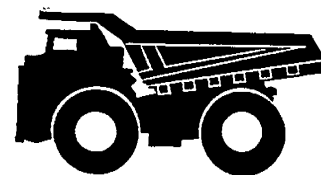


Shop Manual

DG693



140M

DUMP TRUCK

SERIAL SUFFIX

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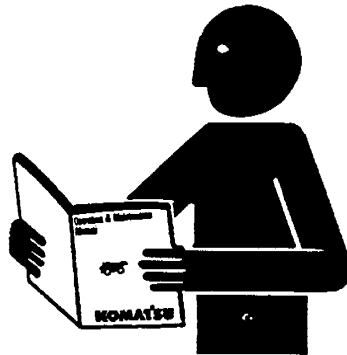
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KOMATSU

⚠ WARNING

Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read and understand this manual before operating or maintaining this machine. This manual should be kept in or near the machine for reference, and periodically reviewed by all personnel who will come into contact with it.

⚠ WARNING



**READ AND UNDERSTAND THE
OPERATION & MAINTENANCE MANUAL
BEFORE OPERATING VEHICLE OR
PERFORMING ANY MAINTENANCE.**

CALIFORNIA Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

FOREWORD

This Service Manual is written for use by the service technician and is designed to help the technician become fully knowledgeable of the truck and all its systems in order to keep it running and in production. All maintenance personnel should read and understand the materials in this manual before performing maintenance and/or operational checks on the truck. All safety notices, warnings and cautions should be understood and followed when accomplishing repairs on the truck.

The first section covers component descriptions, truck specifications and safe work practices, as well as other general information. The major portion of the manual pertains to disassembly, service and reassembly. Each major serviceable area is dealt with individually. For example: The disassembly, service and reassembly of the radiator group is discussed as a unit. The same is true of the engine and engine accessories, and so on through the entire mechanical detail of the truck. Disassembly should be carried only as far as necessary to accomplish needed repairs.

The illustrations used in this manual are, at times, typical of the component shown and may not necessarily depict a specific model.

This manual shows dimensioning of U.S. standard and metric (SI) units throughout and all references to "Right", "Left", "Front", or "Rear" are made with respect to the operator's normal seated position, unless specifically stated otherwise.

Standard torque requirements are shown in torque charts in the general information section and individual torques are provided in the text in bold face type, such as **100 ft.lbs. (135 N.m)** torque. All torque specifications have $\pm 10\%$ tolerance unless otherwise specified.

A Product Identification plate is normally located on the truck frame in front of the right side front wheel and designates the Truck Model Number, Product Identification Number (vehicle serial number), and Maximum G.V.W. (Gross Vehicle Weight) rating.

The HAULPAK[®] Model designation consists of three numbers and one letter (i.e. 140M). The three numbers represent the basic truck model. The letter "M" designates a Mechanical drive and the letter "E" designates an Electrical propulsion system.

The Product Identification Number (vehicle serial number) contains information which will identify the original manufacturing bill of material for this unit. This complete number will be necessary for proper ordering of many service parts and/or warranty consideration.

The Gross Vehicle Weight (GVW) is what determines the load on the drive train, frame, tires, and other components. The vehicle design and application guidelines are sensitive to the **total maximum Gross Vehicle Weight (GVW)** and this means the **total weight**: the Empty Vehicle Weight + the fuel & lubricants + the payload.

To determine allowable payload:

Service all lubricants for proper level and fill fuel tank of empty truck (which includes all accessories, body liners, tailgates, etc.) and then weigh truck.

Record this value and subtract from the GVW rating. The result is the allowable payload.

NOTE: Accumulations of mud, frozen material, etc. become a part of the GVW and reduces allowable payload. To maximize payload and to keep from exceeding the GVW rating, these accumulations should be removed as often as practical.

Exceeding the allowable payload will reduce expected life of truck components.



THIS "ALERT" SYMBOL IS USED WITH THE SIGNAL WORDS, "CAUTION", "DANGER", AND "WARNING" IN THIS MANUAL TO ALERT THE READER TO HAZARDS ARISING FROM IMPROPER OPERATING AND MAINTENANCE PRACTICES.

