

Maintenance Mechanic
Heavy Equipment Mechanic I, II, III
Risk Management 1010 10 th Street Modesto, California 95354 (209) 525-5770
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INTRODUCTION:

A complete job description is available through Stanislaus County Human Resources. The environmental factors, physical and functional demands for this Job Task Analysis were documented by Andersen Physical Therapy, Inc. The methodology for documentation consisted of on-site visits, using various measuring devices such as dynamometers and scales, as well as observation and interviews with employees and managers. A detailed record was made of the physical and functional demands of the job in terms of force pounds, weight, frequency, height, distance, anthropometric measurements, stamina, and degrees of range of motion. The determination of the frequencies of functional activities is based on standards provided by the National Institute for Occupational Safety and Health (NIOSH) and the Work Practice Guide for Manual Lifting (U.S. Department of Commerce, National Technical Information Service).

The Job Task Analysis is organized as follows: General work description; safety requirements; equipment; environmental factors; and physical/functional demands.

GENERAL WORK DESCRIPTION:

The frequency of the following activities may vary according to the physical requirements of the specific job tasks that the employee may be required to perform at random intervals.

Under the general supervision of the department manager, the **Maintenance Mechanic**, conducts major safety inspections and evaluations, performs the less-skilled repair and maintenance work, including minor tune-ups; and does related work as required.

The **Heavy Equipment Mechanic I**, performs service on light and heavy road maintenance equipment used in connection with the construction and maintenance of county roads.

The **Heavy Equipment Mechanic II**, performs skilled work in repairing, overhauling, and maintaining automotive and road construction equipment powered by gasoline, CNG, and/or diesel fuels. The incumbent in this classification performs a full range of diagnosing mechanical, electrical, and hydraulic problems, welding and repair work on construction equipment and trucks with one-ton capacity or larger. Heavy Equipment Mechanic II incumbents are normally assigned work requiring a higher level of skill and knowledge and are certified by the State of California to provide service in the areas of lamp adjustment, brake adjustment, and refrigeration /recycling A/C. This position maintains and makes minor and major repairs to the County Road Maintenance Equipment, transit buses and other gas, CNG and diesel powered vehicles.

The **Heavy Equipment Mechanic III**, assists in directing, managing, planning and organizing the Morgan Shop. This includes the maintenance and repair of the Road Maintenance Equipment and Count's transit buses and other gas, CNG and diesel powered vehicles, and to personally make the most complex mechanical repairs.

SPECIFIC DUTIES: Available through the Human Resources Department at the County of Stanislaus.

http://www.stancounty.com/riskmgmt/risk-dm-jta-class-sub-main.shtm

<u>Safety Requirements</u>: All employees are required to observe company safety procedures and standards to insure individual and collective safety, in addition to avoiding unnecessary risk to oneself, co-workers, customers, and property.

Equipment:

- 1. 30,000# 4 post truck lift
- 2. 4000# overhead crane
- 3. Axle jack with extended handle
- 4. Cleaver lever
- 5. Clutch handler
- 6. Drum tool
- 7. Dual wheel dolly
- 8. Hand truck dolly

- 9. Heavy earth moving equipment
- 10. Miscellaneous hand and power tools
- 11. Mobil crane mounted on truck
- 12. OTC crane
- 13. Transmission jack
- 14. Truck
- 15. Wheel lift

All employees within the Maintenance Mechanic, Heavy Equipment Mechanic I, II, III position are required to provide physical assistance for all weight and frequency requirement needs of all job tasks in order to maintain a safe work environment. Employees must be physically capable of working in any of the job tasks within the Maintenance Mechanic, Heavy Equipment Mechanic I, II, III position.

ENVIRONMENTAL FACTORS

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The following percentages are given in terms of an eight-hour workday:

