

APPLICATION GUIDE

CAT® MEDIUM TRACK-TYPE TRACTORS



D6 - D7 - D8



How To Build A Dozer

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HOW TO BUILD A DOZER

The decisions you make BEFORE you put a dozer on a job site will have a profound effect on the machine's performance, efficiency and ultimate value. This section will guide you in choosing the best machine size, blade type, undercarriage configuration, counterweight and more for your applications.



SELECTING A TRACTOR

Selecting the right tractor for maximum productivity and efficiency involves balancing a number of factors:

Application - Is it a variable utility job (such as cleanup or stockpile work) or a full-time, nonstop production application? Is fine grading involved?

Materials - Is the material loose, aggregated or compacted? Does it need to be broken up? How heavy is it? How abrasive is it? How wet, hard or soft are the underfoot conditions?

Interaction with facilities or other equipment - How much room will the dozer have to maneuver? Will the dozer be working in tandem with scrapers or trucks? Is it charging a hopper?

Regulatory considerations - Are there any emissions, sound level or transportability issues to address?

You should discuss these and other considerations about your typical jobs with your Cat Dealer before choosing a tractor.

Tractor Size

Determining which dozer size class is right for your applications and materials is a complex task because today's Cat Medium Track-Type Tractors offer more flexibility than ever before.

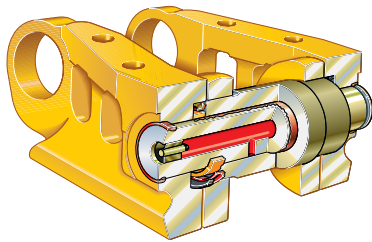
For example, the electric drive system of the D7E enables it to push material faster on every pass, so it can do some of the work of a larger machine. At the same time, it is more maneuverable than other machines in its class, so it can do some of the work of a smaller machine.

Your Cat Dealer can advise you on how to get all the performance you want, without investing in a tractor that is either bigger or smaller than you really need to get your work done.



SELECTING YOUR UNDERCARRIAGE

Undercarriage is where a tractor's power hits the ground, so it must be configured properly for the application. The right undercarriage will not only help you get your work done more effectively, it will also have a huge impact on the total cost of owning and operating any track-type tractor.