 **DANGER**

"DANGER" IDENTIFIES A SPECIFIC POTENTIAL HAZARD
WHICH WILL RESULT
IN EITHER INJURY OR DEATH
IF PROPER PRECAUTIONS ARE NOT TAKEN.

 **WARNING**

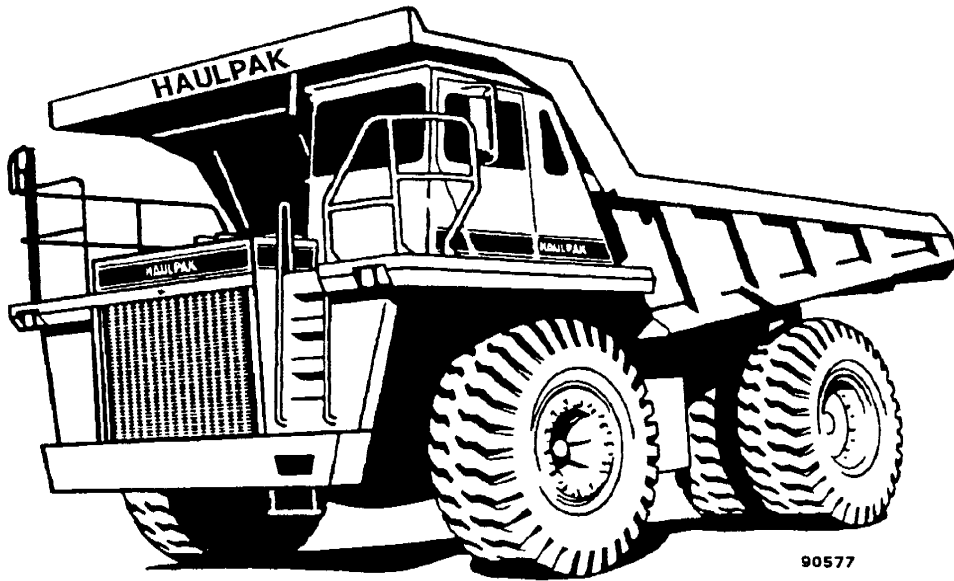
"WARNING" IDENTIFIES A SPECIFIC POTENTIAL HAZARD
WHICH MAY RESULT
IN EITHER INJURY OR DEATH
IF PROPER PRECAUTIONS ARE NOT TAKEN.

 **CAUTION**

"CAUTION" IS USED FOR GENERAL REMINDERS
OF PROPER SAFETY PRACTICES
OR
TO DIRECT THE READER'S ATTENTION TO AVOID UNSAFE
OR IMPROPER PRACTICES WHICH MAY RESULT
IN DAMAGE TO THE EQUIPMENT.

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140M HAULPAK[®] TRUCK

SECTION A

GENERAL INFORMATION

INDEX

TRUCK COMPONENT DESCRIPTION & SPECIFICATIONS	A2-1
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NOTES

COMPONENT DESCRIPTION AND SPECIFICATIONS

ENGINE

The 140M HAULPAK[®] is powered by a Cummins KTA-19C diesel engine. The truck is capable of speeds up to 35 MPH (56.7 km/h).

TRANSMISSION

The diesel engine drives a remote-mounted Allison CLT-5963 transmission incorporating a TC680 torque converter. The transmission has six "Forward" speeds and two "Reverse" speeds and uses Allison Transmission Electronic Control (ATEC) for complete automatic shift sequencing.

The operator may select "R1" or "R2" for Reverse, "N" for Neutral, or any one of the six Forward driving ranges by using the Transmission Range Selector. Each position (R2, R1, N, D, 5, 4, 3, 2, 1) is selected by releasing a range locking mechanism on the lever and choosing the desired range. "D" will permit completely automatic up and down shifts through all six ranges. "5" will limit upshifts to 5th range only. "4" will limit upshifts to 4th range only. "3" will limit upshifts to 3rd range only. "2" will limit upshifts to 2nd range only. "1" is a first range hold position and no upshifts are permitted.

"R1" or "R2" REVERSE position is used to back the truck. "R1" position should be used for normal reverse operation. This range selection utilizes the standard 5.12:1 gear reduction ratio. "R2" position may be used for job operations that would benefit from a higher speed reverse operation. This range selection utilizes a 3.43:1 gear reduction ratio.

