

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

**SAFE USE OF CRANES, CRANE-SHOVELS
DRAGLINES AND SIMILAR EQUIPMENT
NEAR ELECTRIC POWER LINES**

Headquarters, Department of the Army, Washington, DC
December 2, 1987

1. Purpose. This bulletin provides safety information and guidance for operating personnel and Commanders of U.S. Army Cranes, crane-shovels draglines and similar equipment when operating in the proximity of energized power lines.

2. Scope. The requirements prescribed by this bulletin apply to referenced equipment issued to Army units, CONUS, and oversea, for operational use. It contains specific information concerning safety inspections, operating clearances, safety procedures, and training, which are the minimum required for operational use.

3. General. The effectiveness of this bulletin is dependent upon strict adherence to all requirements herein specified.

4. Operating Procedures. Commanders will evaluate areas of operation when there is electrocution potential. Application of safeguards, as outlined below, will insure safety for the operator, ground personnel, and equipment.

a. Cranes shall not operate in the vicinity of overhead power lines, unless **ONE** of the following **TWO** conditions is satisfied:

(1) Power has been shut off, and positive means taken to prevent the lines from being energized.

(2) Equipment or any of its parts does not have the capability of coming within the following minimum clearances from energized overhead lines. Equipment has been positioned and blocked to assure that none of its parts, including cables, can come in within the following clearances:

<i>Power Line Norman System</i>	<i>Maximum Required Distance</i>
Under 50 Kilovolt(KV)	10 feet
69KV	12 feet
115-161KV	15 feet
230-285KV	20 feet
345KV	25 feet
500KV	35 feet

b. Operators around high voltage lines will utilize a qualified signalman to control movement.

c. Frames of cranes or equipment operating in close proximity to energized lines must be grounded wherever possible.

d. In the event the crane boom or cable should come into contact with an energized power line, the operator should stay on the equipment and clear the equipment from the line if this can be done without breaking the line.

e. If fire or other causes make it impossible for the operator to remain on the equipment, he should jump, making certain that all parts of his body are clear of the equipment before his feet touch the ground.

f. Operators shall be familiar with the operation and care of fire extinguishers provided.

g. Cranes shall not be moved between work areas with the boom raised.

h. All equipment safety devices, electrical or mechanical, must be inspected before operation.

i. Three 18 inch x 24 inch weather proof non-reflective warning decals showing requirements consistent with those designated in *a* (1) and

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*This technical bulletin supersedes TB 385-101, 15 June 1979.

(2) above shall be permanently attached to the exterior front and sides of the equipment, and be in plain view. Each decal must be legible at 12 feet. A similar 4 inch x 8 inch decal will be applied over the existing warning plate in the cab and/or in plain view from the operator's position. Instructions contained in these decals will be mandatory. "WARNING DECAL KIT": 7690-00-267-5778,, TB 385-101 (19099) consisting of four (4) decals will be requisitioned through S9G.

Defense General Supply Center
Richmond, VA 23297

A small decal set can be ordered for cranes under 10 ton capacities with NSN 7690-01-205-6014.

NOTE

Cut a piece of sheet metal, plywood, etc., and adhere decal to it before installing on camouflaged equipment. To facilitate removal of the decals from equipment that has to be camouflaged, two (2) methods of attaching the decals are suggested:

1. Weld or bolt hooks on equipment where decals are to be located. Drill hole in decals and hang them on hooks.
2. Weld 1/2 inch angle iron on equipment so that it forms a slot cradle for the decal to rest in."

j. Taglines (safety lines) for controlling loads will be used at all times.

5. Training. *a.* Commanders will insure that personnel concerned with operation of this type of equipment are:

(1) Able to read and understand the signs, notices, operating instructions, and are knowledgeable with the signals used by the designated signalman. They should have good hearing and sight, being able to distinguish red, green, and yellow regardless of position of colors.

(2) Knowledgeable in the potential hazards involved in operating equipment near high tension lines.

(3) Required to follow procedures listed in paragraphs 4 *a* (1) and (2).

b. Training listed in *a* above, will be obligatory on a continuing basis, and the training recorded.

6. Reporting Errors and Recommending Improvements. You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Tank-Automotive Material Readiness Command, ATTN: AMSTA-MBA, Warren, MI 48397-5000. A reply will be furnished to you.

WARNING

OPERATIONS ADJACENT TO OVERHEAD LINES IS PROHIBITED UNLESS ONE OF THE FOLLOWING CONDITIONS IS SATISFIED.

1	POWER HAS BEEN SHUT OFF AND POSITIVE MEANS TAKEN TO PREVENT LINES FROM BEING ENERGIZED.								
2	<table border="1"><thead><tr><th rowspan="6">POSITION AND BLOCK EQUIPMENT INSURING NO PARTS, INCLUDING CABLE, CAN COME WITHIN THE FOLLOWING CLEARANCES;</th><th>VOLTAGE REQD CLEARENCE</th></tr></thead><tbody><tr><td>UNDER 50 KV- 10 FEET</td></tr><tr><td>69 KV-12 FEET</td></tr><tr><td>M-161KV-15 FEET</td></tr><tr><td>230-285 KV-20 FEET</td></tr><tr><td>345 KV-25 FEET</td></tr><tr><td>500 KV-35 FEET</td></tr></tbody></table>	POSITION AND BLOCK EQUIPMENT INSURING NO PARTS, INCLUDING CABLE, CAN COME WITHIN THE FOLLOWING CLEARANCES;	VOLTAGE REQD CLEARENCE	UNDER 50 KV- 10 FEET	69 KV-12 FEET	M-161KV-15 FEET	230-285 KV-20 FEET	345 KV-25 FEET	500 KV-35 FEET
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CHECK WITH YOUR LOCAL POWER SUPPLIER FOR CORRECT LINE VOLTAGE.

Note: Cover Decal Before Painting.

Figure 1. Warning Sign.

By Order of the Secretary of the Army:

Official:

CARL E. VUONO
General, United States Army
Chief of Staff

R.L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-34C,
Requirements for Cranes/Draglines, Near Powerlines-Safe Usage.

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 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

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

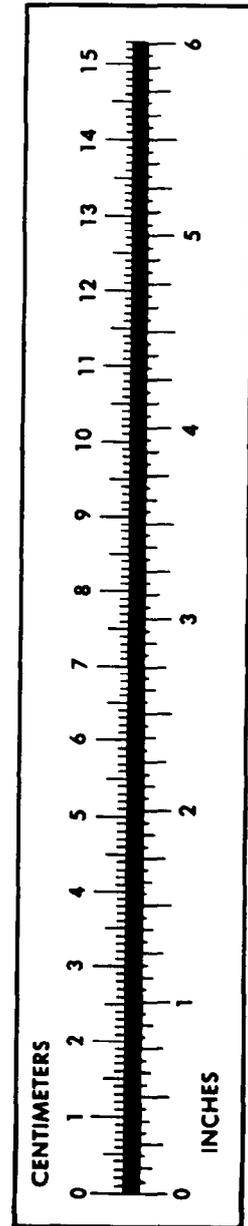
TEMPERATURE

$5/9(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 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: 009471-000