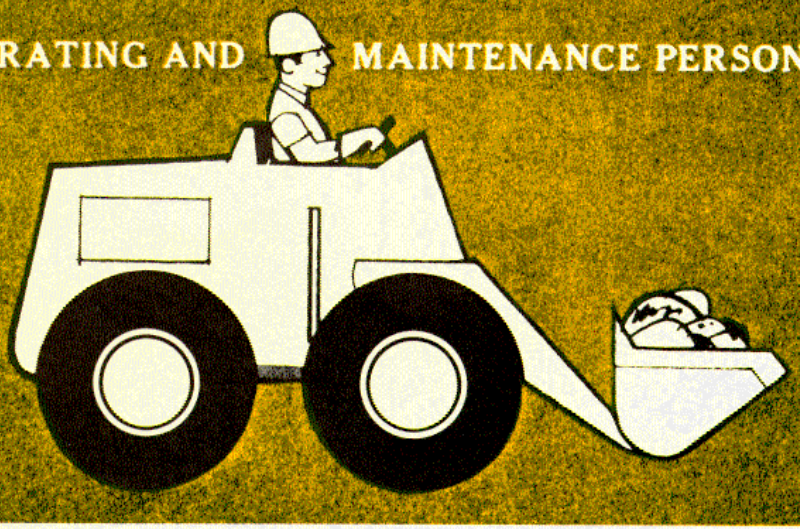
WHEEL TYPE LOADER/DOZER

Safety Manual

FOR OPERATING AND MAINTENANCE PERSONNEL



HEADQUARTERS, DEPARTMENT OF THE ARMY 20 DECEMBER 1973

OPERATOR'S SAFETY MANUAL

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TECHNICAL BULLETIN

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HEADQUARTERS
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WASHINGTON, D.C., 20 December 1973

SAFETY MANUAL, WHEEL TYPE LOADER/DOZER 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 wheel type loader/dozers The information contained in this manual is not intended to replace safety codes, rules and regulations.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army,
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25B, Operator maintenance requirements for Loaders and Dozers.

FOREWORD

SAFETY of the operator and maintenance personnel for loaders and dozers is of prime concern. This Safety Manual is presented as a helpful guide to construction equipment personnel, and shows some of the daily work problems which they/may encounter.

It is the operator's responsibility to know the specific requirements, precautions and work area hazards and to discuss them with his foreman or supervisor. A common understanding should be reached to assure safe operating performance.

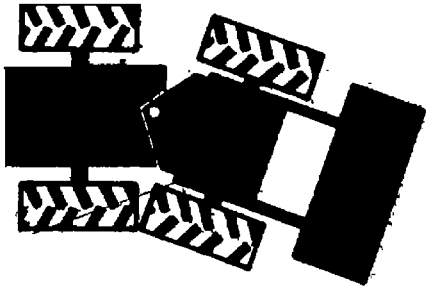
The operator should study this Safety Manual to be aware of basic safety precautions which may prevent serious injury and damage to property.

A WORD TO THE OPERATOR

This Manual begins with your "safety homework" and takes you step-by-step through your working day with safety in mind. The final chapter covers safety in maintenance operations which you might perform.

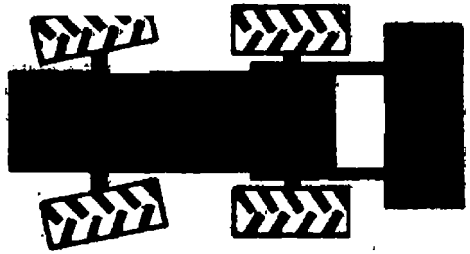
Remember that on any job, YOU are the key to safety. Good safety practices not only protect the men around you...they are your own best protection. Study this Manual and the manufacturer's operation manuals covering your specific loader or dozer. Read all warning and caution instructions. Practice safe operation. Be alert to possible hazards before they cause trouble, and remember.

SAFETY IS UP TO YOU.



ARTICULATED

This Manual covers two basic machine designs- the articulated machine and the rigid-frame machine. The frame of the articulated machine, shown above, is built in two parts connected by a pivot. The operator's controls may be located on the front or rear section. The machine pivots in the center to steer.



RIGID-FRAME

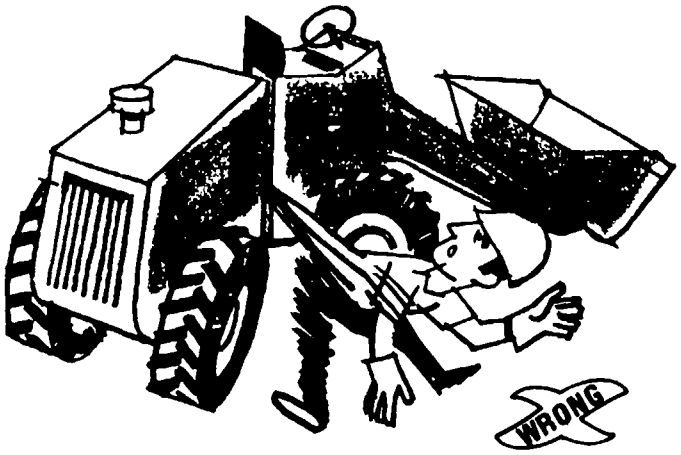
The rigid-frame machine is shown above and has a rigid one-piece frame. The rear wheels generally pivot to steer the machine.

CONTENTS

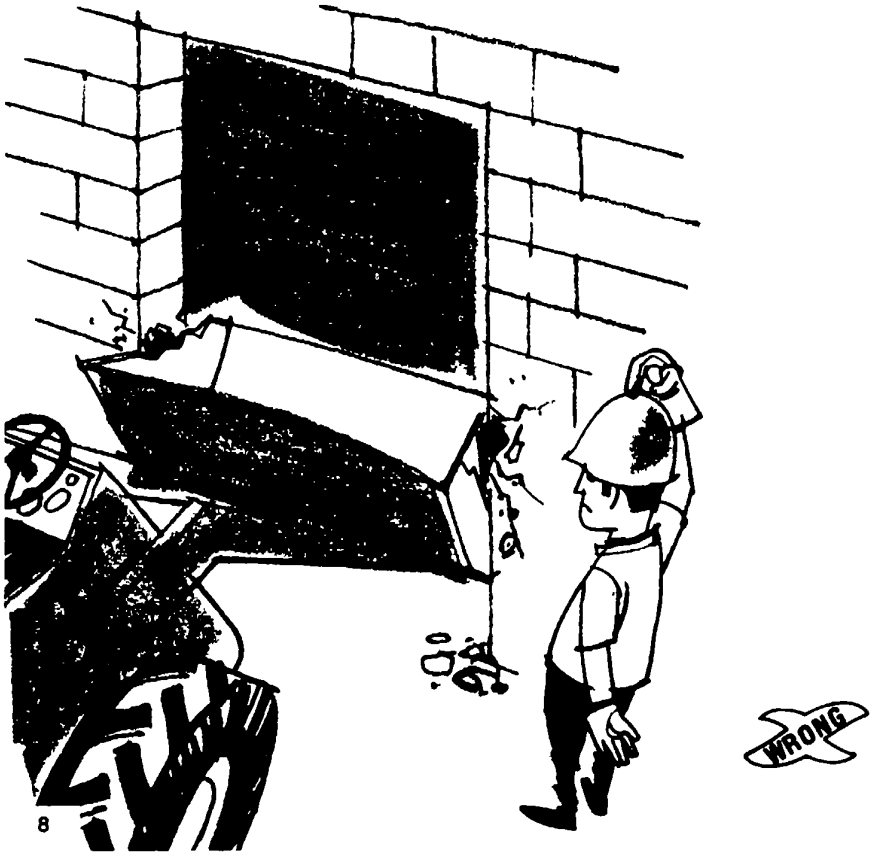
know your safety program

- Know the employer's safety rules for your job. Consult your foreman for specific Instructions and safety equipment required For instance, you may need:
  - Hard hat
  - Safety shoes
  - Ear protectors
  - Reflective clothing
  - Safety goggles
  - Heavy gloves
- There are many safety and warning devices you should recognize...they can tell you what hazards to expect. Some you may encounter are
  - Flags and flares
  - Barricades
  - Signs and other markings
  - Warning lights

- Loose, flopping clothing can get caught In machinery and cause injury. Wrist watches, rings and other accessories can be dangerous, too.
- Learn the traffic rules at the work site. Know the hand signals used on the job and who is responsible for signaling. Take signals from only ONE person.



BE PREPARED BEFORE YOU START



know your equipment

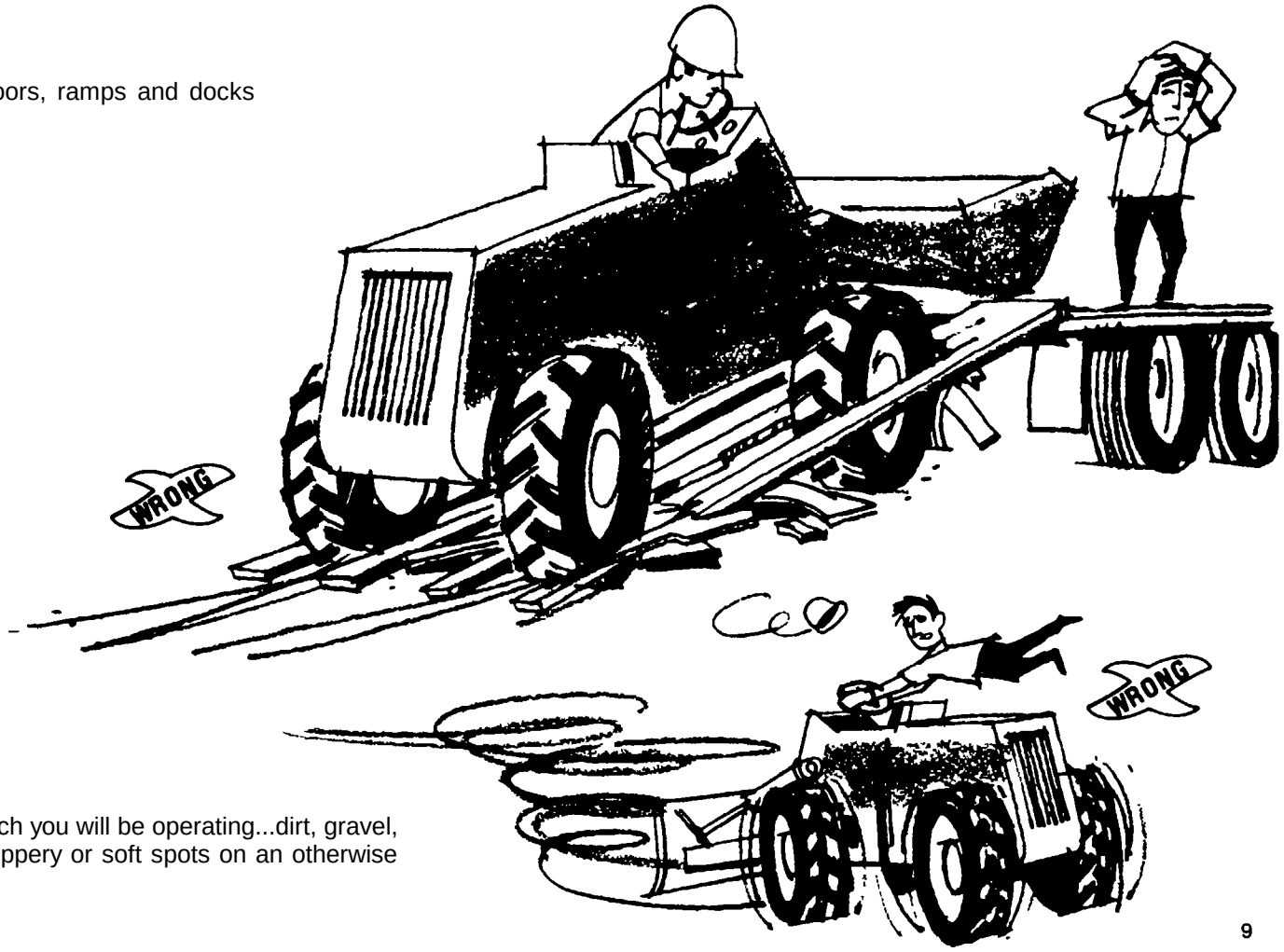
- READ THE MANUAL furnished with your loader or dozer to learn its operating and maintenance characteristics, capacities and limitations. Know what operating clearances your machine requires.

