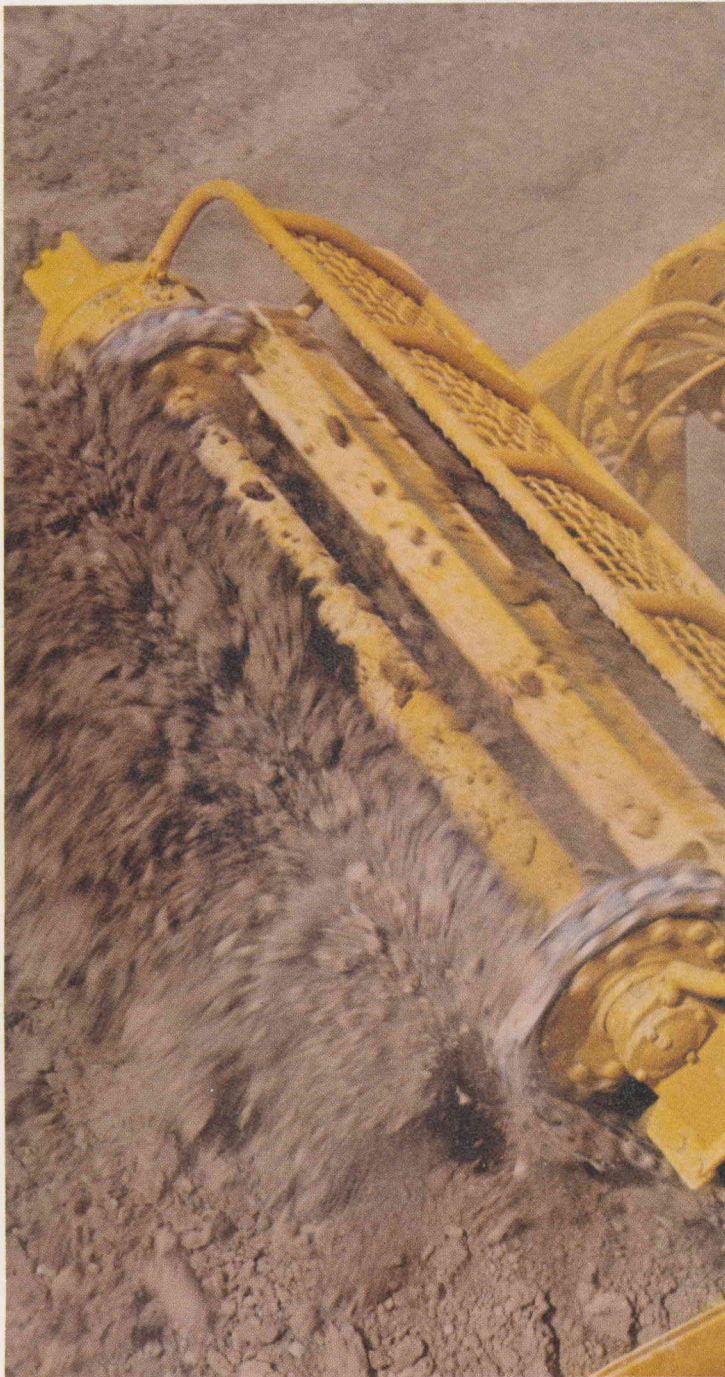


# Elevating Scrapers by **CATERPILLAR**



613

J621

633C

**Caterpillar offers the most complete line in the industry...**

16 Wheel Tractor Scraper Models—four basic configurations.

Take a look at the depth Caterpillar offers in each of four basic configurations—a total of 16 different models. Seven of these machines are improved models (B or C series) which feature increased horsepower, an 8-speed semi-automatic transmission and other engineering advances. From this broad line, you can choose the scraper size and configuration that best meets your needs.



**STANDARD SCRAPERS**

- Basic machines of most earthmoving spreads with the widest range of applications and material appetite.
- Two axle and three axle rigs to cover all hauling jobs.
- Six models from 14 to 40 cu. yd. (11 to 31 m<sup>3</sup>) struck.



**TANDEM POWERED**

- Climb grades up to 40%, fully loaded.
- Engineered for soft, muddy footings.
- Three models from 14 to 40 cu. yd. (11 to 31 m<sup>3</sup>) struck.



**PUSH-PULL**

- Self-loading teams work alone.
- Tandem power for hill climbing, soft footings.
- Three models from 14 to 32 cu. yd. (11 to 24,5 m<sup>3</sup>) struck.



**ELEVATING SCRAPERS**

- Self-loaders... eliminate push loading and wait time.
- Provide a balanced spread with minimum machines and operators.
- Three models from 11 to 32 cu. yd. (8,4 to 24,5 m<sup>3</sup>) heaped.

Booklets on each scraper family are available from your Caterpillar dealer.

The



**613 moves from job to job**

- Large capacity (11 cu. yd.-8,4 m<sup>3</sup>), yet qualifies easily for roading.
- 8' wide (2440 mm) regardless of tires, less than 18,000 lb. (7,800 kg) per axle.
- Speeds to 26 mph (43 km/h) for fast cycles.



**J621\* cuts cost of finishing work**

- Production and utility with 21.5 cu. yd. (16,5 m<sup>3</sup>) heaped capacity.
- High rimpull available to meet all job needs.
- Loads fast in a variety of materials.

# Elevating Scraper Line



## 633C hauls 32 cu. yd. (24,5 m<sup>3</sup>) fast

- Big capacity for volume production.
- Lowest loaded weight-to-HP ratio in its class.
- Aggressive loading action in all materials.

**Caterpillar Elevating Scrapers** work alone without pusher assistance. Each scraper's elevator sweeps its load "paddle-wheel" fashion into the bowl. It loads heaped capacities of most materials in less than a minute. The pulverizing action chops and mixes the material, conditioning the material for compaction on the fill.

An elevating scraper fleet can reduce the number of

machines and operators required to do a job, especially on short haul work that prohibits a good balance between standard scrapers and pushers. And elevating scrapers can work with the conventional fleet to maintain production when additional standard scrapers would result in scraper/pusher mismatch. Each unit is also an excellent finishing and clean-up tool.