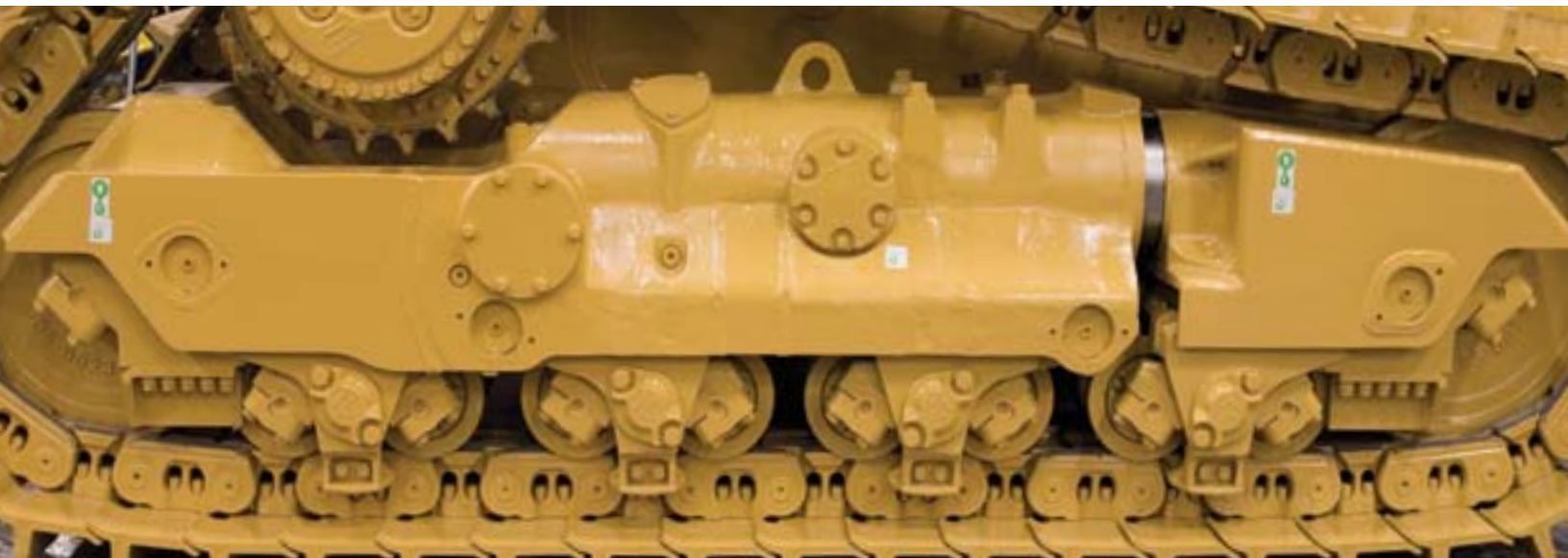


Undercarriage Types

Heavy Duty Track is designed for aggressive impact applications, yet has the necessary wear material for long life in abrasive conditions. Heavy Duty Track is designed to be disassembled for bushing turn service to maximize wear life. It can be resealed in applications that are limited by track seal life. For extreme applications, Heavy Duty Track can be configured with outrigger chains creating a tri-track or quad-track configuration.

Positive Pin Retention Track (PPR) is available on the D8T. It is designed for high-impact and high-load applications. It reduces link movement on the pin, thereby resisting endplay growth, which could exceed the track seal capacity.

In many applications, **SystemOne™ Undercarriage** delivers reduced maintenance costs and increased life, setting a new standard for performance in many customer applications. The system includes an innovative track cartridge and rotating bushing design that increases bushing life, eliminating the need for bushing turns. A rotating bushing, together with a center tread idler, helps to extend the life of the entire system, including sprockets, idlers and rollers. The net effect is improved productivity at dramatically lower costs in moderate to high abrasion applications.



Track Shoes

A wide variety of track shoes is available for Cat Track-Type Tractors. Selection should be based on the underfoot conditions, machine application and undercarriage wear life. The best general rule is to choose the narrowest shoe that provides adequate flotation and traction.

Single Grouser shoes are considered general-purpose shoes and are used in most applications. Single grouser shoes are available in moderate service and extreme service configurations.

Moderate Service (MS)

shoes are lower in weight than ES shoes, and have a narrower profile, allowing for better penetration.



Extreme Service (ES) shoes are recommended for high-impact applications because they provide increased structural durability and additional grouser wear life to match the wear lives of other undercarriage components. ES shoes have thicker plates and taller, thicker grousers. The taller ES grousers increase traction in rock applications but will create more ground disturbance when the grouser penetrates the soil. The thicker ES grouser edge may not penetrate as well as MS shoes in firm underfoot conditions.

Super Extreme Service (SES) shoes are recommended for conditions that are beyond ES applications and where abrasion and consideration of the whole undercarriage life management are required.

Double Grouser Shoes are available in narrow widths. These are recommended for applications requiring better turning capability and less ground disturbance. However, the double grouser shoes result in less traction and penetration.



IMPLEMENTS & COUNTERWEIGHTS



Blades, rippers and other implements are the tools that actually contact the material a dozer is working. They can be customized to a specific application and readily changed to meet varying job needs as the machine moves from site to site. For some implements, choosing the counterweight is critical in matching machine performance to various site conditions.

In addition to traditional dozer implements, Caterpillar also offers a range of dozer technologies and electronic tools to help improve accuracy and efficiency on the job. Your Cat Dealer can help you select the best combination of implements, counterweight configurations and technology tools to match your unique job requirements.



