GROVE® TM650

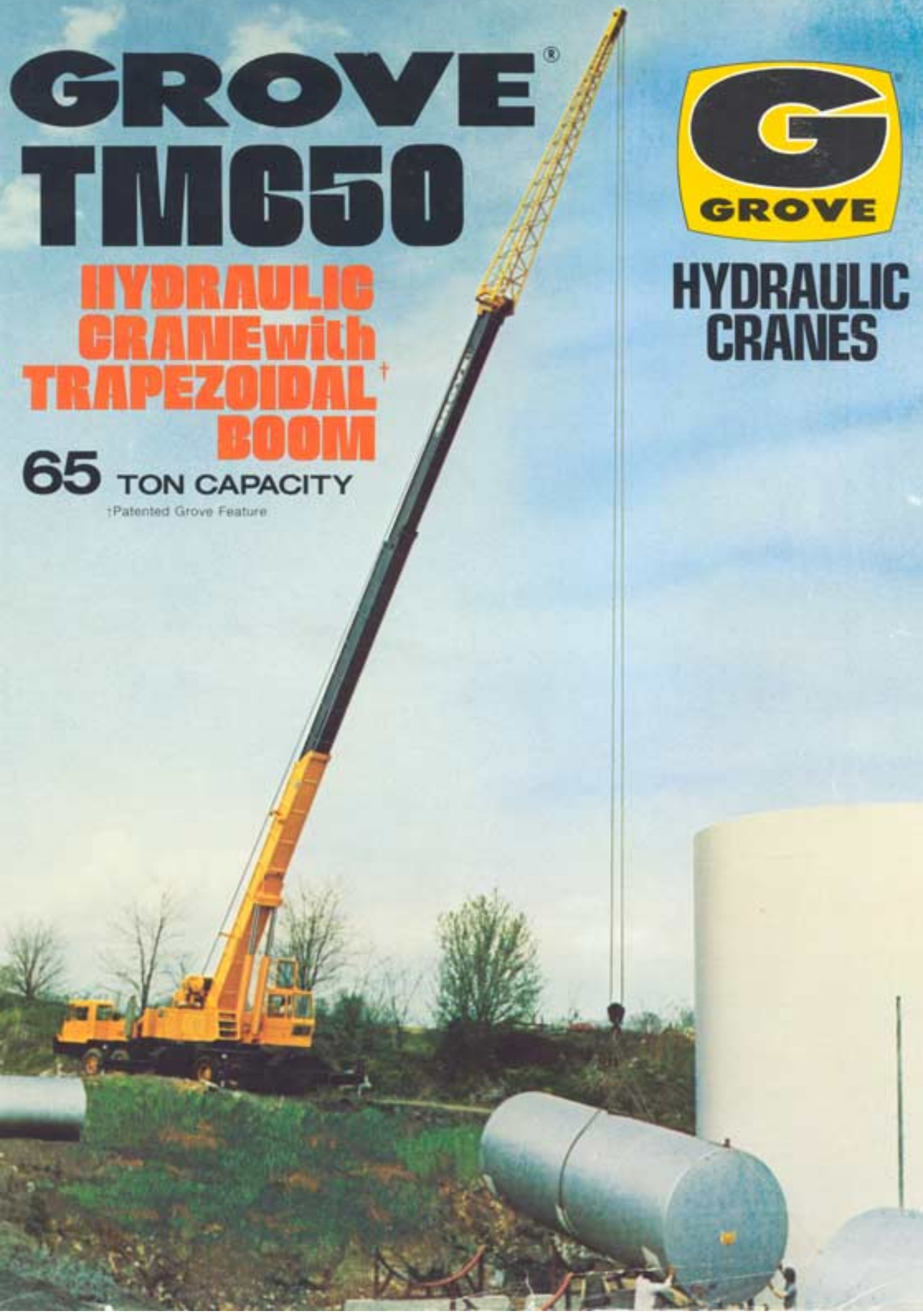
HYDRAULIC CRANE with TRAPEZOIDAL† BOOM

65 TON CAPACITY

†Patented Grove Feature

GROVE

HYDRAULIC CRANES



8,000 lbs. @ 178′
TIP HEIGHT

30,000 lbs. @ 122′
TIP HEIGHT

50,000 lbs. @ 90′
TIP HEIGHT

THE GROVE® TRAPEZOIDAL† BOOM

A LONG REACH BOOM OF SUPERIOR STRENGTH AND CAPACITY

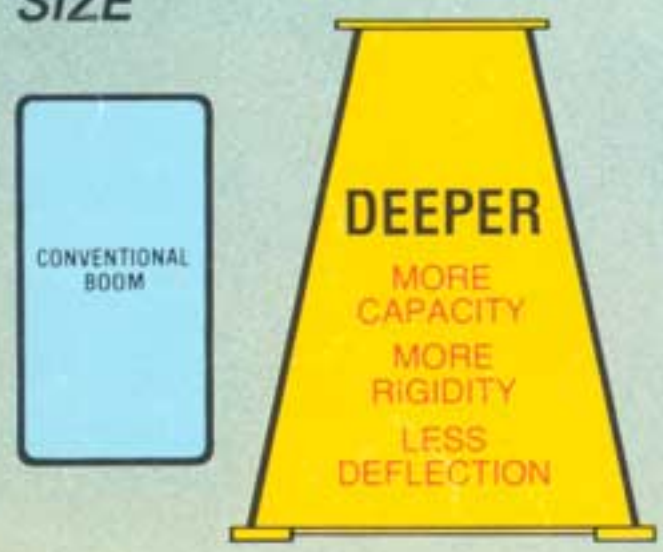
The Grove Trapezoidal Boom, a major engineering accomplishment in telescoping hydraulic boom design, represents the optimum strength-to-weight ratio for hydraulic crane operation. Compared to conventional hydraulic booms, the Trapezoidal boom provides greater reach and tons greater capacity at full boom and at any working radii. The superior strength and rigidity are directly attributable to the trapezoidal design and the use of very high strength steels. This permits a deeper, wider and lighter boom with greater resistance to lateral and vertical deflection.

"SWINGAWAY" BOOM EXTENSION

The "Swingaway" boom extension for the TM650 stores laterally along-side the boom base section and swings quickly into working position to provide 122′ tip height. Additional 14′ inserts may be added to create an 88′ jib which provides a maximum tip height of 178′. The 88′ jib section may be offset 7½°.

