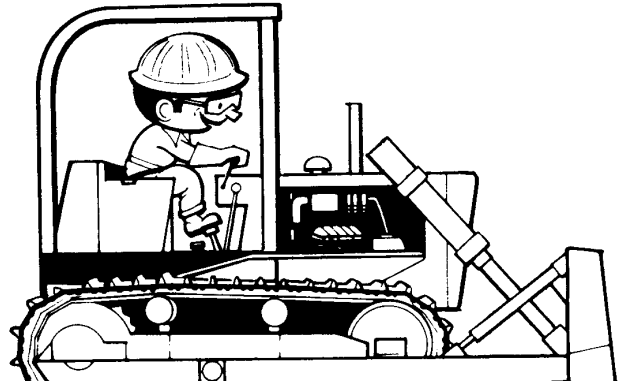


CRAWLER TRACTOR/LOADER

SAFETY MANUAL

FOR OPERATING AND MAINTENANCE PERSONNEL



HEADQUARTERS, DEPARTMENT OF THE ARMY

20 JUNE 1974

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SAFETY MANUAL, CRAWLER TRACTOR/LOADER
FOR OPERATING AND MAINTENANCE PERSONNEL

This manual is intended to illustrate only basic safety procedures. Additional precautions may be necessary for the safe operation of Crawler Tractor/Loaders. The information contained in this manual is not intended to replace safety codes, rules, and regulations.

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By Order of the Secretary of the Army:

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*General, United States Army,
Chief of Staff*

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DISTRIBUTION:

To be distributed in accordance with DA Form 12-25B, Operator maintenance requirements for Earth Moving Equipment, Loaders, Tractor Tracked, Light Medium, and Heavy.

FOREWORD

SAFETY of the operator and maintenance personnel for crawler tractors/loaders is of prime concern. This safety manual is designed to present situations which exemplify some of the daily work problems encountered by the operator and other personnel.

It is the responsibility of the operator to know what specific requirements, precautions and work area hazards exist, and to discuss these with his foreman or supervisor. A common understanding should be reached by all personnel to assure safe performance in operating the equipment.

The operator is the key to safe job performance and should study this safety manual to be aware of basic safety precautions to help prevent serious injury and damage to property. This manual is presented as a helpful guide to construction equipment personnel.

A WORD TO THE OPERATOR

The construction industry is alert to operator safety. Machines offer many built-in safety features. Companies provide up-to-date accident prevention programs. Your safety is of prime concern to the manufacturer, and employer.

Yet serious injuries occur! You can help to avoid them!

The safest machine still needs to be operated with care and with knowledge of its performance capabilities. The most comprehensive safety program must still be followed. So the man who has the ultimate responsibility is the operator.-You!

READ THIS MANUAL, AND THE MANUFACTURERS' MANUALS COVERING YOUR SPECIFIC CRAWLER TRACTOR. STUDY THEIR PRECAUTIONS. READ THE WARNING PLATES ON YOUR TRACTOR. PRACTICE SAFE OPERATION. INSIST THAT YOUR FELLOW WORKERS DO, TOO. BE A CAREFUL AND CAPABLE OPERATOR.



Remember – SAFETY IS UP TO YOU!

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EVERY EMPLOYER HAS A SAFETY PROGRAM

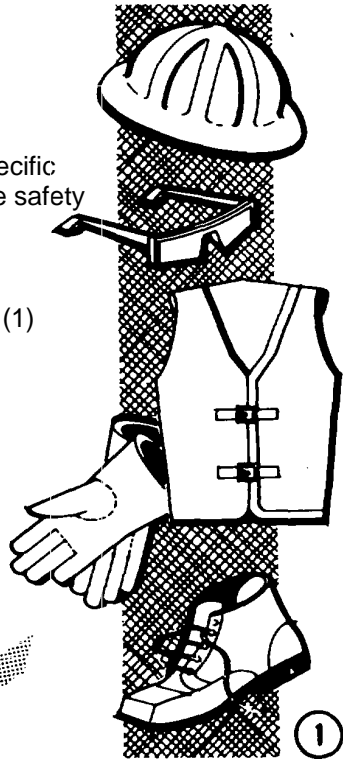
KNOW WHAT IT IS!

Consult your foreman for specific instructions on a job, and the safety equipment required.

For instance, you may need (1)

- HARD HAT
- SAFETY SHOES
- SAFETY GOGGLES
- HEAVY GLOVES
- REFLECTOR VESTS
- EAR PROTECTORS
- RESPIRATORS

RIGHT



RIGHT



ALWAYS AVOID



WRONG

Loose clothing or any accessory - flopping cuffs, dangling neckties and scarves, or rings and wrist watches - that can catch in moving parts and put you out of work (2) (3).

EVERY EMPLOYER HAS A SAFETY PROGRAM

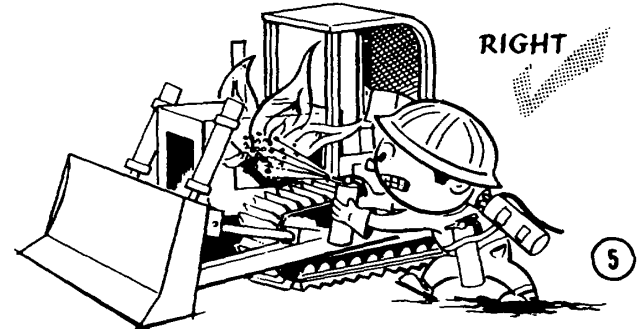
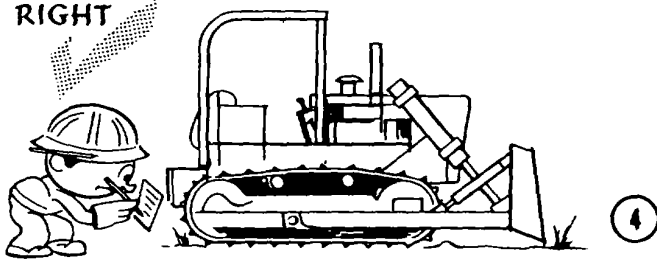
CHECK IT OUT!

Know what protective devices your crawler tractor equipped with . . . and see that each item is securely in place.

For instance:

- GUARDS
- CANOPIES
- SHIELDS
- PROTECTIVE DEVICES
- ROLL-OVER PROTECTIVE STRUCTURES
- SEAT BELTS, ETC.

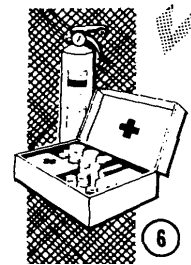
RIGHT



BE ALERT!

Plan ahead - work safely - avoid accidental damage and injury. If a careless moment does cause an accident or fire, act quickly with the tools and skills at hand - know how to use a fire extinguisher (5) (6) - and where to get aid and assistance. In an emergency, split second action is the key to safety.

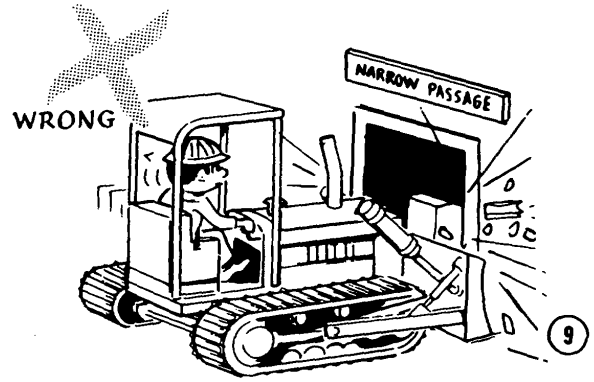
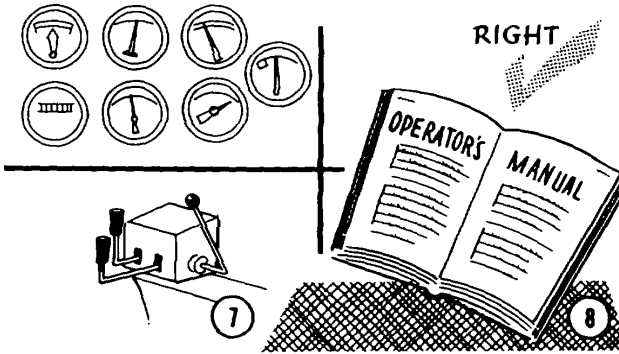
RIGHT



PREPARE FOR SAFE OPERATION

BY UNDERSTANDING THE EQUIPMENT:

Become thoroughly familiar with all controls, indicators, warning lights, and warning plates (7).
Know the operating characteristics of the crawler tractor, and its working capacities.
Learn - and don't forget - the limitations of the machine and equipment.
Know the clearances required for tractor and attachments.
Know where and how to check the tractor's liquid levels - oil, fuel, coolant, and hydraulic fluid (8).



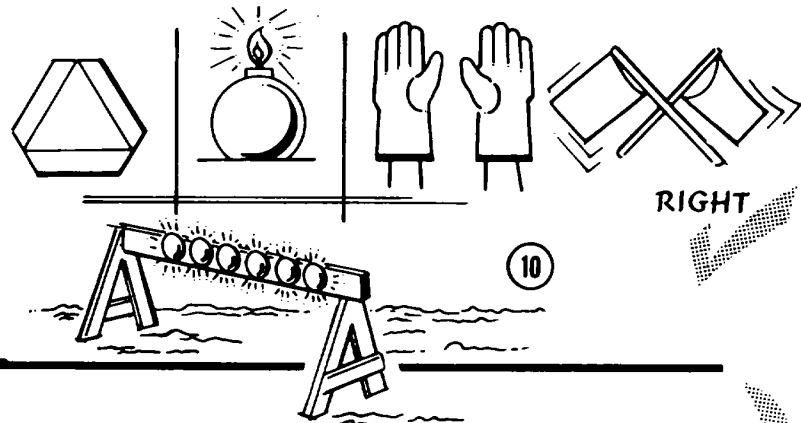
BY FAMILIARITY WITH THE AREA.

When operating tractor inside a plant, know what clearances you will encounter - overhead, doorway, aisles, etc.; also, the weight limitations of floors and ramps (9).
When roading the equipment, find out what conditions you will likely meet - clearances, congestion, type of surface, etc. Be aware of fog, smoke or dust elements that obscure visibility.

PROMOTE SAFETY PREPARE FOR SAFE OPERATION

Determine warning devices to be used (10). Know whether you will be escorted..

Become acquainted with the terrain where you will be working, and what hazards to expect.



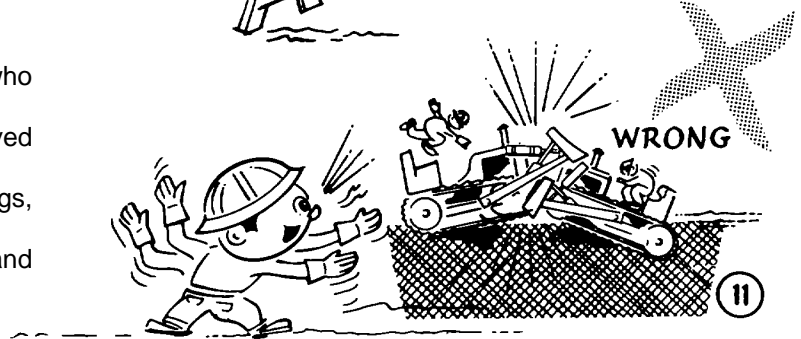
BY KNOWLEDGE OF TRAFFIC RULES:

Learn the hand signals to be used on a job; and who has the responsibility for signaling (11).