- Learn the location and function of ALL controls, indicators, warning devices and caution Instructions.
- Be familiar with the safety devices on your machine, such as
  - Seat belts
  - Canopies
  - Roll-over protective structures (ROPS)
  - Articulated steering frame lock
  - Shields and guards
  - Visual or audible warning devices
- Learn to recognize the machine's warning and safety devices. They will alert you to conditions such as LOW PRESSURE or HIGH TEMPERATURE that may make it hazardous to continue operating

BE PREPARED BEFORE YOU START

know the work area

- Know the weight limitations for any floors, ramps and docks on which you will operate



- Check out the surface on which you will be operating...dirt, gravel, snow or Ice Watch out for slippery or soft spots on an otherwise smooth surface

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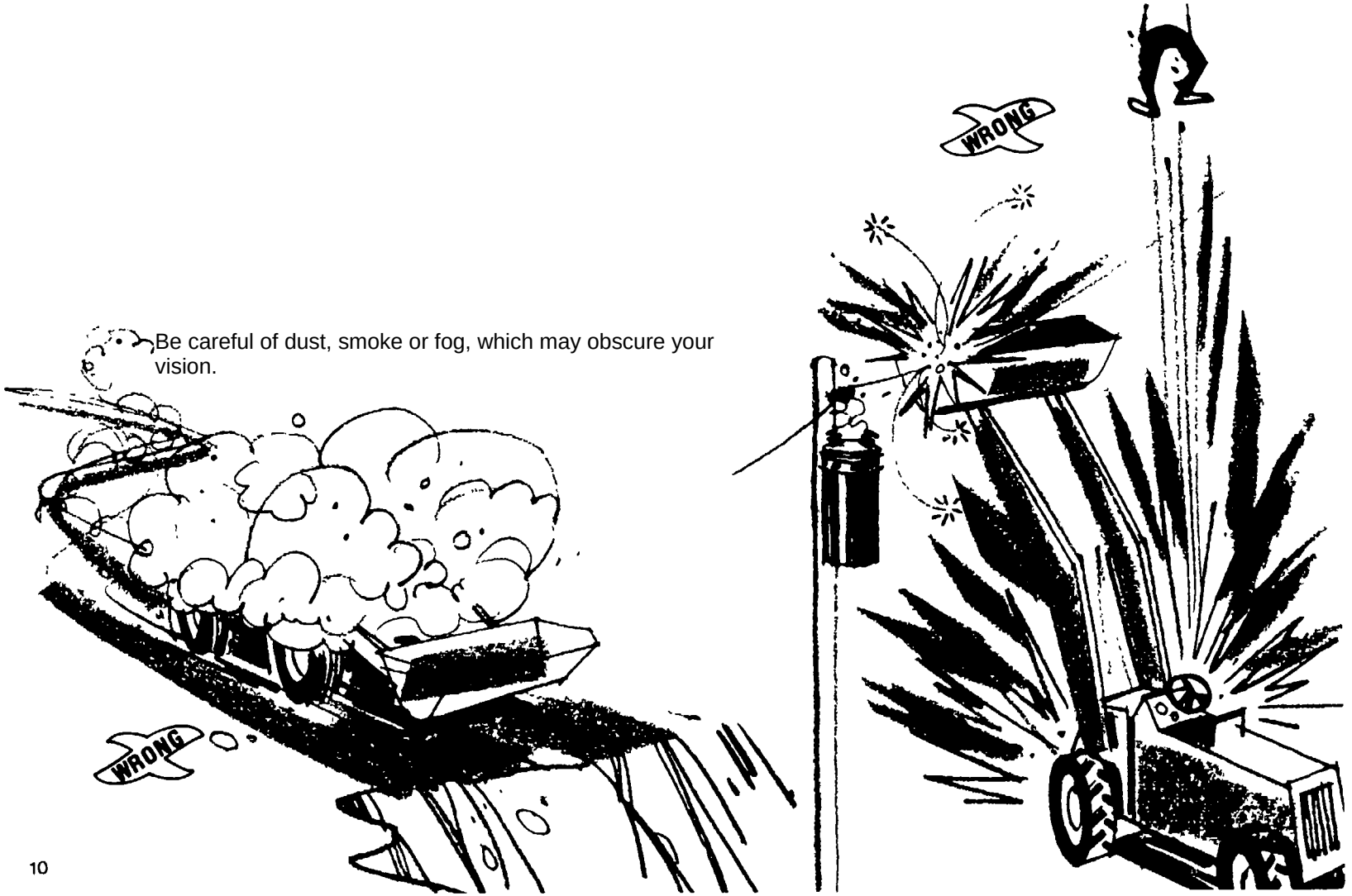
BE PREPARED BEFORE YOU START

- Know the CLEARANCES in the work area. A little time spent checking side and overhead clearances, Including power lines, can save a lot of trouble later.

Be careful of dust, smoke or fog, which may obscure your vision.



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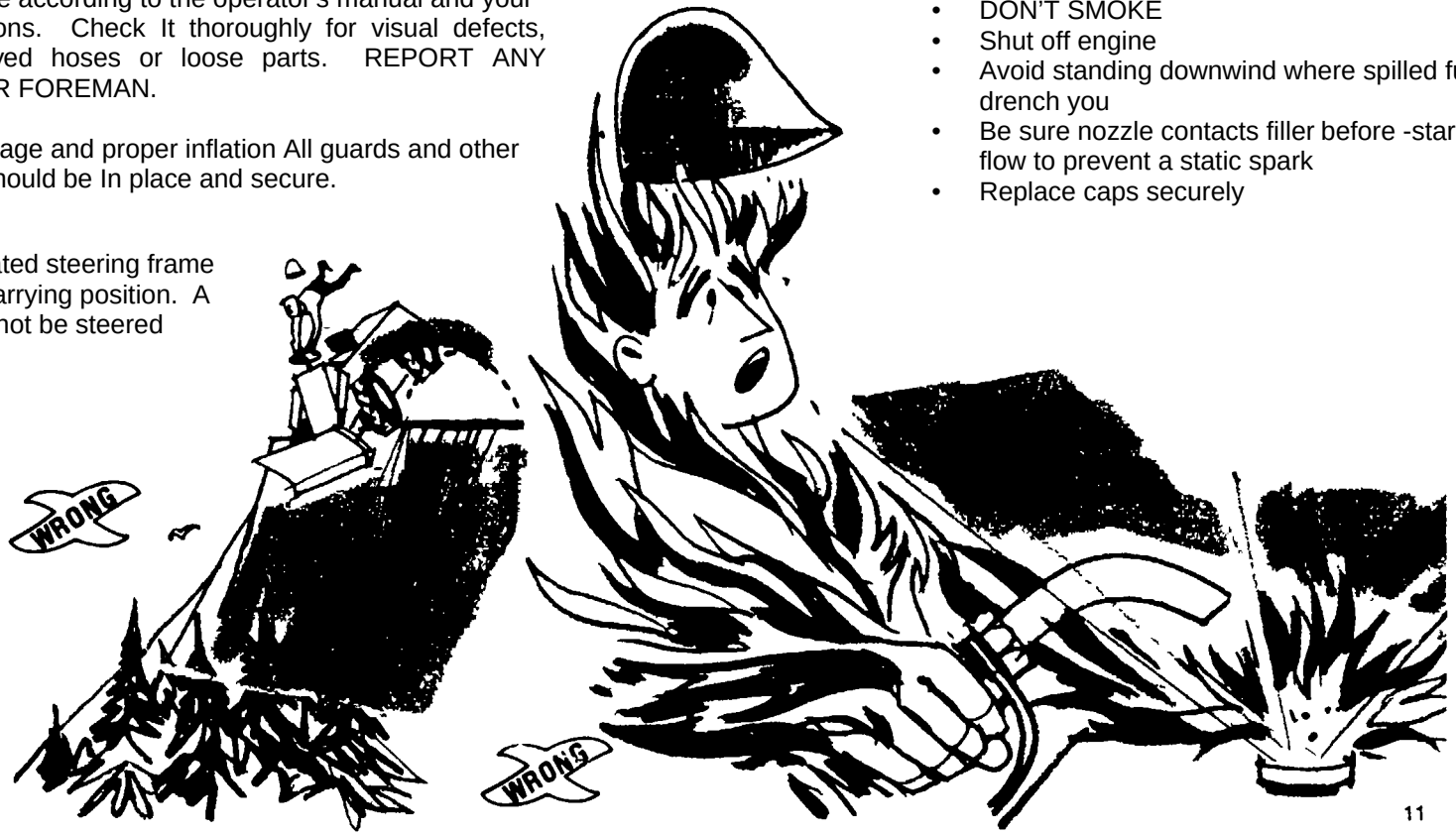
complete your pre-operating check

- Inspect your machine according to the operator's manual and your foreman's Instructions. Check It thoroughly for visual defects, such as leaks, frayed hoses or loose parts. REPORT ANY DEFECTS TO YOUR FOREMAN.

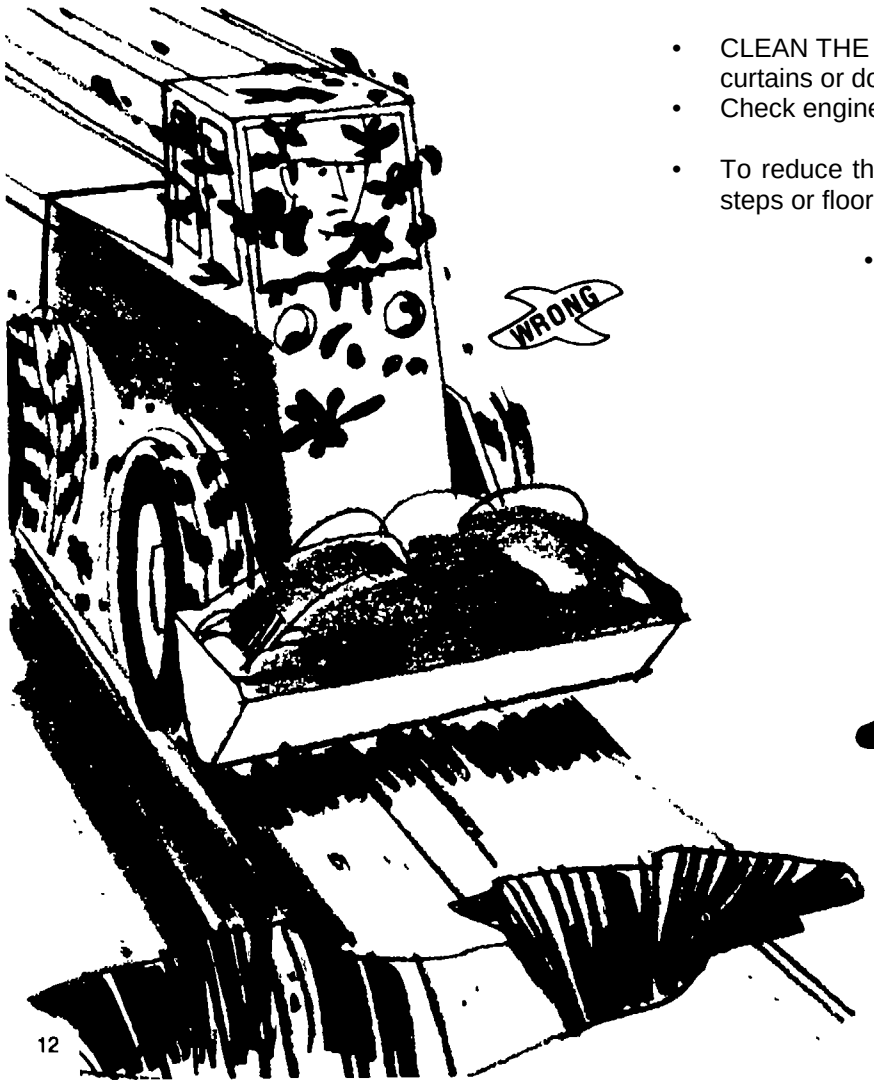
- Inspect tires for damage and proper inflation All guards and other protective devices should be In place and secure.

- Disconnect articulated steering frame lock and store in carrying position. A locked vehicle cannot be steered



- Watch out for fire hazards when refueling.
- DON'T SMOKE
- Shut off engine
- Avoid standing downwind where spilled fuel could drench you
- Be sure nozzle contacts filler before -starting fuel flow to prevent a static spark
- Replace caps securely