†Patented Grove Feature

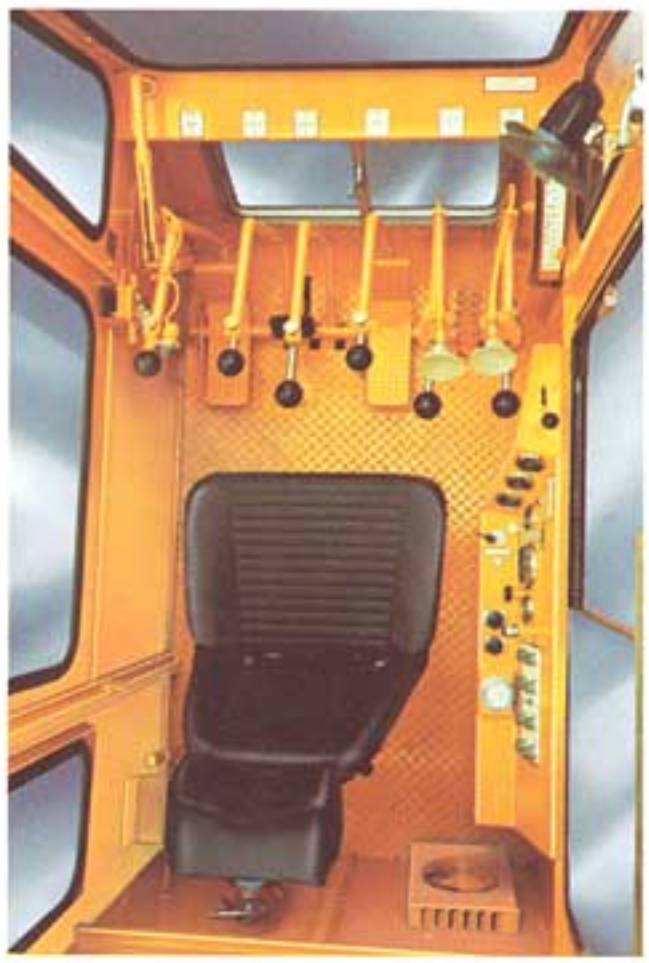
COMPARE PHYSICAL SIZE



WIDER
LESS SIDE DEFLECTION
WITH NO INCREASE IN WEIGHT

IF IT'S TRAPEZOIDAL ...IT'S A GROVE

FEATURES



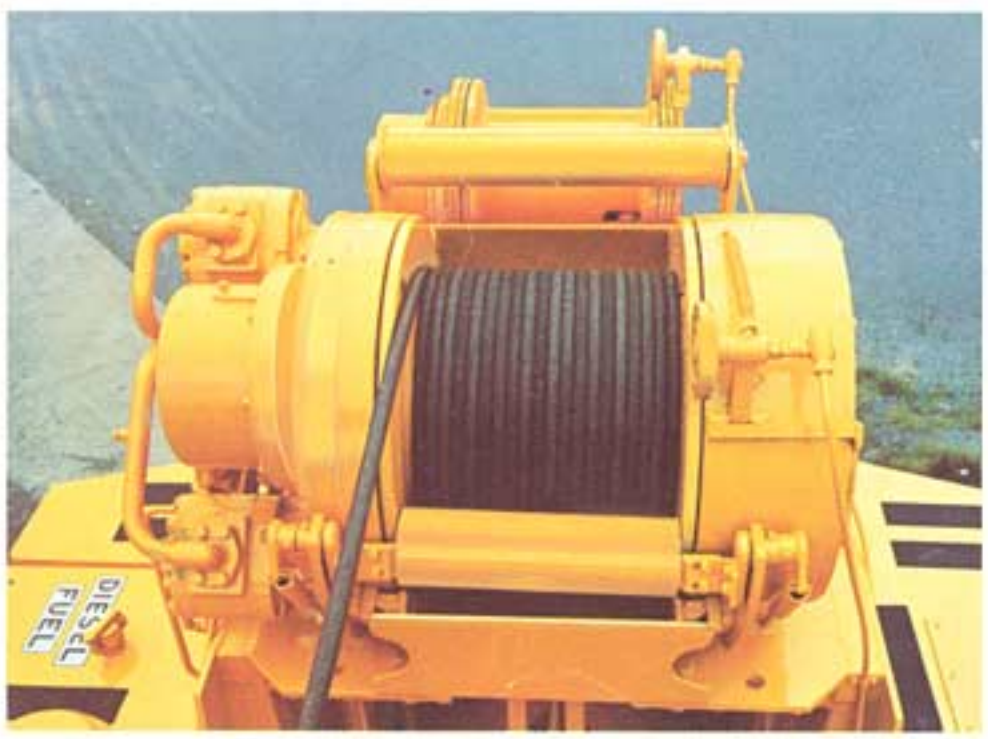
"UP-FRONT VISIBILITY" and an unobstructed view of the load are provided by the forward placement of the operator's cab and the fact that when the tinted skylight is raised and windshield removed there is nothing to interfere with visibility.

OPERATOR CONVENIENCE is another feature of the all-steel cab. Notice that the full-length control levers are adjustable and combination hand and foot controls are provided for swing and boom elevation functions. Other features include complete engine controls and instrumentation, sliding door, laminated safety glass, boom angle indicator, sight leveling bubble and adjustable operator's seat with headrest.

EASIER REEVING . . . negative boom angle permits ground level reeving. Removable pin-type rope guards make it quick and easy.

GROVE EXTENDIBLE COUNTERWEIGHT is hydraulically extended to working position to provide improved capacities with a minimum of weight. Power installed and removed, it is also equipped with an automatic travel lock.

GROVE TWO-SPEED HOIST† provides both high-line-pull and high-line-speed without changes in lagging or gearing. Line speed, 560 fpm maximum. Single-line-pull, 16,800 lbs. maximum.