Learn thoroughly the "Rules" that should be observed at the work site.

Learn to tell, at a glance, the meaning of all flags, signs and markings - wherever encountered.

Always watch for "Slow Moving Vehicle" signs, and proceed with caution.

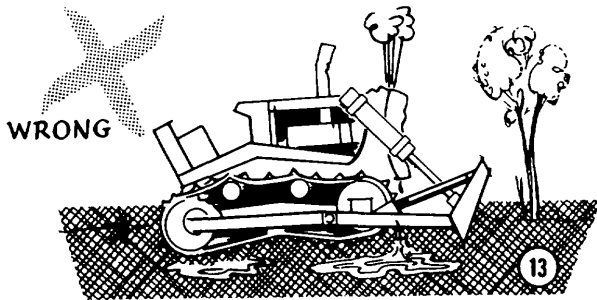
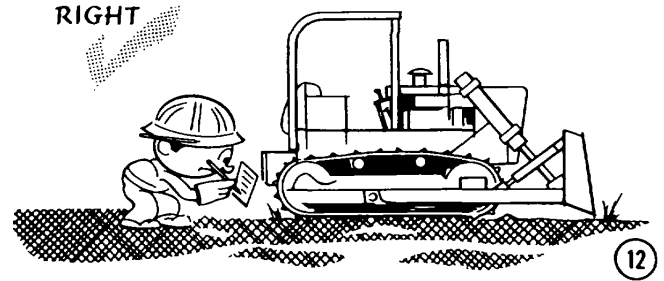


BEFORE STARTING YOUR MACHINE

KNOW EQUIPMENT IS READY!

Check guards, canopies, safety bars protective devices installed on the crawler tractor. Every one should be in place and secure (12).

When operating POWER TAKE-OFF (PTO) driven equipment, make doubly sure the safety guards provided on that equipment are in place.



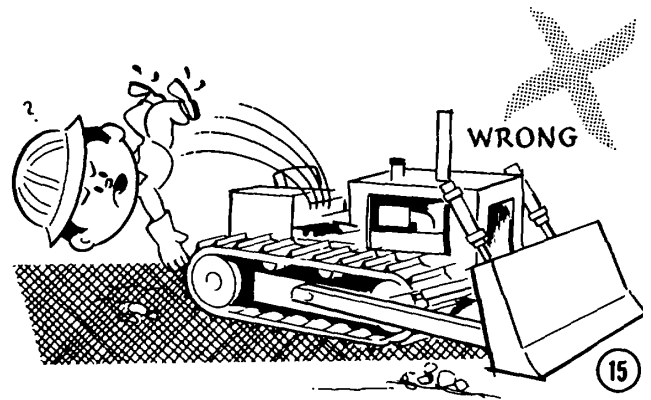
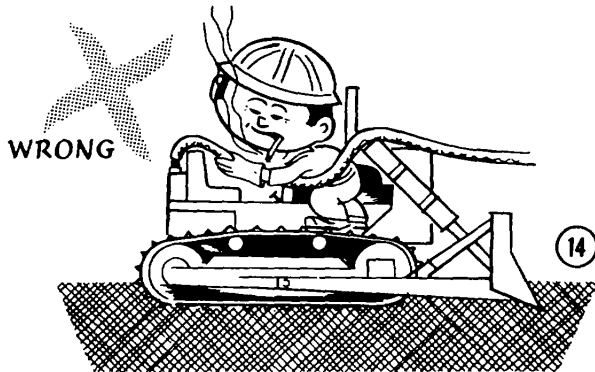
Carefully inspect your equipment for visual defects - leaks in fuel, lubrication and hydraulic systems; loose tracks or shoes; any broken or missing part (13).

DO NOT START OR OPERATE A DEFECTIVE MACHINE. Have it repaired - and then okayed by your supervisor before using it.

BEFORE STARTING YOUR MACHINE

Check levels of fuel, coolant, hydraulic fluid, and lubricating oil. When checking or adding fuel FIRST, PUT OUT THAT CIGARETTE (14).

Check and secure all caps and filler plugs for fuel, oils, radiator, etc.



3

Be sure to clean any oil, grease or mud accumulation from floor of operator's compartment, stepping points and grab rails to minimize the danger of slipping (15).

In freezing weather beware of snow or ice deposits on stepping points, grab rails and floor.

Remove loose tools, or other objects from floor of operator's compartment.

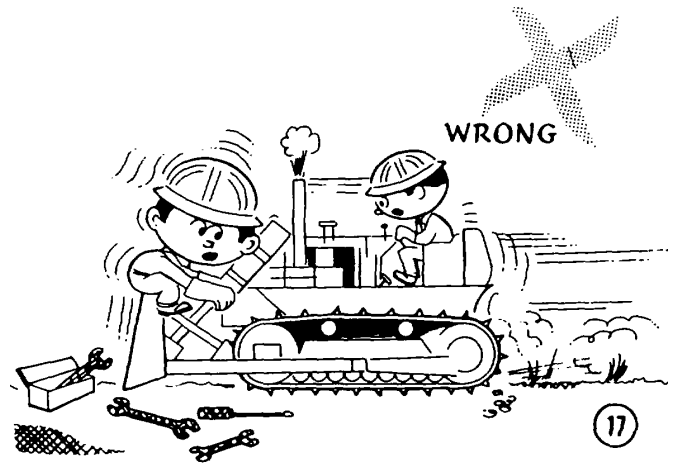
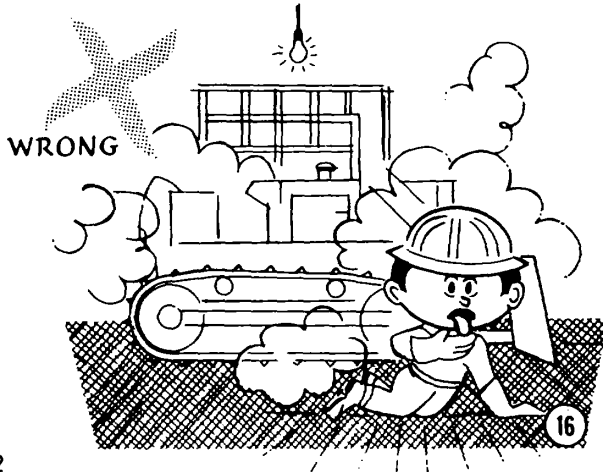
Secure any loose items that will be carried on the crawler tractor - chains, shovels, lunch buckets, etc.

BEFORE STARTING YOUR MACHINE

KNOW SURROUNDING AREA IS SAFE!

Check area for any unusual conditions that could be dangerous.

If necessary to start an engine within an enclosed area, provide adequate ventilation (16). EXHAUST FUMES CAN KILL.



WARN PERSONNEL OF ANY DANGER!

Warn anyone who is servicing the machine or who is standing in its path. Make sure they are safely out of the way before you start (17). At all times - REMEMBER THE PEDESTRIAN AND BYSTANDERS.

NOW, YOU'RE READY TO START

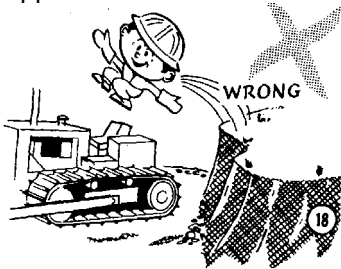
Walk around the crawler tractor once more - eyes open and alert to people and obstacles that may be in the way, then

MOUNT SAFELY!

Climb aboard your machine carefully (18).

Use all the stepping points and grab rails provided.

Adjust seat for the most comfortable position and fasten seat belt if so equipped.



START CORRECTLY!

Know the exact starting procedure for your crawler tractor. This varies with the type of control equipment provided. Follow the manufacturer's operation manual (19).

In general:

All transmission controls must be in NEUTRAL.

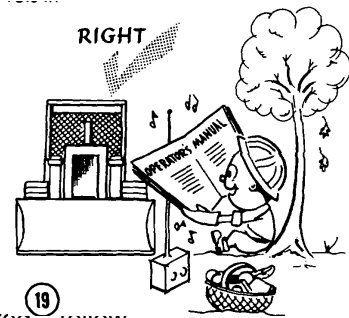
Transmission safety lever in locked position.

Attachments - blade, bucket, or ripper in down position and controls in neutral position.

Check for free movement of throttle control and set to starting position.

Then start the engine.

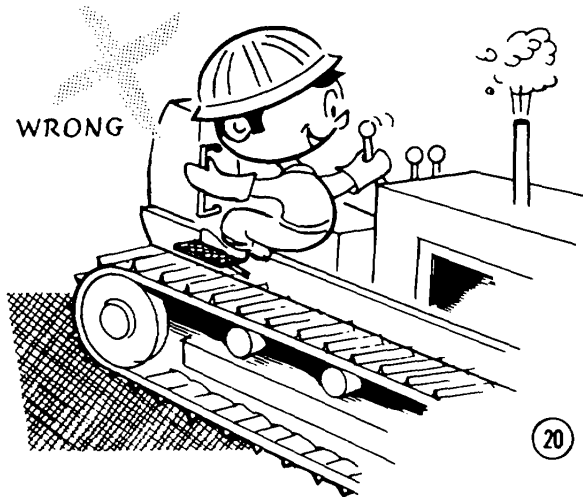
When cold weather starting fluid is required, follow manufacturer's recommendations: **REMEMBER - THIS FLUID IS FLAMMABLE!** Do not puncture or burn container. Dispose of it following the manufacturer's recommendation on the container.



NOW, YOU'RE READY TO START

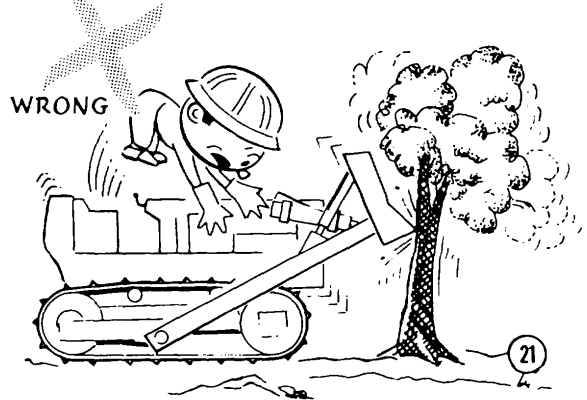
SIT SECURELY!

Do not operate the tractor from any position other than the seat provided (20).



MOVE CAREFULLY!

Again make sure the coast is clear that no people or objects are in your path (21). NEVER STAND UP OR DISMOUNT FROM YOUR CRAWLER TRACTOR WHILE IT IS IN MOTION!