Seldom = 1% - 2% **Occasional** = 3% - 33%
 Frequent =
 34% - 66%

 Constant =
 67% - 100%

	ENVIRONMENTAL FACTORS	MAXIMUM FREQUENCY
1.	Unprotected heights: Ladder	Seldom
2.	Being around moving machinery: traffic Up to Constant for road mechanic	Occasional
3.	Exposure to marked changes in temperature and humidity: outside temperatures may seasonally vary between 28-110 degrees.	Seldom
4.	Exposure to dust, fumes, smoke, gases, or other irritating substances (specify): exhaust, road dust. <i>Respiratory protection is available</i>	Occasional
5.	Driving:	Occasional
6.	Exposure to excessive noise: Hearing protection is available	Occasional
7.	Exposure to radiant or electrical energy: Electrical panel	Seldom
8.	Exposure to solvents or chemicals: <i>Refer to MSDS document. Hand protection is available</i> Up to Frequent for lube maintenance employee	Occasional
9.	Exposure to slippery or uneven walking surfaces: Grease, oil, water, mud, undeveloped ground	Occasional
10.	Working below ground:	Not Available
11.	Unusual fatigue factors:	Not Applicable
12.	Working with explosives:	Not Required
13.	Excessive vibration:	Seldom
14.	Working with hands in water or other substance:	Seldom
15.	Working proximity:Alone: Closely with others:	Seldom Constant
16.	Working inside:	Constant
17.	Working outside:	Frequent

FUNCTIONAL ACTIVITIES

The frequency of the following activities may vary according to the physical requirements of the specific job tasks the employee may be required to perform at random intervals.

PHYSICAL AND FUNCTIONAL REQUIREMENTS

FREQUENCY DEFINITIONS	<u>SELDOM</u>	OCCASIONAL	FREQUENT	CONSTANT
Percent of the Day	1-2%	3-33%	34-66%	67-100%
Material Handling	1-4 Reps	5-32 Reps	33-250 Reps	251-2,000 Reps
Non Material Handling	1-4 Reps	5-32 Reps	33-250 Reps	251-2,000 Reps
Repetitive & Static Work	1-50 Reps	51-250 Reps	251-1,000 Reps	1,001-20,000 Reps

1.) **<u>PUSH</u>**: Pushing activities may require use of the back in conjunction with leg and arm musculature.

MAXIMUM REQUIREMENT				
0-10 pounds:	Frequent			
11-25 pounds:	Frequent			
26-35 pounds:	Occasional			
36-50 pounds:	Occasional			
51-75 pounds:	Seldom			
76-100 pounds:	Seldom	Maximum Force:	100 Pounds	

Assistive Devices: 4-Wheeled Cart, hand truck. Additionally, one person assistance is available with forces greater than 100 pounds.

Comments: Pushing is utilized with activities such as retrieving, returning, storing, adjusting, moving, and/or transporting, equipment, and supplies (e.g. tool, component, door, cart). The employee exerts up to 100 pounds of force in a horizontal plane from waist to shoulder height of a distance up to 100+ feet when performing job tasks (e.g. battery cart; open/close door; tool chest cart; torque hand tools; power tool, drill, grinders; wrench; push levers).

2.) **PULL:** Pulling activities may require use of the back in conjunction with leg and arm musculature.

MAXIMUM REQUIREMENT				
0-10 pounds:	Frequent			
11-25 pounds:	Frequent			
26-35 pounds:	Occasional			
36-50 pounds:	Occasional			
51-75 pounds:	Seldom			
76-100 pounds:	Seldom	Maximum Force:	100 Pounds	

Assistive Devices: 4-Wheeled Cart, hand truck. Additionally, one person assistance is available with forces greater than 100 pounds.

Comments: Pulling is utilized with activities such as retrieving, returning, storing, adjusting, moving, and/or transporting, equipment, and supplies (e.g. tool, component, door, cart; tie down device, come-along, wire, hoses, chains and miscellaneous structure components). The employee exerts up to 100 pounds of force in a horizontal plane from waist to shoulder height of a distance up to 100+ feet when performing job tasks (e.g. battery cart; open/close door; tool chest cart; torque hand tools; power tool, drill, grinders; wrench; pull levers). *Pushing is the preferred method of moving carts*.

3.) **STAND-UP LIFT**: Lifting weighted objects between floor and waist height.

MAXIMUM REQUIREMENT				
0-10 pounds:	Occasional			
11-25 pounds:	Occasional			
26-35 pounds:	Occasional			
36-50 pounds:	Seldom			
51-75 pounds:	Seldom			
76-100 pounds:	Not Required	Maximum Force:	<u>75</u> Pounds	

Assistive Devices: Hoist, fork lift, jack. One person assistance is available with weights greater than 75 pounds.

Comments: A stand-up lift is utilized with activities such as retrieving, returning, storing, adjusting, moving, and/or transporting, equipment, and supplies (e.g. part, tool, component). The employee lifts items weighing between <1 pounds and 75 pounds from/to the floor when performing job tasks (e.g. up to 100 pound miscellaneous part; up to 200+ pound component; up to 90 pound tool; up to 30 pound battery; up to 30 pound rotor, clutch; up to 100+ pound iron for fabrication; equipment seat, portable tool box; testing equipment; housekeeping and clean-up; trash can). *Safe lifting is performed by utilizing a posture of partial squatting and a straight back.*

4.) **LEVEL LIFT:** Lifting weighted objects from between waist and chest height level for a maximum horizontal distance of up to four feet.