†*The Grove Trapezoidal Boom, Two Speed Hoist, Extendible Counterweight and Vertical Jack Lock are patented Grove features.*

SPECIFICATIONS

BOOM — Four section, 35 ft. to 119 ft. (10.7m to 36.27m). Two trapezoidal telescoping full power sections to 87 ft. (26.5m) and a 32 ft.(9.75m)"Swing Away" Boom Extension. Integral check valves on each telescoping cylinder. Boom telescope sections are individually controlled and supported on graphite impregnated nylon wear pads.

BOOM NOSE — Five sheaves mounted on tapered roller bearings. Removable pin type rope guards allow easy reeving. Rope dead ends on each side of boom nose.

BOOM ELEVATION — Dual double-acting hydraulic cylinders with integral holding valves. Elevation from −4° to 80°. Combination controls provided for hand or foot operation.

***JIBS** — 14 ft. (4.20m) base jib section combines with 32 ft. (9.75m) "Swing Away" Boom Extension to make basic 46 ft. (14.02m) jib. 14 ft. (4.20m) pinned inserts available to make 60 ft. (18.28m), 74 ft. (22.55m) and 80 ft. (26.80m) jib length. Jib mast, pendant lines, and back stops included in the make up of all jibs. Jib sheave mounted on tapered roller bearings. Jib may be offset 7½°.

SWING — Bearing swing circle, 360° continuous rotation, "Grove Planetary Glide Swing" with foot actuated disc swing brake, hand-operated turntable brake, and two position positive turntable lock. Combination controls provided for hand or foot operation. Swing speed 2.7 RPM.

OUTRIGGER CONTROLS — Independently controlled in-out-up and down, from superstructure cab and from either side of carrier. Sequence control arrangement eliminates accidental outrigger actuation. Sight level bubbles at each outrigger control station.

COUNTERWEIGHT — 10,300 lb. turntable-mounted, power installed and removed, hydraulically extended to working position and retracted to stowed or travel position.

CAB — Full vision, all steel, fully enclosed, laminated safety glass windows throughout, removable windshield with storage provision, hinged tinted skylight, sliding left side door, rear vent window, adjustable full length control levers, combination hand and foot controls for swing and boom elevation, fully adjustable operator's seat with head rest. Full engine instruments and controls. Combination hand and foot throttle. All crane superstructure and outrigger controls, sight level bubble, boom angle indicator, hot water heater, electric windshield wiper, door and window locks, dome light, dash light, 2¾ lb. dry type fire extinguisher.

CAB INSTRUMENTATION — Engine oil pressure gage, engine water temperature gage, ammeter, electric fuel gage, electric tachometer, stalled engine indicator light, ignition-on indicator light and engine oil temperature gage.

HYDRAULIC SYSTEM:

RESERVOIR — 205 gallon (776 liter), steel welded construction with integral baffles and clean out access.

FILTER — Return line, full flow with bypass protection, replaceable cartridge.

PUMPS — Four-section, gear-type driven from superstructure engine. Combined capacity 194 GPM. Manual control pump disconnect operated from superstructure cab.

CONTROL VALVES — Precision four-way double-acting with integral load check, main and circuit relief valves. Four individual valve banks permitting simultaneous, independent control of four crane functions. Maximum operating pressure 2500 PSI (175 kgs. / sq. cm.)

OIL COOLER — Full flow fin and tube type, oil to air.

POWER DISTRIBUTION — (Main hoist) (Boom elevation) (Main hoist boost, mid telescope, auxiliary hoist) (Swing, lift boost, fly telescope, outriggers).