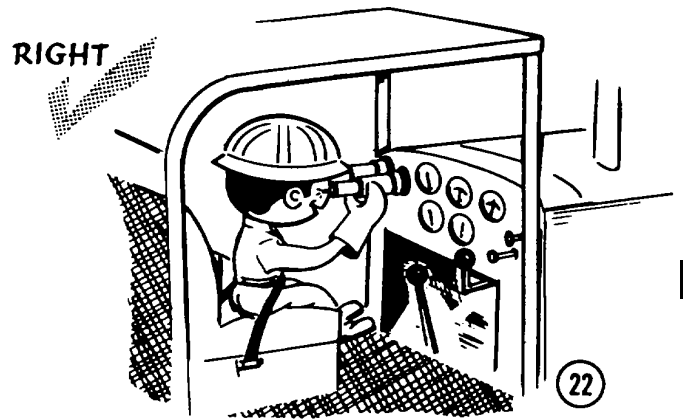


RUN AN OPERATING CHECK

No crawler tractor should be worked if any part is not in safe operating condition. It is the OPERATOR'S RESPONSIBILITY to check the condition of all systems and to run the check in a safe area. Check particularly - each day before working the equipment - the control, hoist or hydraulic systems, including steering and brakes.

AFTER STARTING ENGINE -

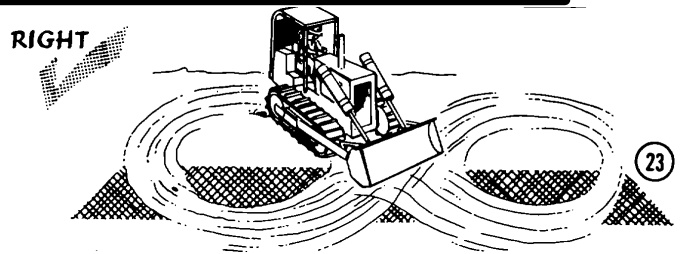
Observe gauges, instruments, and warning lights to assure that they are operable and their readings are within the operating range (22).



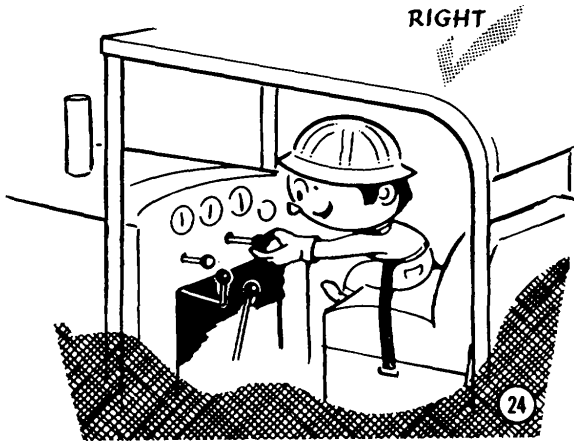
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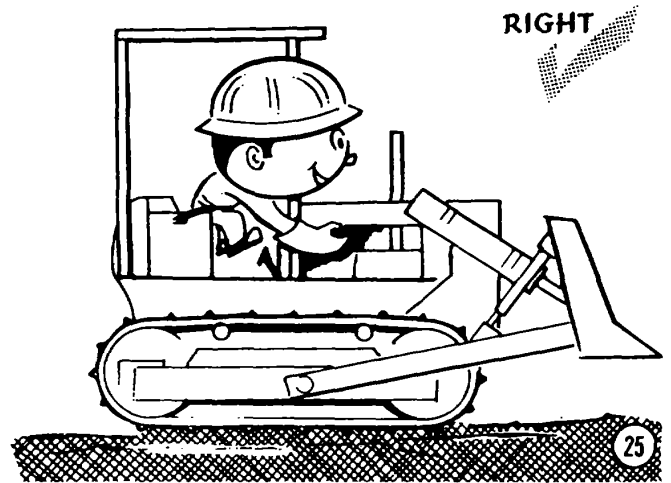
Test steering - right and left - while moving slowly (23).



RUN AN OPERATING CHECK

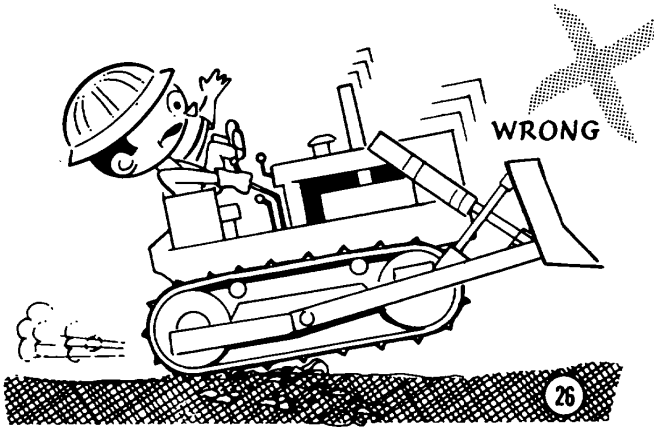


Test engine speed control (24).



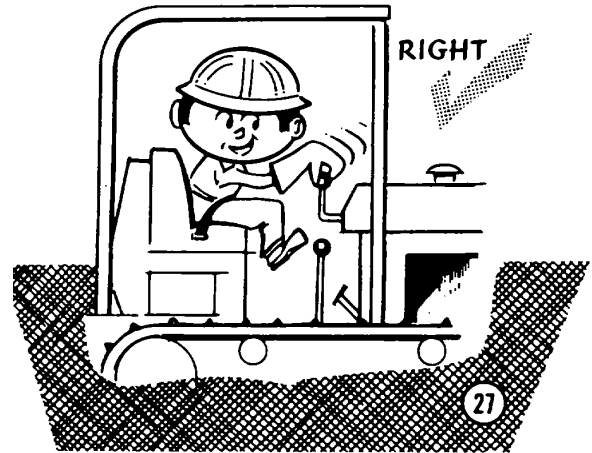
Test brakes against engine power on torque converter equipped machines.
Test brakes against ground speed on all tractors (25).

RUN AN OPERATING CHECK



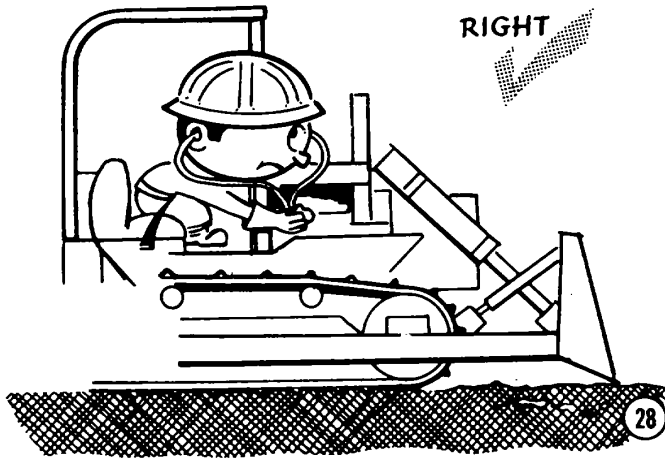
Test clutch or neutral position on power shift transmissions to be sure machine speed and direction can be controlled (26).

Stop and operate all equipment controls – observing “feel” of levers and response of attachment (27).

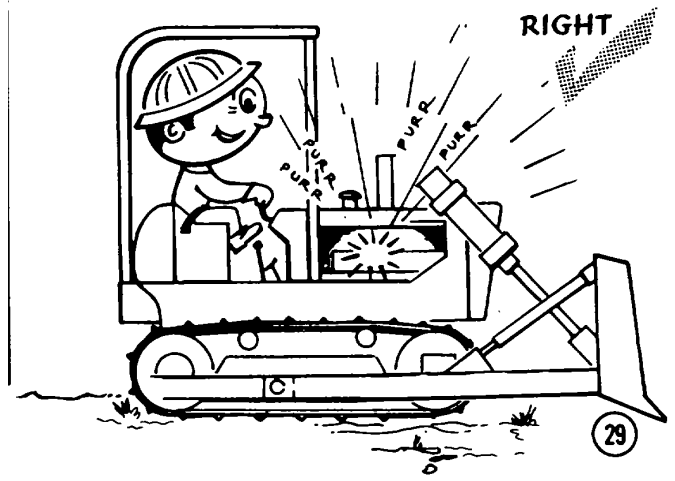


RUN AN OPERATING CHECK

Listen to engine and gear compartments, while moving slowly, to detect an unusual noises (28).



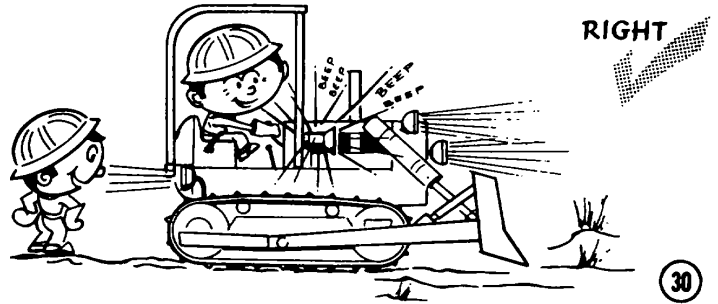
Be sure the engine is operating in a normal manner, in every rest before starting the work (29)



RUN AN OPERATING CHECK

If machine is so equipped, check lights, back-up alarms, emergency brake, and like equipment (30).

ADVISE THE PROPER MAINTENANCE AUTHORITY OF ANY MALFUNCTION OF ANY PART.



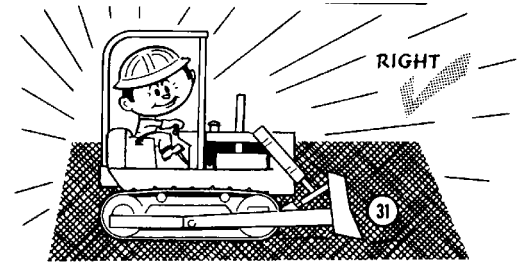
BEFORE WORKING TRACTOR

Operator should make certain that any unsafe condition has been satisfactorily remedied (31).

TEMPORARY PARKING

Always set parking brake and place transmission in neutral when parking temporarily with engine running. IF TRACTOR IS EQUIPPED WITH A TRANSMISSION LOCK, ENGAGE IT. Lower all attachments to the ground.

NEVER LEAVE MACHINE UNATTENDED WITH ENGINE RUNNING!



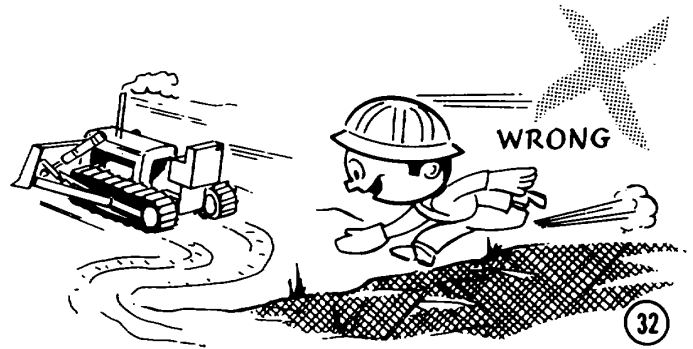
AT END OF OPERATING PERIOD

PARK SAFELY!

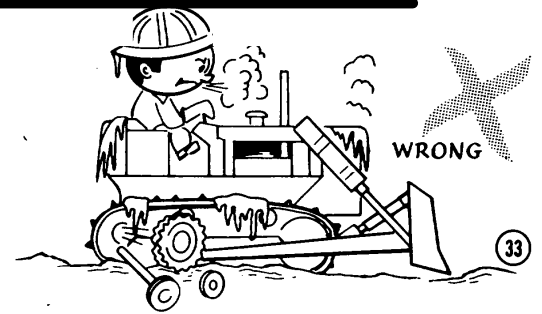
Park in a non-operating area or as instructed. If necessary to park in traffic lane, use appropriate flags, barriers, flares and warning signals as required. Also provide advance warning signals in traffic lane for approaching traffic.