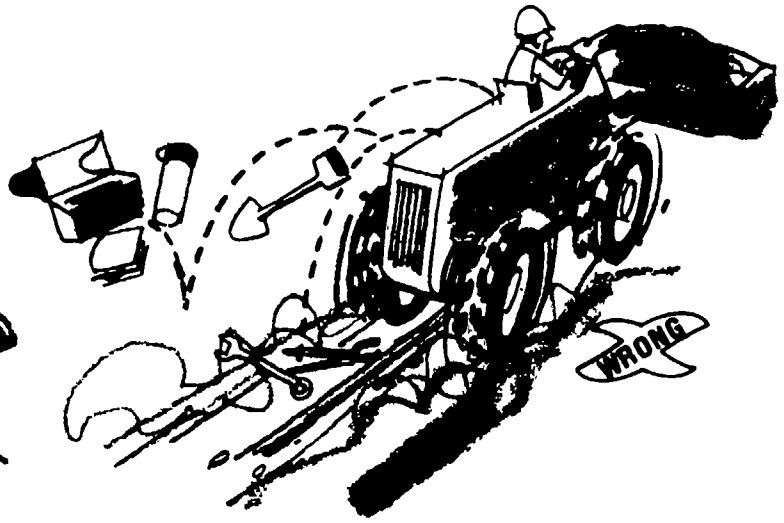
GET STARTED SAFELY

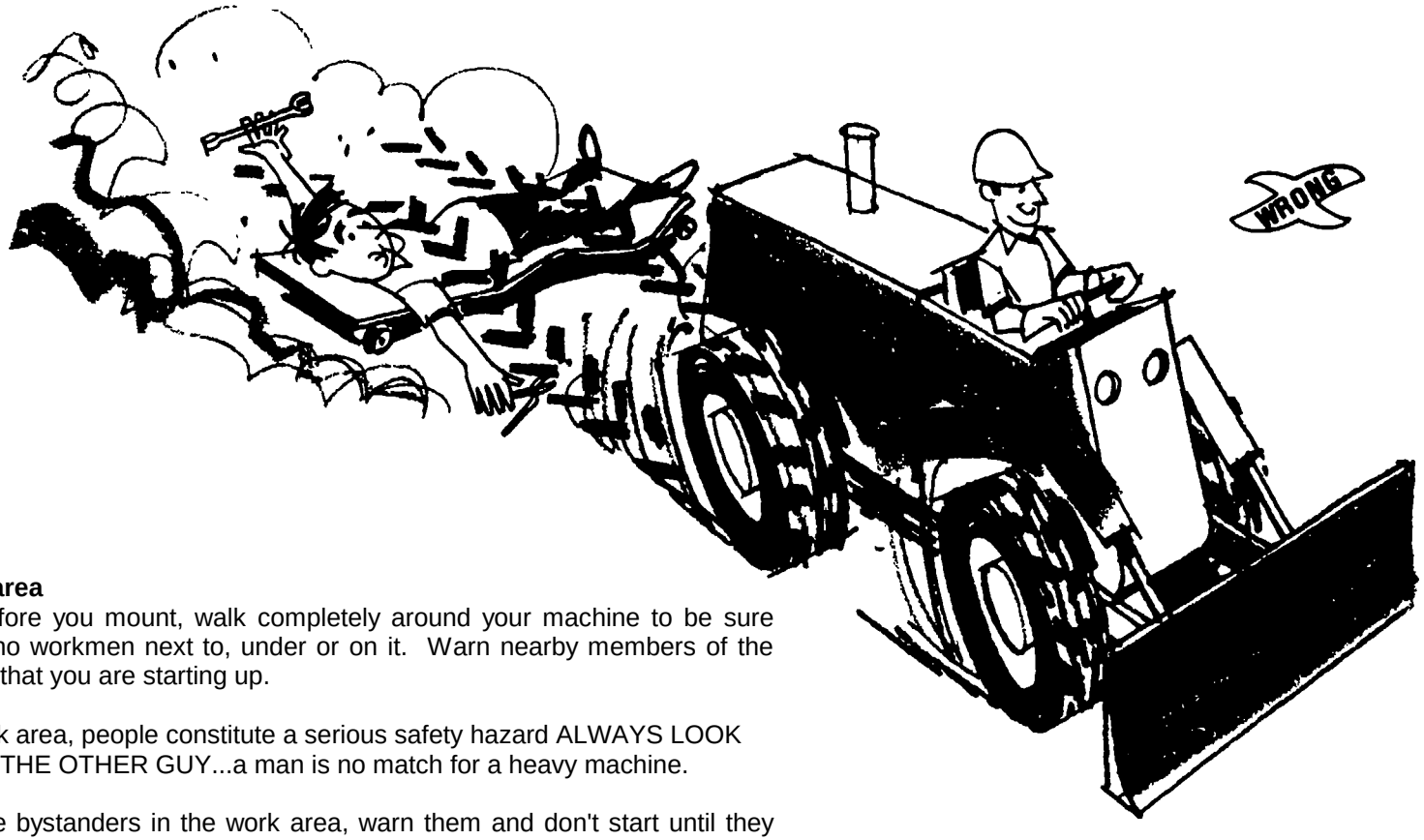


- CLEAN THE WINDSHIELD AND WINDOWS to provide good visibility before you start. Fasten curtains or doors so they don't block your vision.
- Check engine compartment for trash which could cause fire.

- To reduce the danger of slipping, remove oil, grease or mud from the grab irons, hand rails, steps or floor of operator's compartment. In winter, watch out for snow and ice.

    - Remove or fasten any loose items in the operator's compartment such as tools, chains or lunch buckets They could jam a control or cause you to slip





clear the area

- Finally, before you mount, walk completely around your machine to be sure there are no workmen next to, under or on it. Warn nearby members of the work crew that you are starting up.

- In any work area, people constitute a serious safety hazard ALWAYS LOOK OUT FOR THE OTHER GUY...a man is no match for a heavy machine.

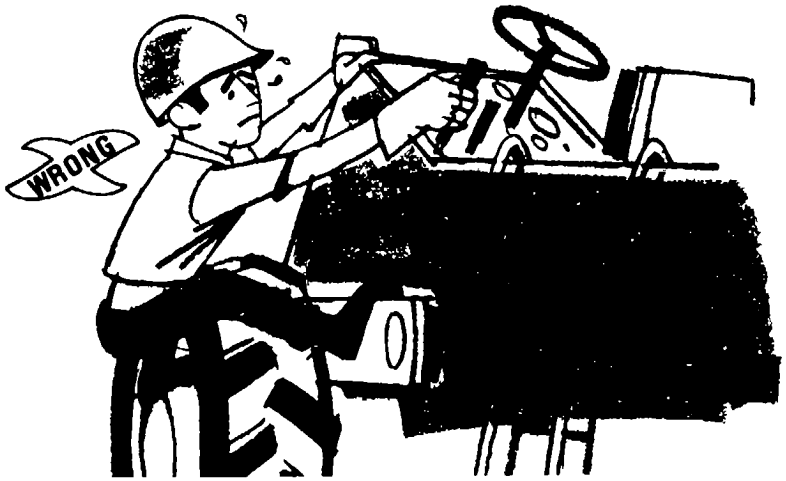
- If there are bystanders in the work area, warn them and don't start until they are out of danger

GET STARTED SAFELY

be careful when you get on the machine

- Always use available hand rails, ladders or steps. Be alert for slippery conditions. Don't get on your machine or operate it with wet or greasy hands or muddy shoes.

- DO NOT USE THE STEERING WHEEL OR OTHER CONTROLS AS HANDHOLDS when entering the operator's compartment Adjust the seat to your most effective operating position and fasten seat belt when provided



GET STARTED SAFELY

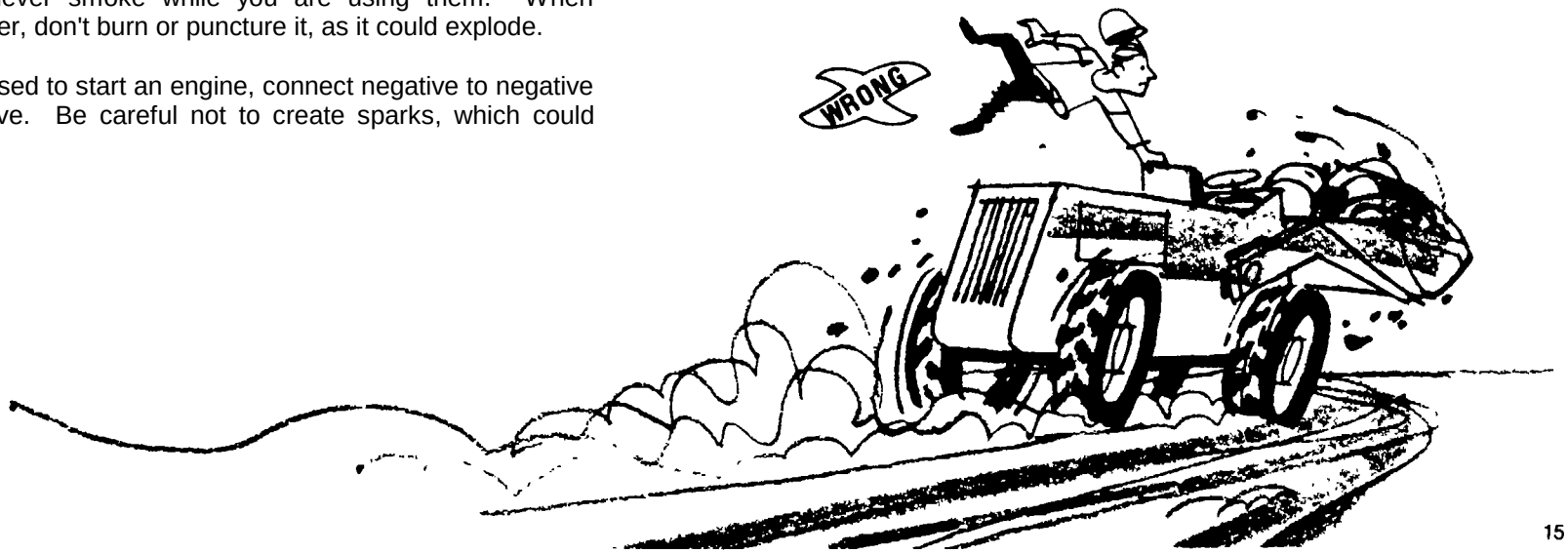
start up safely

- Check controls to be sure they are in NEUTRAL to prevent sudden movement when the machine is started
- Start the engine ONLY FROM THE OPERATOR'S SEAT. It is a good safety practice to give warning before you start up.
- Follow the manufacturer's recommended starting procedure. After engine has been started, check all gauges and instruments to be sure that everything is operating properly.

- EXHAUST FUMES CAN KILL. If necessary to start an engine in an enclosed area, be sure to provide adequate ventilation.

- When using a cold weather starting aid, follow the manufacturer's recommendations. Some starting aids are highly flammable...DON'T USE TOO MUCH...never smoke while you are using them. When disposing of a container, don't burn or puncture it, as it could explode.

- If jumper cables are used to start an engine, connect negative to negative and positive to positive. Be careful not to create sparks, which could cause an explosion.



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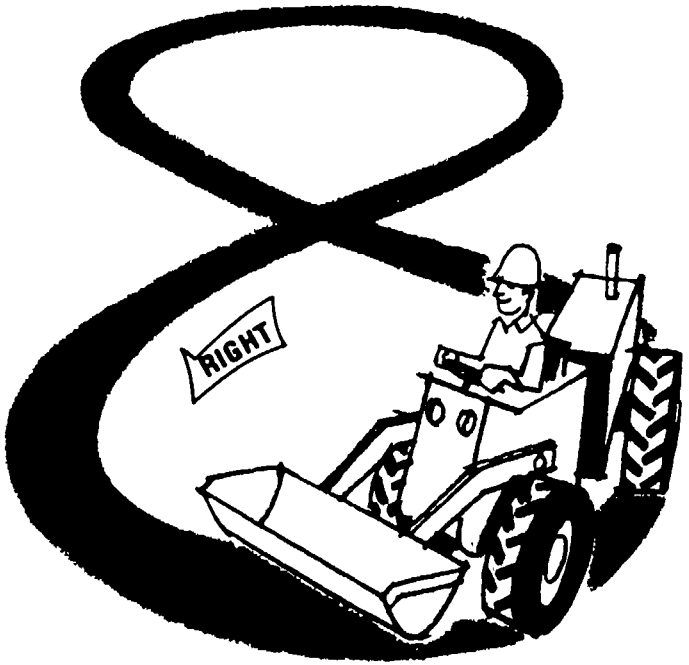
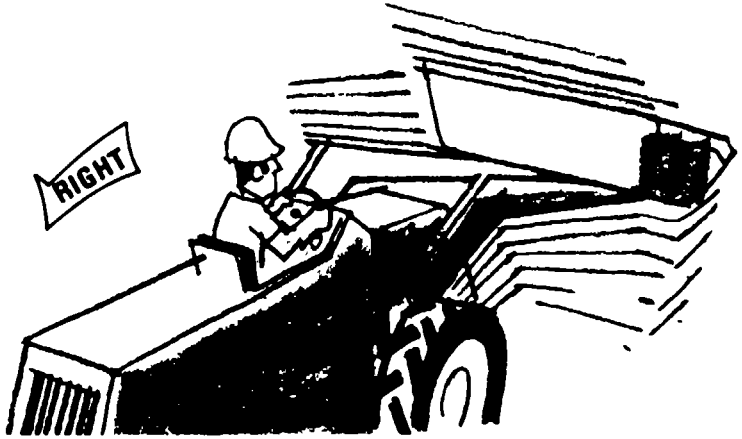
GET STARTED SAFELY

test machine before operating

- TEST SERVICE AND PARKING BRAKES to make sure you will be able to stop and stay stopped.
- To be sure you can control direction of travel and speed, shift the transmission through all gear ranges and test the speed control.
- Re-check lights, back-up alarms or other warning and safety devices.



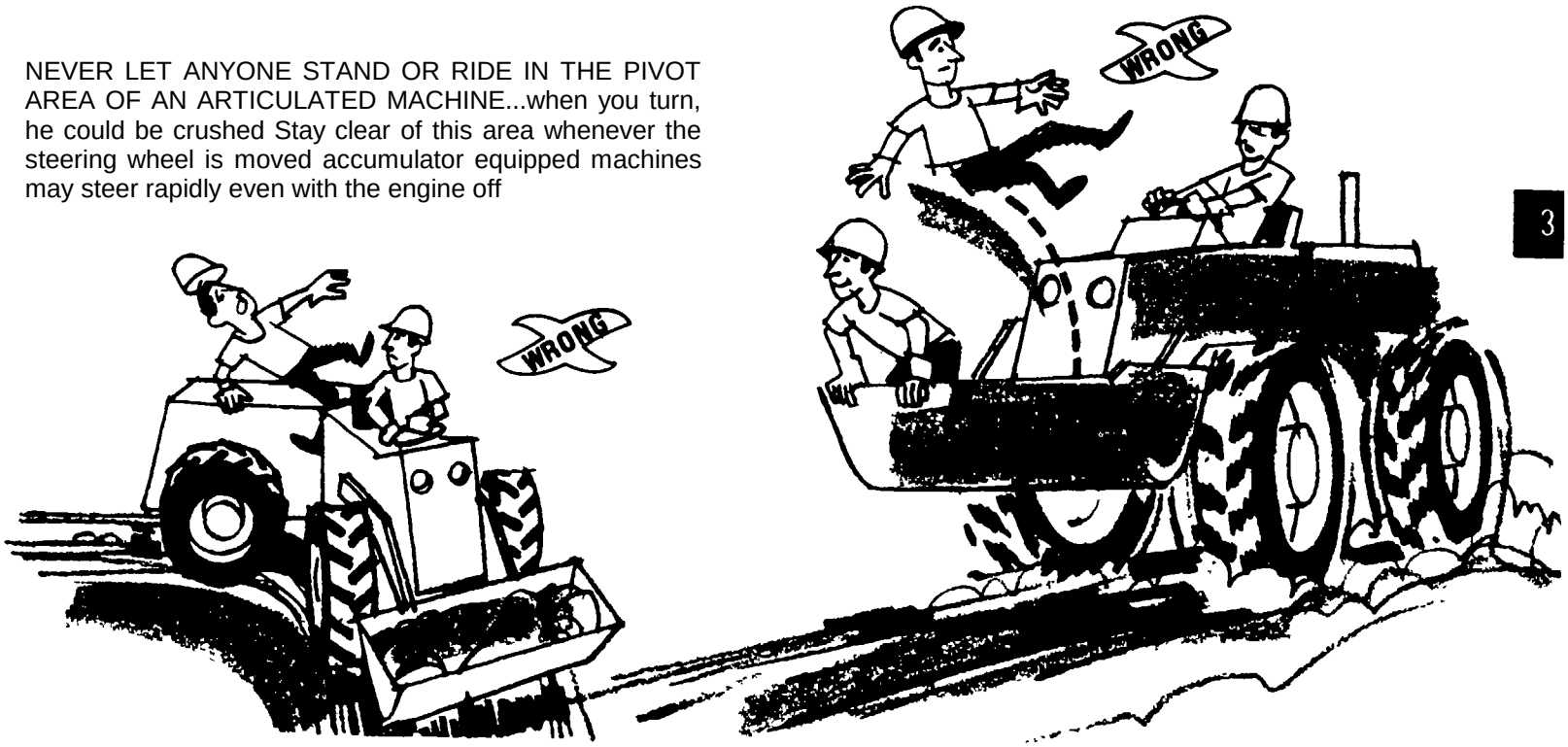
- Operate bucket, blade and equipment controls through a complete cycle check for faults.