*Denotes Optional Equipment

HOIST SPECIFICATIONS

DESCRIPTION: Series parallel circuitry and two motors provide both high line pull and speed ranges. Power up and down, equal speed, planetary reduction with integral automatic brake.		**DESCRIPTION:** Power up and down, equal speed, planetary reduction with integral automatic brake.	
HOIST DATA	**MAIN HOIST Grove Model 32S-1716A**	***AUXILIARY HOIST Grove Model 15S-16**	***AUXILIARY HOIST Model 40 SGECR (Free fall)**
Drum Dimensions	16 in. diameter (41 cm) 16 in. length (41 cm) 24 in. diameter flange (61 cm)	12 in. diameter (30.5 cm) 16 in. length (41 cm) 17.5 diameter flange (44.5 cm)	9 in. diameter (23 cm) 13 in. length (33 cm) 17.5 diameter flange (44.5 cm)
Performance	**HIGH SPEED RANGE** Single line speed 560 FPM (Max.) (170.6 m) Single line pull 8,400 lbs. (Max.) (3810 kgs) **LOW SPEED RANGE** Single line speed 280 FPM (Max.) (85.3 m) Single line pull 16,800 lbs. (Max.) (7620 kgs)	Single line speed 210 FPM (Max.) (64 m) Single line pull 8,880 lbs. (Max.) (4028 kgs)	240 FPM (Max.) (73 m) 9,145 lbs. (Max.) (4148 kgs)
Drum Rope Storage Capacity	**650 ft. of ¾ in. Rope (Max.) (198 m)	720 Ft. of ½ in. Rope (Max.) (219.4 m) 480 ft. of ⅝ in. Rope (Max.) (146.3 m)	675 ft. of ½ in. Rope (Max.) (205.7 m)
Permissible Single Line Rope Pull	¾ in., 6x41 Class - 14,605 lbs. (6624.8 kgs) ¾ in., 19x7 Class - 13.700 lbs. (6214.3 kgs)	½ in., 19x7 Class - 6,150 lbs. (2789.6 kgs) ½ in., 6x37 Class - 7,200 lbs. (3265.9 kgs) ⅝ in., 19x7 or 6x37 Class - 7,680 lbs. (3483.6 kgs)	½ in., 19x7 Class - 6,150 lbs. (2789.6 kgs) ½ in., 6x37 Class - 7,200 lbs. (3265.9 kgs)

**6th layer of rope not recommended for hoisting operations.

ENGINE SPECIFICATIONS

MAKE & MODEL	GM6V-53N Diesel	*Cummins V555-C200 Diesel
TYPE	6 cylinder, O.H.V.	8 cylinder, O.H.V.
BORE & STROKE	3.875 in. x 4.50 in.	4.625 in. x 4.125 in.
DISPLACEMENT	318.4 cu. in.	555 cu. in.
NET FLYWHEEL HP	178 @ 2500 RPM	175 @ 2600 RPM
GOVERNED RPM	2500 RPM	2600 RPM
NET FLYWHEEL TORQUE	410 lbs. ft. @ 1200 RPM	394 lbs. ft. @ 1800 RPM
ELECTRICAL SYSTEM	12-volt, Negative Ground	12-volt, Negative Ground
COMBUSTION SYSTEM	2 Cycle, naturally aspirated	4 Cycle, naturally aspirated
COOLING SYSTEM	Liquid	Liquid
FUEL CAPACITY	75 gallons	75 gallons
ALTERNATOR	60 AMP, 12-volt	58 AMP, 12-volt
BATTERY	(2) 204 A.H., 12-volt	(2) 204 A.H., 12-volt
AIR CLEANER	Dry Type	Dry Type
HOURMETER	Yes	Yes

Constant improvement and engineering progress make it necessary that we reserve the right to make specification, equipment, and price changes without notice.

SPECIFICATIONS

OVERALL WIDTH — 10 ft. 8 in. (3.25m)

WHEELBASE — 224 in. (5.69m)

OUTRIGGERS — Hydraulic double box, telescoping beam outriggers. Removable beams, vertical jack cylinders with integral safety holding valves and 30½ in. (77.5cm) dia. aluminum floats. Mechanical spin locks on each vertical jack to secure outriggers at any level. Beams extend to 21 ft. (6.40m), centerline to centerline retract to 10 ft. 6 in. (3.20m) overall width. Full controls in superstructure cab and both sides of carrier with sight leveling bubble at each station. Powered by superstructure engine.

FRAME — High strength constructed; all welded fabrication with box type design and integral welded outrigger boxes.

STEERING GEAR — Ross, cam and lever with Garrison hydraulic power assist.