Park on level ground, if possible. When this is not possible - position machine at right angles to the slope (32). Make sure the tracks are on a firm footing, and there is no danger of sliding.

Lower all attachments to the ground.



In freezing weather, park on a hard surface. Freeze-down should be avoided. Drive train failure could result in trying to move a machine under its own power when frozen to the ground (33).



AT END OF OPERATING PERIOD

SHUT DOWN PROPERLY!

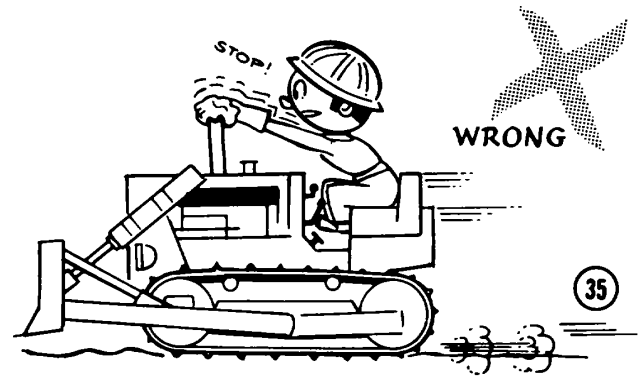
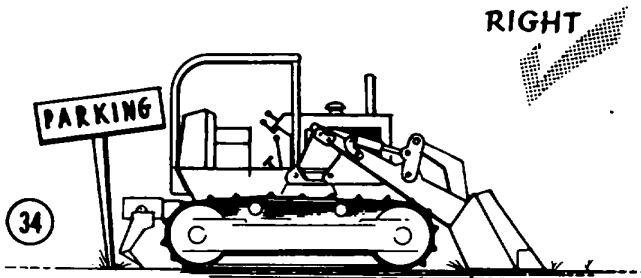
Know the exact stopping procedure for your crawler tractor. As with the starting procedure, this varies with the type of equipment being used. Follow manufacturer's operation manual.

In general:

Lower attachments and place control levers in neutral. This helps stabilize the machine and prevent accidents (34).

Place transmission controls in neutral and engage transmission control lock.

Set parking brake.



Allow engine to idle for gradual cooling down; then stop engine. DO NOT use any "emergency" stopping device to stop an engine under normal conditions (35).

Disconnect the electrical system with the system master switch, if provided. Follow employer's additional shut down procedures to prevent accidental or unauthorized starting.

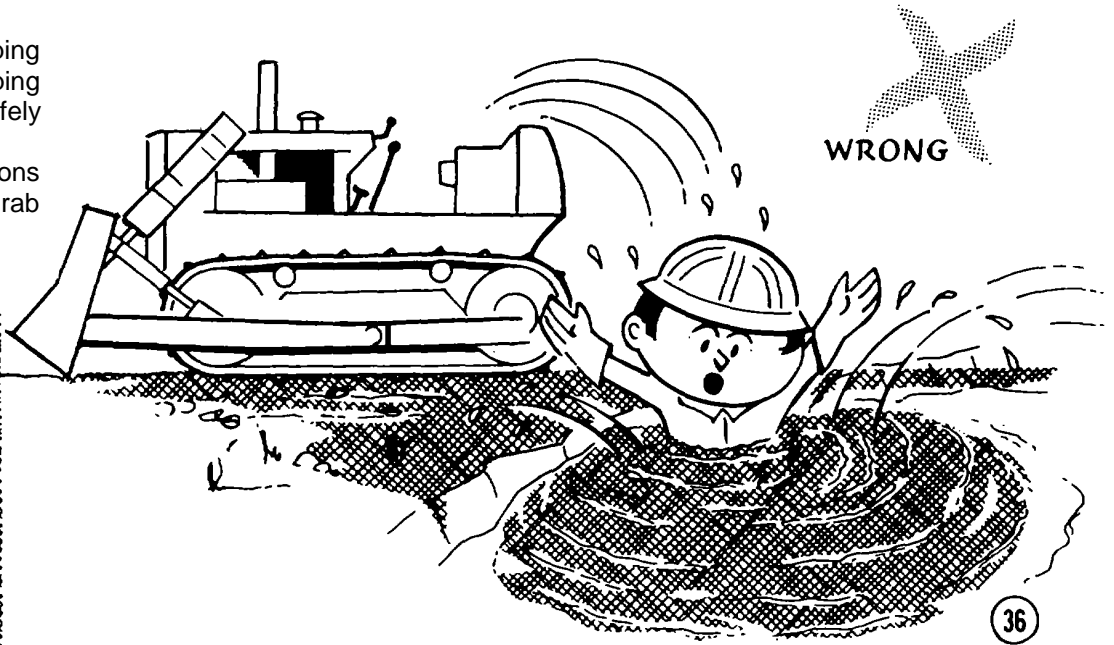
Block tracks if machine is stopped on a grade or ramp. Position and lock any anti-vandalism devices.

AT END OF OPERATING PERIOD

DISMOUNT CAREFULLY!

Don't jump off. After stopping machine, use the stepping points and grab rails to safely dismount (36).

Be careful of slippery conditions on stepping points and grab rails when dismounting.



WORK SAFE

REMEMBER THESE RULES:

Keep your seat. When roading or operating, stay in the proper position. Be certain of the control location, and maintain command of your machine at all times (37).

Check the entire working area continuously. If you can't see it clearly from the operator's seat - and you don't have a spotter - dismount and examine for possible hazards before you proceed.

Don't jump - either off or on the equipment. Never mount or dismount a moving vehicle.

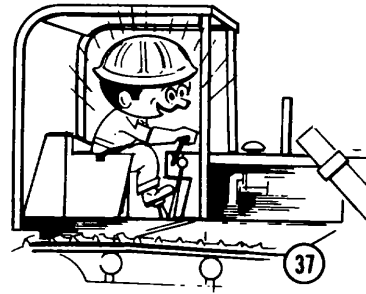
Look and listen for equipment defects. STOP - when malfunctioning controls or erratic operation are detected. Correct or report trouble *immediately*. Should the fuel system spring a leak, be extra careful of fire.

Prevent asphyxiation. If you must operate in a building, or if your machine is equipped with an enclosed cab, be *positive* there is adequate ventilation.

Use but don't abuse your equipment. Misuse can cause an accident (38).

NEVER SPEED. And never coast. Keep in gear at all times. Maintain a ground speed consistent with ground conditions.

What's more - you are an operator of *heavy construction equipment*. Act accordingly!



Your safety -and the safety of those around you is determined by the care and judgment YOU use while operating the equipment.



WORK SAFELY

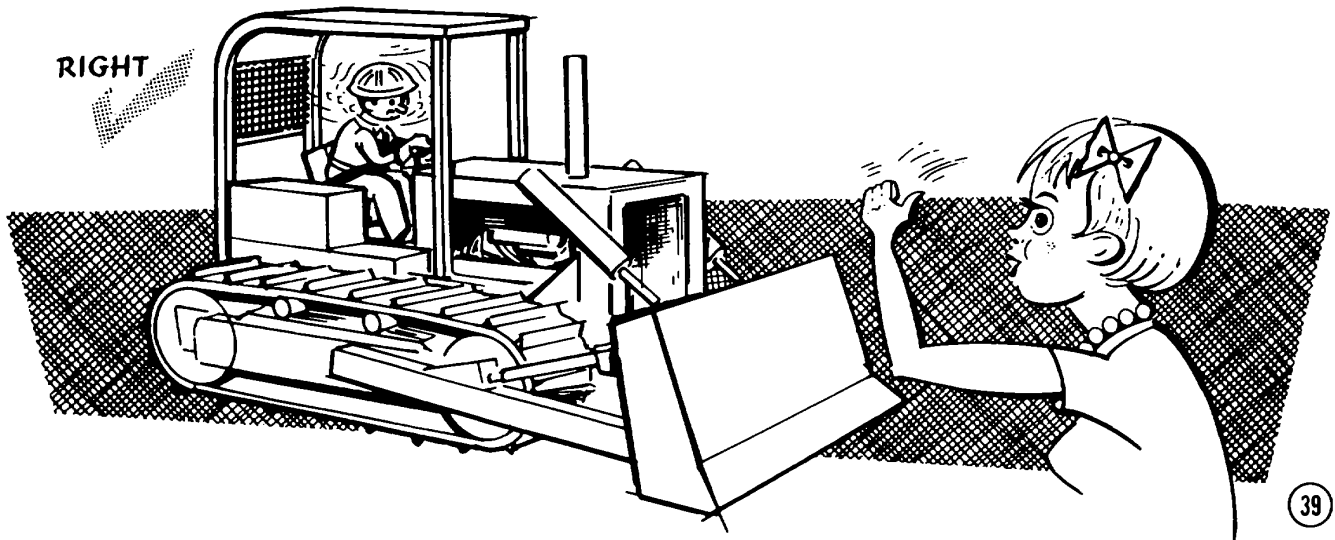
REMEMBER THE OTHER GUY:

Say NO! to riders (39). If you do carry an authorized passenger, don't let him ride any place but in specified safe position as provided.

Always look around before and while you back up or hook up - or swing an attachment.

NEVER move pipe or similar items over the head of other workmen.

Be sure that everyone is in the clear, when back to hook up to a scraper, sheepfoot roller or other equipment. Watch the ground man for the all-clear signal before moving tractor.

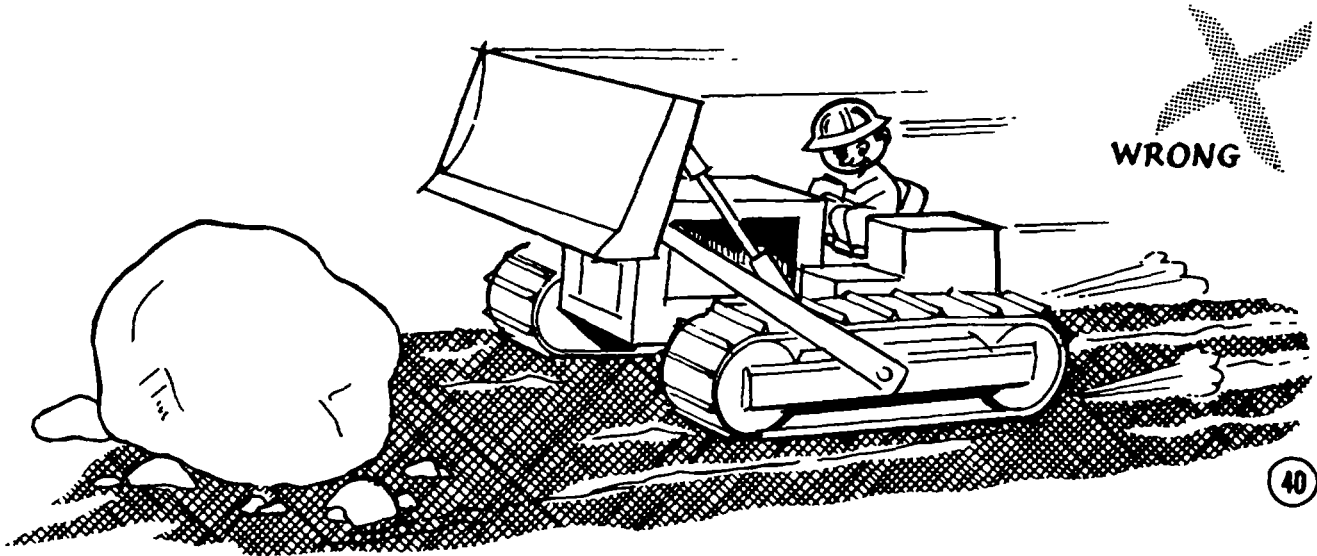


WORK SAFELY

Take it slow and easy when traveling through congested areas. Traffic courtesy pays off.