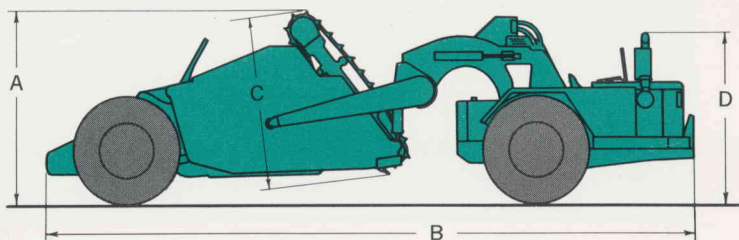
## Choice of Three Models

### ELEVATING SCRAPER

613

#### General

Capacity, heaped	11 cu. yd. (8,4 m <sup>3</sup> )	
Flywheel horsepower	150	
Weight on wheels, approx.		
Empty	lb.	kg
Tractor	16,300	7 400
Scraper	10,900	4 900
Total	27,200	12 300
Loaded, based on avg. load of:		
Tractor	25,000	11 300
Scraper	28,200	12 800
Total	53,200	24 100
Loaded gross weight-to-HP ratio	355:1	161:1
Non-stop turning circle	30'3" (9,20 m)	
Brakes, type	air-actuated caliper disc	
Emergency braking system	optional	
Hydraulic retarder option	no	
Tires, standard		
Tractor	18.00-25 (12 PR) E2	
Scraper	18.00-25 (16 PR) E2	
Options	18.00-25, Radial (16 PR)	
	18.00-25 (16 PR) E3	
	23.5-25, Radial (16 PR)	
	23.5-25 (12-16 PR) E2-E3	
<b>Tractor</b>		
Engine model	3160	
Power shift transmission	Manual	
	4-speed fwd.—2 rev.	
Top speed	26 mph (43 km/h)	
Differential lock	no	
<b>Scraper</b>		
Elevator flight spacing	15" (380 mm)	
Number of flights	16	
Scraper bowl, maximum depth of cut	6.75" (171 mm)	
Ejection method	retracting floor, dozer ejector	
Floor opening max.	3'9" (1140 mm)	



#### Dimensions

A Overall Height	9'4½" (2850 mm)
B Overall Length	31'9" (9700 mm)
C Shipping Height	8'3" (2500 mm)
D Height to top of stack	9'10" (3000 mm)
Wheelbase	20'10" (6350 mm)
Shipping Width	8' (2440 mm)
Overall Width	8' (2440 mm)
Bowl Width	7'5" (2260 mm)



## J621

## 633C

21.5 cu. yd. (16,5 m <sup>3</sup> )		32 cu. yd. (24,5 m <sup>3</sup> )	
300		415	
lb.	kg	lb.	kg
41,000	18 600	56,900	25 800
22,100	10 000	29,300	13 300
63,100	28 600	86,200	39 100
48,000	21 800	72,000	32 700
58,900	26 700	82,300	37 300
52,200	23 700	75,900	34 500
111,100	50 400	158,200	71 800
370:1	168:1	381:1	173:1
37'8" (11,48 m)		40' (12,19 m)	
air-actuated expanding shoe		air-actuated expanding shoe	
yes		yes	
yes		yes	
29.5-29 (28 PR) E2		33.25-35 (32 PR) E3	
29.5-29 (28 PR) E2		33.25-35 (32 PR) E3	
29.5-29 (28 PR) E3		33.25-35 (32 PR) E2	
29.5-29, Radial (34 PR)		33.25-35, Radial (32 PR)	
29.5-29 (28 PR) E3			
D336		D343	
Manual or Semiauto.		Semiautomatic	
8-speed fwd.—1 rev.		8-speed fwd.—1 rev.	
30 mph (48,3 km/h)		33 mph (53,3 km/h)	
standard		standard	
16¼" (415 mm)		24" (610 mm)	
18		13	
9.6" (244 mm)		14.5" (370 mm)	
retracting floor, dozer ejector		pivoting floor	
4'10" (1470 mm)		6'1" (1850 mm)	

11'4" ( 3450 mm)	13' ( 3960 mm)
39'4¾" (12 000 mm)	43'10" (13 450 mm)
10'4" ( 3150 mm)	11'8" ( 3550 mm)
10' ( 3050 mm)	11'8" ( 3550 mm)
25'3½" ( 7700 mm)	27'9" ( 8500 mm)
11'9½" ( 3600 mm)	11'4" ( 3450 mm)
11'9½" ( 3600 mm)	12'6" ( 3810 mm)
10' ( 3050 mm)	10'6" ( 3200 mm)