FINAL DRIVE

The Planetary Final Drive has full floating axle shafts and a plug-in differential carrier assembly.

SERVICE BRAKE SYSTEM

The service brakes are controlled by an all hydraulic actuation system. Depressing the service brake pedal actuates front dry disc brakes and rear wet disc brakes. Automatic Emergency Braking is provided if system pressure falls below a preset value. All functioning wheel brakes will be automatically applied by accumulators.

DYNAMIC RETARDING

Dynamic retarding is actuated by depressing the operator's retarder pedal which applies oil-cooled, rear mounted, wet disc brakes only; *the front brakes are not applied.*

Application of the retarder pedal may be fully modulated and should be used to slow the truck during normal truck operation, to control speed coming down a grade or to make non-emergency stops. Use of the retarder pedal saves wear on the front brakes and provides better steering control.

POWER STEERING

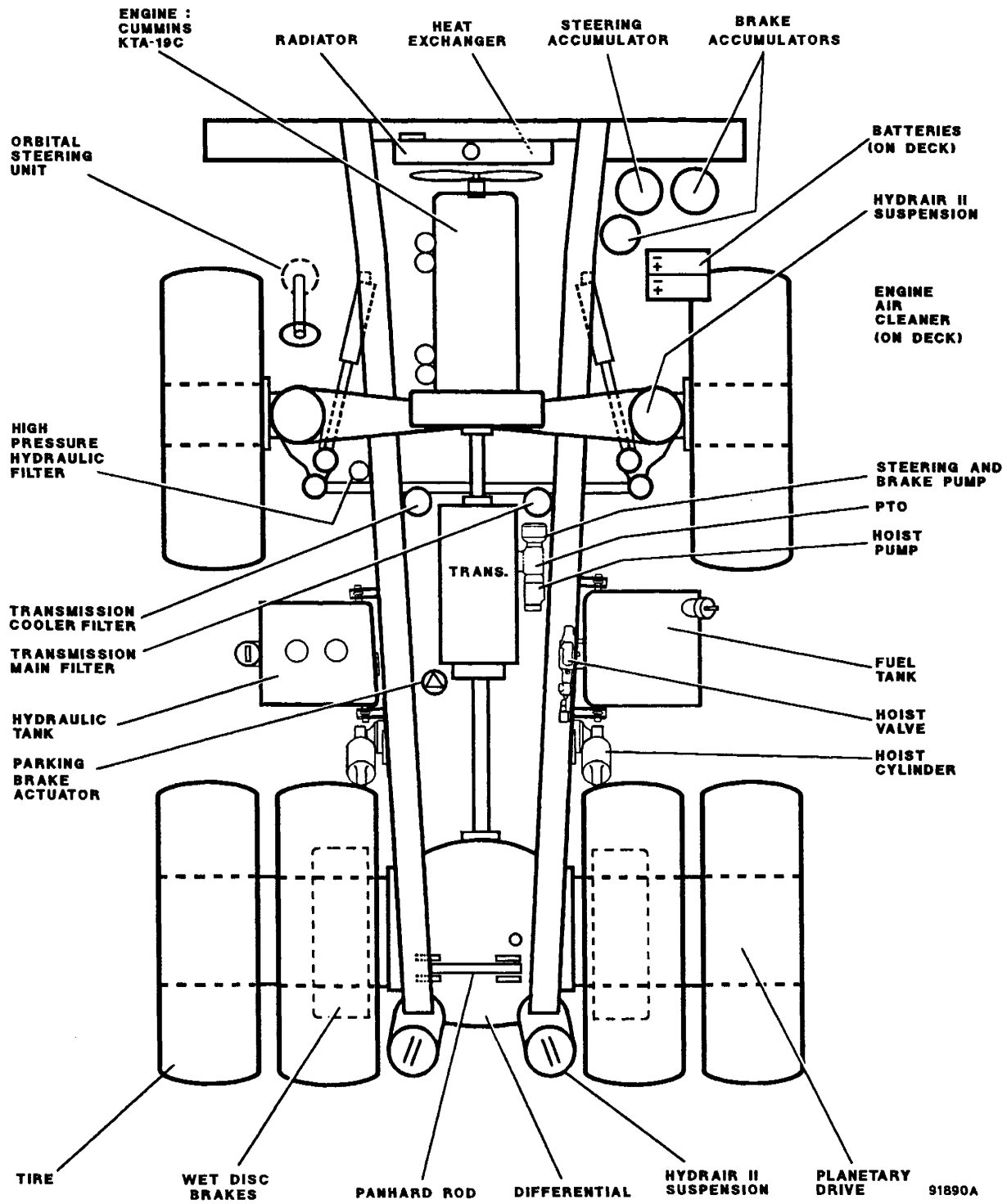
The HAULPAK[®] Truck is equipped with an orbital power steering system mounted under the cab floor with noise and vibration isolators. An accumulator automatically provides emergency power to safely steer the truck while stopping.