Give right of way to loaded equipment on haul and in pits. Maintain a safe distance from vehicles. Pass cautiously when necessary.

Don't obstruct your vision when traveling or v ing. Carry bucket or blade LOW for maximum visibility while traveling (40).



WORK SAFELY

Unfamiliarity with your equipment and your work area can lead mistakes. And mistakes cause accidents. Know ALWAYS - what y are doing where you are working and what the consequences of an error could be. The following precautions can help you keep safety-minded but follow your tractor operation manual for proper operating instructions.

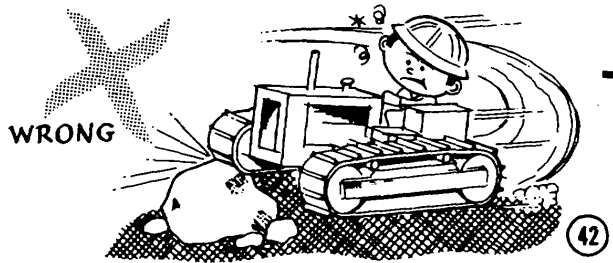
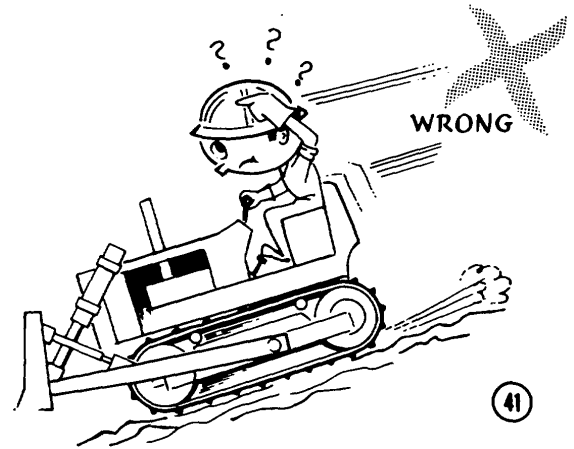
SHIFTING:

Never coast or free wheel downgrade in neutral.

Always stay in gear when traveling down slopes.

Do not brake on grades by shifting. Decelerate engine and apply the foot brake.

With a constant mesh or sliding gear transmission, do not shift on grade. Choose proper gear speed before proceeding downgrade (41).



SPEEDING:

Drive at speeds slow enough to insure i have complete control at all times (42).

Travel slowly over rough ground and hill sides.

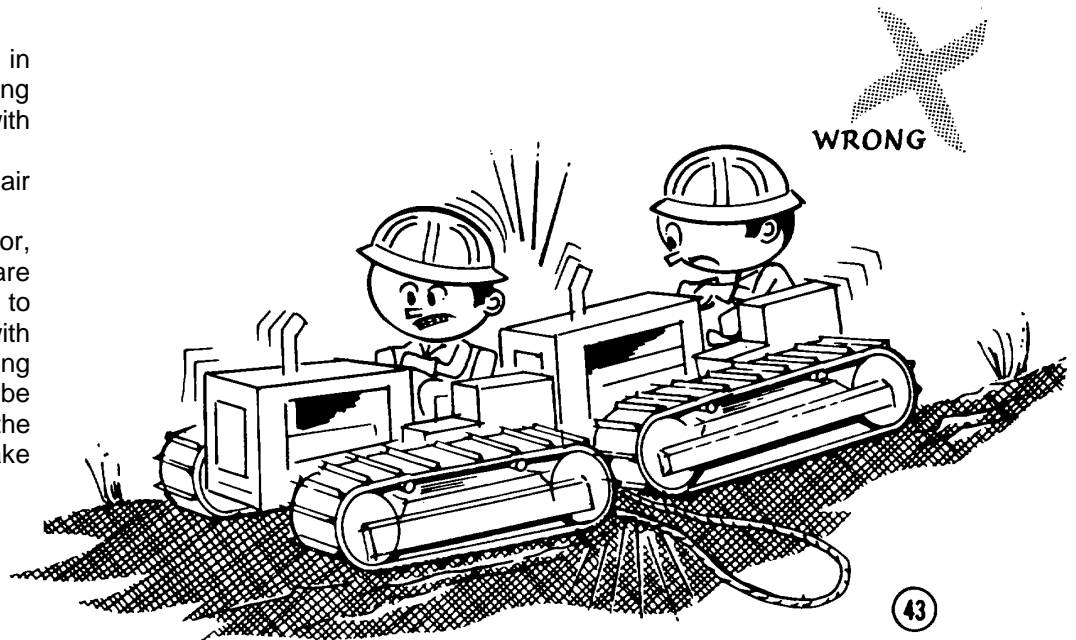
WORK SAFELY

ON THE ROAD AND TOWING:

When roading equipment in traffic, use proper warning devices in accordance with local laws or regulations.

When towing a tractor to a repair area, use proper cable.

When towing a disabled tractor, know what brakes are available. DO NOT try to brake a towed tractor with power brakes or steering brakes - these may be inoperative (43). Use the parking or emergency brake where possible.



WORK SAFELY

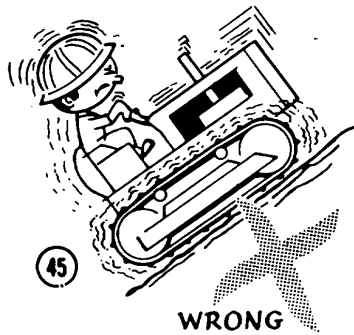
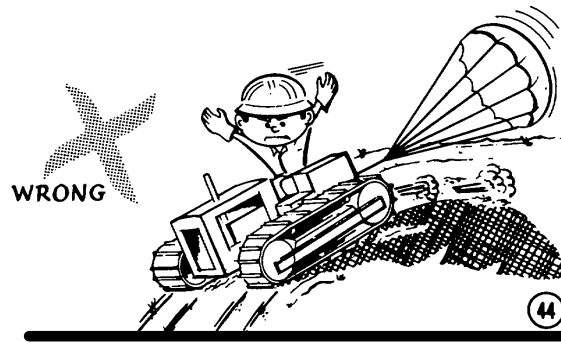
OPERATING ON SLOPES:

Avoid sidehill travel whenever possible. Drive up and down the slope. The danger of tipping is always present

In steep downhill operation, do not allow engine to overspeed (44). Select proper gear speed before starting tractor downgrade.

There is no substitute for good judgment when working slopes. Should the tractor start slipping sideways on a grade during freezing weather this danger is increased - turn it *immediately* in the direction of the downgrade.

The grade of the slope you should attempt will be limited by such factors as condition of the ground, load being handled, the type of tractor, etc.



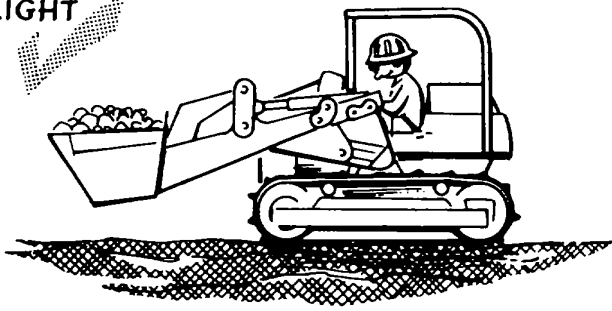
Consider all factors carefully before starting up. Keep in mind

. . . .If the slope is too steep, the tractor may develop a jerky, bucking motion which can turn quickly into a slide (45).

. . . .If the machine is being forced down grade, it may be necessary to resort to reverse or cross steering.

WORK SAFELY

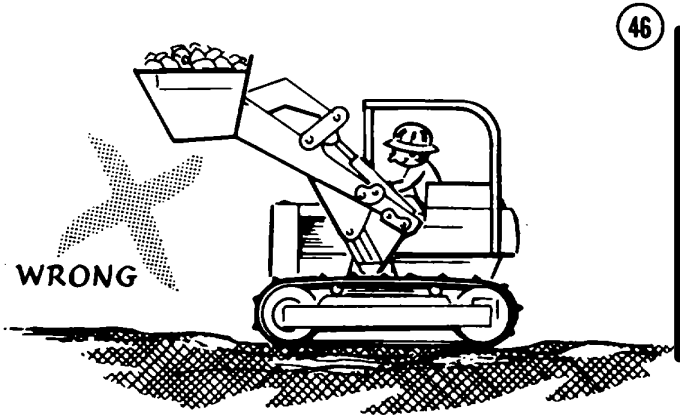
RIGHT



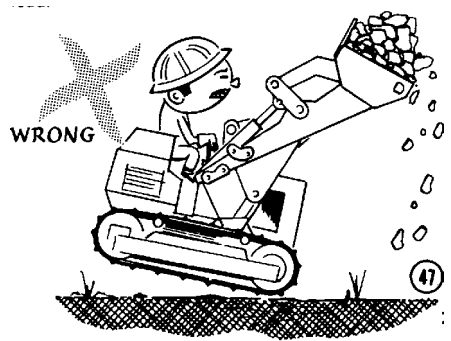
CARRYING LOADS:

Never transport a load with the bucket fully raised. When transporting a loaded bucket, carry it as close to ground level as possible and at proper speed. This lowers the center of gravity - increasing the tractor's stability and your safety (46). Handle only those loads which are safely arranged. Do not over-load (47). Do not start or stop quickly when transporting a load.

WRONG



WRONG

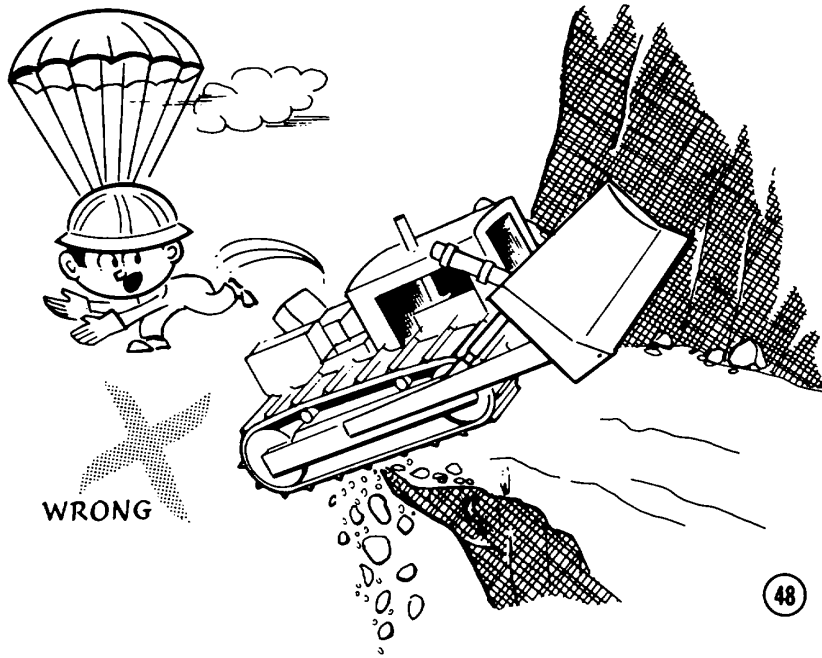


WORK SAFELY

DANGEROUS AREAS:

Always check work area for dangerous features

Avoid operating your equipment too close to an overhang - or to a deep ditch (48). BEWARE OF CAVING EDGES! BEWARE OF FALLING ROCKS! BEWARE OF SLIDES!