BLADES

Properly matching a tractor to a dozer blade is essential for maximizing production. Blade choice is dependent on the limitations of the tractor, along with the characteristics of the material being moved, such as:

Particle Size and Shape - The larger the individual particle size, the harder it is for a cutting edge to penetrate. Also, particles with sharp edges resist the natural rolling action of a dozer blade. These particles require more dozing power to move than a similar volume of material with rounded edges.

Voids - Fewer voids in the material mean the individual particles have more of their surface area in contact with other particles, forming a bond that must be broken to move the material. A well-graded material without voids is generally heavy and will be hard to remove from the bank state.

Water Content - In most materials, a lack of moisture increases the bond between particles and makes it difficult to remove from the bank state. On the other hand, high moisture content makes the material heavy and can also require more force to move.

In general, tractors can only exert as much drawbar force as the machine itself weighs. This is typically limited by the amount of traction the machine is able to produce, depending on terrain and underfoot conditions. However, in certain cases, tractors can produce more drawbar force than their machine weight.

Your Cat Dealer can help you select the blade or blades that best match your tractor, applications, materials and job site underfoot conditions.



COMMON BLADES & APPLICATIONS

Universal Blade (U) - This blade is best for lighter or relatively easily dozed material. The large wings on this blade make it the most efficient for moving large loads over a long distance.

Applications include land reclamation, stockpile work, charging hoppers, trapping for loaders, overburden removal, landfill, and stockpiling of coal and woodchip piles.



Semi-Universal (Semi-U or SU) - SU-blades combine the desirable characteristics of U-blades and S-blades into one. The addition of short wings increases blade capacity. The wings provide improved load retention while maintaining the blade's ability to penetrate and load quickly in tightly packed material, and to handle a wide variety of materials in production applications. Equipped with a push plate, it can be effective for push-loading scrapers.



Straight (S) - Straight blades provide excellent versatility. Because they are smaller than SU- or U-blades, they are easier to maneuver and can handle a wider range of materials. S-blades are more aggressive in penetrating and obtaining a blade load, plus they can handle heavy material easily.

Variable Pitch Power Angle Tilt (VPAT) - Versatility is a key feature of VPAT blades. They can handle a variety of applications from site development to general dozing work. Blade lift, lower, angle and tilt are controlled with one lever. Foldable versions of this blade type are also available to facilitate machine transport in width restricted areas.



VPAT blades can be mechanically tipped forward for improved penetration or to shed sticky material and tipped backward for finish grading and improved productivity.



Special Application Blades

Variable Radius Semi-U - These blades combines the benefits of Semi-U designs—such as “cutting” ability and ground penetration—with U-blade characteristics of load retention and reduced side spill. A variable radius moldboard causes dirt to move to the center of the blade creating more rolling action. The extended side plates retain the load and increase capacities. Variable Radius Semi-U blades are excellent tools for land improvement, soil conservation and reclamation.

Angle (A) - Angle blades can be positioned straight or angled 25 degrees to either side. They are designed for side casting, pioneering roads, backfilling, cutting ditches and other similar tasks. Angling blades can reduce the amount of maneuvering required to do these jobs. Their outside mounted “C” frame can be used for attachments such as pushing, land clearing, or snow removal tools. A-blades are not recommended for rock or severe applications.



Cushion (CU) - Cushion blades are used for on-the-go push loading. Rubber cushions allow the dozer to absorb the impact of contacting a scraper push block. When not push loading, the dozer can be used for cut maintenance and other general dozing jobs. The narrow width of CU-blades increases machine maneuverability in congested cuts and reduces the possibility of cutting tires associated with SU- and U-blades.

Light Universal - Lighter U-blades provide high volume movement of light, non-cohesive materials such as coal and woodchips. Heavier U-blades are better for production dozing and reclamation work.