## PRODUCT UPDATING

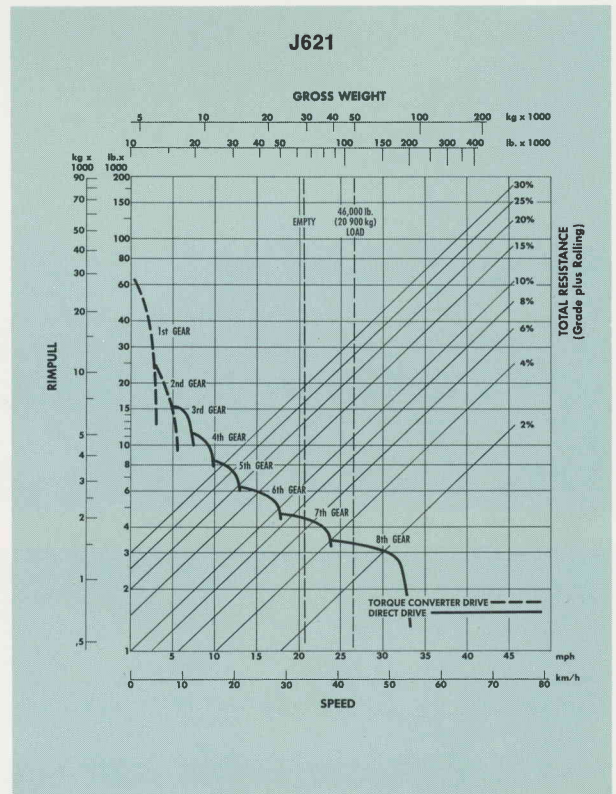
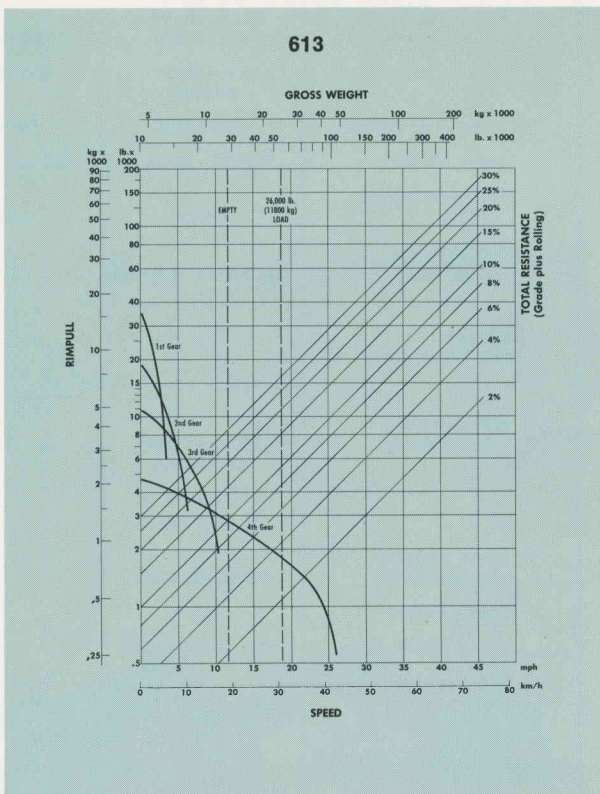
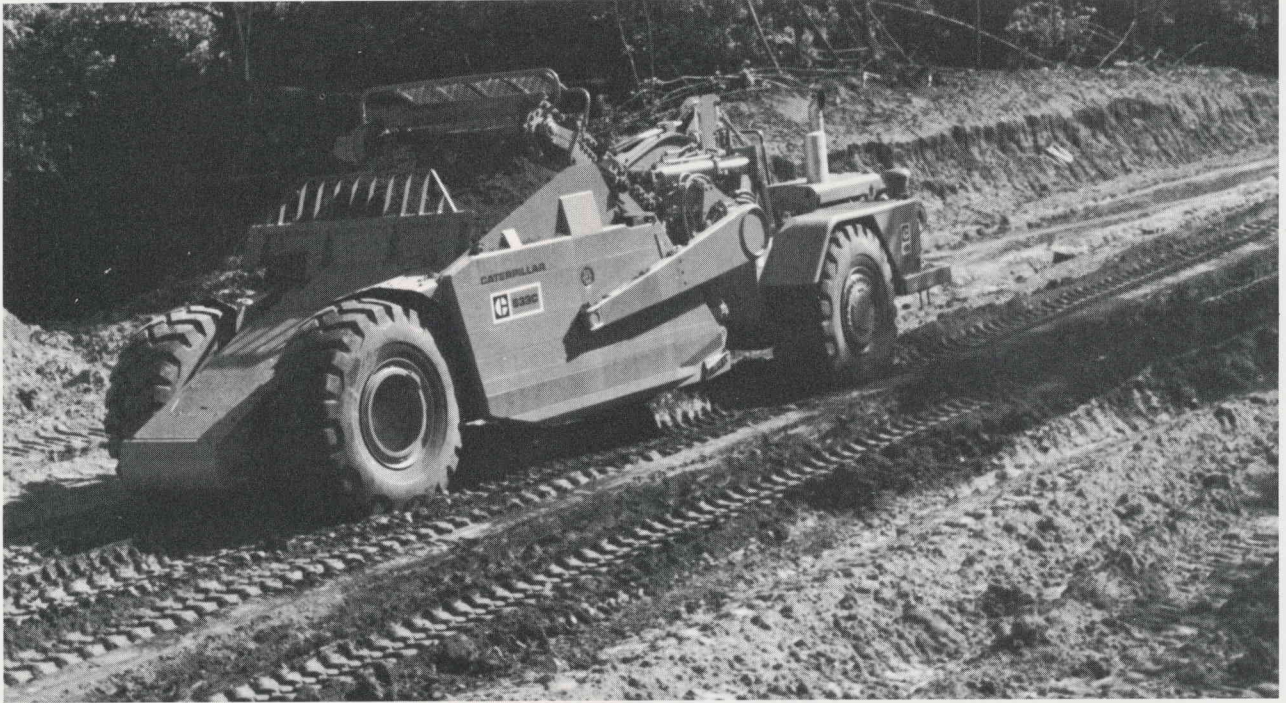
**Caterpillar has a continuous product improvement program.** As engineers develop design advances adding productivity, reliability and safety, many become standard without waiting for the introduction of a new model.

**The J621 is an example.** For even faster, cleaner ejection of sticky materials, floor retraction force has been increased 34%, ejector force 55%. And the J621 now has an automatic emergency braking system. Should the regular air system fail, the brakes automatically apply using air from reserve tanks. An electric horn and red dash light forewarn operator.

**The Series C 633 has many improvements** over the former model. Here's a partial listing:

TRACTOR IMPROVEMENTS	633C	633
Increased flywheel HP	415	400
Faster cycling potential, Empty weight-to-horsepower	208 lb/hp (95 kg/hp)	214 lb/hp (97 kg/hp)
Gross loaded vehicle weight-to-HP	382 lb/hp (173 kg/hp)	398 lb/hp (178 kg/hp)
More efficient aftercooler	air-to-air	water-to-air
Quieter with muffler	standard	optional
Automatic precleaner scavenging	standard	none
Improved transmission	Semiautomatic power shift, 8 speed	manual power shift, 9 speeds, 3 shifts
Greater retarding HP (@ 1900 rpm)	400 (option)	326 (option)
Better differential lock	axial piston actuation	fork actuation
Easier pedal operation	heel radius	toe radius
Larger fuel tank	220 gal. (830 lit)	170 gal. (641 lit)
Emergency braking system	standard	optional
Better operator visibility	seat raised 4" (102 mm)	—
<b>SCRAPER IMPROVEMENTS</b>		
More powerful hydraulic drive	18% more torque (all 4 speeds) 14% more HP in 3rd & 4th speeds	—
Longer hydraulic component life	Fluid-to-air cooler	—
Cat XT-3 hoses	yes	—
Stronger hitch	Larger gooseneck arch	—
Lighter-stronger draft tube	one piece thru-tube	3-piece tube, center casting
Easier draft arm removal for shipping	outside of bowl	inside of bowl
Better load retention	Higher top extensions	—

# Cycle time and production potentials



- ESTIMATE YOUR HAUL ROAD RESISTANCE.
- USE CHARTS TO FIND ROADING SPEEDS.
- COMPILE AND CONVERT FOR TRAVEL TIME.

Use these charts to estimate elevating scraper production potential on your job.