WORK SAFELY

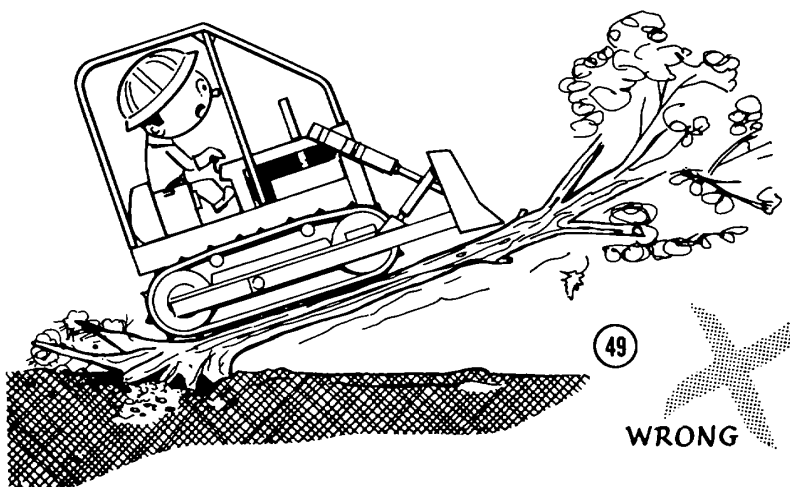
HAZARDOUS OPERATIONS:

Be extremely alert during any dangerous operation

When undercutting high banks - the whole mass can become unstable and cave in.

When backfilling along a newly constructed wall - the fill material and weight of tractor may cause the wall to collapse.

When felling trees - the tractor should be equipped with proper overhead guarding. Push smaller trees over, if possible. But never allow a tractor to climb up on the root structure while the tree is falling (49). Use extreme caution when pushing over any tree with a dead top.



"Pioneering" - be sure you know how this is done. It should be done by only the most experienced operators. Danger from falling branches and up-turning roots is acute on virgin land. Follow tractor operation manual.

WORK SAFELY

SAFE OPERATING HABITS:

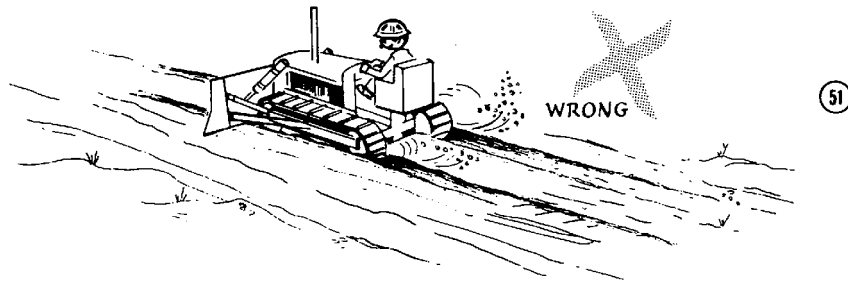
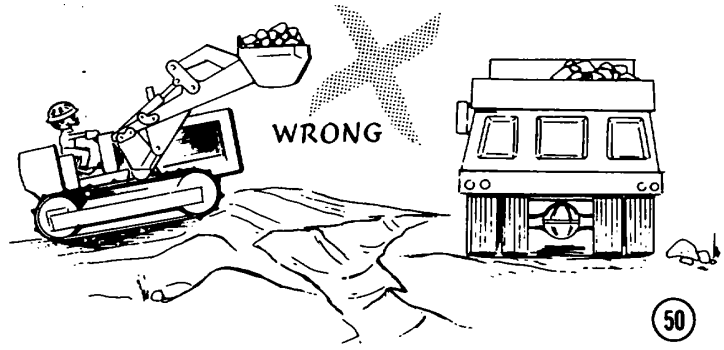
For everyone's safety, establish good operating and working habits

Keep work areas as level as possible (50).

This results in easier maneuvering - and a minimum of operator fatigue. To maintain a smooth surface, backdrag occasionally with equipment where available.

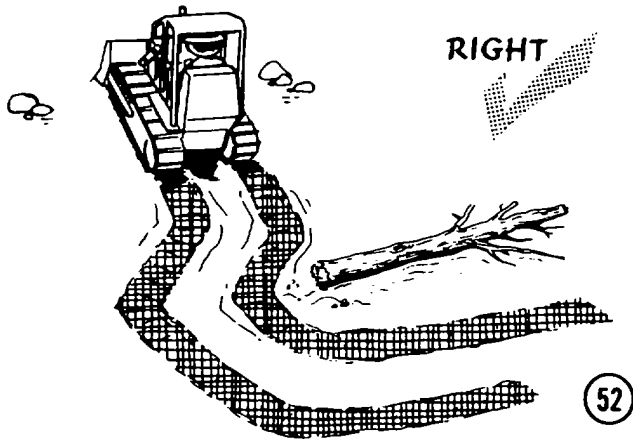
Avoid excessive spinning of the tracks.

Spinning can convert a smooth area into ruts that tend to tip the machine (51).

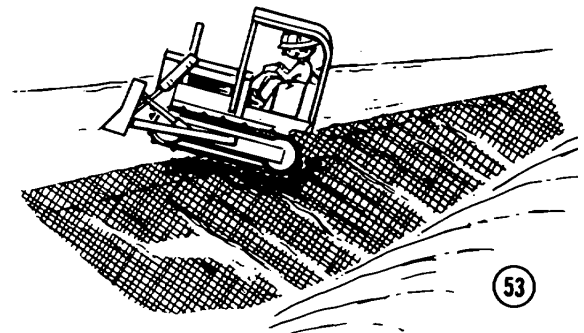


WORK SAFELY

Avoid going over obstacles - rough terrain, rocks, logs, curbs, ditches, ridges and RR tracks whenever possible (52). The size and type of obstacle that can be safely crossed will depend on many factors including good judgment. When obstructions must be crossed, do so with extreme care at an angle if possible. Reduce speed. Downshift. Ease up to the "breakover" point balance slowly on the obstruction - and ease down to minimize the jolt of contact on the other side.

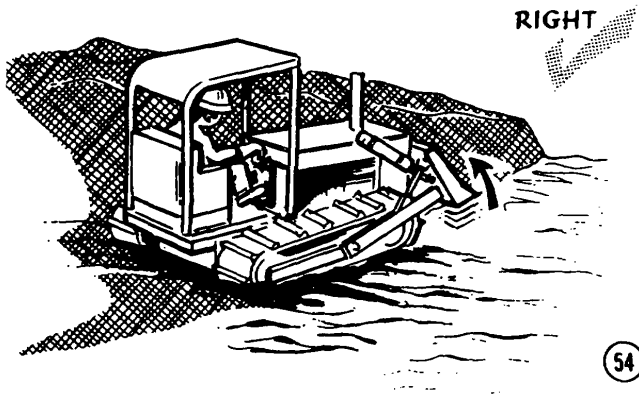


RIGHT



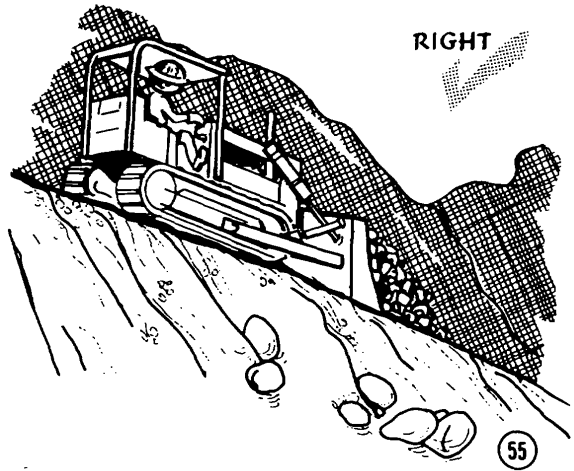
Cross a gully or deep ditch at an angle with reduced tractor speed (53).

WORK SAFELY



When starting to mire down in mud, don't spin tracks or try to "seesaw" machine. Get traction by dropping the load (54).

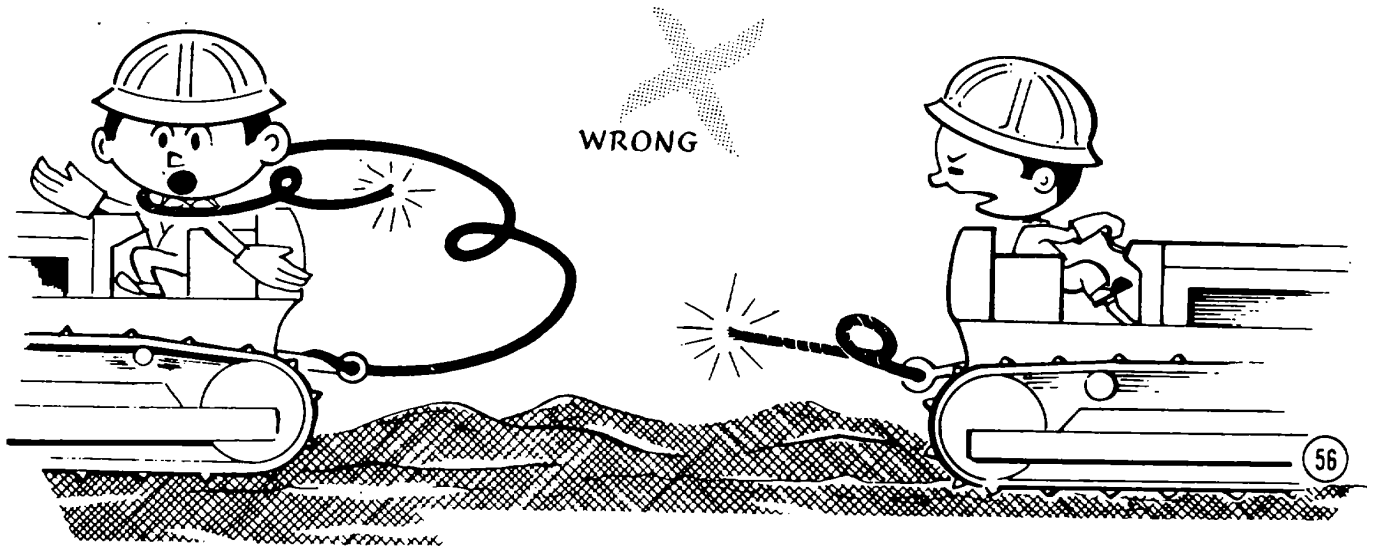
When loading on a grade, push or drift material downhill wherever possible then *gradually* load blade (55). Remember - a full blade is easier to control than one partially full.