CLUTCH — Lipe Rollway 14 in., two plate dry disc; area: 423 sq. in. .

TRANSMISSION — Fuller RTOO 9513 Roadranger, 13 speeds forward and 2 reverse.

UNIVERSAL JOINTS — Needle bearing type.

AXLES — Front: (2) Shuler Tubular, 100 in. track, 40,000 lbs. capacity.
Rear: (2) Clark BD50-60 Planetary 94½ in. track, 70,000 lbs. capacity.

SUSPENSION — Front: Reyco Spring type, tandem mounted, 54 in. spacing.
Rear: Hendrickson T-600, solid mount, 54 in. spacing.

OVERALL CARRIER LENGTH — 35 ft. 8 in. (10.87m)

GROUND CLEARANCE — 10 in. (25.4cm)

TURNING RADIUS — 44 ft. (13.41m)

TIRES — Front: 14.00x20-18 Ply, hiway tread.
Rear: 14.00x20-18 Ply, NDM&S.

WHEELS — Front: Cast spoke 10 in. x 20 in.
Rear: Integral with axles 10 in. x 20 in.

BRAKES — Full air on all eight wheels, 12 CFM compressor.
Total lining area: 1528 sq. in.
Front: 17¼ in. x 4 in.
Rear: 16½ in. x 7 in.

PARKING BRAKE — Maxi brake, spring applied emergency chambers on both rear axles with emergency release kit.

ELECTRICAL SYSTEM — 12 volt lighting, 12 volt starting. Federal safety standard lights and reflectors.

CAB — One-man, safety glass windshield and windows, windshield washer and electric wiper, door and window locks. Bostrom "T" bar seat, seat belt, dual West Coast mirrors, hot water heater, fan defroster, electric horn, traffic hazard warning switch (four-way flasher), full engine instruments and carrier controls. 2¾ lb. dry type fire extinguisher.

CAB INSTRUMENTATION — Electric tachometer, engine oil pressure gage, voltmeter, speedometer, air pressure gage, electric fuel gage, engine water temperature gage, high beam indicator, low air pressure audio visual warning.

MISCELLANEOUS STANDARD EQUIPMENT — Wheel nut wrench and handle, channel front bumper, two front towing loops, rear fenders, automatic radiator shutters, ether injection starting aid (less bottle), hook block tie down, mud flaps.

SPEED AND GRADEABILITY
ROADRANGER TRANSMISSION (RTOO 9513)

ENGINE	SPEED RANGES	% of Gradeability @ Max. Torque
GM8V-71N	2.3 to 45.6 MPH	40.2 to .64%
CUMMINS NTC-335	2.3 to 45.6 MPH	44.4 to .85%

ENGINE SPECIFICATIONS

MAKE & MODEL	GM8V-71N	*Cummins NTC-335
TYPE	8 Valve in head	6 Valve in head
BORE & STROKE	4.25 in. x 5 in.	5.5 in. x 6 in.
DISPLACEMENT	568 cu. in.	855 cu. in.
HORSEPOWER	304 @ 2100 RPM	320 @ 2100 RPM
GOVERNED RPM	2100 RPM	2100 RPM
TORQUE	814 lbs. ft. @ 1400 RPM	895 lbs. ft. @ 1500 RPM
AIR CLEANER	Dry Type	Dry Type
FUEL CAPACITY	60 gallons	60 gallons
ALTERNATOR	62 AMP, 12-volt	53 AMP, 12-volt
BATTERY	(2) 204 A.H., 12-volt	(2) 204 A.H., 12-volt
HOURMETER	Yes	Yes

AXLE WEIGHT DISTRIBUTION CHART

ITEM	GROSS LBS.	FRONT LBS.	REAR LBS.
Basic TM650 including 35-87 ft. boom, Grove main hoist with 650 ft. of ¾ in. rope, GM8V-71N (carrier engine) GM6V-53N (Superstructure engine)	89,800	36,868	52,932
†10,300 lbs. counterweight (retracted position)	+10,300	− 4,140	+14,440
32 ft. swingaway boom extension	+ 1,300	+ 1,208	+ 92
65 ton, 5 sheave hookblock - stowed	+ 1,100	+ 1,750	− 650
*Model 40 SGECR auxiliary hoist with 650 ft. of ½ in. rope	+ 1,060	− 430	+ 1,490
*Model 15S-16 auxiliary hoist with 400 ft. of ⅝ in. rope	+ 938	− 380	+ 1,320