- Sit properly, in an alert position Check out controls in a sa area while moving slowly. STEER MACHINE BOTH RIGH AND LEFT to be sure the steering is operating properly
- Don't take a chance with a defective machine. REPORT IT T YOUR FOREMAN.

- NEVER CARRY AN UNAUTHORIZED RIDER.

- NEVER LET ANYONE STAND OR RIDE IN THE PIVOT AREA OF AN ARTICULATED MACHINE...when you turn, he could be crushed Stay clear of this area whenever the steering wheel is moved accumulator equipped machines may steer rapidly even with the engine off



BE SAFE WHEN YOU WORK

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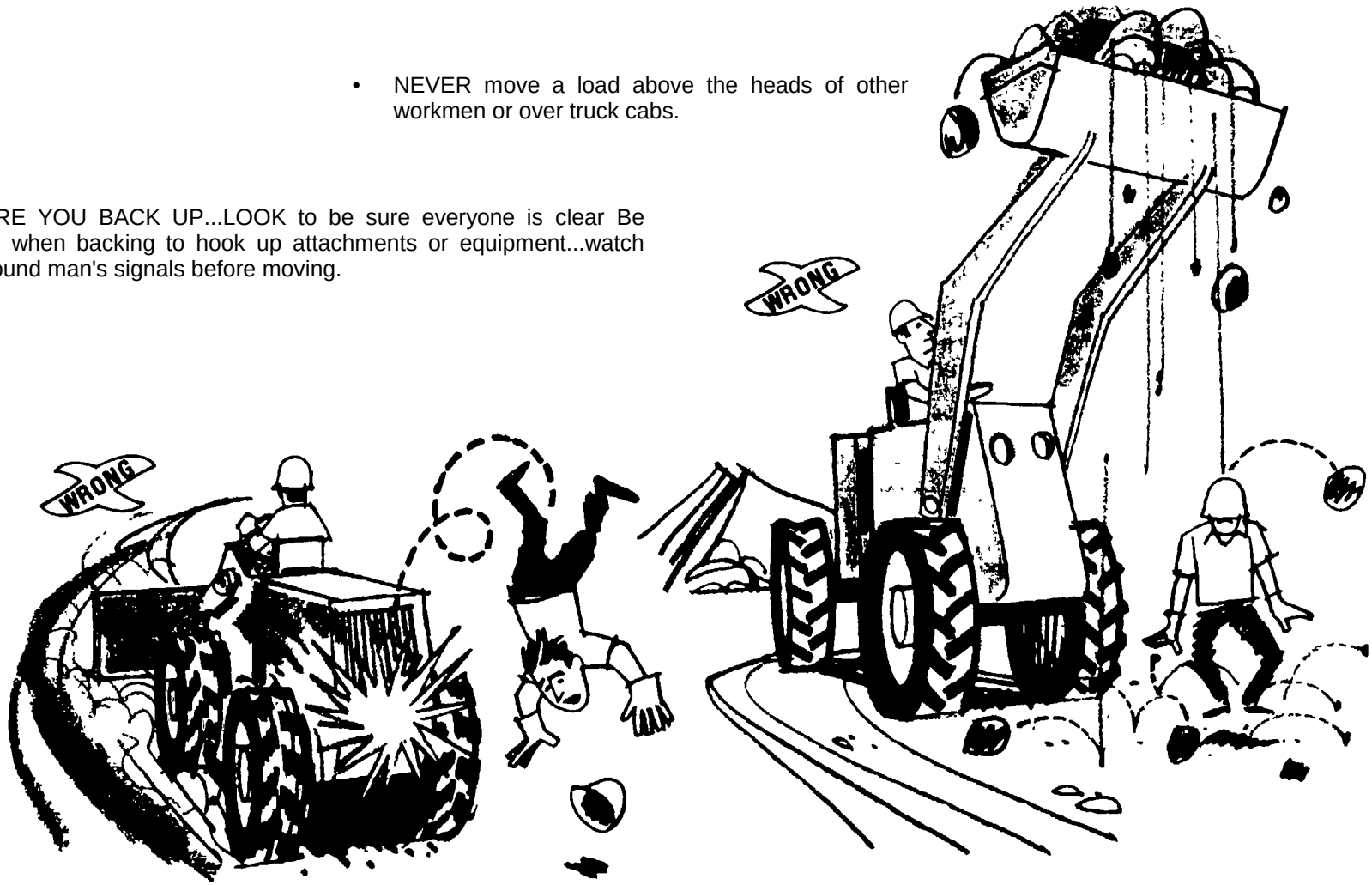
- NEVER move a load above the heads of other workmen or over truck cabs.

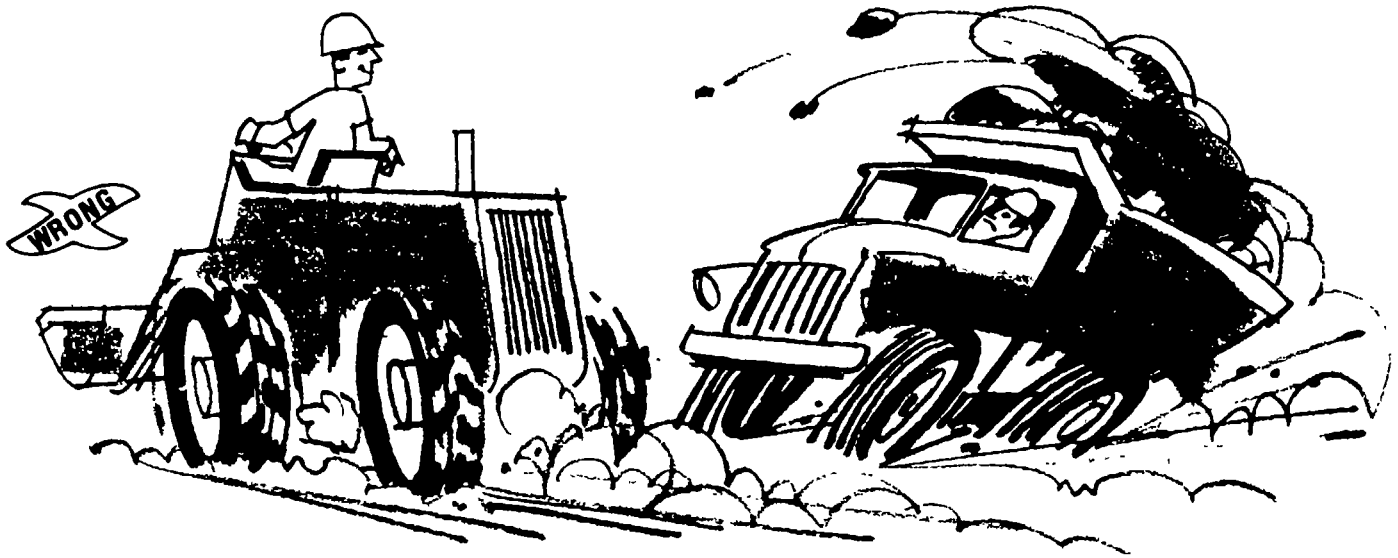
- BEFORE YOU BACK UP...LOOK to be sure everyone is clear Be careful when backing to hook up attachments or equipment...watch the ground man's signals before moving.



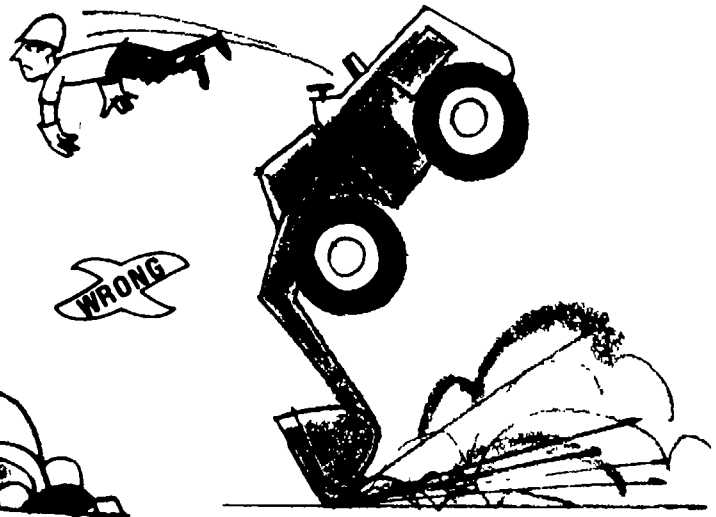
remember these rules when traveling

- Take It slow In congested areas, over rough ground and on slopes. Keep your speed slow enough so you are in COMPLETE CONTROL AT ALL TIMES

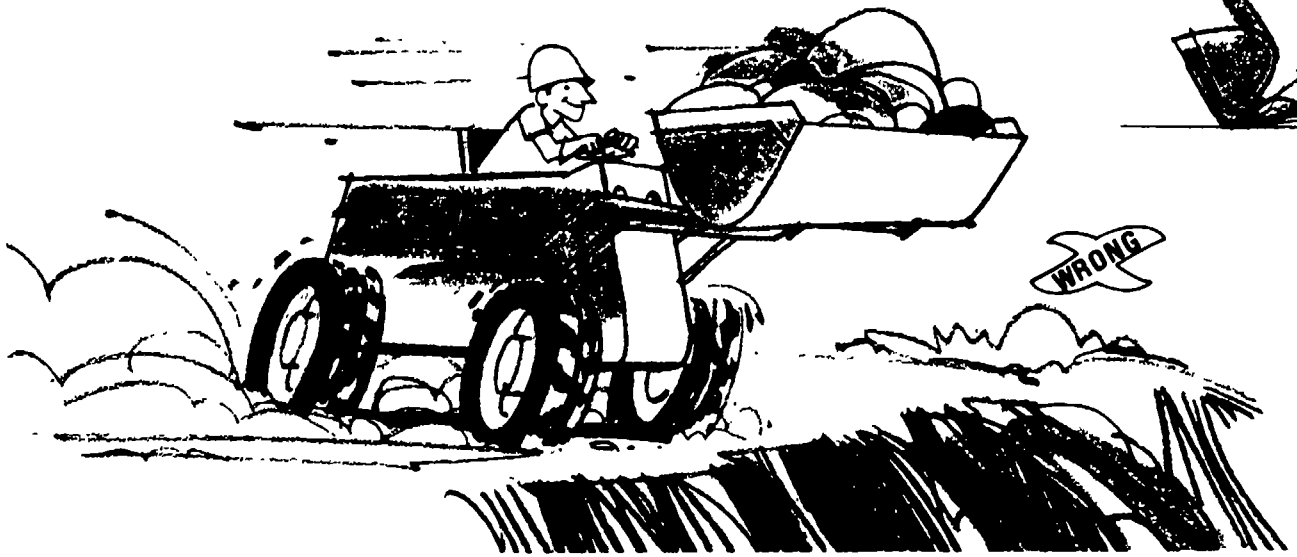
- Give loaded vehicles the right of way. Follow your employer's traffic rules for the job site. Watch out for other vehicles.

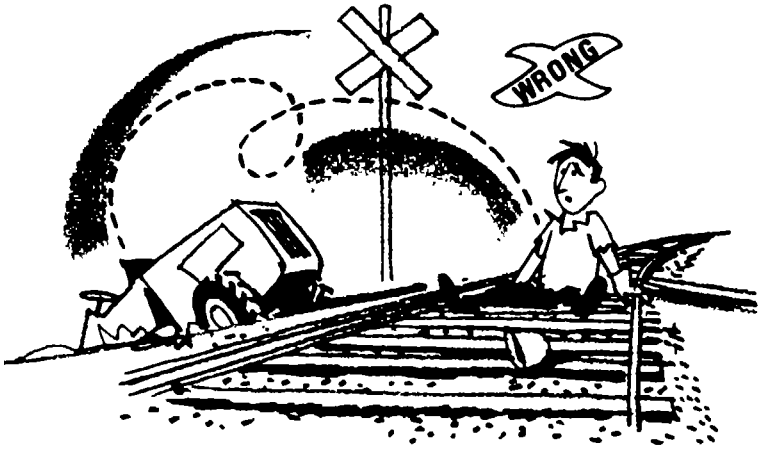


- The bucket or attachment should not be used as a brake except in an emergency.



- Carry the bucket or attachment low so it doesn't block your vision when traveling.