WORK SAFELY

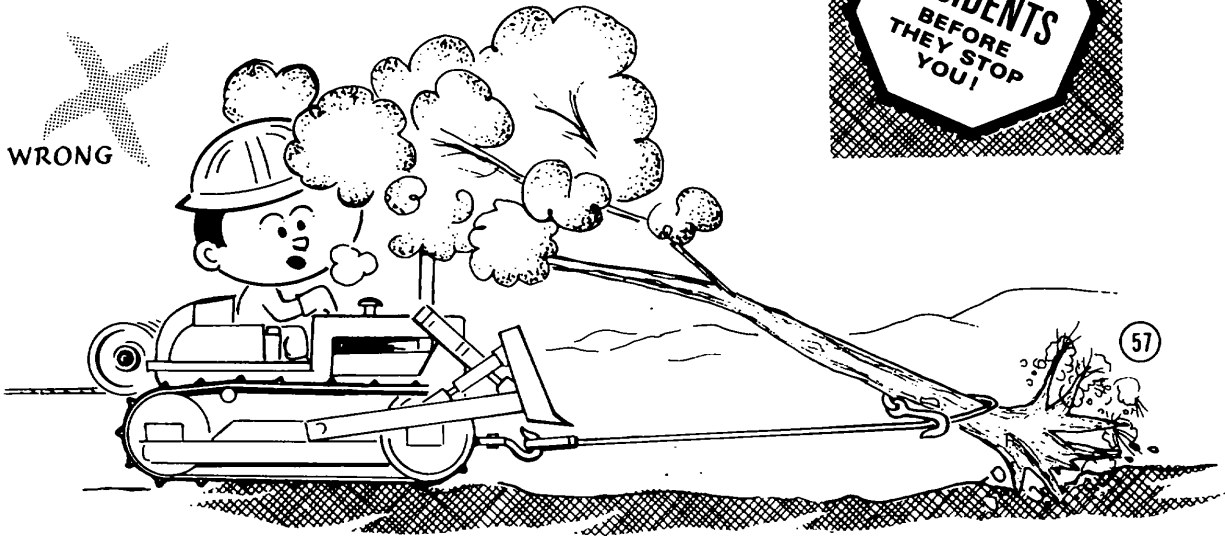
When using a long cable to hitch your tractor to a load, move forward and take up slack slowly - do not jerk - do not kink cable keep cable taut. If the connecting cable is slack, the sudden impact of the load can snap it (56).

Examine the cable to be sure it is in good condition, that it is big enough for the job, and has properly secured hooks and clamps.



WORK SAFELY

If it becomes necessary to snub the machine, use adequate anchor. Danger always exists that even a large tree may be pulled over (57).



MAINTENANCE - WITHOUT ACCIDENT

Specific safety procedures should always be observed, whether servicing the equipment or making the repairs. Remembering these - in time! - can prevent an injury or save your life

AVOID FIRE HAZARDS

Fuel is dangerous!

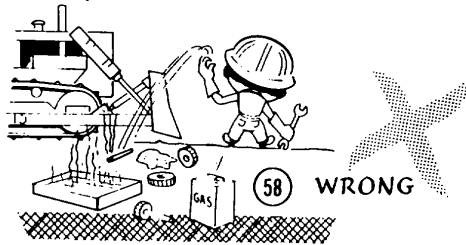
Don't smoke while refueling.

Don't smoke while handling highly flammable material.

Engine should be shut off when refueling.

Use care in refueling if the engine is hot.

Don't use open pans of gasoline or diesel fuel for cleaning parts (58). Good commercial, nonflammable solvents are preferred.



Battery gas is highly flammable!

Leave battery box open to improve ventilation when charging batteries.

Don't check battery charge by placing metal objects across the posts (59).

Don't allow sparks or open flame near batteries.

Don't smoke near battery.

Flame is not a flashlight!

Never check fuel, battery electrolyte or coolant levels with an open flame.

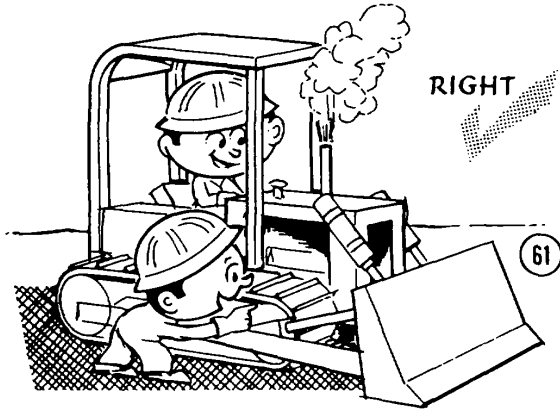
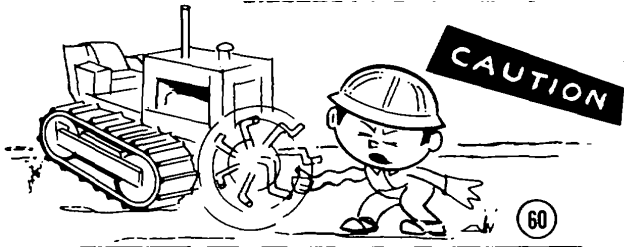
Never use an open flame to look for leaks anywhere on the equipment.

Never use an open flame as a light anywhere on or around the equipment.

KNOW WHERE FIRE EXTINGUISHERS ARE KEPT!



MAINTENANCE - WITHOUT ACCIDENT



UNDER ALL MAINTENANCE CONDITIONS

Do not perform any work on the equipment unless authorized to do so. Then be sure you know what you're doing. Follow manufacturer's recommended procedures.

Never service the equipment while it is being operated.

Use caution when hand cranking an engine (60).

Avoid working on equipment with the engine running. If it is necessary to make checks with the engine running, ALWAYS USE TWO MEN one, the operator, at the controls, the other checking where the operator can see him (61).

Also, put the transmission in neutral, set the brake, and apply any safety locks provided. KEEP HANDS AWAY FROM MOVING PARTS..

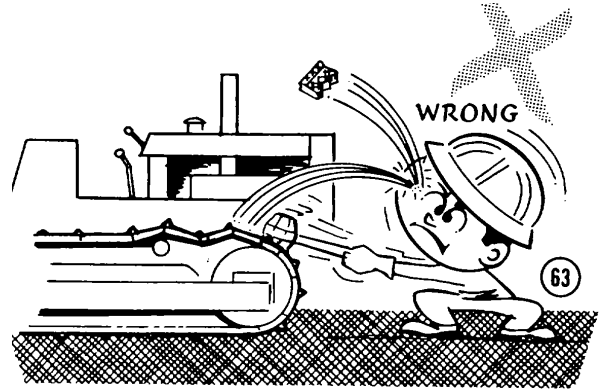
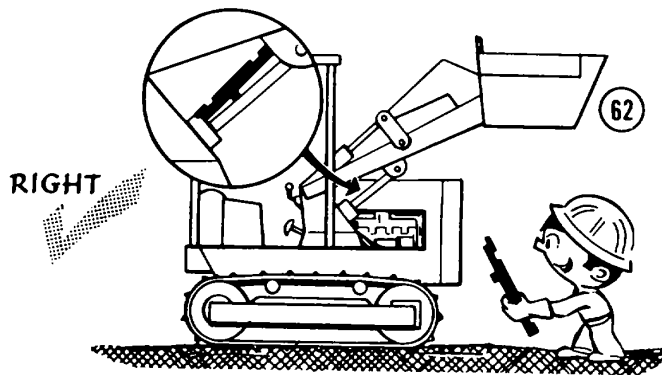


MAINTENANCE - WITHOUT ACCIDENT

Before servicing, adjusting or repairing tractors which have attachments such as shovels, loaders, dozers, scrapers, rippers, etc. - LOWER attachments to the ground - or, if necessary to raise them for access to certain parts, SECURELY SUPPORT by manufacturer's safety bar, if provided, or external means (62). DO NOT rely on controls to support or position attachments for maintenance.

Never allow ANYONE to walk under equipment that is raised and not properly blocked.

Avoid working directly under raised and blocked equipment unless absolutely necessary.



If the machine is on an incline, block it securely.

Use hoisting equipment for lifting heavy parts.

TAKE CARE! WATCH OUT FOR OTHER PEOPLE IN THE VICINITY.

Use extreme caution in removing radiator caps, drain plugs, grease fittings or hydraulic pressure caps.

Wear safety glasses when drilling, grinding or hammering metal (63).

MAINTENANCE - WITHOUT ACCIDENT

Make sure the maintenance area is adequately vented.

Keep maintenance area CLEAN AND DRY. Oily and wet floors are slippery; greasy rags are a fire hazard; wet spots are dangerous when working with electrical equipment.

When handling LP gas cylinders - do so with care. Don't drop and don't damage.

WARNING: *Severe freeze burns* can result from spilling LP gas on your body.

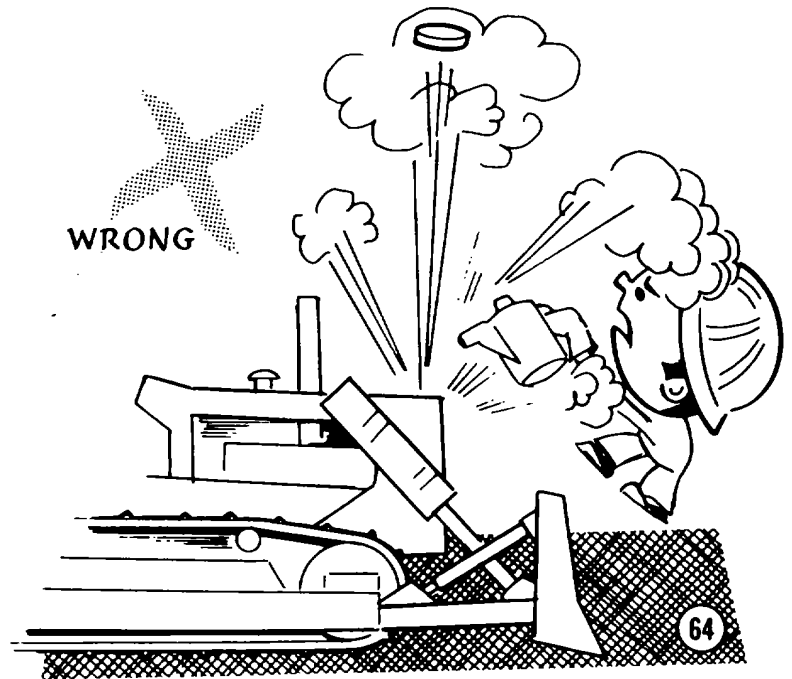
Store starting aids in a cool and well ventilated place, out of the reach of unauthorized personnel.

SERVICING PRECAUTION

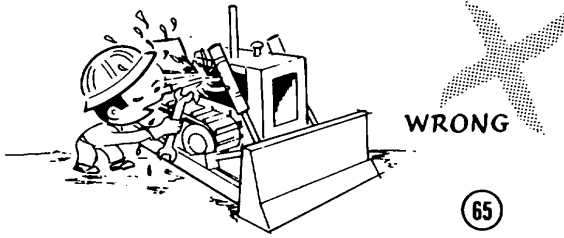
Stop the engine before cleaning or lubricating the equipment.

Lower mounted equipment and tools to the ground *carefully*.

Engine coolant gets hot! Don't remove the radiator cap until coolant temperature is below the boiling point (64). Then turn cap slightly to relieve pressure before removing.



MAINTENANCE -- WITHOUT ACCIDENT



Exhaust gases are dangerous! Periodically check exhaust system for excessive leakage.