MAXIMUM REQUIREMENT				
0-10 pounds:	Frequent			
11-25 pounds:	Frequent			
26-35 pounds:	Occasional			
36-50 pounds:	Seldom			
51-75 pounds:	Seldom			
76-100 pounds:	Not Required	Maximum Force:	<u>75</u> Pounds	

Assistive Devices: Hoist, jack, forklift, 4-wheeled cart, hand truck. Additionally, one person assistance is available with weights greater than 75 pounds.

Comments: A level lift is utilized with activities such as retrieving, returning, storing, adjusting, moving, and/or transporting, equipment, and supplies (e.g. part, tool, component). The employee lifts items weighing between <1 pounds and 75 pounds when performing job tasks (e.g. up to 100 pound miscellaneous part; up to 200+ pound component; up to 75 pound tool; up to 30 pound battery; up to 30 pound rotor, clutch; up to 100+ pound iron for fabrication; equipment seat, portable tool box; testing equipment; housekeeping and clean-up; trash can).

5.) WEIGHT CARRY: Carrying weighted objects between waist and chest height beyond a distance of four feet.

MAXIMUM REQUIREMENT				
0-10 pounds:	Frequent			
11-25 pounds:	Occasional			
26-35 pounds:	Seldom			
36-50 pounds:	Seldom			
51-75 pounds:	Not Required			
76-100 pounds:	Not Required	Maximum Force:	<u>50</u> Pounds	

Assistive Devices: Hoist, jack, forklift, 4-wheeled cart, hand truck. Additionally, one person assistance is available with weights greater than 50 pounds.

Comments: Weight carry is utilized with activities such as retrieving, returning, storing, adjusting, moving, and/or transporting, equipment, and supplies (e.g. part, tool, component). The employee lifts items weighing between <1 pounds and 50 pounds 25+ feet when performing job tasks (e.g. hand and power tool; miscellaneous part or component).

6.) **OVERHEAD LIFT/PULL DOWN**: Lifting weighted object from/to chest and overhead height level.

MAXIMUM REQUIREMENT				
0-10 pounds:	Occasional			
11-25 pounds:	Occasional			
26-35 pounds:	Seldom			
36-50 pounds:	Seldom			
51-75 pounds:	Not Required			
76-100 pounds:	Not Required	Maximum Force:	40 Pounds	

Assistive Devices: Hoist, jack, vertical ladder, step ladder or step stool is available to bring items to eye or shoulder level. Additionally, one person assistance is available with weights greater than 40 pounds.

Comments: Overhead lift/pull down is utilized with activities such as retrieving, returning, storing, adjusting, moving, and/or transporting, equipment, and supplies (e.g. tool, part). The employee lifts items weighing between <1 pounds and 40 pounds to a maximum height of 72 inches above feet when performing job tasks (e.g. operate hand or power tool; repair or maintain equipment part and/or component; manual hoist work on equipment under carriage; up to a 40 pound clutch; miscellaneous part and equipment component; welding; lubricating). *Variables to overhead reaching will be the employee's height and anthropometric reach*.

7.) OVERHEAD REACH:

MAXIMUM FREQUENCY: Occasional

Comments: Overhead reach is performed to a maximum height of 72 inches above feet when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, controls, and supplies (e.g. overhead work areas; repair or maintain equipment; remove/replace part or component; under carriage work on hoist; climb in/out of elevated equipment; inspection of equipment; welding; lubricating; operation of hand or power tool). *A ladder (appropriate height) or step stool may be utilized to bring items to eye or shoulder level. Variables to overhead reaching will be the employee's height and anthropometric reach.*

8.) FORWARD REACH:

MAXIMUM FREQUENCY: Frequent

Comments: Forward reach is performed to a distance of 32 inches when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, controls, and supplies (e.g. repair or maintain equipment; remove/replace part on component; climb in/out equipment; inspect equipment; welding; operation of hand or power tool; drive or operate heavy equipment; tire replacement; operate testing equipment; lubricating; pressure washing; push/pull tool box; bench work). *The degree of elbow extension required for reaching will vary according to the employee's anthropometric reach.*

9.) <u>STOOP</u>:

MAXIMUM FREQUENCY: Occasional

Comments: Stooping is performed when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, and supplies (e.g. repair or maintain equipment; remove/replace part on component; climb in/out equipment; inspect equipment; welding; operation of hand or power tool; drive or operate heavy equipment; tire replacement; operate testing equipment; lubricating; pressure washing). *Variable to stooping will be the employee's height. Stooping of the head, trunk and knees can be minimized or avoided by substituting alternate positions of squatting, kneeling or bending when performing job tasks.*

10.) SOUAT: (Unloaded)

MAXIMUM FREQUENCY: Seldom

Comments: Squatting is performed when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, and supplies (e.g. repair and maintain equipment; hand or power tool operation; worksite inspection). *Squatting may be minimized or avoided by substituting alternate positions of bending or kneeling. Partial squatting is a preferred lifting posture.*

11.) FORWARD BEND:

MAXIMUM FREQUENCY: Frequent

Comments: Bending forward at the waist is performed when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, controls and supplies (e.g. repair and maintain equipment; hand or power tool operation; worksite inspection). Maximum forward trunk flexion required is 80 degrees. *Employee may when possible avoid excessive forward bending of the trunk up to 80 degrees by using alternate positions of bending at the hips, kneeling, half kneeling, stooping, sitting or squatting.*

12.) **<u>TWIST</u>**:

MAXIMUM FREQUENCY: Occasional

Comments: Twisting at the waist is performed when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, and supplies (e.g. repair and maintain equipment; hand or power tool operation; worksite inspection; drive vehicle). *Twisting at the waist may be minimized by turning the whole body, including the feet.*

13.) **<u>TURN</u>:**

MAXIMUM FREQUENCY: Occasional

Comments: Turning is performed when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, and supplies (e.g. repair and maintain equipment; hand or power tool operation; worksite inspection).

14.) <u>KNEEL</u>:

MAXIMUM FREQUENCY: Seldom

Comments: Kneeling is performed when retrieving, returning, storing, adjusting, moving, and/or transporting, equipment, controls, and supplies (e.g. repair and maintain equipment; worksite inspection; operation of hand or power tools; under dash board work; climb on/off creeper). *Kneeling may be minimized or avoided by substituting alternate positions of bending, squatting, or half kneeling.*

15.) CRAWL:

MAXIMUM FREQUENCY: Seldom

Comments: Crawling is performed when performing job tasks (e.g. positioning under/in/out for repair and maintenance of equipment; worksite inspection).

16.) STAIR CLIME:

MAXIMUM FREQUENCY: Not Required

Comments: Stair climb is not required when performing job tasks.

17.) **LADDER CLIMB**:

MAXIMUM FREQUENCY: Seldom

Comments: Ladder climbing is performed onto/off of safety ladders or steps to access equipment and supplies (e.g. located up to10 feet above floor level (e.g. to/from atop heavy equipment; repair and maintain equipment located above head height; 3-point heavy equipment climb). *Variables to overhead climbing will vary according to the employee's height and anthropometric reach*.

18.) <u>WALK</u>:

MAXIMUM FREQUENCY: Frequent

Comments: Walking is performed when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, and supplies (e.g. to/from worksite; repair and maintain equipment; to/from parts office, tool box, tool bench, testing equipment; equipment inspection; off-site service calls; tire replacement; to/from storage and parts room). Walking length varies between 3 feet and 200+ feet depending on job task.

19.) <u>SIT</u>:

MAXIMUM FREQUENCY: Occasional

Comments: Sitting is performed for a maximum of 45-minute intervals when performing job tasks (e.g. drive to/from off-site road calls; road testing light and heavy equipment; console and dashboard work).

20.) **<u>STAND</u>:** (Static)

MAXIMUM FREQUENCY: Frequent

Comments: Static standing is performed for a maximum of 30-minute intervals when performing job tasks (e.g. repair and maintenance of equipment; worksite inspection; lubrication; hand and power tool operation; welding, wiring, fabrication assembly, demolition; break down and/or build components; bench work).

21.) BALANCE:

MAXIMUM FREQUENCY: Constant

Comments: Adequate balance is required for safe walking, standing, climbing, reaching and lifting.

22.) HAND/FOOT CONTROL:

	MAXIMUM REQUIREMENT
HAND:	
Right:	Frequent
Left:	Frequent
Both:	Occasional
Either:	Occasional
FOOT:	
Right:	Occasional
Left:	Occasional
Both:	Not Required
Either:	Not Required

Comments: Hand controls are utilized to operate equipment (e.g. vehicle, tool, lever) when adjusting controls (e.g. miscellaneous hand and power tools; lever control; come-along; tie-downs; lubricating device; drive vehicle). Foot controls are utilized to operate equipment (e.g. forklift, backhoe, truck, scraper, grader, tractor, striper, loader, transmission jack; vehicle).