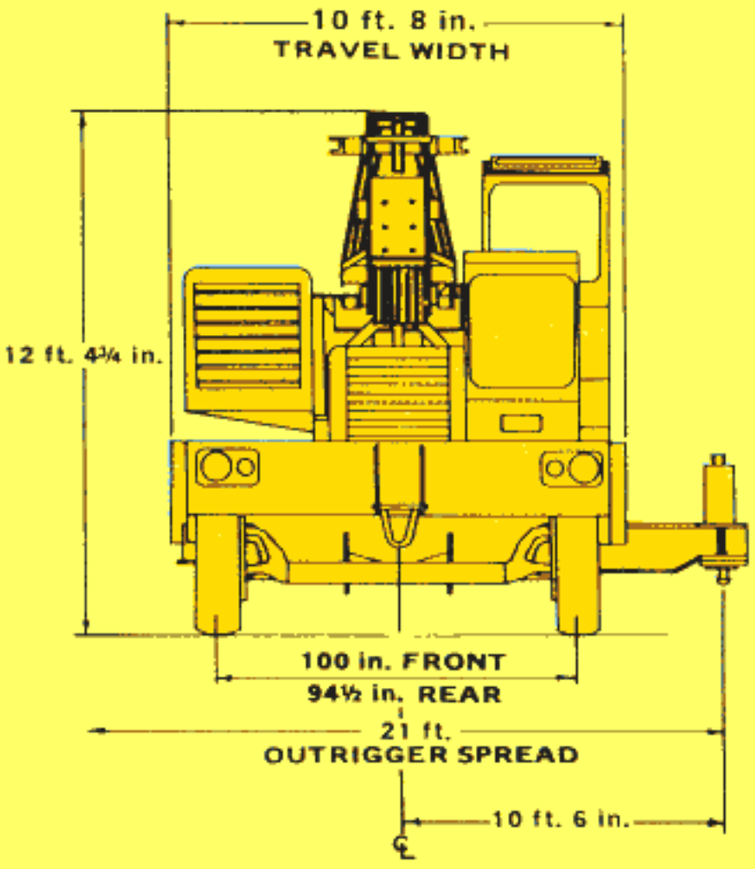
ITEM	GROSS LBS.	FRONT LBS.	REAR LBS.
Auxiliary boom head	+ 230	+ 448	− 218
30 ton, 3 sheave hookblock - stowed	+ 640	+ 1,235	− 595
8 ton, single sheave hookblock - stowed	+ 190	+ 368	− 178
10 ton headache ball - stowed	+ 450	+ 870	− 420
5 ton headache ball - stowed	+ 200	+ 376	− 176
Substitute Cummins NTC-335 diesel engine in carrier	+ 365	+ 410	− 45
Substitute Cummins V555 diesel engine in upper	+ 170	+ 50	+ 120
Remove (2) rear outrigger beams	− 3,336	+ 1,115	− 4,455
Remove (2) front outrigger beams	− 3,336	− 2,100	− 1,236
*9,800 lbs. counterweight (retracted position)	+ 9,800	− 3,938	+13,738