Landfill - Designed to handle refuse and cover material, Landfill blades feature an open trash screen on top of the blade that allows good visibility and protects the radiator.



REAR IMPLEMENTS

Counterparts to dozer blades, rear implements such as rippers may actually get more use on some jobs than the blade itself. The second most common rear implements are winches. Rear implements add versatility to a tractor, and their selection should be based on machine application.

Cat Medium Track-Type Tractors have been balanced to maximize productivity with the use of rear implements. Rear implements have an impact on the need for and total mass of a counterweight. When a rear implement is not used, a counterweight may need to be added in its place.

Common Rear Implements for Cat Medium Track-Type Tractors

Ripper Arrangements

For any ripping job, choosing the right tractor for the conditions is essential. Key factors include tractor flywheel horsepower, gross weight and penetration force available at the tip. The use of ripping has increased with urban encroachment, and with increasing concerns about the safety and pollution associated with the common alternatives to ripping, such as drilling and blasting.

Multi-Shank Fixed Parallelogram Linkage Ripper - Versatile multi-shank rippers can be effective for use at multiple sites or in multiple applications, without the need to change rear implements. The number of shanks can be varied to match material conditions.

Multi-shank rippers are especially useful for applications that require covering a wide area, such as pre-ripping for scrapers. The fixed parallelogram ripper linkage maintains a constant tooth angle at all ripping depths. (D6K, D6N, D6T)

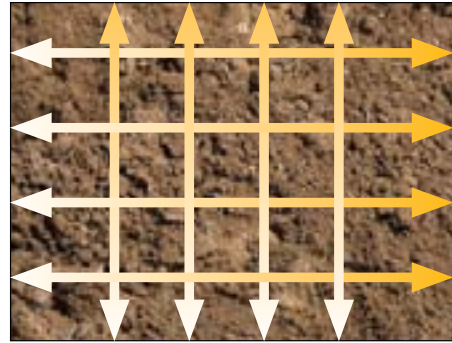


Multi-Shank Ripper with Hydraulically Variable Angle - As versatile as the multi-shank fixed parallelogram ripper, this arrangement adds hydraulically controlled adjustment of the parallelogram ripper linkage. It allows the operator to adjust the angle of the ripper tip to match the material conditions, providing improved ripping productivity. (D7E, D8T)

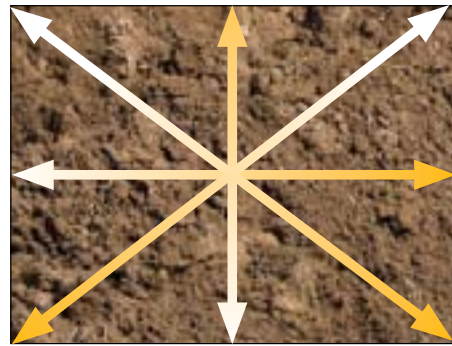
Single-Shank Ripper with Hydraulically Variable Angle - This ripper arrangement is designed for tough ripping applications and deep ripping requirements. A single-shank ripper should be selected when the machine will be used for production ripping. In a production ripping application, the tractor will spend more than 20 percent of the time ripping in tough material. (D8T)

Similar to multi-shank rippers with hydraulically variable angle, the hydraulically controlled adjustment of the parallelogram ripper linkage allows the operator to adjust the angle of the ripper tip to match the material conditions.

Reverse Rippers are commonly used by customers in the petroleum industry. This feature, typically mounted to the backside of the blade, allows ripping of material while the tractor is reversing to prepare for the next dozing pass.



Common ripping pattern



Adjust direction, angle and depth of ripping when materials are found to be too hard



OTHER TRACTOR ATTACHMENTS

Winches

Hydrostatically or mechanically driven winches mount to the rear of the tractor and provide towing capability. Winches are used for vehicle retrieval, logging, oil field setup and teardown, and various utility towing applications.

