

POSITION DUTY STATEMENT

PM-0924 (REV 01/2022)

CLASSIFICATION TITLE Senior Trans Electrical Engineer (Specialist)	OFFICE/BRANCH/SECTION HQ/Maintenance/SM&I/Office of Specialty Investigations	
WORKING TITLE Tunnel/Movable Bridge Inspection Senior Specialist	POSITION NUMBER 913-624-3163-XXX	REVISION DATE 05/14/2024

As a valued member of the Caltrans leadership team, you make it possible for the Department to provide a safe and reliable transportation network that serves all people and respects the environment.

GENERAL STATEMENT:

Under the supervision of the Chief of the Office of Specialty Investigations at Structure Maintenance and Investigations (SM&I), the incumbent is required to: (1) plan, prepare, perform, report, oversee and direct the safety inspections and evaluations of in-service highway tunnels on the state or local highway networks in accordance with the federal regulation in 23 CFR Part 650 Subpart E National Tunnel Inspection Standards (NTIS), focusing primarily on the electrical and electronic systems and the electrical and electronic components of other functional systems, and (2) receive work assignments from and provide assistance to the Tunnel Inspection Branch Chief, who has overall responsibility for the inspection program, with any delegated duties and/or aspects of the program.

The incumbent may also be required to plan, prepare, perform, report, oversee and direct the safety inspections and evaluations of in-service highway movable bridges on the state or local highway networks in accordance with the federal regulation in 23 CFR Part 650 Subpart C National Bridge Inspection Standards (NBIS), focusing primarily on the electrical and electronic systems and the electrical and electronic components of other functional systems.

CORE COMPETENCIES:

As a Senior Trans Electrical Engineer (Specialist), the incumbent is expected to become proficient in the following competencies as described below in order to successfully perform the essential functions of the job, while adhering to and promoting the Department's Mission, Vision, Values, Strategic Imperatives and Goals. Effective development of the identified Core Competencies fosters the advancement of the following Leadership Competencies: Change Commitment, Risk Appetite, Self-Development/Growth, Conflict Management, Relationship Building, Organizational Awareness, Communication, Strategic Perspective, and Results Driven.

- **Learning on the Fly:** Learns quickly, is open to change, experiments, and is flexible. (Strengthen Stewardship and Drive Efficiency - Engagement)
- **Decision Making:** Makes critical and timely decisions. Takes charge. Supports appropriate risk. Makes challenging and appropriate decisions. (Enhance and Connect the Multimodal Transportation Network - Engagement)
- **Continuous Professional Development:** Seeks to obtain knowledge and improve performance while supporting others in doing the same. (Cultivate Excellence - Innovation)
- **Problem-solving and Decision-making :** Identifies problems and uses logical analysis to find information, understand causes, and evaluate and select or recommend best possible courses of action. (Strengthen Stewardship and Drive Efficiency - Innovation)
- **Teamwork and Collaboration:** Sets team structure. Organizes, leads, and facilitates team activities. Promotes team cooperation and encourages participation. Capable of cross functionality and working well with others on a team to achieve personal goals, team goals, and organizational goals. Takes responsibility for individual actions in order to achieve consistent results. (Cultivate Excellence - Integrity)
- **Organizational Awareness:** Contributes to the organization by understanding and aligning actions with the organization's strategic plan, including the mission, vision, goals, core functions, and values. (Strengthen Stewardship and Drive Efficiency - Integrity)
- **Communication:** Expresses oneself clearly in all forms of communication. Gives feedback and is receptive to feedback received. Knows that listening is essential. Keeps others in the Division and other functional units informed as appropriate. (Cultivate Excellence - Engagement)
- **Analytical Skills:** Approaches problems using a logical, systematic, and sequential approach. Weighs priorities and recognizes underlying issues. (Strengthen Stewardship and Drive Efficiency - Integrity)
- **Technical Expertise:** Depth of knowledge and skill in a technical area. (Strengthen Stewardship and Drive Efficiency - Integrity)

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TYPICAL DUTIES:

Percentage	Essential (E)/Marginal (M) ¹	Job Description
35%	E	<p>Plan, prepare and perform inspections of tunnels in the capacity of a Team Leader per the NTIS and/or an inspector, focusing primarily on the electrical and electronic systems and the electrical and electronic components of other functional systems. The tunnel inspections may include initial, routine, damage, in-depth and special inspections of the structural elements, civil elements, mechanical systems (typically consisting of ventilation systems, drainage and pumping systems, emergency generator systems and flood gates), electrical and electronic systems (typically consisting of electrical distribution, emergency distribution, lighting and emergency lighting), fire/life safety/security systems (typically consisting of fire protection, fire detection, emergency communications, and operations and security), signs and protective coating systems. Perform direct observations of the functional system testing, critical system checks and testing documentation of the tunnel owner/custodian/operator.</p> <p>Plan, prepare and perform inspections of movable bridges in the capacity of a Team Leader per the NBIS and/or an inspector, focusing primarily on the electrical and electronic systems and the electrical and electronic components of other functional systems. The movable bridge inspections may include initial, routine, damage, in-depth, special and complex feature inspections of the structural elements, structural systems (typically consisting of support, balance, pier protection and bridge house), mechanical systems (typically consisting of support, balance, drive, control, interlocking, traffic control and bridge house) and electrical systems (typically consisting of drive, control, interlocking, navigation guidance, electrical power, traffic control and bridge house). Perform direct observations of the functional system testing, critical system checks and testing documentation of the bridge owner/custodian/operator.</p> <p>Identify, review and/or manage critical findings of structural or safety-related deficiencies that require immediate action in accordance with the applicable inspection standard (NTIS or NBIS) and the SM&I Procedures Manual.</p>
15%	E	<p>Report the results of tunnel and/or movable bridge inspections in comprehensive written reports, which include the inspection findings, condition states and quantities of the elements and defects, repair work recommendations and inventory data using a computerized Tunnel Management System (TMS) and/or Bridge Management System (BMS).</p>
15%	E	<p>Perform quality control reviews of tunnel inspections and inspection reports for compliance with the NTIS, the Specifications for the National Tunnel Inventory, the Tunnel Operations Maintenance Inspection and Evaluation Manual, the Federal Highway Administration (FHWA) Metrics for the Oversight of the National Tunnel Inspection Program and the SM&I Procedures Manual.</p> <p>Perform quality control reviews of movable bridge inspections and inspection reports for compliance with the NBIS, the Manual for Bridge Evaluation, the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, the Specifications for the National Bridge Inventory, the Caltrans Bridge Element Inspection Manual, the Movable Bridge Inspection Evaluation and Maintenance Manual, the FHWA Metrics for the Oversight of the National Bridge Inspection Program and the SM&I Procedures Manual.</p>
10%	E	<p>Develop new or update the existing tunnel-specific inspection procedures (inspection plan) for each tunnel and the specialized inspection procedures for each complex tunnel. Review the requirements for functional system testing, direct observation of critical system checks and testing documentation that are provided by the tunnel owner/custodian. Estimate the required inspector time, equipment resources and owner-provided support (typically consisting of lane closures, traffic control and access) for the inspections. Identify or review the identification of tunnels for inclusion in the National Tunnel Inventory.</p> <p>Develop new or update the existing bridge-specific complex-feature inspection procedures (inspection plan) for each movable bridge. Estimate the required inspector time, equipment resources and owner-provided support (typically consisting of lane closures, traffic control and access) for the inspections.</p>

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10%	E	Review for conformance with State standards the designs of repairs, retrofits, rehabilitations and/or upgrades of the electrical and electronic systems and the electrical and electronic components of other functional systems of tunnels and/or movable bridges.
5%	E	Lead the response and/or respond to various types of emergencies that have caused damage to tunnels and/or movable bridges. Review the emergency response plans of the tunnel/movable bridge owners/custodians/operators. Participate in emergency response drills for tunnels and/or movable bridges.
10%	M	Perform miscellaneous engineering, administrative and training duties related to the inspections and maintenance of tunnels and bridges, as assigned by the Branch Chief or the Office Chief.

¹ESSENTIAL FUNCTIONS are the core duties of the position that cannot be reassigned.

MARGINAL FUNCTIONS are the minor tasks of the position that can be assigned to others.

SUPERVISION OR GUIDANCE EXERCISED OVER OTHERS

This position does not typically supervise other employees except for occasional, infrequent acting assignments. The incumbent will be required to lead, oversee and direct the work of other employees in the capacity of a Team Leader.

KNOWLEDGE, ABILITIES, AND ANALYTICAL REQUIREMENTS

The incumbent must possess thorough knowledge of the standards, specifications, policies and procedures for inspection, evaluation and maintenance of the functional systems and structural elements of highway tunnels and movable bridges, focusing primarily on the electrical and electronic systems and the electrical and electronic components of other functional systems. These include, but are not limited to, the NTIS, the Specifications for the National Tunnel Inventory, the Tunnel Operations Maintenance Inspection and Evaluation Manual, the FHWA Metrics for the Oversight of the National Tunnel Inspection Program, the NBIS, the Manual for Bridge Evaluation, the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, the Specifications for the National Bridge Inventory, the Caltrans Bridge Element Inspection Manual, the Movable Bridge Inspection Evaluation and Maintenance Manual, the FHWA Metrics for the Oversight of the National Bridge Inspection Program and the SM&I Procedures Manual.

The incumbent is expected to be familiar with the codes, specifications, policies and procedures for design and construction of the electrical and electronic systems and the electrical and electronic components of other functional systems of highway tunnels and movable bridges.

The incumbent must be thoroughly familiar with the Caltrans Safety and Health Manual, and the Code of Safe Operating Practices of the Caltrans Maintenance Program.

The incumbent must attain and maintain certification as a Team Leader in accordance with the NTIS.

The incumbent must attain and maintain certification as a Team Leader in accordance with the NBIS.