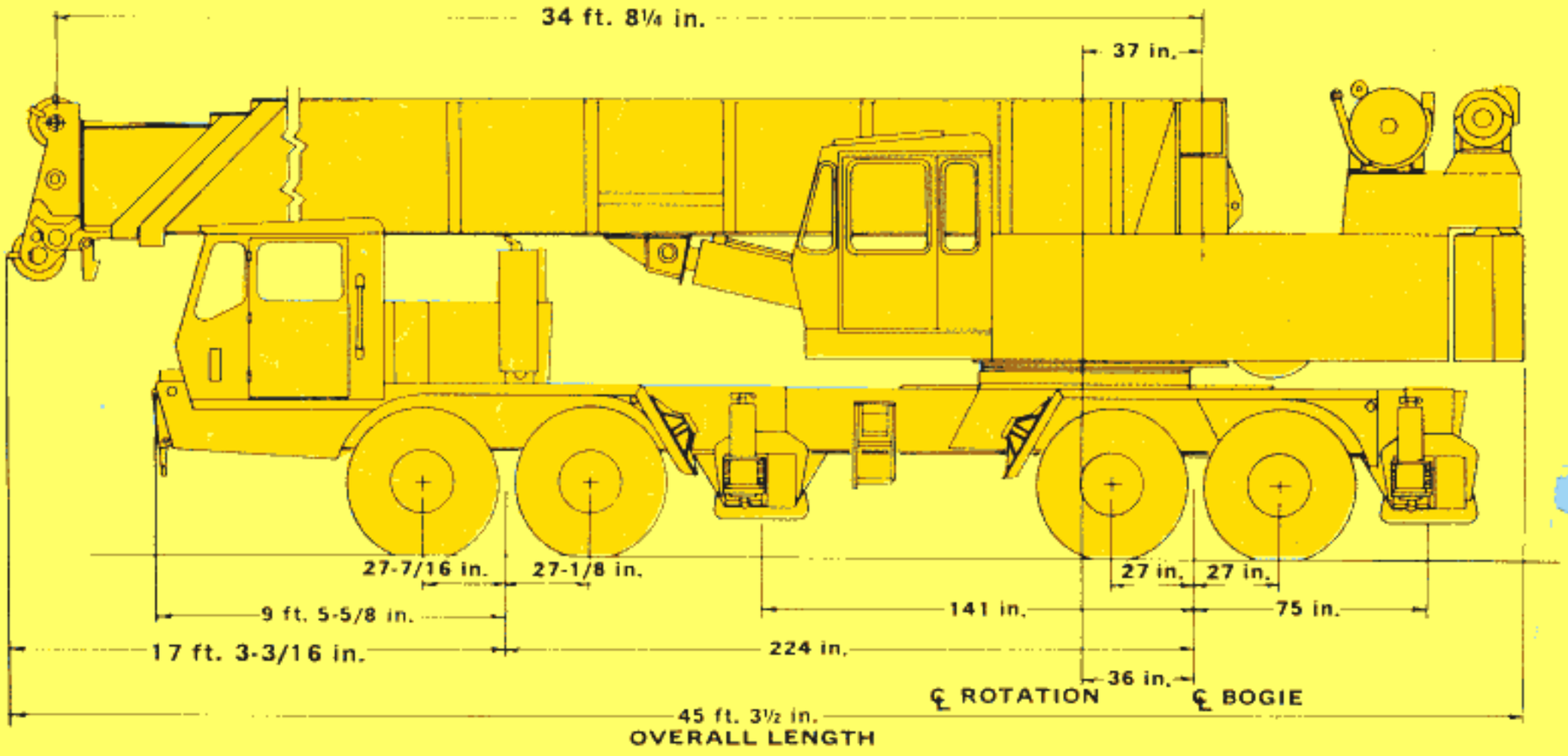
*use 9,800 lbs. counterweight with auxiliary hoist.

†NOTE: 10,300 lbs. counterweight without auxiliary hoist.

TAIL SWING 12' — Counterweight in Stowed Position
TAIL SWING 14' — Counterweight in Working Position

DIMENSIONS





UNIQUE VERTICAL JACK SPIN-LOCKS†

In addition to integral holding valves, exclusive Grove spin-locks provide positive locks for the jacks in any position.

THE GROVE CARRIER

The Grove-designed and built diesel-powered carrier is matched to the particular requirements of the TM650 and its long boom capability. The all-welded, box-beam design steel frame provides a rugged carrier which is exceptionally light for a crane of this capacity.

DOUBLE-BOX BEAM OUTRIGGERS, integral with the frame, provide a lifting base of 21′ for this high capacity crane. Stowable, 30 inch diameter, aluminum alloy outrigger pads combine lightweight ease of handling with excellent flotation.

HYDRAULIC CRANES

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