Specialized Tools

Caterpillar offers a wide range of tractor tools for specialized applications, including:

Woodchip Blade - A very large capacity blade that increases dozing productivity in lightweight woodchips.

Cable Plow - Cable plows mount to the rear of the tractor. Available in both static and vibratory models, they allow high production below-grade installation of copper and fiber optic cables.

Log Arch - Mounted to a winch, a log arch allows the tractor to tow a bundle of logs off the ground.

Street Pads - Bolt-on or clamp-on rubber or polyurethane street pads allow a track-type tractor to travel on paved surfaces with minimal damage.

Fireline Plow - Towed behind a tractor, primarily in the Southeast United States, fireline plows create an eight-foot or wider firebreak to help suppress the spread of wildfires.

Blade Rake - Mounted to the blade with tines that extend below the blade's cutting edge, blade rakes are often called "root rakes" because they allow the operator to remove tree roots below the soil.

Sideboom - For lighter pipe-lifting chores and smaller pipe, sidebooms allow a tractor to do double duty on small pipeline jobs.

Slopeboard - Slopeboards mount to the side of a dozer blade. Hydraulic control allows the operator to finish doze sloping surfaces more efficiently.



Foldable VPAT Blade - A very versatile blade that's ideal for situations where transport width is a concern.

V-Blade (Clearing) - Very heavy-duty blades with a steeply angled V shape and sharp cutting edges, V-blades provide a very aggressive and effective way to clear medium to larger vegetation.

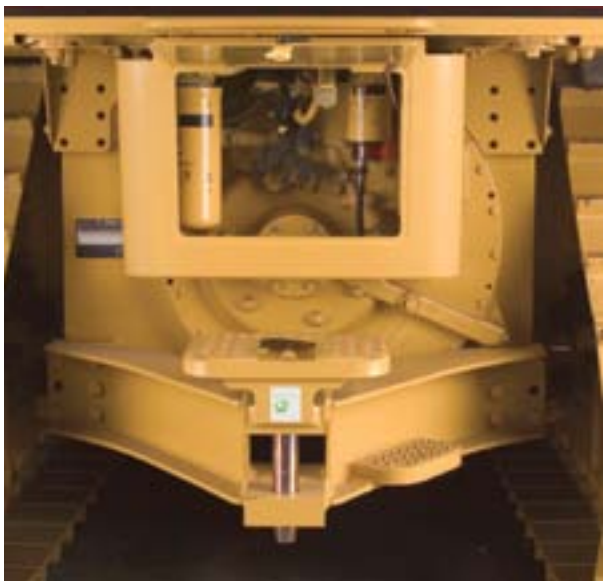
Coal Blade - A large-capacity blade, coal blades enhance dozing production in stockpiled coal and petcoke applications.

Drawbar

Attached to the rear of the tractor, a drawbar can be used for towing implements and for pulling other machines from a stuck or mired position. A drawbar is required on the tractor if no other rear attachment is specified.

Front and Rear Striker Bars

Striker bars are used in waste applications to protect the fuel tank, fenders and other sheet metal on the tractor from damage. Striker bars deflect hazards away from the tractor as debris is carried up by the tracks. Rear striker bars are mounted on a rear striker box, which can be used to store shovels, tools and/or CO₂ cylinders for a fire-suppression system.



COUNTERWEIGHTS

How much counterweight is needed for optimal machine balance depends on a variety of factors, including surface and slope conditions, presence and type of front/rear implements and machine design.

For example, a machine dozing on hard, level ground may need to be neutrally balanced or a little front heavy. A machine dozing downhill may need rear counterweights to maintain traction and blade control. Rear counterweights are not compatible with rippers, but a ripper can often be used in their place when the maximum amount of counterweight is needed.

For optimal performance, especially in lighter blade applications like finish grading, a tractor should be equipped with rear attachments or counterweights for proper balance.