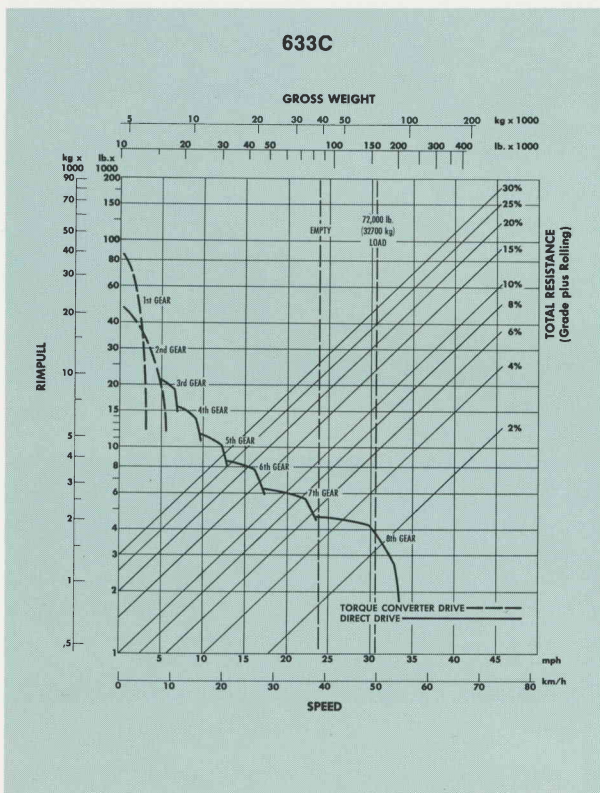
1. Calculate haul road resistance. (Total resistance equals actual % grade plus 2% for tire rolling resistance and an additional 1.5% for each inch (0,6% for each cm) of tire penetration.) Make separate calculations for each significantly different segment of the haul road.

2. On the charts, find the point where machine *gross or net weight* (as applies) intersects the *total resistance* line for a particular road segment. From this point, read directly across to the *gear curve*, then down to *speed*. This gives the MPH (or km/h) the scrapers can attain on that road segment. Do this for all road segments, hauling *and* returning.

3. Determine travel time in minutes for each segment by multiplying MPH × 88 (km/h × 16,7), then dividing into the length of the segment *in feet* (meters).

4. Determine total cycle time by summing all segments, plus loading and dump time (about 1.5 minutes). (Acceleration and deceleration time, not included here, will increase actual cycle time.)

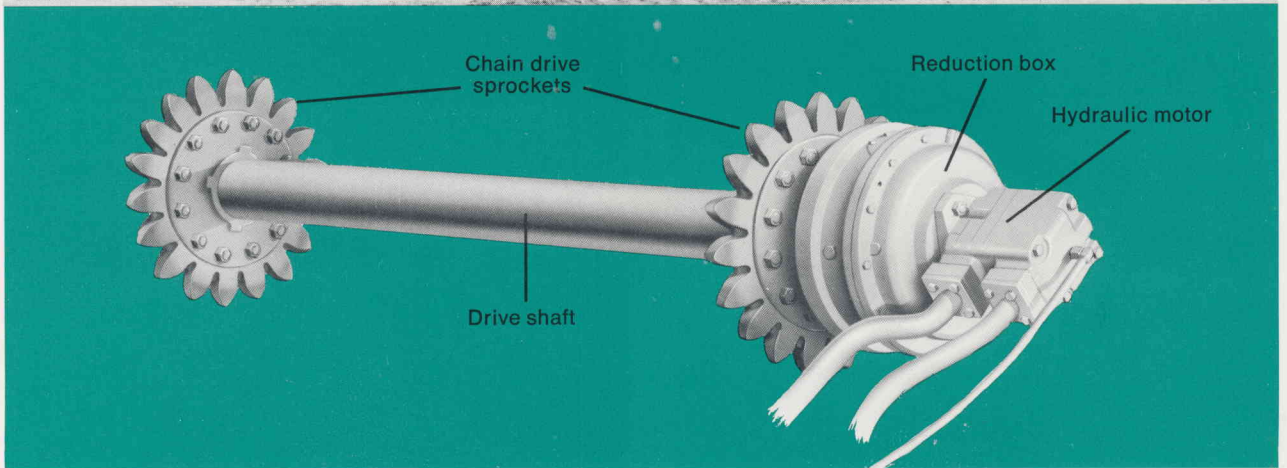
5. Potential bank cubic yards =  $\frac{60 \text{ minutes}}{\text{Cycle time (min.)}} \times \text{bcy per cycle}$ .



**ATTACHMENTS FOR:**

	613	J621	633C
<b>Tractor</b>			
Adapter, fast fuel filler		•	•
Alternator, 50 amp 24-volt		•	Std
Brake, parking	•	•	•
Brake shields		•	•
Cap locks for:			
fuel tank	•	•	•
oil filler pipe	•	•	•
hydraulic tank	•	•	•
radiator	•	•	•
Engine hood door, right side	•	•	•
Fan: blower		•	Std
suction	Std	Std	
reversible			•
Floodlight, rear mounted	•	•	•
Instrument panel guard	•	•	•
Lighting system: 24-volt, off highway	Std	Std	Std
24-volt, highway	•		
Retarder, hydraulic		•	•
Seat belt	•	Std	Std
Starting aid, ether	•	•	•
Tires, optional	•	•	•
Tool kit	•	•	•
Windshield wipers	•	•	•
<b>Scraper</b>			
Brake shields		•	•
Cutting edges, special application		•	•
Cutting edge teeth	•	•	•
Elevator reverse	Std	Std	•
Fenders		•	•
Ejector floor cleaner			•
Shipping bracket			•
Skid shoe for floor strike-off blade			•
Tires, optional	•	•	•

# Load fast and easy



## ELEVATOR LOADING SPEEDS

	613		J621		633C	
	fpm	m/min	fpm	m/min	fpm	m/min
1st	225	69	171	52	130	39,5
2nd	—	—	262	80	170	52,0
3rd	—	—	—	—	250	76,0
4th	—	—	—	—	300	91,0



- CAT HYDRAULIC DRIVE.
- POWERFUL, STEADY-SPEED ELEVATOR.
- NO DAMAGE IF STALLED.