- Avoid crossing obstacles such as ridges, curbs, logs or railroad tracks. If you can't avoid them, use caution when crossing

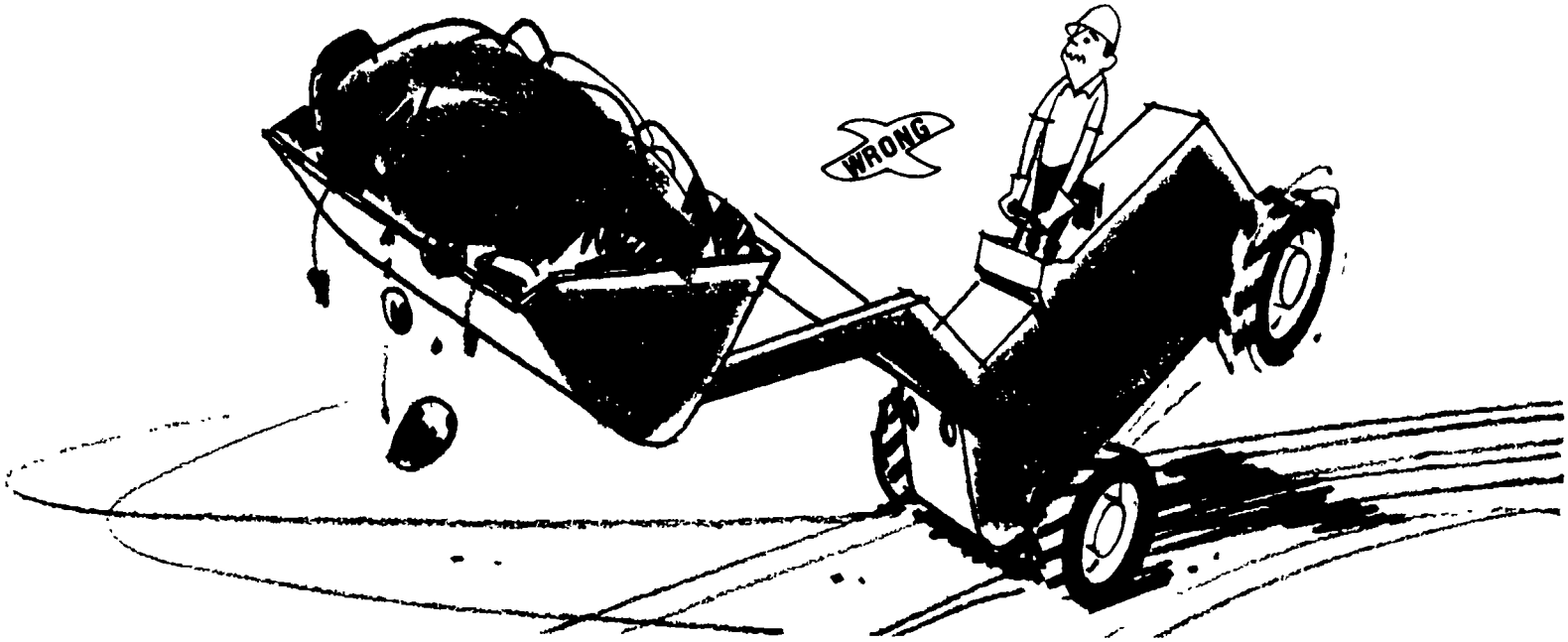
- STAY BACK FROM EDGE OF BANKS AND PITS

Edges can cave in or your machine can lose its footing and slide over the edge.

BE SAFE WHEN YOU WORK

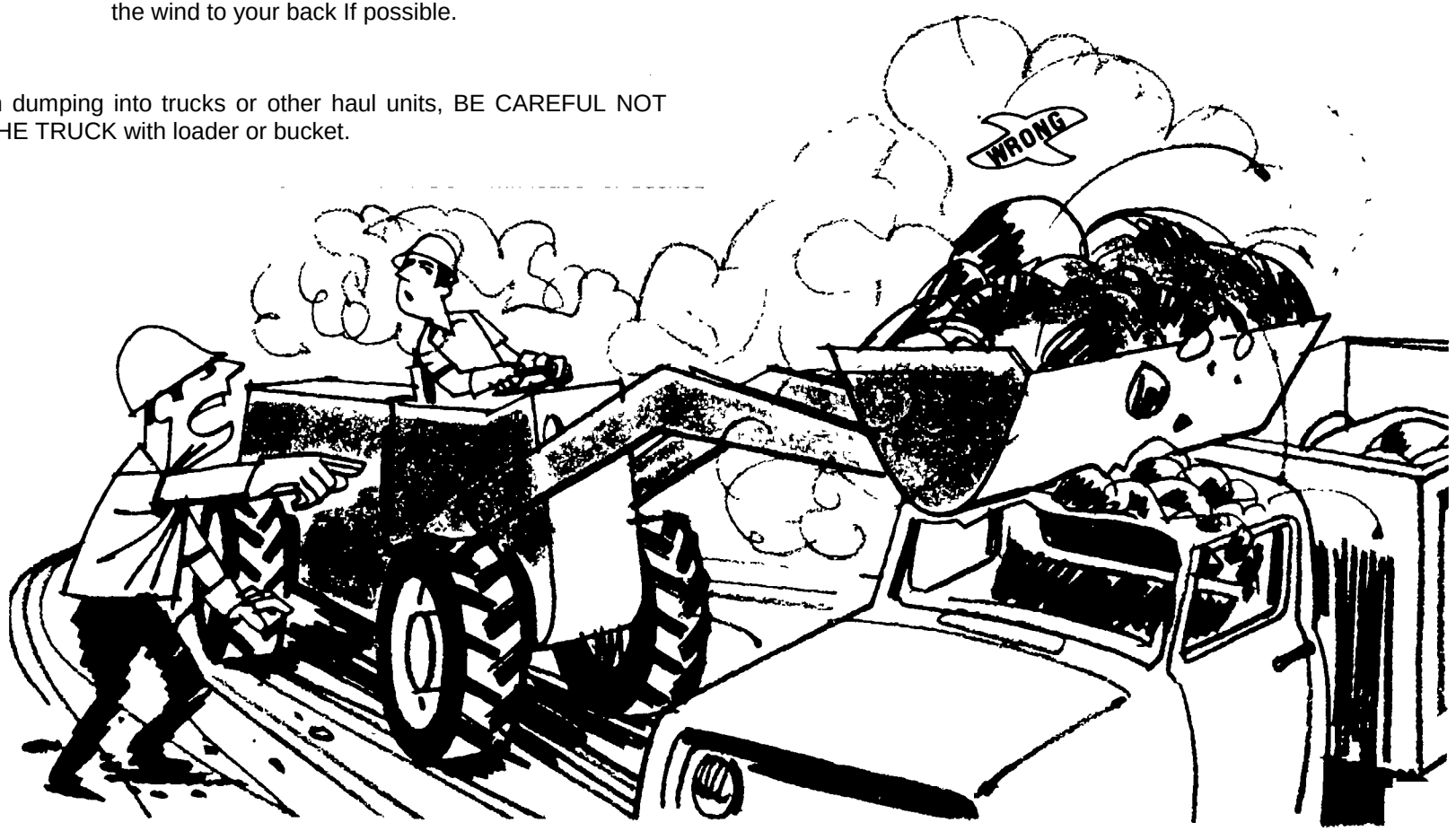
load, carry and dump safely

- When loading, try to keep the machine on level ground. Start and stop smoothly when carrying a load.
- Keep a loaded bucket or attachment close to the ground for stability. If an overload causes the machine to tip forward, DON'T PANIC... LOWER THE LOAD.



- For better visibility on windy days, carry the load low and dump with the wind to your back If possible.

- When dumping into trucks or other haul units, BE CAREFUL NOT TO HIT THE TRUCK with loader or bucket.

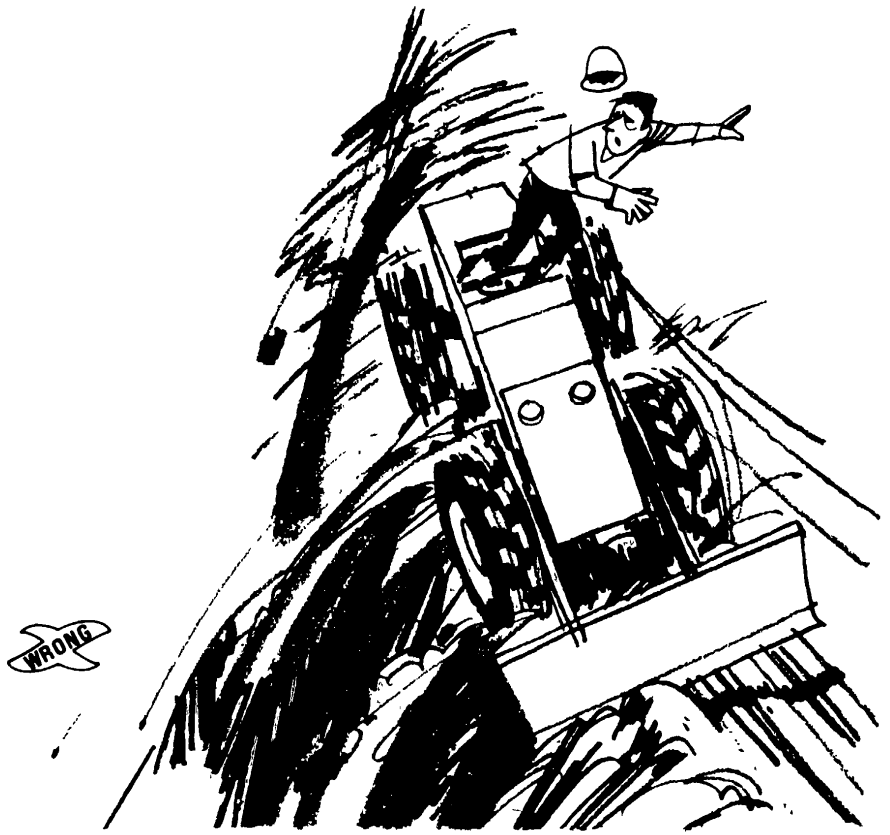


BE SAFE WHEN YOU WORK

use care on slopes

- Operate straight up and down slopes whenever possible. Sidehill operation could cause the machine to roll over

- Stay in proper gear when traveling downhill...NEVER COAST IN NEUTRAL. Maintain engine RPM to give you control when you need it. It is generally recommended that the same gear range be used for traveling up or down a grade.



be careful in hazardous areas

- Whenever possible, two men should work together In hazardous areas one to operate the machine and the other to direct him and watch for dangers.

- NEVER enter a dust cloud or a dark area such as an underpass or bunker before checking it for obstructions or hazards you can't see.

    - WATCH OUT FOR OVERHEAD DANGERS, such as overhanging trees or falling rocks. If undercutting is absolutely unavoidable, use overhead protection.

- Keep the proper distance from overhead power lines...and check for buried power and utility lines before you dig.

report a defective machine

- EVEN A MINOR DEFECT CAN BECOME SERIOUS...report any machine defects to your foreman.

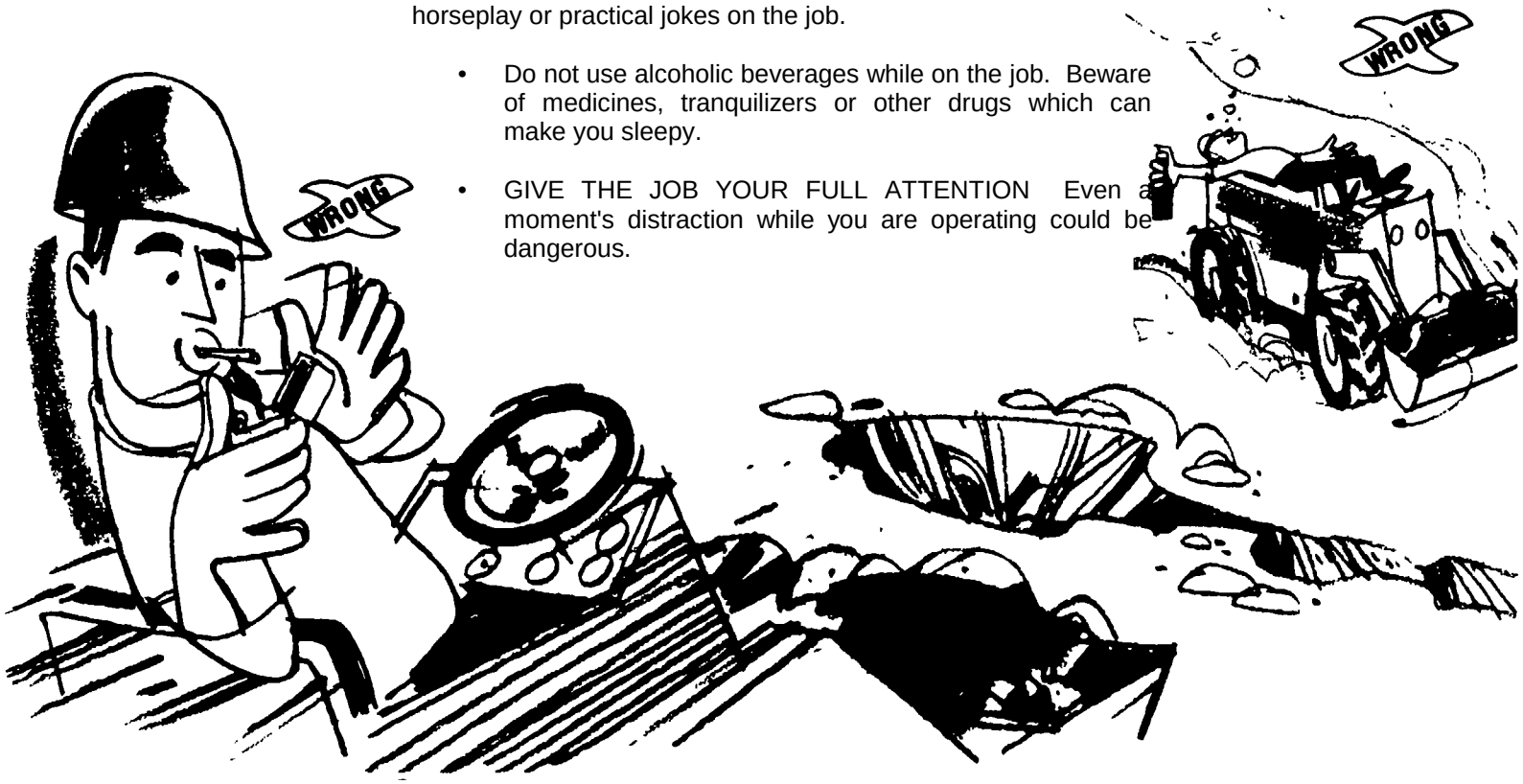
- If possible, haul a disabled machine to a repair area...avoid towing it. If towing is unavoidable and the steering or braking systems are faulty, use a rigid tow bar. Always follow the manufacturer's recommended towing procedure.