PROTECTION ACCESSORIES

In addition to blades, implements and counterweights, Cat Track-Type Tractors may be outfitted with a range of accessories that provide additional protection, including:

Sweeps - Sweeps are used in forestry applications to provide additional guarding. Constructed of formed steel tubing, they are mounted on the tractor with rubber isolation mounts for vibration and shock resistance. Sweeps are designed to protect only the tractor itself; they do not provide additional falling object protection or rollover protection for the operator.

Screens - Window screens help protect windows from breakage during land clearing applications or when tractor is equipped with a winch.

Bottom Guards - Bottom guards protect the underside of a tractor from dirt, rocks and debris. To be effective, they must be designed to withstand 1.5 times the tractor weight over a 100 mm² area. Front guards also include a pull hook for machine retrieval.

Transmission Guards - Transmission guards protect the transmission housing in rocky terrain. They are usually installed in conjunction with a ripper or winch.



TECHNOLOGY & AUTOMATION TOOLS

Caterpillar offers technologies that help Cat Track-Type Tractors work more efficiently and productively in a wide range of applications.

Cat Grade Control - Factory integrated Cat Grade Control utilizes position sensing cylinders and cab mounted GNSS (GPS + GLONASS) to provide automatic grade control without blade-mounted sensors. It dramatically improves machine versatility, decreases earthmoving costs, reduces operator fatigue and improves productivity.



AccuGrade – A blade-mounted, dealer-installed, automated grade control system using GNSS (GPS + GLONASS), laser and/or UTS technologies is available for a wide range of track-type tractor applications. An AccuGrade Attachment Ready Option (ARO) can be ordered from the factory, which aids in the installation process at the dealer.

CAES - CAES allows machine operators to achieve a desired grade, slope and maximum landfill compaction resulting in optimal airspace utilization. Using GNSS (GPS + GLONASS) technology, this system delivers real-time elevation, grade and compaction information on an in-cab display, giving operators the information they need to maximize efficiency.



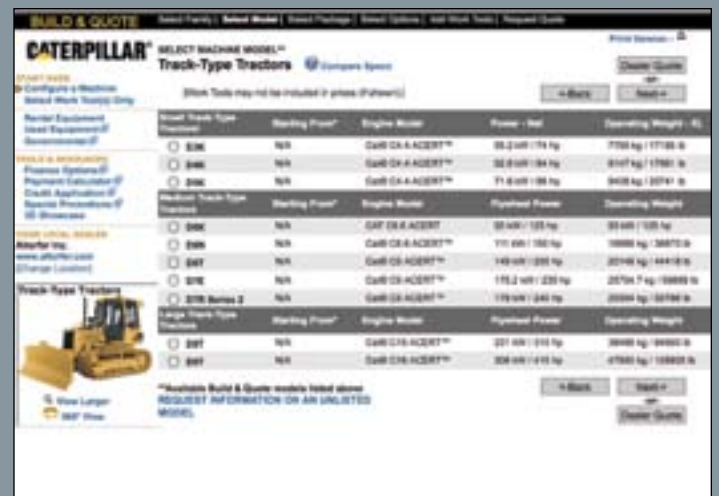
AutoCarry - AutoCarry helps the operator optimize ground power while the tractor is carrying material. The system takes into account machine design and operating conditions (such as slope) to optimize productivity over the entire dozing cycle. (D8T)

Automatic Ripper Control - Automatic Ripper Control adjusts ripper height and engine speed, allowing the operator to focus on steering and planning.

Auto Blade Assist (ABA) - Available on dual tilt machines, ABA automates blade pitch and lift operations to lessen the mental and physical demand on the operator. Settings are customizable, allowing ABA to aid in a wide range of applications.

Configuring A Machine Using Cat Build & Quote

Cat Build & Quote is an online tool that will guide you to a standard Cat equipment package based on your application and job requirements. It offers a good place to start configuring the dozer you need...and it can put you in touch with your Cat Dealer to finish the ordering process.



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