Don't forget a hydraulic system, may be pressurized! To relieve pressure, follow the manufacturer's manual. When filling or venting system, loosen the filler and-level cap SLOWLY (65).

If tractor is equipped with a hydraulic accumulator, recharge by using only dry nitrogen. Again follow manufacturer's manual for procedure.

When checking hydraulic pressure, be sure and use the correct test gauge for the pressure in the particular system.

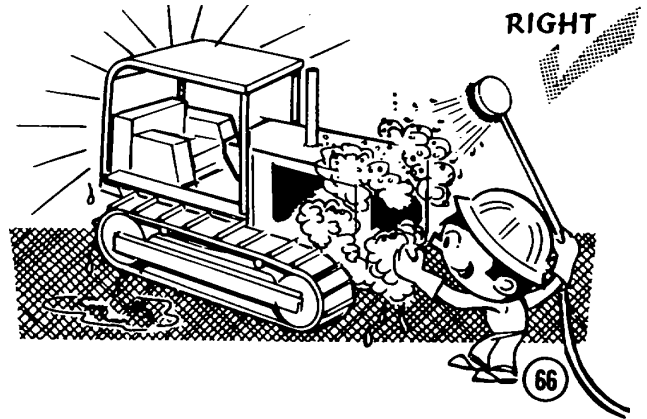
Use extra caution around power take-off equipment.

Before attempting to service, shut off the engine and disengage the PTO lever.

Keep ALL equipment free of dirt and oil (66).

This attention will minimize fire hazards and facilitate spotting of loose or defective parts.

When preparing engine for storage, remember that inhibitor is volatile and therefore dangerous. Seal and tape openings after adding the inhibitor. Keep container tightly closed when not in use.



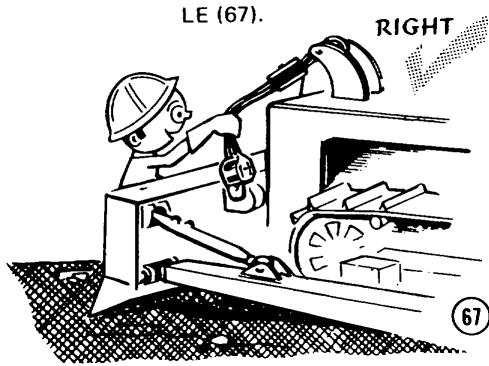
MAINTENANCE - WITHOUT ACCIDENT

ADJUSTING PRECAUTIONS

. . . .for Operating Adjustments

Keep clutch and brake bands of cable control units properly adjusted at all times. Before making adjustments, stop engine - and be sure that the cable is slack.

ALWAYS WEAR GLOVES WHEN HANDLING CABLE (67).



Before removing any housing covers, stop engine. Take all objects from your pockets which could fall into the opened housings. Don't let adjusting wrenches fall into opened housings (68).

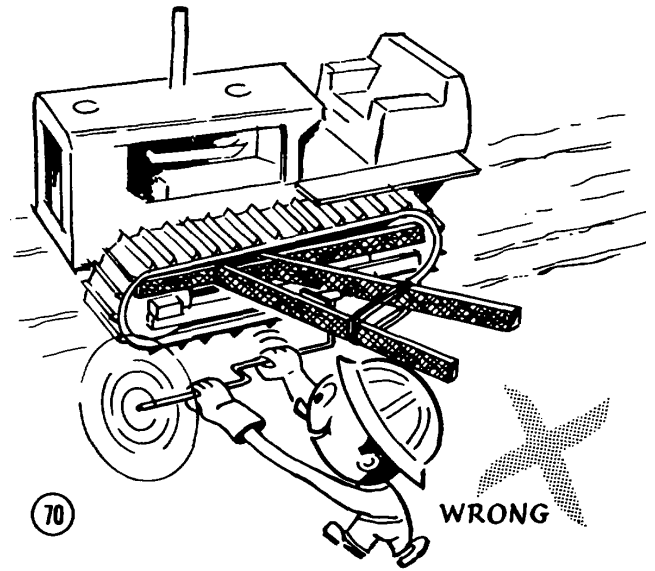
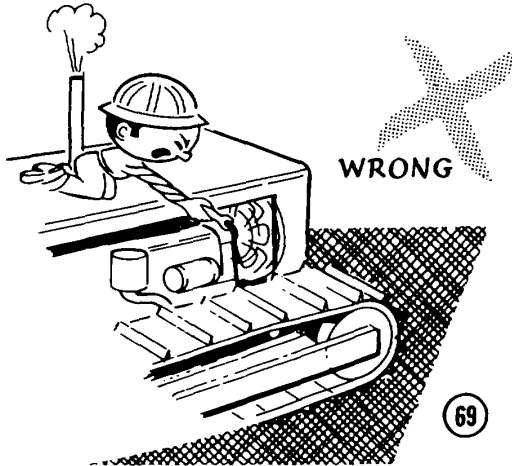
MAINTENANCE - WITHOUT ACCIDENT

... for Maintenance Adjustments

Don't attempt to check belt tension while the engine is running (69).

Don't adjust the carburetor or the fuel pump while the machine is in motion.

Before attempting to adjust hitch or PTO linkage, shut off the engine and disengage the PTO lever.



When adjusting track tension, never use makeshift jacks (70). Follow manufacturer's manual.

MAINTENANCE -- WITHOUT ACCIDENT

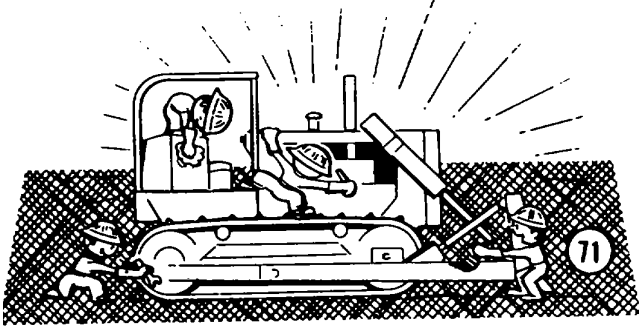
PRECAUTIONS DURING REPAIR - (71)

Before working on the engine fuel system - With gasoline powered or diesel engines, close fuel shutoff valve.

With LP gas powered engines, close LP cylinder valve and run engine until fuel is depleted and engine dies.

Check manufacturers service manual before working on pressurized parts or systems.

Before working on hydraulic system - make sure engine is not running and the system pressure is relieved by working the control levers in all directions with the engine shut off.



Before repairing the electrical system, or performing a major overhaul, make sure the batteries are disconnected.

When working on the track -

Handle it with extreme caution.

Never place your fingers between the track shoes when removing track.

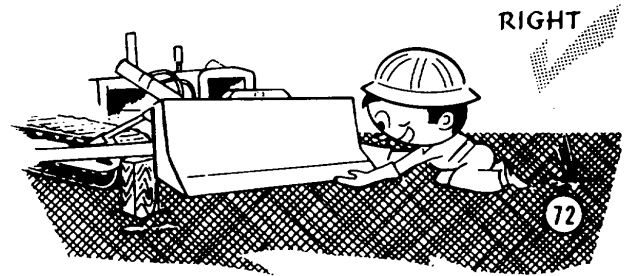
Protect your eyes with safety glasses while striking metal parts.

When changing cutting edges -

Stop the engine and securely block the bucket, blade, bowl, etc. (72).

Never let your bare hands come in contact with the sharp edges. WEAR GLOVES.

When installing, use a drift punch to align holes.



LOAD AND UNLOAD YOUR TRACTOR-SAFELY

Operating and maintaining equipment without damage or injury is part of the safety picture. The other part is safely loading and unloading your equipment (73).

All tractors are not loaded the same way, and the procedures recommended by the manufacturer should always be followed. For example, it is generally advisable to back small tractors up ramps to avoid tipping.

Several precautions are applicable to all equipment.

however - - and are mandatory for safety's sake.

Load and unload on the **LEVEL**.

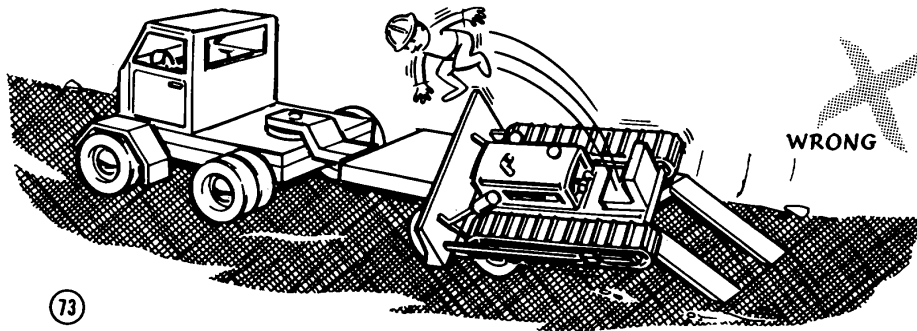
Block transport vehicle so it can not move.

Use ramps of **ADEQUATE** strength, **LOW** angle, and **PROPER** height.

Keep trailer bed **CLEAN** of clay, oil and all materials which can become slippery.

Tie and block tractor **SECURELY** for transport.

KNOW the correct loading and unloading procedures for your type of equipment.



73

A FINAL WORD

You have now read the Crawler Tractor/Loader Safety Manual. Although it is impractical to try to cover every possible operating or maintenance situation, the safety precautions recommended here should serve to develop operator safety habits and promote safe operation. Follow your employer's Safety instructions and those covered by the manufacturers' manuals.

YOU WILL THEN DISCOVER THE
GREATEST SAFETY DEVICE THERE IS
.... THE CAREFUL OPERATOR!

-- Be a member of the SAFETY TEAM --



Remember – SAFETY IS UP TO YOU!

*U.S. GOVERNMENT PRINTING OFFICE : 1990 0 - 277-866

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

PUBLICATION DATE

PUBLICATION TITLE

BE EXACT... PIN-POINT WHERE IT IS

PAGE NO.

PARA-GRAPH

FIGURE NO.

TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

TEAR ALONG PERFORATED LINE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE:

DA FORM 2028-2
JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

THE METRIC SYSTEM AND EQUIVALENTS

WEIGHT MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

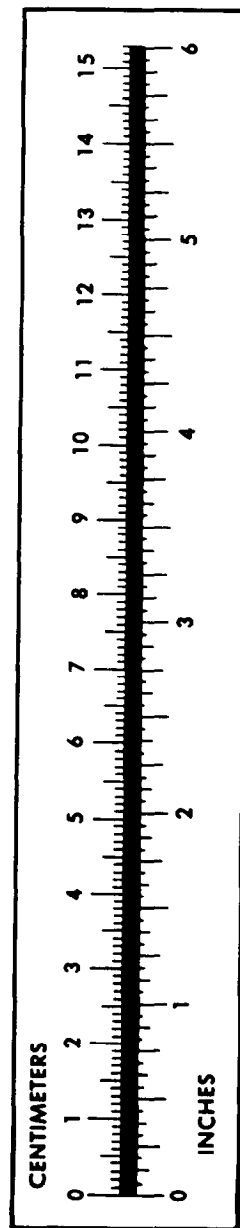
TEMPERATURE

$5/9(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
its	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
ometers per Liter	Miles per Gallon	2.354
ometers per Hour	Miles per Hour	0.621



PIN: 009465-000