- If you must leave the machine unattended';
  Lower bucket or attachment "flat" to ground
  Shut engine off
  Engage parking brake if provided.

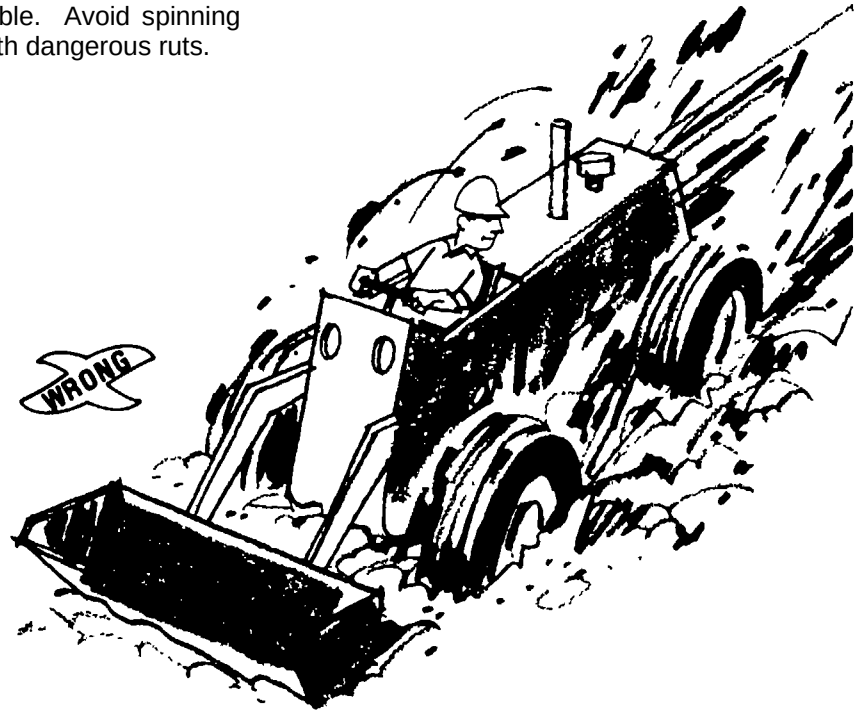
- Avoid "showoff" or "grandstand" operation. Never engage In horseplay or practical jokes on the job.

  - Do not use alcoholic beverages while on the job. Beware of medicines, tranquilizers or other drugs which can make you sleepy.

  - GIVE THE JOB YOUR FULL ATTENTION Even a moment's distraction while you are operating could be dangerous.

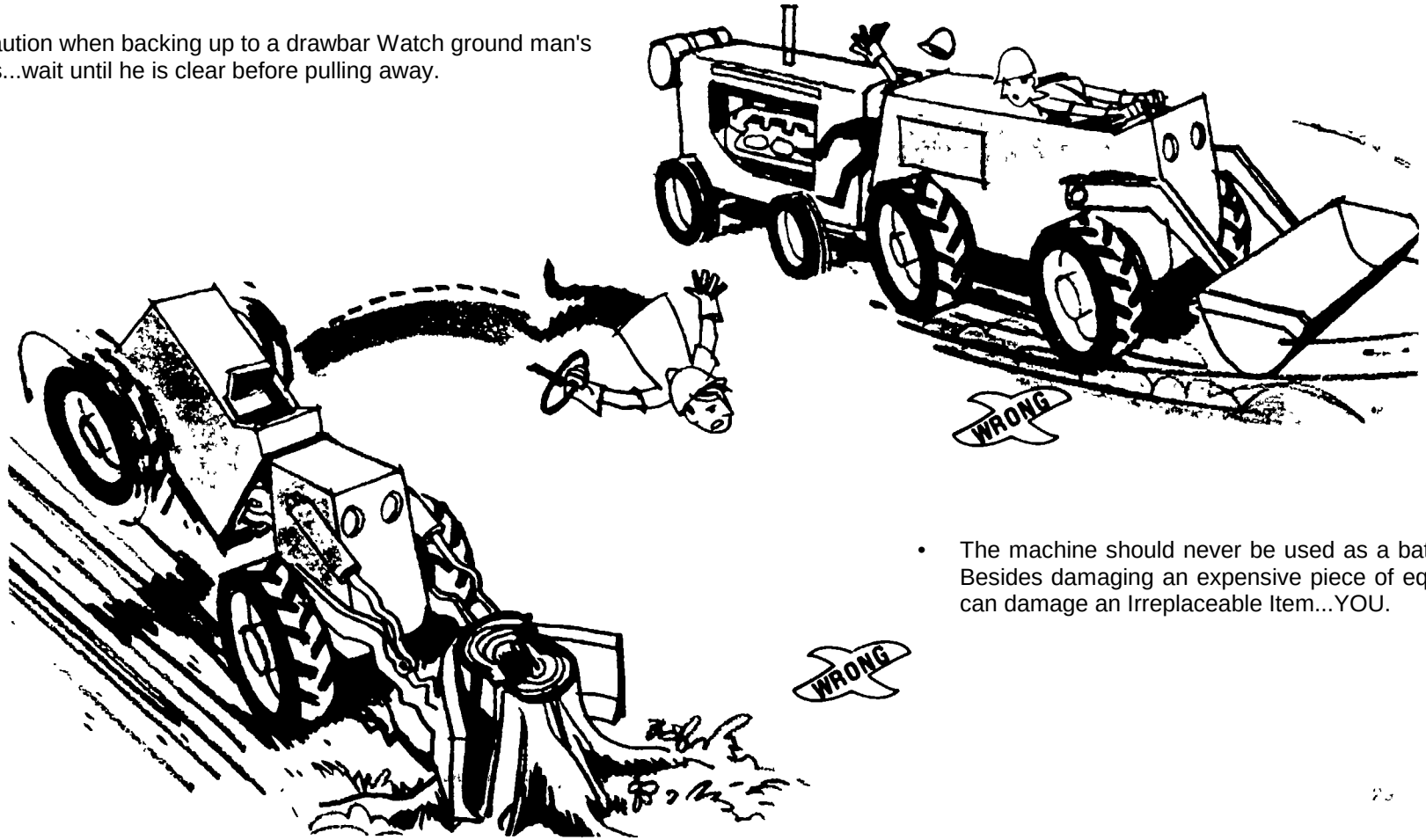


- Keep the work area as smooth as possible. Avoid spinning your wheels and ruining a smooth area with dangerous ruts.



- When using cables to move a load, be sure cables are of adequate size and inspect them for flaws. Keep cable tight-move slowly when taking up slack or the sudden pull could snap the cable causing it to whip around dangerously. CLEAR BYSTANDERS FROM THE AREA.

- Use caution when backing up to a drawbar Watch ground man's signals...wait until he is clear before pulling away.



- The machine should never be used as a battering ram Besides damaging an expensive piece of equipment, it can damage an Irreplaceable Item...YOU.

BE SAFE WHEN YOU WORK

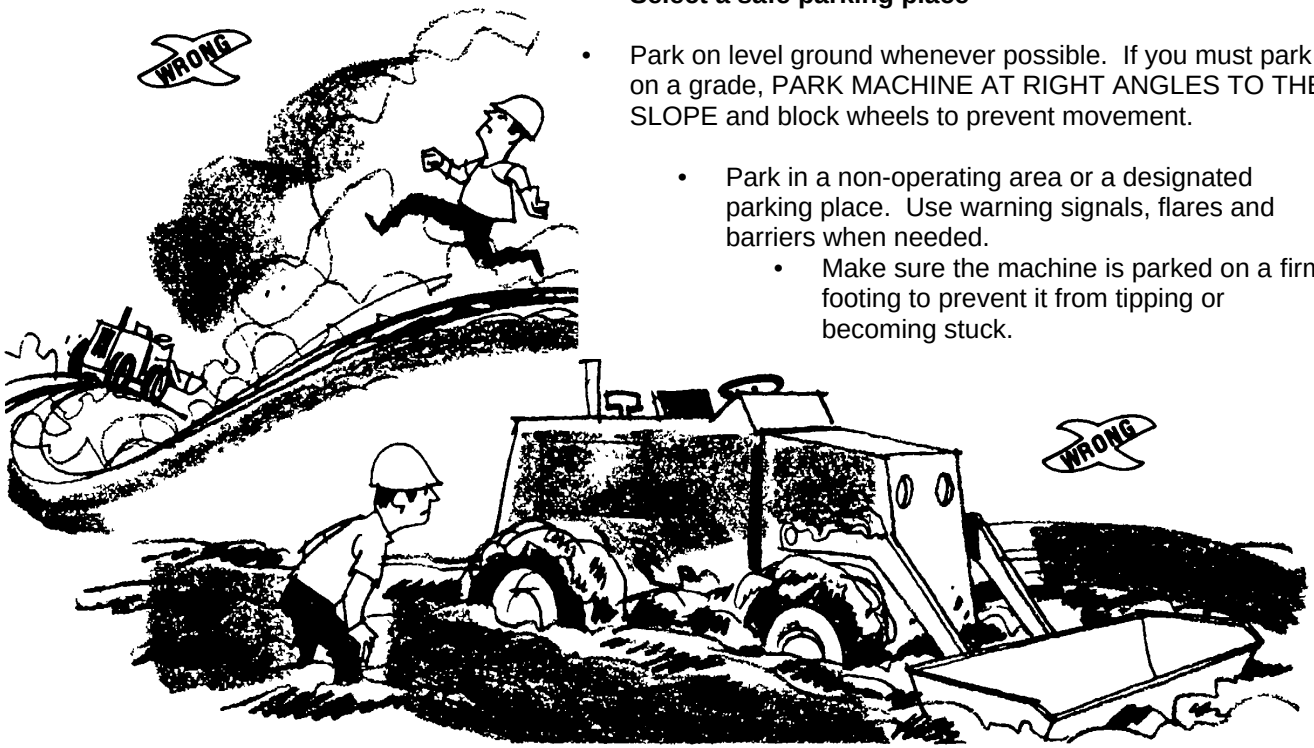
- USE LIGHTS AFTER DARK...to see and be seen

- On dangerous overhead jobs such as clearing in woods, It Is preferable to use a machine with overhead protection.

END THE OPERATING PERIOD SAFELY

Select a safe parking place

- Park on level ground whenever possible. If you must park on a grade, PARK MACHINE AT RIGHT ANGLES TO THE SLOPE and block wheels to prevent movement.
    - Park in a non-operating area or a designated parking place. Use warning signals, flares and barriers when needed.
        - Make sure the machine is parked on a firm footing to prevent it from tipping or becoming stuck.



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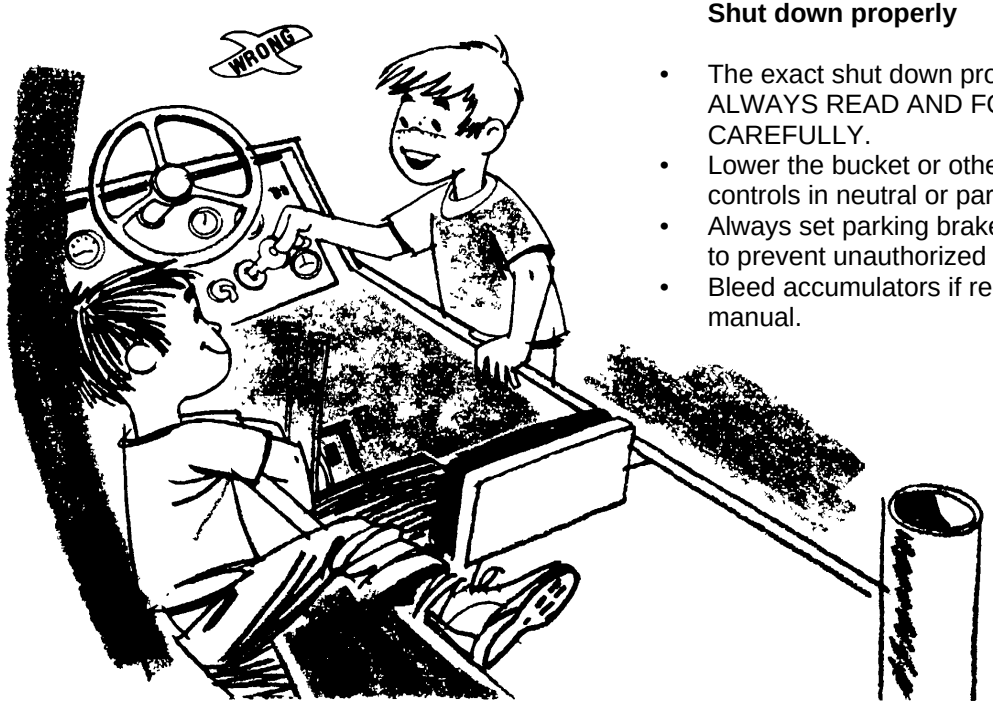
END THE OPERATING PERIOD SAFELY



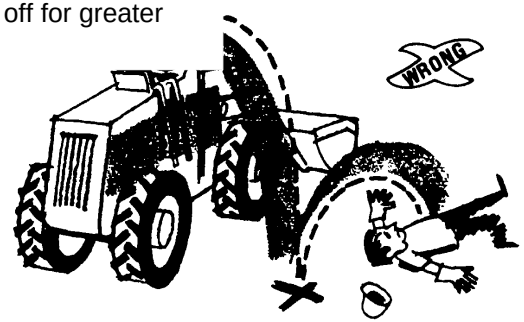
Shut down properly

- The exact shut down procedure varies for different machines so ALWAYS READ AND FOLLOW THE OPERATOR'S MANUAL CAREFULLY.
- Lower the bucket or other attachments "flat" to the ground. Place all controls in neutral or parking position.
- Always set parking brake. Lock transmission control or ignition lock to prevent unauthorized starting. REMOVE ANY KEYS.
- Bleed accumulators if recommended in the manufacturer's operator manual.