The incumbent must have the ability to: (i) perform visual observations, testing and checks during the inspections, and use engineering judgment to assess the condition state, functionality and load capacity of the functional systems and structural elements of highway tunnels and movable bridges; (ii) take accurate field notes and report the inspection results in comprehensive reports; (iii) collect physical and statistical data during the inspections and enter that data in a computerized tunnel/bridge management database system; (iv) work independently and make decisions with minimum direction or supervision; (v) travel and work statewide for extended periods of time; (vi) safely drive State vehicles and operate a variety of inspection tools and equipment.

The incumbent is required to be proficient in the use of the SM&I TMS and BMS, as well as computer software for word processing and engineering computation.

RESPONSIBILITY FOR DECISIONS AND CONSEQUENCES OF ERROR

The incumbent will be required to make decisions regarding the safety, condition and repair needs of the functional systems and structural elements of highway tunnels and movable bridges. Errors in judgment and/or decisions could jeopardize public or employee safety. Inaccurate, incomplete or overdue tunnel or movable bridge inspections and inspection reports may result in: (i) reduction of public mobility, (ii) increased maintenance and operations costs, (iii) inaccurate scope and unnecessary delays in

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repair, rehabilitation or replacement projects, (iv) potential tort liability for the Department, and (v) non-compliance with the federal tunnel and bridge inspection mandates, which may cause sanctions by the FHWA such as withholding or forced re-direction of federal reimbursement funds.

PUBLIC AND INTERNAL CONTACTS

The incumbent is expected to have regular oral and/or written contacts with the maintenance, construction, local assistance and traffic operations personnel at various Caltrans districts and divisions, other state departments and local agencies.

The employee may be required to present and discuss critical findings with Caltrans, local agency and FHWA staff.

The incumbent may be required to provide expert background and recommendations to technical committees on the inspections and maintenance of tunnels and movable bridges.

PHYSICAL, MENTAL, AND EMOTIONAL REQUIREMENTS

The incumbent may be required to make critical safety decisions in emergency situations relating to the functional systems and structural elements of highway tunnels and movable bridges with or without supervision or direction from their chain of command.

The employee must participate in safety and first-aid training, and may be required to administer first aid in the field in the event of an injury.

Hearing and sight are essential for job performance because the incumbent must be able to see traffic, equipment, obstructions, gages, controls, warning signs and warning lights, and hear traffic, equipment, directions and warning sounds in order to perform their duties safely.

The employee must be able to travel with and work closely with other members of the inspection team.

The incumbent may be required to sit for long periods of time while driving or using a computer.

The inspections of tunnels and movable bridges may require the employee to walk up and down steep inclines or suspension cables, walk or stand near sudden elevation breaks higher than 6 ft, work from catwalks, platforms, scaffolding or ledges, climb fences, interior or exterior ladders, push or pull heavy doors or manhole covers, enter confined spaces, use harnesses and respirators, and perform inspections at heights up to 700 ft and near or over waterways where the water depths exceed 3 ft.

The employee will be required to lift, carry and operate inspection tools and equipment, which may weigh as much as 65 lbs. These operations may involve grasping, fine manipulation, reaching overhead, pushing, pulling, twisting, lifting, squatting, crouching, crawling, balancing and bending.

The incumbent may need to operate aerial lifts or traveler platforms in the course of the inspections. This would require the employee to utilize their motor skills in order to manipulate the hand and foot controls of the machinery.

WORK ENVIRONMENT

The work is split approximately 50-50 between various field locations throughout California and an office base of operation, which may include telework. The time allocated to the field and office activities is dictated by the workload and is expected to fluctuate. The incumbent will be required to travel from their headquarters location to the field work locations for day or overnight trips for up to 2 weeks per month. The incumbent must be able to travel by driving a state vehicle or by using commercial transportation.

While in the office, the incumbent will be required to work in a climate-controlled environment under artificial lighting.

While in the field, the incumbent will be required to work outdoors, day or night, near highway traffic with or without lane closures, and may encounter the following environments and entities: sun, heat, cold, rain, sleet, snow, fog, wind, noise, dust, dirt, trash, exhaust gases, aerially-deposited lead, lead contained in the paint and primer coatings of tunnel and bridge elements, chemicals, contaminated ground and water, unregulated human encampments, animals (such as snakes, birds, bats, spiders and rats) and their droppings, plants (such as poison oak, ivy and vines), mechanical system components (such as motors, fans, pumps, generators, belts, gears and piping), electrical system components (such as motors, panels, switchboards, transfer switches, lights and conduit), various structural and terrain features that exist in and around the tunnels and bridges (such as underground bores and plenums, sumps, confined spaces, steps, stairs, uneven surfaces, elevation breaks, waterways and heights), and a

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variety of sometimes extreme weather conditions and climates that occur in California.

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.)

EMPLOYEE (Print)

EMPLOYEE (Signature)

DATE

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

SUPERVISOR (Print)

SUPERVISOR (Signature)

DATE

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