INSTRUMENTS

The cab instrument panel displays for the operator all switches and gauges which are necessary to safely control the truck and monitor the truck's operating systems.

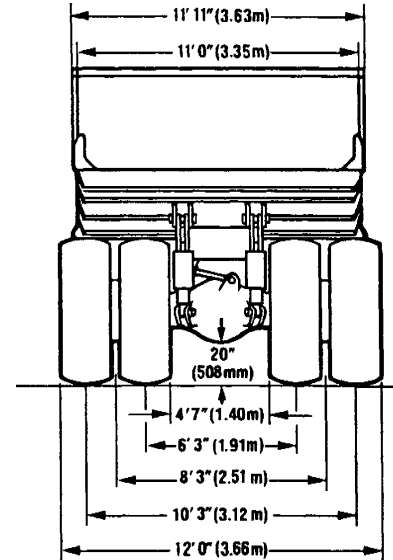
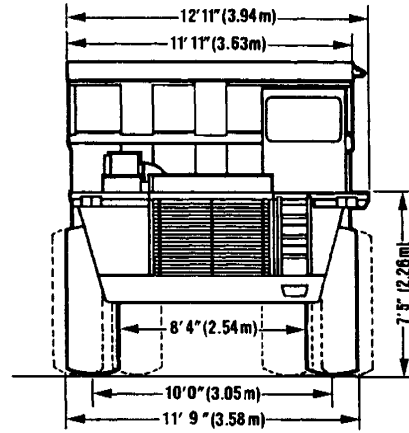
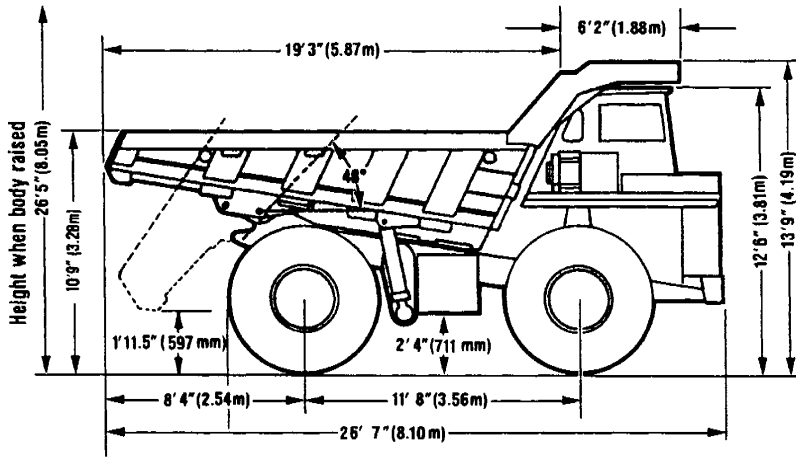
SUSPENSION

HYDRAIR[®] II suspension cylinders located at each wheel provide a smooth and comfortable ride for the operator and dampens shock loads to the chassis during loading



MODEL 140M HAULPAK® MAJOR COMPONENTS

OVERALL TRUCK DIMENSIONS



91747

SAFETY RULES

Safety records of most organizations will show that the greatest percentage of accidents are caused by unsafe acts of persons while the remainder are caused by unsafe mechanical or physical conditions.

