

POSITION DUTY STATEMENT

PM-0924 (REV 01/2022)

CLASSIFICATION TITLE Equipment Engineer	OFFICE/BRANCH/SECTION Equipment/Engineering & Prod/Proj Mgmt/3239	
WORKING TITLE Equipment Engineer (PM, MFG,Electrical)	POSITION NUMBER 932 001 3639 925	REVISION DATE

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 direction of a Senior Equipment Engineer, the Equipment Engineer uses Computer Aided Design (CAD) to perform detailed electrical engineering design, electrical schematics, and wire harness drawings for Direct Current (DC) systems on mobile equipment in the Caltrans fleet. Provides manufacturing and installation support for in-house builds and aids in electrical system specification for vendor contracts. Performs all associated research and development of these electrical systems. Programs various equipment control modules that interface with Caltrans electrical harnesses. Troubleshoots mobile equipment electrical systems and Caltrans manufactured harnesses.

Performs manufacturing design duties including using CAD to design component brackets and production tooling/fixtures. Evaluates fabrication complexity and makes recommendations to the production team. Organizes shop assembly lines and aids the production team in creating parts lists and task lists, verifying inventory availability, and establishing production timelines based on historical performance, available labor force, and chassis/component delivery dates. Occasionally performs design and testing of hydraulic systems.

Performs project management duties utilizing a variety of software applications to acquire, organize, filter, sort, group, summarize, and present project data to stakeholders. Uses computer programming languages such as VBA, C#, and SQL to extract data from databases and spreadsheets, implement cross-program automation, and develop reports and dashboards. Programs interactive graphical user interfaces for users to view project data and generate customized reports. This position also requires a drivers license.

CORE COMPETENCIES:

As an Equipment Engineer, 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.

- **Creativity and Innovation:** Thinks beyond the confines of traditional models to recognize opportunities, seek creative solutions and take intelligent risks. (Cultivate Excellence - Engagement, Innovation)
- **Decision Making:** Makes critical and timely decisions. Takes charge. Supports appropriate risk. Makes challenging and appropriate decisions. (Safety First, Cultivate Excellence - Equity, Integrity)
- **Reliability:** Ability to demonstrate dependability in meeting commitments, and providing a consistent work product. Takes responsibility for individual actions in order to meet deadline demands. (Safety First, Cultivate Excellence - Engagement, Integrity, Pride)
- **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. (Safety First, Cultivate Excellence - Equity, Integrity)
- **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. (Safety First, Cultivate Excellence, Enhance and Connect the Multimodal Transportation Network - Equity, Integrity, Pride)
- **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. (Safety First, Cultivate Excellence, Enhance and Connect the Multimodal Transportation Network - Engagement, Integrity, Pride)
- **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, Equity, Integrity)
- **Analytical Skills:** Approaches problems using a logical, systematic, and sequential approach. Weighs priorities and recognizes underlying issues. (Safety First, Cultivate Excellence - Innovation)

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- **Computer literacy and application:** Appropriate knowledge of computer applications and other tools necessary to successfully perform tasks. (Cultivate Excellence - Innovation)

TYPICAL DUTIES:

Percentage		Job Description
Essential (E)/Marginal (M) ¹		
40%	E	Electrical Duties: Uses SolidWorks 3D and SolidWorks Schematic to prepare DC electrical designs for mobile equipment. Creates schematics, 3D wire routes, and manufacturing drawings for electrical harnesses. Develops designs and fabrication drawings for the mounting and installation of electrical components on the truck chassis. Performs all research and development involving new electrical components and provides acceptable substitutions to the parts department if necessary. Ensures electrical components and installed lighting comply with California Vehicle Code and FMVSS standards. Ensures electrical specifications on vendor contracts comply with legal standards and the division's quality standards. Supports the wire shop and installers during the manufacturing and installation process. Uses truck manufacturer software to program ECUs to interact with Caltrans harnesses. Uses electrical testing equipment such as multimeters and lighted circuit testers to assist production personnel with electrical troubleshooting. Assists field personnel with investigating and solving electrical problems related to Caltrans built harnesses and the viability of new electrical component retrofits onto existing equipment already in active service.
35%	E	Manufacturing Duties: Collaborates with the Division's Engineering and Production team in planning, organizing, and executing in-house and vendor built production runs. Effectively communicates with production superintendents, Materiel Warehouse, production leads, wire shop, and assembly personnel on how to most efficiently produce equipment. This includes utilizing Microsoft Project in combination with projected delivery estimates of Cab-Chassis vehicles and key components, historical production data, and labor force assumptions to develop production schedules that span 3-4 years. Develops key performance indicators to analyze current manufacturing processes and explores innovative solutions to increase efficiency. Uses SolidWorks 3D to design and create manufacturing drawings for brackets, production tooling, and fixtures. Routinely monitors inventory status, manufactured parts status, production rate, and warranty issues on production runs to ensure accurate scheduling and adapt to unexpected delays. Assists the production team in generating manufacturing documentation including parts lists, task lists, bolt kits, and hydraulic kits. Schedules regular meetings with shop personnel and production superintendents to help projects stay on track, aid in conflict resolution, and promote a collaborative team environment.
20%	E	Project Management Duties: Uses Microsoft Project, Microsoft Access, Microsoft Excel, spreadsheet programs, and databases to query, organize, filter, sort, group, summarize, and present project, inventory, and manufacturing data. Uses various computer programming languages including VBA, C#, and SQL to automate data driven tasks and allow these programs to communicate with each other. Creates dashboards and interactive data access applications using Microsoft Access and Windows Forms. Queries Caltrans fleet and project management data, usually involving post-processing operations such as duplicate checks, filtering, grouping, sorting, and accuracy verification. Builds professional quality spreadsheets, reports, charts, and pivot tables, often for high-level management. Uses Smartsheet to create collaborative spreadsheets with conditional formatting, implement automated approval and notification workflows, generate permission based views, and link data across multiple sheets and departments.
5%	M	Occasionally performs mechanical design in SolidWorks 3D, hydraulic design, and hydraulic troubleshooting.