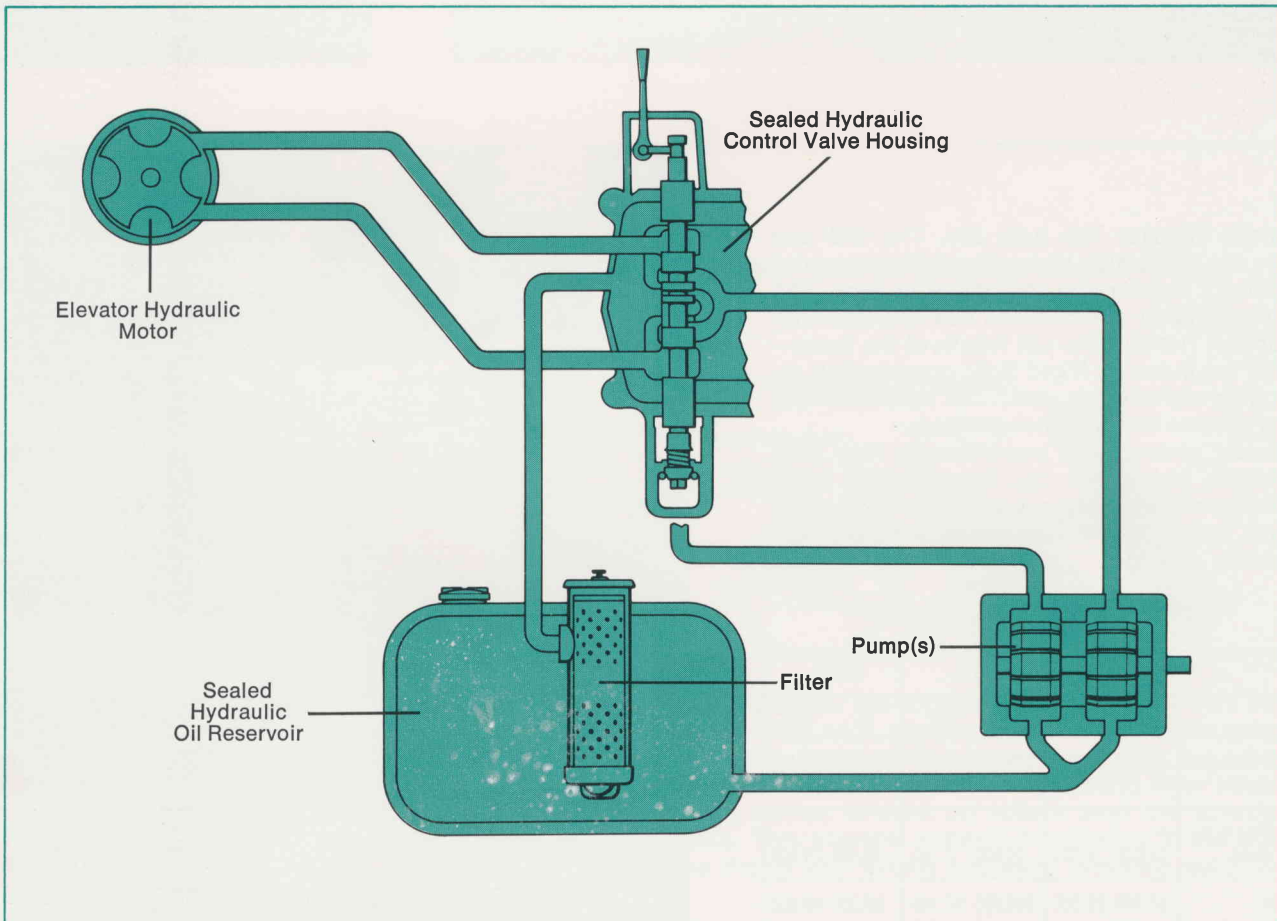
**Cat high-torque hydraulic drive** turns the elevator at a relatively constant speed under heavy load. This lets the operator select the best loading depth without continual adjustment, leaves the cut smooth for easier, more efficient loading on the next pass.

An engine-driven implement pump powers the hydraulic motor on the elevator. The motor turns the elevator's chain and flights through a specially-designed planetary gear reduction box and live drive shaft with drive sprockets on each side.

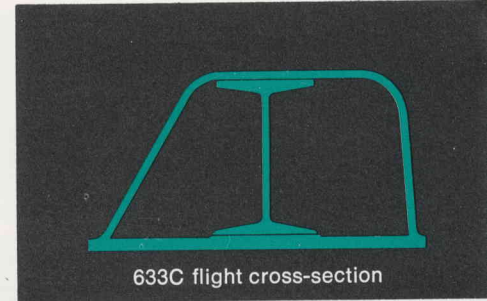
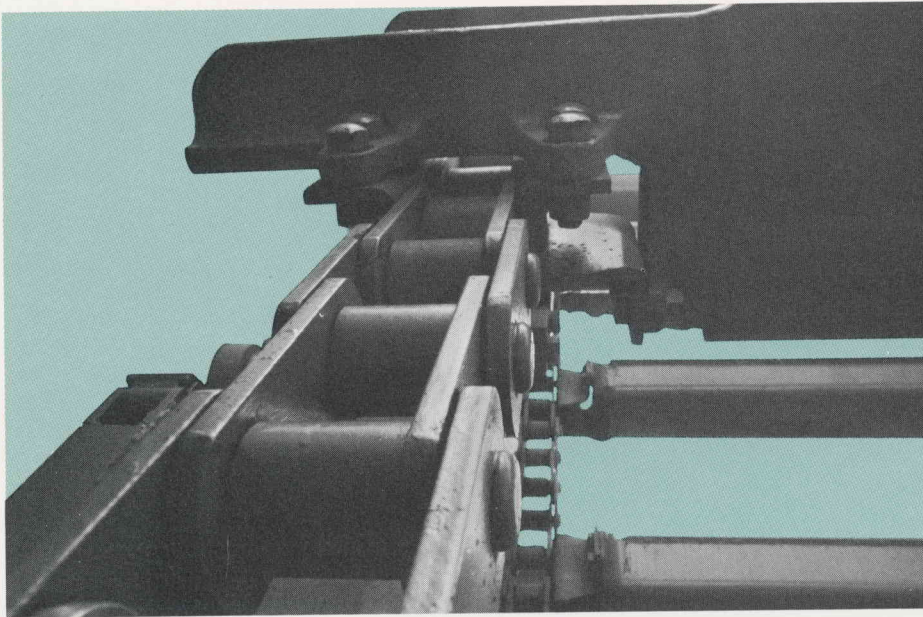
If a rock stalls the elevator, a hydraulic relief valve prevents damage to the hydraulic system of Cat scrapers. Unlike electric drive systems, there are no fluid couplings to refill with oil or new heat plugs to install on each side.

• **Hydraulic system protection**

The hydraulic drive system is sealed and filtered. Particles worn from pump, motor or hose are immediately caught by the filters. The circuit has no breather-type venting, no chance for dirt to enter the circuit to cause premature wear.