Watch your step when getting off

- Be careful of slippery conditions on stepping points and on the ground.
- Get off your loader or dozer only when it is fully stopped. A machine in motion , even coasting to a stop, could make you fall.

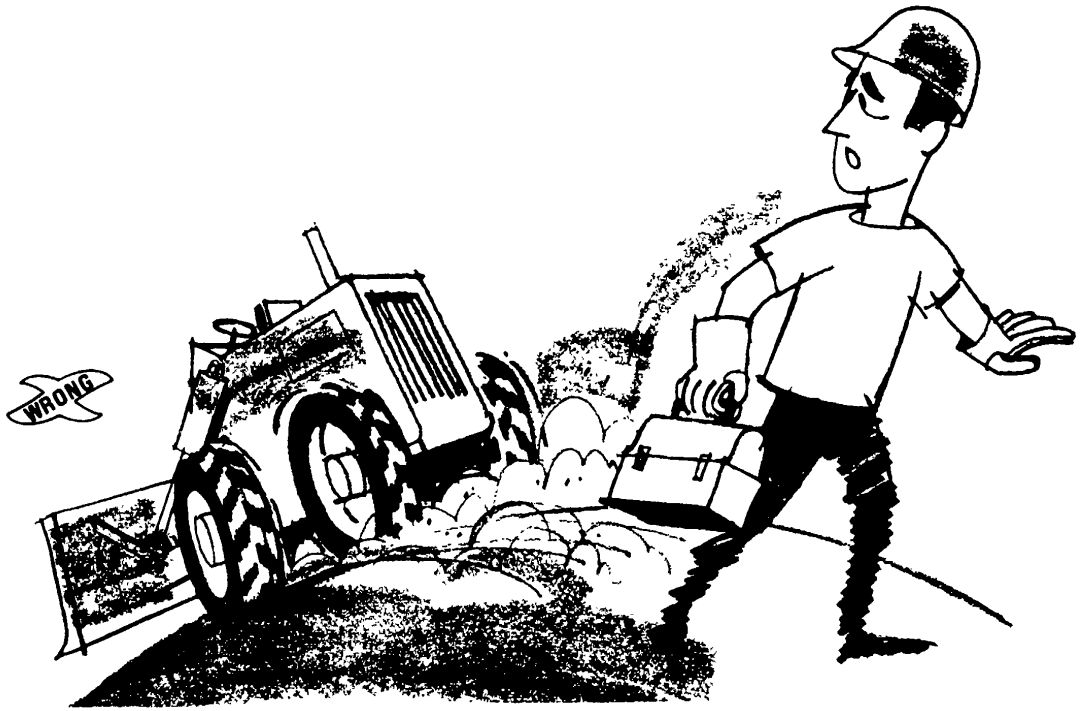
- DON'T JUMP OFF…Use the grab irons and hand rails provided. Face the machine when getting off for greater safety.

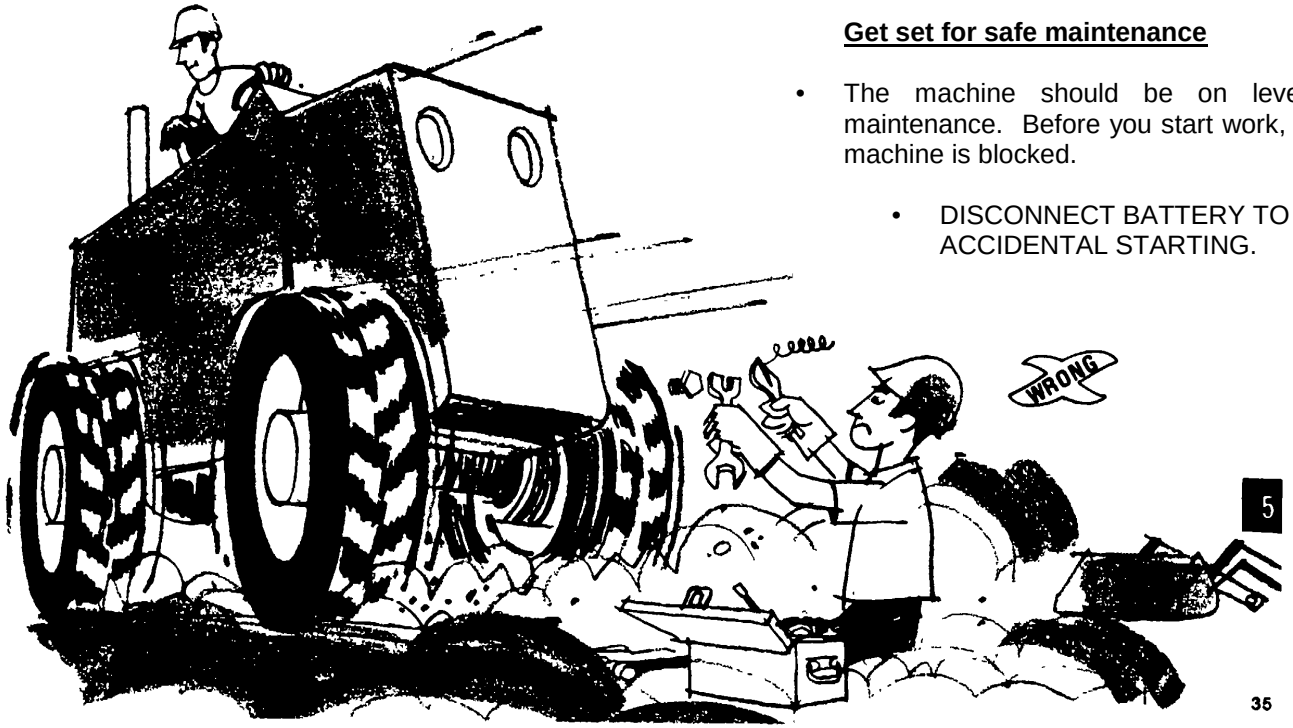


END THE OPERATING PERIOD SAFELY

be sure the machine is safe to leave

- Block wheels securely to prevent rolling, especially if parked on a grade.
- TO PREVENT UNAUTHORIZED ACCIDENTAL STARTING, disconnect or remove battery if necessary. Follow your employer's instructions.
- To protect against tampering and vandalism, secure protective equipment, if provided.





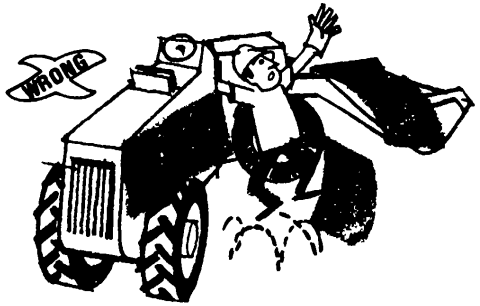
Get set for safe maintenance

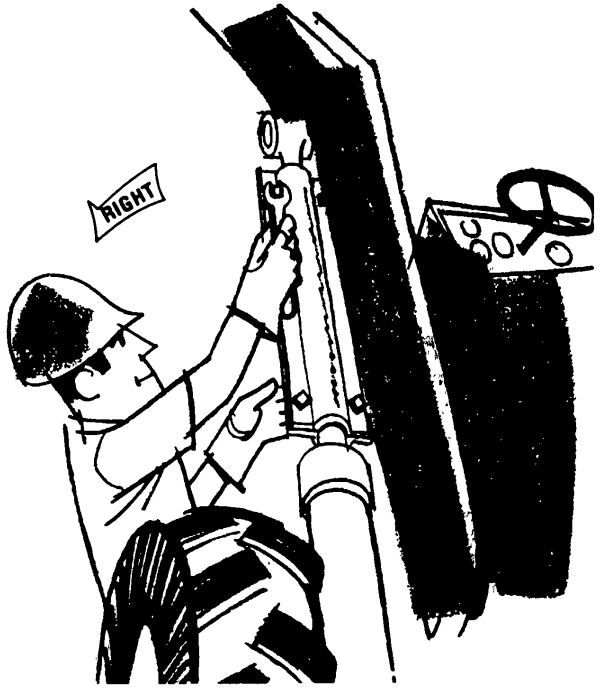
- The machine should be on level ground for maintenance. Before you start work, make sure the machine is blocked.
    - DISCONNECT BATTERY TO PREVENT ACCIDENTAL STARTING.

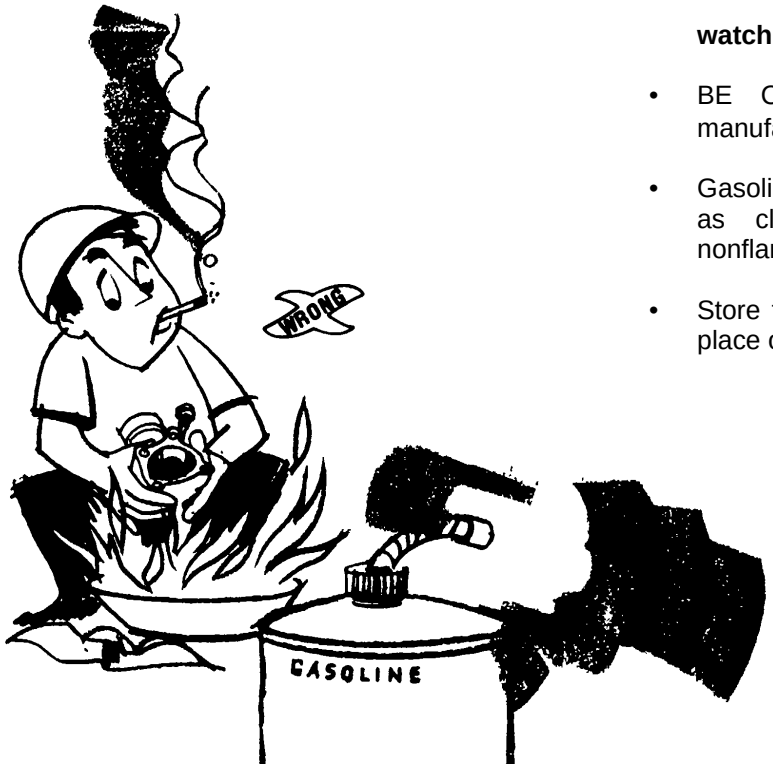
PERFORM MAINTENANCE WITH CARE

- Lower the bucket or other attachments “flat” to the ground, or block securely if they must be raised. If your machine has a lift arm safety bar for this purpose, USE IT.

- Before working in the pivot area of an articulated machine, SECURELY ATTACH STEERING FRAME LOCK to prevent machine from turning.







watch out for fire hazards

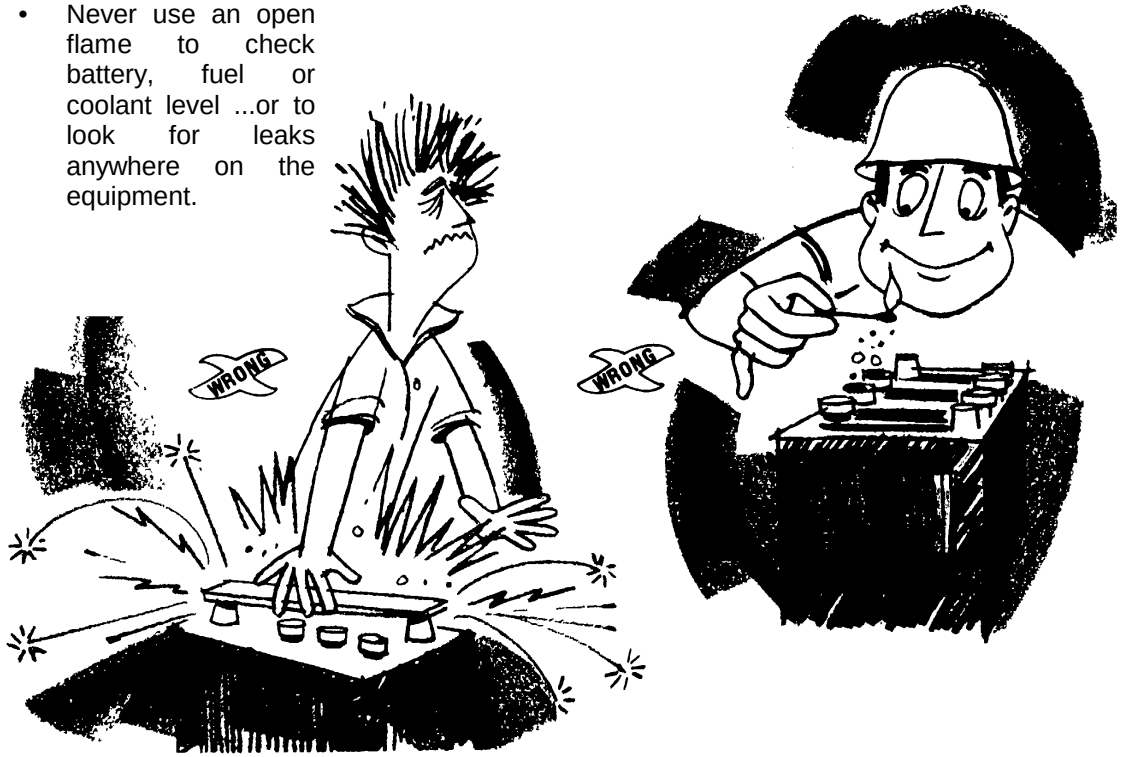
- BE CAREFUL WITH LP…always refer to the manufacturer's operator manual when working with LP.
- Gasoline is highly flammable and should never be used as cleaning fluid. Use a good commercial nonflammable solvent.
- Store flammable starting aids in a cool well-ventilated place out of the reach of unauthorized personnel.

PERFORM MAINTENANCE WITH CARE

- When charging, leave battery compartment open for ventilation.

- Never check battery charge by placing a metal object across the posts…the sparks could cause an explosion. Use a voltmeter or hydrometer.

- Never use an open flame to check battery, fuel or coolant level ...or to look for leaks anywhere on the equipment.



- Fires can occur. Know which fire extinguisher to use, where it is and HOW TO USE IT.