The following safety rules are intended to instruct the HAULPAK[®] operator on what to do and not to do while operating the truck. However, all situations cannot be covered by these safety rules; local conditions and regulations may add many more to this list.

GENERAL

1. Prevention is the best safety program. Prevent accidents by knowing all the safety regulations required by the employer, all necessary precautions at the job site, and the manufacturer's recommendations for the truck. Report any conditions that need attention to the proper authorities.
2. Wear proper clothing. Loose fitting clothing, unbuttoned jackets and sleeves, jewelery, etc. can catch on a protrusion and cause a potential hazard.
3. Always use personal safety equipment such as safety shoes, safety glasses and hard hat. There may be conditions when ear protective devices should also be worn.
4. When walking to or from the truck, keep a safe distance from all machines even if the operator is visible.

Before Starting Engine

1. Carefully study the Operator Handbook before starting engine or driving truck. Give particular attention to safety material and caution and warning decals. Only qualified operators or technicians should attempt to operate the HAULPAK[®].
2. Before operating truck, a careful visual inspection as well as operational checks should be completed. Report any items that need attention to the proper authority.
 - a. Inspect entire truck for oil or coolant leaks.



If engine has been running, allow coolant to cool before removing the fill cap or draining radiator.

Any operating fluid, such as hydraulic oil, or engine coolant escaping under pressure, can have sufficient force to enter a person's body by penetrating the skin and cause serious injury and possibly death, if proper medical treatment by a physician who is familiar with this type of injury is not received immediately.

- b. When checking coolant in radiator, relieve pressure before removing radiator cap.
- c. Check tires for cuts, damage or "bubbles". Check tires for proper inflation. If tire is warm from operation, allow tire to cool before adjusting tire pressure. If inflation is needed, use an air chuck with extension hose clipped on the tire inflation valve to allow service away from front of wheel.
- d. Visually inspect all headlights, worklights, clearance lights, and taillights for damage and be certain lenses are clean. Good visibility may prevent an accident.
- e. Upon completion of an exterior inspection of the truck, clean mud, grease, ice or snow from shoes and ladder before climbing access ladder.
- f. Always use handrails and ladder when mounting or dismounting truck.



Always mount and dismount facing the truck. Never attempt to mount or dismount while the truck is in motion.

- g. Check the deck areas for debris or loose hardware.
- h. When getting in or out of truck cab, face the cab and use handrails provided.

- i. Become familiar with all protective equipment devices on the truck and insure that these items (seat belts, grab bars, anti-skid material, canopies, etc.) are securely in place.
- j. Check on-board fire extinguishers. Do not use a fire extinguisher for any purpose other than extinguishing a fire. If extinguisher is used, report the occurrence so it may be refilled or replaced.

Starting Engine And General Operation

1. Make sure all persons are clear of truck before starting engine. Always sound the horn as a warning device before activating any controls. When backing the truck, give backup signal (three blasts on horn); when starting forward, two blasts on horn. These signals must be given each time the truck is moved forward or backward.
2. Insure adequate ventilation before startup if the truck is in an enclosure. Exhaust fumes are dangerous.
3. If a cold weather starting aid is used, read and follow the manufacturer's instructions for use and disposal.



Starting fluid is highly flammable. Use with extreme care.

4. Check windshield wipers, lights, windows and horn for proper operation and cleanliness.
5. Operate each of the truck brake circuits at least twice prior to operating and moving the truck. These checks should include individual activations of the service brake, parking brake, and brake lock with the engine running. If any application/release of any brake circuit does not appear proper, or if sluggishness is apparent on application/release, shut the truck down and notify maintenance personnel. DO NOT operate truck until brake circuit in question is fully operational.



Use brake lock at dump or loading site ONLY. DO NOT use brake lock to park the truck with engine shut down or to stop the truck during routine operation.