23.) UPPER AND LOWER EXTREMITY COORDINATION:

MAYIMIM	REQUIREMENT
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Simple Grasp:	Frequent
Firm Grasp:	Frequent
Fine Manipulation:	Occasional
Eye/Hand Coordination:	Constant
Hand/Foot Coordination:	Occasional

Comments: Grasping and coordination activities are performed when retrieving, returning, storing, adjusting, moving, and/or transporting equipment, and supplies (e.g. hand and power tool; parts, component, controls).

Simple grasping is utilized to perform job tasks (e.g. lift or manipulate objects weighing less than 5 pounds; lubricating, repairing, maintaining equipment; fabricating, wiring, assembling, disassembling, cleaning, sorting, handling miscellaneous parts; drive vehicle).

Firm grasping is utilized to perform job tasks (e.g. lift or manipulate objects weighing 5 pounds or greater; lubricating, repairing, maintaining equipment; fabricating, wiring, assembling, disassembling, cleaning, sorting, handling miscellaneous parts and components).

Fine manipulation is utilized to perform job tasks (e.g. handwriting, keyboard, small component work; nut/bolt, wiring and miscellaneous parts).

Eye/hand coordination is utilized to perform job tasks (e.g. repair and maintain equipment; worksite inspection; handwriting, keyboard, small component work; nut/bolt, wiring and miscellaneous parts; drive vehicle).

Hand/foot coordination is utilized to perform job tasks (e.g. operate heavy equipment; metal shear equipment; drive vehicle).

Depending on individual hand dominance, one hand may be used more frequently than the other when performing job tasks.

24.) CERVICAL (NECK) MOVEMENT:

MAXIMUM REQUIREMENT		
Static Neutral Position:	Frequent	
Flexing:	Frequent	
Rotating:	Frequent	
Extending:	Occasional	

Comments: Neck movement is required when performing job tasks (e.g. worksite inspection; repair and maintain equipment; operate hand, power and testing equipment; drive vehicle). *Participating in observation of work environment allowing for safe working conditions. Full cervical range of motion is required to safely perform the job tasks.*



Stanislaus County JOB TASK ANALYSIS SUMMARY

FREQUENCY DEFINITIONS	SELDOM	OCCASIONAL	FREQUENT	<u>CONSTANT</u>
Percent of the Day	1-2%	3-33%	34-66%	67-100%
Material Handling	1-4 Reps	5-32 Reps	33-250 Reps	251-2,000 Reps
Non Material Handling	1-4 Reps	5-32 Reps	33-250 Reps	251-2,000 Reps
Repetitive & Static Work	1-50 Reps	51-250 Reps	251-1,000 Reps	1,001-20,000 Reps

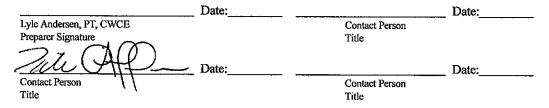
The following is a summary of the physical demands of the Job Task Analysis that were obtained for the position of:

MAINTENANCE MECHANIC HEAVY EQUIPMENT MECHANIC I, II, III

Functional Activities	Maximum Requirements	Functional Activities	Maximum Requirements
Push (Force) ^I	100 pounds	Stair Climb	Not Required
Pull (Force) ¹	100 pounds	Ladder Climb ¹	Seldom
Stand Up Lift ¹	75 pounds	Walk ¹	Frequent
Level Lift ¹	75 pounds	Sit ¹	Occasional
Weight Carry ¹	50 pounds	Stand (Static) ¹	Frequent
Overhead Lift/Pull Down ¹	40 pounds	Balance ¹	Constant
Overhead Reach ¹	Occasional	Hand Control ¹	Frequent
Forward Reach ¹	Frequent	Foot Control	Occasional
Stoop ¹	Occasional	Simple Grasp ¹	Frequent
Squat (Unloaded)	Seldom	Firm Grasp ¹	Frequent
Forward Bend ¹	Frequent	Fine Manipulation ¹	Occasional
Twist ¹	Occasional	Eye/Hand Coordination ¹	Constant
Turn ¹	Occasional	Hand/Foot Coordination ¹	Occasional
Kneel	Seldom	Cervical (neck) Movement ¹	Frequent
Crawl	Seldom	• • • • • • • • • • • •	

¹ The critical demands of the job.

Lyle andersen, PT



LA/gm