PERFORM MAINTENANCE WITH CARE

observe these maintenance precautions

- Keep the maintenance area clean and dry. Oily or wet floors are slippery…wet spots are dangerous around electrical equipment. Greasy rags are a fire hazard.

- Keep equipment clean and free of dirt and oil so you can spot loose or defective parts.

- Before working under a machine, BE SURE TO TAG THE CONTROLS SO NO ONE ELSE WILL START IT. If more than one man is working on a machine each must be familiar with the controls and aware of what the others are doing.

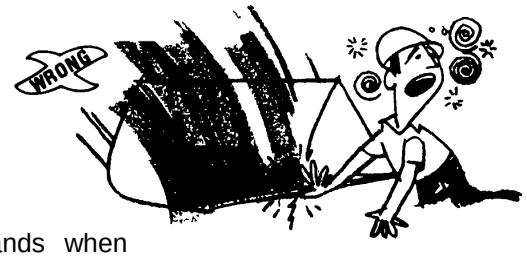
- NEVER adjust pressure relief valves to get higher operating pressures. The manufacturer's recommended pressures give the safest performance with the longest life.

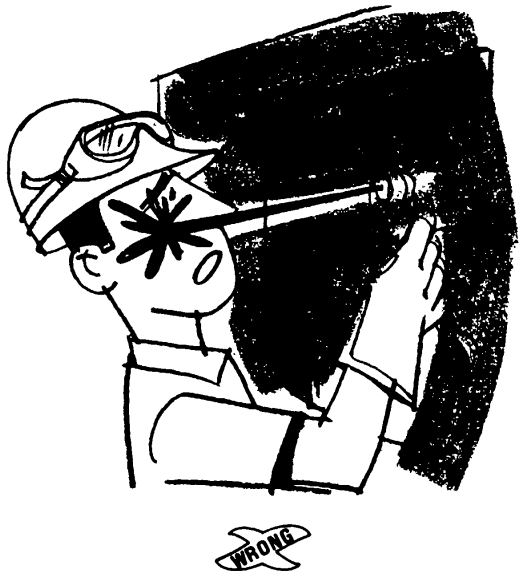
- Remove ALL pressure caps carefully. Bleed pressure from accumulators. Wait until coolant is below the boiling point before removing the radiator cap.

- RELIEVE HYDRAULIC PRESSURE BEFORE WORKING ON MACHINE by working controls in both directions with the engine off. Follow the operator's manual. Loosen cap slowly when filling or venting the system.

- Be careful of hot oil when working with hydraulic lines or draining engine oil. If possible, allow the machine to cool before working on it.

- KEEP BRAKES ADJUSTED…improperly adjusted brakes could cause an operator to lose control.





- Wear gloves to protect your hands when changing cutting edges or cables. Block the attachment before you start so you don't get caught.

PERFORM MAINTENANCE WITH CARE

- If you must move a defective machine, USE A TRAILER IF AVAILABLE or tow it carefully following the manufacturer's recommendations.

- If you have to crawl under a machine, be sure you are out of traffic and the machine is securely blocked.

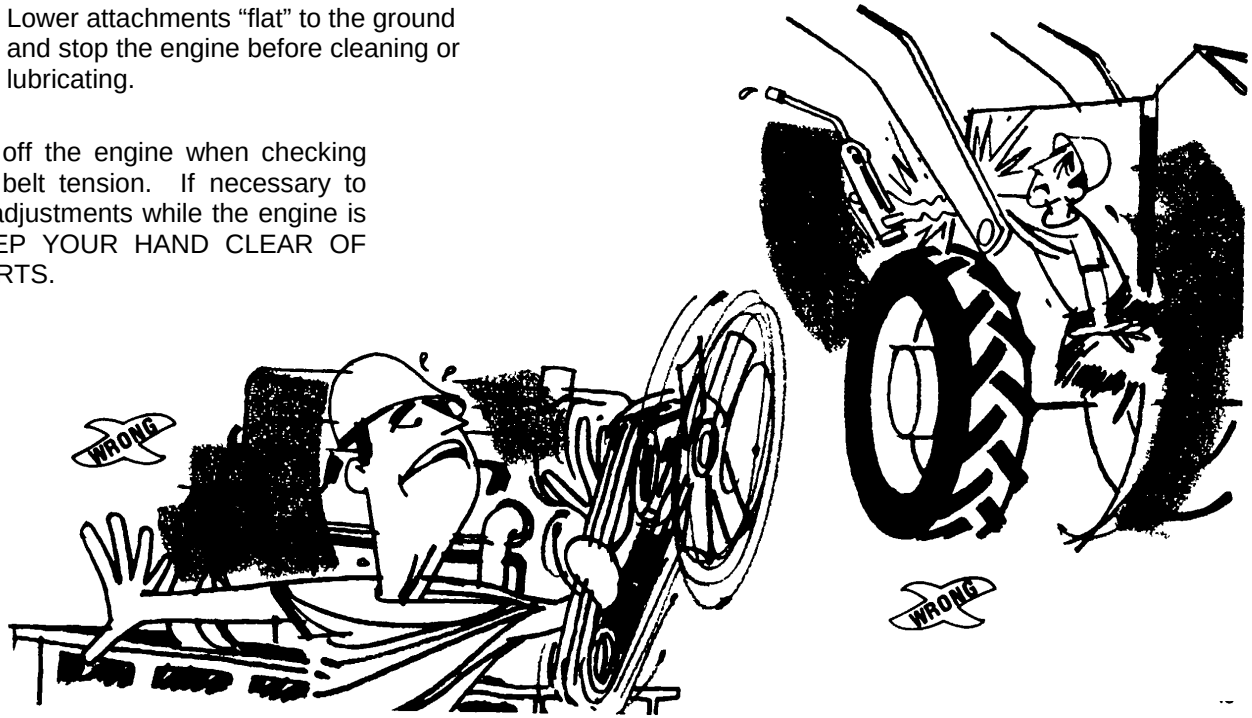
- EXHAUST GASES ARE DEADLY. If necessary to start a machine inside a building, make sure there is adequate ventilation and get the machine outside as soon as possible. Periodically check exhaust system for leakage.

- Before you remove inspection covers, stop the engine. Don't let tools or loose objects from your pockets fall into the opening.

PERFORM MAINTENANCE WITH CARE

- Lower attachments “flat” to the ground and stop the engine before cleaning or lubricating.

- Always shut off the engine when checking or adjusting belt tension. If necessary to make other adjustments while the engine is running, KEEP YOUR HAND CLEAR OF MOVING PARTS.

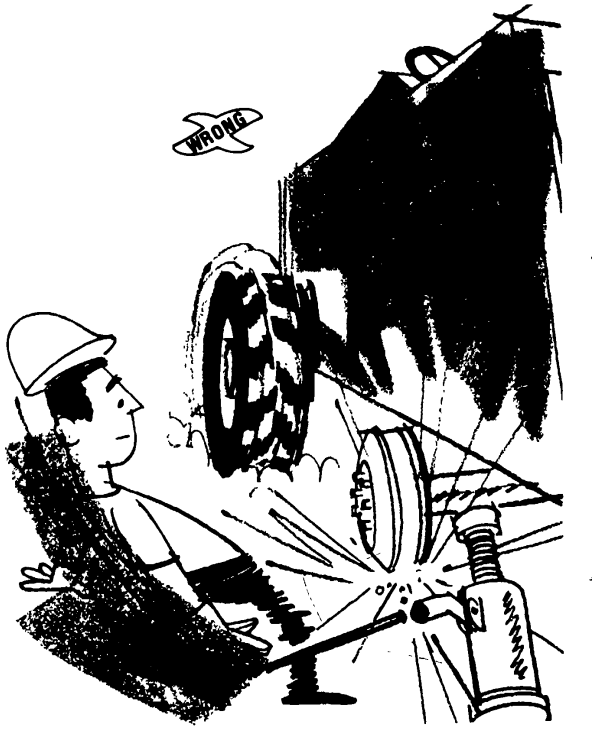


tire safety recommendations

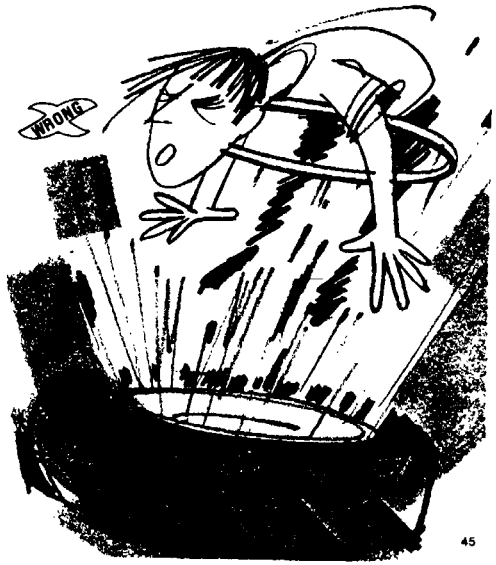
- Before you place a jack in position, BLOCK THE WHEEL ON THE OTHER SIDE OF THE VEHICLE. Always block the machine up to prevent it from failing.

- Remove valve core carefully and exhaust all air from tire. Run a piece of wire through the valve stem to make sure it is not plugged.

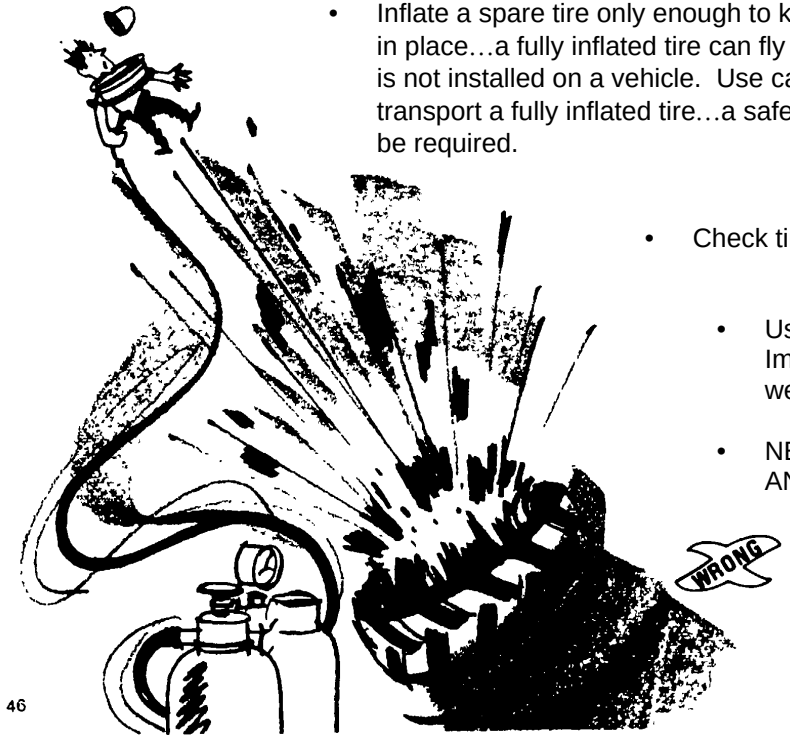
- Deflate the tire before removing rocks or prying objects from the tire tread. Keep your fingers clear of bead breakers and rams, and stand to one side when you apply pressure. IF BEAD BREAKER SIPS, IT CAN FLY OFF WITH ENOUGH FORCE TO CAUSE SEVERE INJURY. Be careful to clean all dirt and rust from the lock ring gutter.



- Always use an INFLATION CAGE, SAFETY CABLES or CHAINS when removing tire lock rings or inflating tires
- Use a long enough hose and self-attaching air chuck Stand to one side when inflating tires
- NEVER begin to INFLATE a tapered bead tire UNLESS BEAD SEAT BAND HAS BEEN PRIED OUT over lock ring
- If tapping of lock ring is required to assist seating, USE EXTREME CAUTION
- NEVER mix rim parts of different sizes or use damaged parts.



PERFORM MAINTENANCE WITH CARE



- Inflate a spare tire only enough to keep rim parts in place…a fully inflated tire can fly apart when it is not installed on a vehicle. Use care if you must transport a fully inflated tire…a safety chain may be required.

- Check tires only when the vehicle is empty

  - Use caution with reworked wheel parts. Improper welding, heating or brazing weakens them and can cause failure.

  - NEVER CUT OR WELD ON THE RIM OF AN INFLATED TIRE.

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REMEMBER…

it only takes one unsafe act to cause an accident. Use these safety rules, the operator's manual and follow your employer's instructions to develop safe working habits.

A CAREFUL OPERATOR IS THE GREATEST SAFETY DEVICE THERE IS!

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

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BE EXACT. . .PIN-POINT WHERE IT IS

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

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DA FORM 1 JUL 79 2028-2

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

'NEAR MEASURE

. 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

'VEIGHTS

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

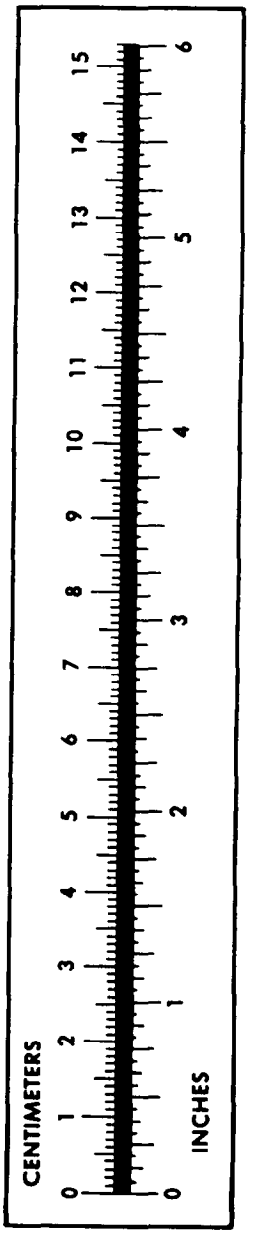
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°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
ıts	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
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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