6. Check parking brake periodically during shift. **Use parking brake for parking only.**
7. Observe safety and warning decals on the truck at all times.
8. Keep all unauthorized reading material out of truck cab.
9. Do not carry tools and supplies in cab of truck or allow trash to accumulate in cab.
10. Do not allow anyone to ride on decks or steps of truck. Riders should be in cab only.
11. Only authorized persons are allowed to ride in the truck cab. **Wear seat belts at all times.**
12. Do not allow anyone to get on or off truck while it is in motion.
13. Do not move truck into or out of a building without a signal person present.
14. DO NOT leave truck unattended while engine is running.
15. Check for flat tires periodically during shift. If truck has been run on a "flat", **it must not be parked in a building until the tire cools.**

If tire must be changed, do not stand in front of rim and locking ring when inflating tire mounted on the machine. Initial inflation to required pressure must be done with a safety cage or rack enclosing the tire and rim assembly. Observers should not be permitted in the area and should be kept at least 1500 ft. (457 m) away from the side of such tires.



Do not weld or apply heat on the rim assembly with the tire mounted on the rim. Resulting gases inside the tire may ignite causing explosion of tire and rim.



In the event of fire in the tire and wheel area (including brake fires), stay away from the truck until the tire and wheel are cool. Tire and rim assembly may explode if subjected to excessive heat. Personnel should move to a remote or protected location if sensing excessively hot brakes, smell of rubber burning or evidence of fire near tire and wheel area.

WARNING

If the truck must be approached to extinguish a fire, those personnel should do so only from the front or the back of the tire, unless protected by use of large heavy equipment as a shield. Stay at least 50 feet (15 m) from the tread of the tire.

16. Report haul road, pit or dump conditions which may present hazards (muddy roads, ice, snow, pot holes, spilled debris, etc.) immediately to supervisor.

Loading

1. Pull into the loading area with caution. Remain at a safe distance while truck ahead of you is being loaded.
2. Do not drive over unprotected power cables.
3. When approaching or leaving a loading area, watch out for other trucks and for personnel working in the area.
4. When positioning truck under shovel, follow "Spotter" or "Shovel Operator" signals. Operator may speed up loading operations by watching truck position ahead of him in order to judge where he is to place his unit.
5. While truck is being loaded, operator should stay in cab of truck. Apply **brake lock** during loading operation.
6. After truck is loaded, pull away from shovel with caution.

Hauling

1. Stay alert! Govern truck speed by the road conditions, weather and visibility.
2. Always operate truck so it is under control at all times.
3. Use extreme caution when approaching a haul road intersection. Be prepared to avoid collisions with other vehicles. Watch for oncoming vehicles and be prepared to slow down and move aside if haul road is restricted.
4. Obey all road signs.
5. If unfamiliar with the road, drive with extra caution.
6. Always dim headlights when meeting oncoming vehicles.
7. Maintain a safe distance when following another truck. Never approach another truck from the rear, in the same lane, closer than 50 ft. (15 m). When operating on a down grade, this distance should be no closer than 100 ft. (30 m).
8. Before starting up or down a grade, maintain a speed that will insure safe driving and provide effective retarding under all conditions. Refer to speed/grade decal in operator cab.
9. When operating truck in darkness or when visibility is poor, do not move truck unless headlights are on. Do not back truck without a spotter if backup horn or lights are inoperative.
10. When backing the truck, give backup signal (three blasts on horn); when starting forward, two blasts on horn. These signals must be given each time the truck is moved forward or backward.
11. Do not stop or park on a haul road unless unavoidable. If you must stop, move truck to a safe place, apply parking brake, block wheels securely and notify maintenance personnel for assistance.
12. Cab doors should remain closed at all times while truck is in motion or unattended.

Passing

1. Use only the areas designated for passing. Before passing, make sure the road ahead is clear.
2. Do not pass another vehicle on a hill or blind curve.
3. If a disabled truck is blocking your lane, slow down and pass with extreme caution.

Dumping

1. Pull into dump area using caution. Carefully maneuver truck into dump position. Obey signals as directed by the spotter, if present.
2. When in dump position, apply wheel brake lock and move selector switch to "Neutral" position.
3. Put hoist control lever in "Hoist" position and depress throttle pedal.
4. Remove foot from throttle pedal as last stage of hoist cylinder starts to extend.
5. After load has been dumped, place hoist control lever in the down position and release the lever allowing the body to return to the frame.
6. With body completely down against frame, leave the dump area.