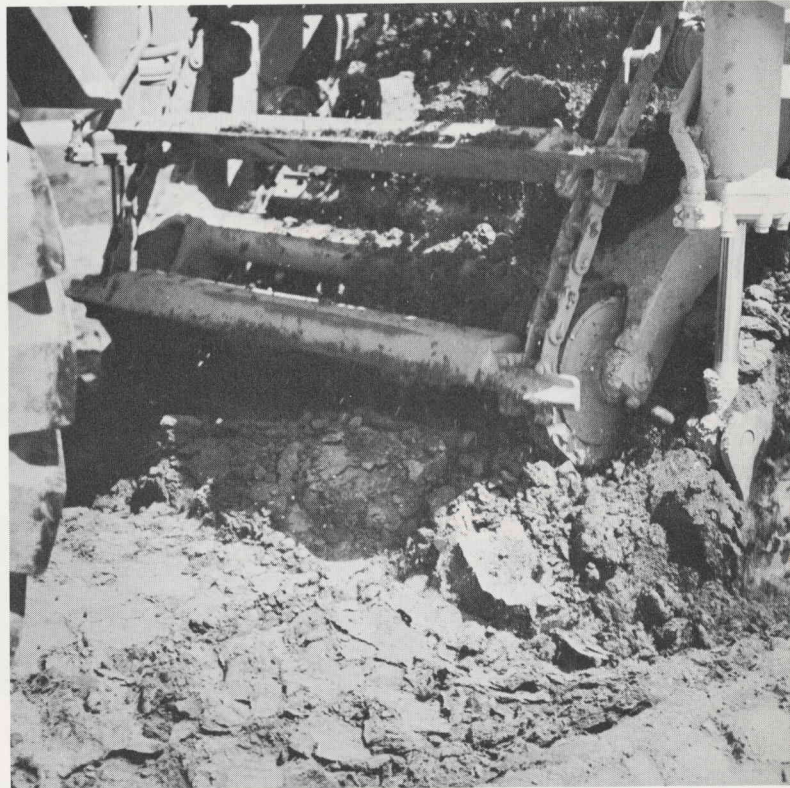
# Built-in durability



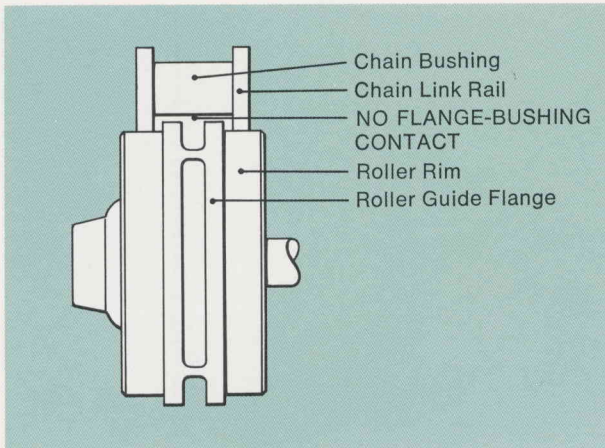
**High-strength elevator has long life.** The 613 and J621 flights are 100% high-strength steel in triangular construction for rigidity and resistance to wear. The 633C HT steel flights are modified box-sections with I-beam support running the full length of the faces—strongest in the industry. Rigid flight construction reduces bending and twisting which can hold chain out of line and shorten life of all components.

Cat elevator chains have exceptionally high pull-strength—much higher than the actual pulling force of the drive sprockets during loading at relief valve setting. This buffer zone is your protection from high impact loading damage:

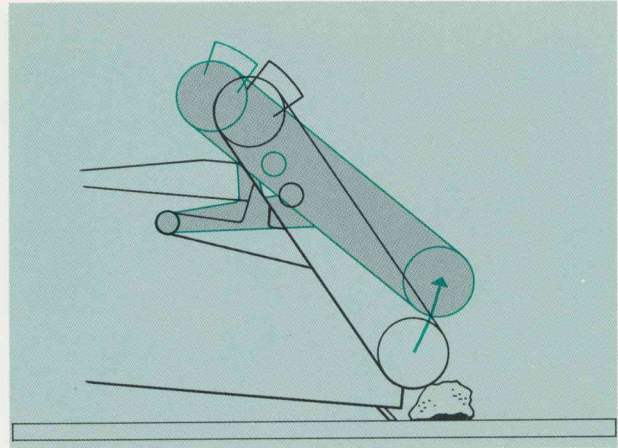
	613		J621		633C	
	lb.	kg	lb.	kg	lb.	kg
Minimum pull-strength built in to chain	55,000	24 900	120,000	54 400	120,000	54 400
Maximum pulling force applied to chain	12,600	5 700	16,000	7 260	30,000	13 600
Safety margin	42,400	19 200	104,000	47 140	90,000	40 800



- EXTRA STRONG FLIGHTS AND CHAINS.
- HEAT TREATED, ALLOY STEEL PINS AND BUSHINGS.
- FLEXIBLE ELEVATOR MOUNTING.



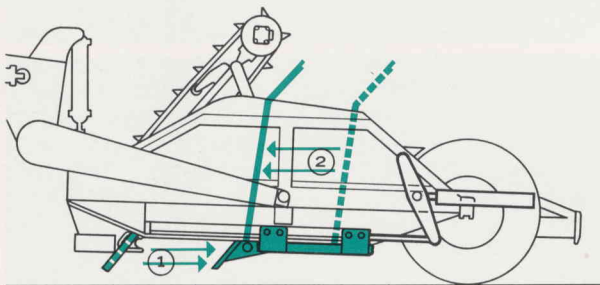
**Pins and bushings** are alloy steel, heat-treated to resist abrasive wear. Only the hardened link rails contact the support roller and idler rims while guiding the chain, adding substantially to chain bushing life.



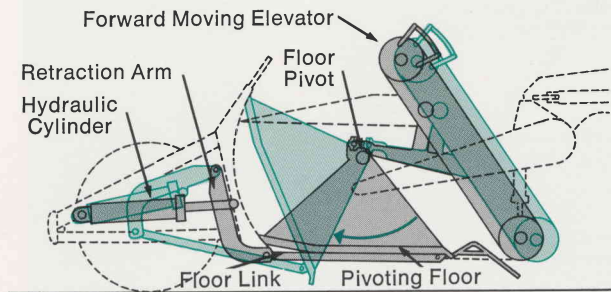
**The elevator's flexible mounting** protects flights and cutting edge against sudden shock. The elevator is free to swing upward to accommodate rocks or other large objects, yet quickly returns to keep flights biting and lifting dirt into bowl.

## FAST, CLEAN DUMPING

- DOUBLE-ACTING EJECTION CYLINDERS
- CONTROLLABLE EJECTION RATE WITH EJECT-HOLD-RETURN CONTROL POSITIONS
- LARGE FLOOR OPENING



**613 and J621 Ejection.** The load ejects in two smooth, fully-controlled steps: (1) The scraper floor and cutting edge retract hydraulically about half the floor's length, leaving a large opening. (2) Then the dozer-type ejector moves forward to the cutting edge to force even sticky material out. Double-acting hydraulic cylinders give precise control of ejection rate. Operator can slow ejection action with control lever "hold" position at any stage of ejection.



**633C Ejection.** The scraper floor pivots back from the fixed cutting edge, shearing sticky material from sides and back, and leaving a large opening. At the same time, the elevator (attached to pivoting floor above pivot) moves forward on rollers atop the scraper sides. This prevents material from being forced into the flights and avoids hydraulic pressure build-up.