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

Occasional supervision of others required only in absence of supervisor. May also direct the work of technical staff. Provide guidance for Heavy Equipment Mechanic during installation and troubleshooting of electrical components and systems.

KNOWLEDGE, ABILITIES, AND ANALYTICAL REQUIREMENTS

Knowledge of: Engineering fundamentals and mathematics, electrical engineering methods, materials and equipment used in the design, fabrication and maintenance of automotive and mobile electrical equipment and their subsystems; provisions of the California Vehicle Code, FMVSS, NEC, SAE for lighting equipment and other vehicle electrical equipment; regulations,

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techniques and instruments for measuring, testing and troubleshooting AC and DC electrical devices and systems; commercial vehicle electrical requirements; requirements for commercial vehicle electrical safety equipment; general automotive electrical engineering; electrical engineering analysis; on-board mobile equipment computer systems; and Federal and State codes and regulations governing the design and installation of electrical equipment; mechanical Engineering, Manufacturing Engineering methods, materials and equipment used in design, fabrication and maintenance of automotive equipment and their subsystems; project Management principles, strategies and guidelines; basic computer programming.

Ability to: Prepare, analyze and check drawings, specifications and estimates for vehicles and components as related to electrical systems; explain in layman's terms how an electrical schematic on paper works when installed on a piece of equipment; organize and conduct research on automotive safety equipment; draw or work from plans, drawings, and specifications; effectively and professionally communicate with others; prepare formal spreadsheets, reports, and charts; analyze situations accurately and take effective action; maintain cooperative relationships with members of the department and with manufacturers and dealers in the automotive and equipment field; operate in a lead capacity; analyze situations and adopt an effective course of action; use a computer and standard platform of state supplied software, and learn new software programs as applicable to mobile equipment auxiliary controls; work with spreadsheets and databases; learn and write basic computer programming code.

RESPONSIBILITY FOR DECISIONS AND CONSEQUENCES OF ERROR

Proper and thorough electrical design, fabrication, and installation will have a critical and direct impact on the operation and safety of equipment. Consequences of errors include down-time for equipment and injury or death to self or others. Ineffective project management can cause significant delays in the production of equipment and unnecessary cost increases. Delays result in older equipment being operated longer with higher operation and maintenance costs. When equipment is completely inoperable and its replacement is delayed, the Division of Maintenance doesn't have the equipment they need to do their job. Additionally, unnecessary cost increases results in less funds available for new or replacement equipment. All of these consequences are a hindrance to Caltrans' mission and compromise the safety of the public.

PUBLIC AND INTERNAL CONTACTS

Incumbent will work with all users of Caltrans equipment, including various levels of the Division of Equipment staff and other Caltrans employees. Will also work with vendors who manufacturer Caltrans fleet vehicles and auxiliary equipment and other governmental offices.

PHYSICAL, MENTAL, AND EMOTIONAL REQUIREMENTS

Physical Requirements: Ability to work with a keyboard & mouse; manual dexterity; sitting for long periods; develop and maintain cooperative relationships; ability to focus for long periods of time; ability to drive rental & State vehicles. Employee will be required to climb into and crawl under trucks and equipment. Employee may be required to work in snow and ice conditions for equipment testing and evaluation.

Mental Requirements: Must grasp the essence of technical information; have the ability to multi-task, adapt to changing priorities and complete projects with short notice; ability to accept critique of others.

Emotional Requirements: Ability to resolve emotionally charged issues reasonably, professionally and diplomatically; must be able to develop and maintain cooperative working relationships with the public and other agency members.

WORK ENVIRONMENT

While doing his/her duties, the incumbent will be working under artificial light in a climate controlled office a majority of the time. The incumbent will also work in truck assembly shops, repair shops, highway maintenance yards and various outdoor sites which have varied temperature and sound levels. Occasional overnight travel within the state is required but not frequent.

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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