The HAULPAK[®] is not to be moved with the dump body raised EXCEPT IN EMERGENCIES.

Failure to follow this CAUTION may result in hoist cylinder, frame, and/or body hinge pin damage.

Parking

1. When parking, park only in designated parking areas and at a safe distance from other vehicles as determined by supervisor.
2. If parking truck in other than designated parking area is necessary, select a level area, apply parking brake and block wheels front and rear. **Do not use brake lock as a parking brake.**
3. If necessary to park on a slope, park at right angles to the incline and block wheels securely.
4. When parking do not leave truck unattended if engine is left running or if dump body is raised.
5. If engine is to be shut down, follow procedure outlined under "Shutting Down Engine".

Shutting Down Engine

1. Bring truck to complete stop, move range selector to the "Neutral" position and apply parking brake.
2. Allow engine to run from 3 to 5 minutes at idle to provide cooling of the engine.



Do not leave truck unattended during engine idle cool down period.

3. Turn off all lights and accessories.
4. Engine shutdown may be activated when key-switch is moved to the "Off" position on some trucks; other trucks may require depressing and holding a shutdown button until the engine stops. Refer to the **Operator Handbook** for specific model information. Some trucks may include an **optional "Ground Level Shutdown" button**.
5. Close and lock all windows, remove key from key-switch and lock cab to prevent unauthorized truck operation. Dismount truck properly.

When Service Is Necessary

1. If truck is to be towed for any reason, use a rigid tow bar. Check truck cab for decal recommending special towing precautions. Refer to "Towing" instructions for further precautions.
2. When truck body is in the dump position, do not allow anyone beneath it unless "body-up" retaining cable or pins are installed.
3. Do not repair or service truck while engine is running, except when adjustments can only be made under such conditions. **Keep a safe distance from moving parts.**
4. When servicing air conditioning system with refrigerant (Freon), wear a face shield and cold resistant gloves for protection against freezing.
5. Follow package directions carefully when using cleaning solvents.
6. If an auxiliary battery assist is needed, turn off all accessories and be sure area is well ventilated.

NOTE: HAULPAK[®] Trucks are generally equipped with two 12 volt batteries connected in series to provide 24 volt output. Be sure to maintain correct voltage and polarity when connecting booster cables. Damage to electrical components may result if voltage and polarity are not correct.



Lead-sulphate batteries will give off hydrogen gas! Sparks or flame near these batteries may cause a violent explosion which will expel debris and extremely toxic and corrosive sulphuric acid!

Use the following procedure to minimize the possibility of sparks in the vicinity of the battery:

- a. Connect one lead of booster cable to 24V positive (+) post of battery needing assist, and other lead of the booster cable to the 24V positive (+) post of auxiliary battery.
- b. Connect one lead of second booster cable to 24V negative (-) post of auxiliary battery and then connect other lead of the booster cable to a good frame ground on the disabled truck away from the battery needing assist.

Towing

Prior to towing a truck, many factors must be carefully considered. Serious personal injury and/or significant property damage may result if important safety practices, procedures and preparation for moving heavy equipment are not observed.



Both right and left planetary sun gears/drive axles should be removed before any towing. Refer to Section "G" for these instructions. Extensive secondary damage can occur to final drive components and/or transmission, if truck is towed without first removing sun gears/drive axles.

A disabled truck may be towed after the following MINIMUM precautions have been taken.

1. Shut down engine.
2. Refer to operator's cab for towing decal for any special instructions.
3. If truck is equipped, install hydraulic connections for steering and dumping between towing and towed vehicles.
4. Inspect tow bar for adequacy (approximately 1.5 times the gross vehicle weight of truck being towed).
5. Determine that towing vehicle has adequate capacity to both move and stop the towed truck under all conditions.
6. Protect both operators in the event of tow bar failure.
7. Block disabled truck to prevent movement while attaching tow bar.
8. Release disabled truck brakes and remove blocking.



Do not tow the truck any faster than 5 MPH (8 kph).

9. Sudden movement may cause tow bar failure. Smooth and gradual truck movement is preferred.
10. Minimize tow angle at all times - NEVER EXCEED 30°. The towed truck must be steered in the direction of the tow bar.

NOTES