# Get reliable Caterpillar power



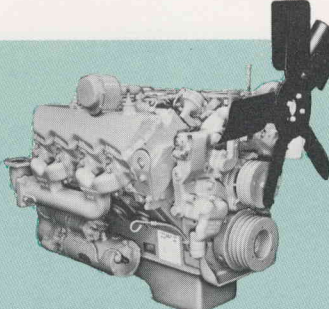
**Caterpillar-built engines** have a reputation for endurance, efficiency and trouble-free operation. It's the result of proven design and special metallurgy, followed up by precision manufacturing. And once assembled, dynamometer testing of *each* engine confirms specified horsepower.

You get honest horsepower—power available at the flywheel with all regular equipment operating, including fan, water pump, lubricating oil pump, fuel pump, generator or alternator and air cleaner. Some manufacturers rate their engines without these necessary accessories and some at higher rpm than the vehicle's standard setting. Such HP ratings don't deliver the power implied when installed in the machine. Cat engines do.

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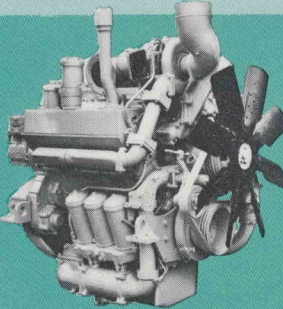
**Power efficiency at all rpm.** Caterpillar engines for the 633C and J621 have variable fuel timing which advances or retards injection automatically according to engine needs—in contrast to the compromise timing of fixed systems. Result: easier starting, better acceleration and excellent response.

- **PROVEN DESIGN.**
- **DYNAMOMETER TESTED.**
- **HONEST RATING.**



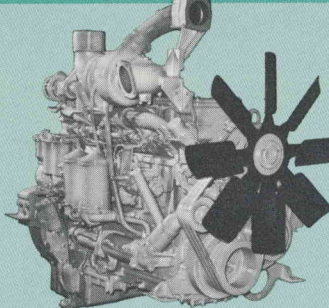
**613**  
150 Flywheel HP  
3160 engine  
V-8  
4.5" x 5"  
bore & stroke  
(114 x 127 mm)  
636 cu. in. displacement (10,4 lit)

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**J621**  
300 Flywheel HP  
D336 engine  
V-8  
4.5" x 5.5"  
bore & stroke  
(114 x 140 mm)  
700 cu. in. displacement (11,5 lit)

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**633C**  
415 Flywheel HP  
D343 engine  
In-line 6 cylinders  
5.4" x 6.5"  
bore & stroke  
(137 x 165 mm)  
893 cu. in. displacement (14,6 lit)

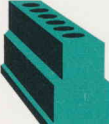
**Cat Automatic Variable Fuel Timing**


Starting and low rpm

High Speed advance


### LONG-LIFE ENGINE COMPONENTS




**Strong grey iron blocks** have strong internal ribs and deep-seated bearing saddles to maintain perfect alignment of crankshaft and bearings.




**Cylinder heads** are cast of special alloyed grey iron with a minimum specified tensile strength of 40,000 lb./sq. in. (2800 kg/cm<sup>2</sup>).




**Valves rotate 3°** per lift as they operate on the 633C and J621 for better heat dissipation and longer life, and seat on nickel-base-alloy replaceable inserts.




**Special-shaped pistons** allow for heat expansion, hold rings true to liners at operating temperatures for maximum power and low oil consumption.



**Connecting rods** are solid H-section drop-forged steel.

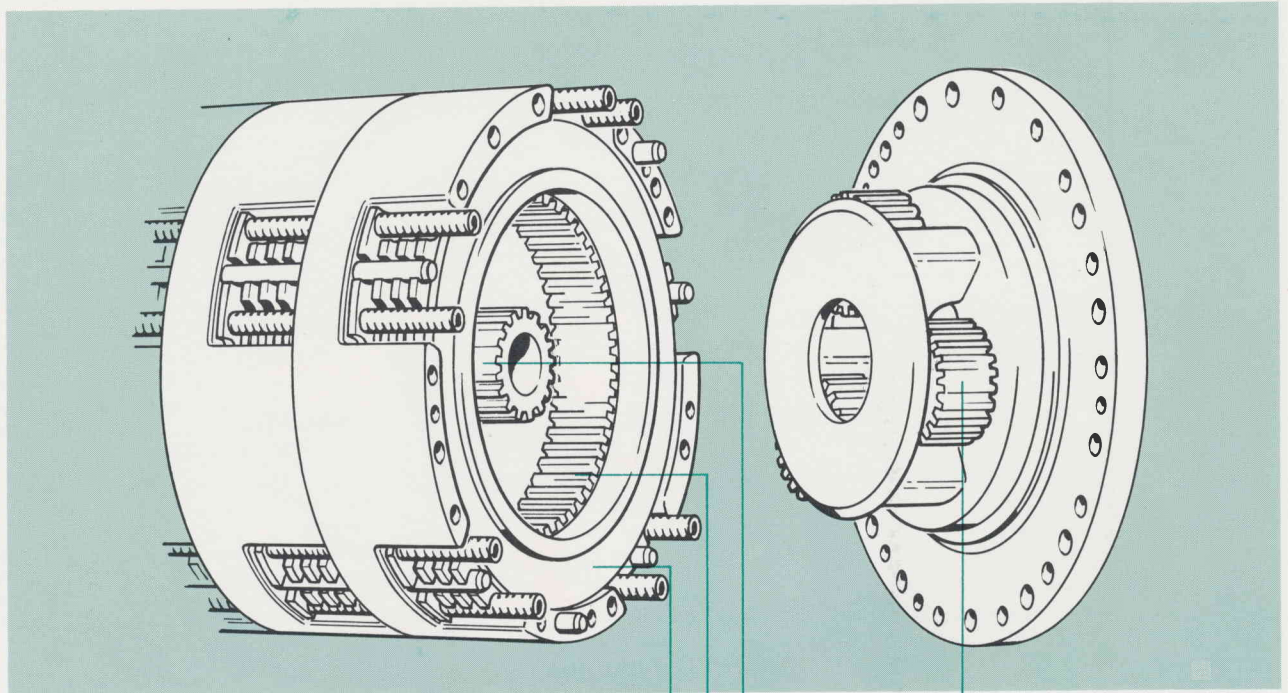


**Main and connecting rod bearings** are steel-backed aluminum, have higher load carrying capacities than some copper-lead bearings, and are highly resistant to acids formed in lube oil.



**Forged crankshafts** are statically and dynamically balanced, have precision ground, specially hardened and super-finished journals.

