Acceptance or rejection of a contractor's materials and work is usually based on results of materials tests. It is imperative that tests are performed in accordance with accepted procedures. Errors in materials testing could cause the contractor undue cost and delay. Highway design is dependent on materials testing and errors in testing and interpretation of test results increases construction costs, cause defective highways, possible injury and/or damage, and potentially expose the State to liability issues.

Failure to understand and failure to incorporate appropriate standards, requirements and policies into work product may result in expensive waste of time and materials, cause additional work and project delays, and could result in excessive construction contract claims.

An error in decision, judgment, or the processing of estimates or other contract administration paperwork would result in errors in payment to contractors and/or providers of service under contract with the Department. Poor engineering decisions made by incumbent could cause reduction of productivity

Incumbent is responsible for his/her actions, decisions, quality of work, and proper use of State time, equipment and materials. Improper performance of duties and/or failure to adhere

to established policies, procedures and guidelines could lead to adverse action and possible termination.

## **PUBLIC AND INTERNAL CONTACTS**

Incumbent must be able to communicate effectively with others including Department staff, technical/professional level staff of outside agencies, contractor's personnel and members of the public regarding construction projects. Has contact with private contractors, private companies, resident engineers, inspectors and their staff, and other branches, both District and Headquarters.

## **WORK ENVIRONMENT**

Job will have exposure to chemicals, equipment, machinery, heat, cold, dust, gas, fumes, chemicals, dirt, lab equipment, construction materials, outdoor conditions, indoor conditions, humidity, and high decibels of noise. Incumbent will have exposure to lab conditions, which may or may not be climate controlled. Hard hat and safety vest or approved safety shirt **must** be worn at all times in the field, no exceptions. While at the Construction office employees will normally work in a climate-controlled office under artificial light; however, due to periodic problems with the heating and air conditioning, the building temperature may fluctuate. Workload may subject employee to night work, frequent changes of shift, frequent changes of work hours and workdays, and geographic transfer. Travel is required. Possession of a valid California Drivers License is desirable. Vacations may be restricted during peak times. Overtime may be required.

## **PHYSICAL, MENTAL AND EMOTIONAL REQUIREMENTS**

Must possess the ability to work on uneven ground, climb, lift, carry, bend, squat, kneel, crouch, reach, pull, push, grasp, sit, stoop, crawl, and repetitive use of extremities. Must be able to transport variety of objects that are less or equal to 20 pounds. Hard hat and safety vest or approved safety shirt **must** be worn at all times in the field, no exceptions. May be required to sit for long periods of time. May be required to stand for long periods of time. Ability to work in lab conditions. Ability to work indoors and outdoors. Ability to work under artificial light. Ability to use office equipment and lab equipment. Work within a noisy and occasionally distracting work environment. Evaluate and understand critical calculations, data and other material that may require long periods of mental concentration

The workload is subject to frequent, substantial, and unexpected changes. Workload may subject employee to frequent changes of shift, frequent changes of work hours and workdays, and geographic transfer. Travel is required. Possession of a valid California Drivers License is desirable. Night-work, overtime and/or flexible hours may be required. Must be able to organize and prioritize. Must be able to concentrate, formulate effective strategies, be multi-tasked, adapt to changes in priorities, and complete complex task or projects with short notice. Ability to resolve emotionally charged issues reasonably and diplomatically. Must be able to develop and maintain cooperative working relationships. Vacations may be restricted during peak times. Use of computers, lab equipment, and office equipment is required

The employee must be able to understand and follow instructions provided, both oral and written, analyze plans and specifications accurately and take effective action. The employee must have the ability to lead and to work under pressure.

**I have read, understand and can perform the duties listed above. (If you believe you may require reasonable accommodation, please discuss this with your hiring supervisor. If you are unsure whether you require reasonable accommodation, inform the hiring supervisor who will discuss your concerns with the Reasonable Accommodation Coordinator.)**

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EMPLOYEE (Print)

DATE

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EMPLOYEE (Signature)

DATE

**I have discussed the duties with and provided a copy of this duty statement to the employee named above.**

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SUPERVISOR (Print)

DATE

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SUPERVISOR (Signature)

DATE

July 2002