# Gain full work potential ...trouble-free performance

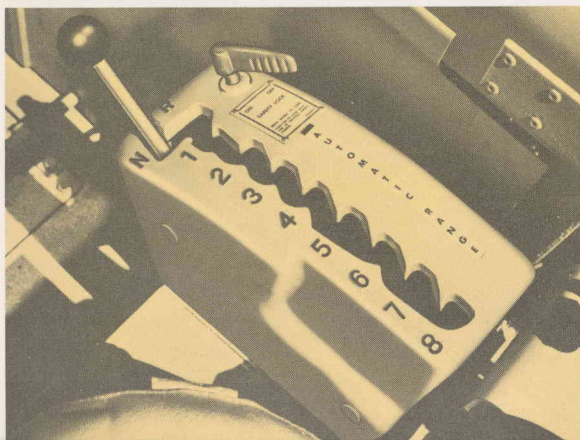
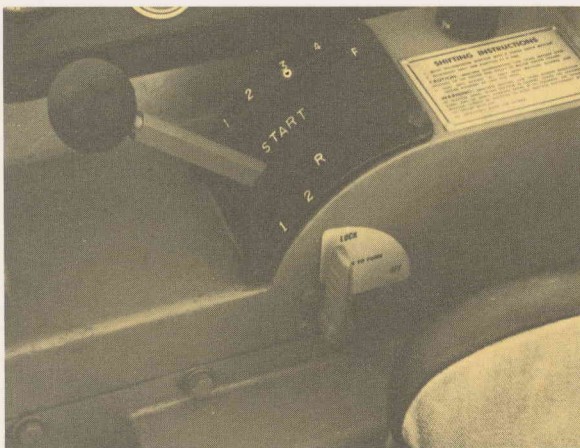


**Long life features** of Caterpillar planetary-gear transmissions include large shafts and heavy-duty bearings. Compact gears provide high reduction. Planetary design spreads loads equally over at least three gears  $120^\circ$  apart, in some cases over four gears  $90^\circ$  apart. This reduces shaft, gear and bearing loads. Contrast this to the single point loading of gears in countershaft transmissions.

Large diameter clutch plates have high leverage or holding capabilities. Oil continuously cools and lubricates them to reduce wear, extend life. Hydraulic modulation during shifts dampens shock on the power train components, adds to operator comfort—and still retains fast, lively response.

Planet gears  
Sun gear  
Ring gear  
Clutch plates

- HIGHLY EFFICIENT TRANSMISSION DESIGNS.
- PLANETARY DESIGN REDUCES GEAR LOADING.
- OIL COOLED CLUTCH PLATES/MODULATED ENGAGEMENT.



◀ **The 613 power shift transmission** has four speeds forward (to 26 mph—43 km/h) and two in reverse. A torque converter, driven by the engine flywheel, supplies high torque multiplication and anti-stall power to the planetary transmission—more than 35,000 lb. (15 900 kg) of rimpull (at stall) for loading. Generous rimpulls in all gears assure fast cycling ability.

◀ **The 633C and J621 Semiautomatic transmissions** have eight speeds forward and one in reverse. The first two speeds are *torque converter* drives for high torque and full hydraulic power during loading and dumping...the other six are *direct drives* for fast pickup and haul road efficiency. All are power shift: manually selected in 1st and 2nd—automatic from 2nd to 8th. The operator keeps complete control even in the automatic ranges. He can select any top gear (5th, for example), and the transmission will not shift beyond it. He can push a hold pedal that locks the transmission in the gear it's in and stops up-shifting during loading. The same pedal lets him skip in-between gears when slowing down quickly.

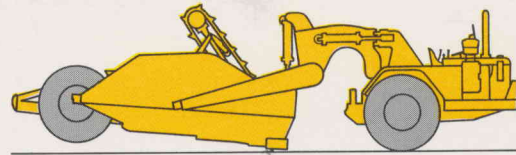
**An alternate J621 transmission** provides eight manual power shift speeds.

# Other elevating scraper features

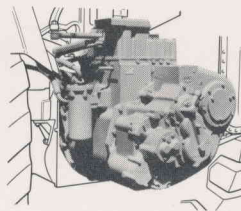


- POWER TRAIN EFFICIENCY DESIGNED-IN.
- NO DESIGN COMPROMISES.
- ONE-SOURCE QUALITY CONTROL.
- ADVANCED PARTS AND SERVICE NETWORK.

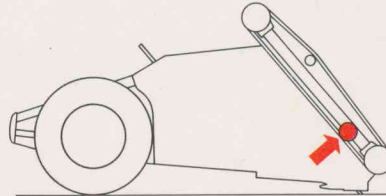
Caterpillar designs and builds its own engines, transmissions and power train components as team members to achieve maximum efficiency. Each Cat component matches the others precisely to give excellent overall machine performance. There aren't the compromises found in machines using off-the-shelf engines and transmissions of various brands. And complete quality control by *one* manufacturer assures long life in all components. Another bonus is the Caterpillar dealer service organization with modern facilities, trained specialists and complete parts stocks—all available to you when needed. Many other-make machines require multiple dealer back-up.



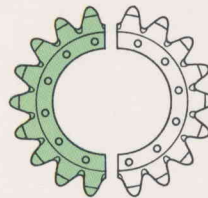
**Positive downpressure at cutting edge** from double-acting bowl lift cylinders speeds penetration of hard loading materials. Optional cutting edge teeth provide additional penetration.



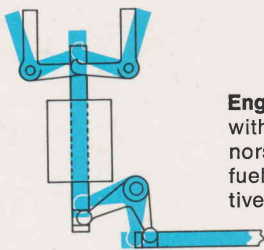
**Tractor transmissions** are highly accessible, encourage maintenance. The main and secondary filters, pump, oil filler and dipstick are all within arm's reach. By removing the mounting bolts and two hydraulic lines, the transmission swings free as a single unit for easy repair or replacement.



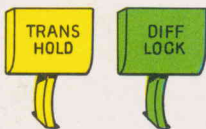
**Support idlers (613) and rollers (633C)** maintain elevator chain alignment and proper flight approach when loading.



**Drive sprocket teeth** can be renewed without removing elevator chain or disturbing alignment by replacing split bolt-on rim.



**Engines respond instantly** to load demands with Caterpillar hydramechanical governors. Hydraulics do the work of moving the fuel rack. Light flyweights are extra sensitive to rpm changes.



**Cat-built differential lock** for the J621 and 633C provides extra traction in soft, muddy footings. It locks the drive wheels together so neither can spin free. Disengaged, it allows normal differential action.



**XT-3 hydraulic hose**—manufactured by Caterpillar—outlasts all other-make hoses in high temperature, high pressure and high flex applications.

# BREBNER MACHINERY

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