Product INFORMATION

LOADER BACKHOE REPORT

The 580SK versus CAT 416B

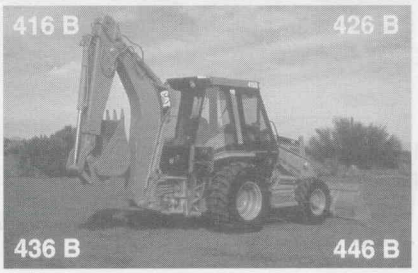
INTRODUCTION

Case Line

In late 1992, Caterpillar introduced a new loader/backhoe product line. The B-Series is CAT's way to set itself apart in the industry and build upon its strength in crawlers and excavators. The major change of the B-Series is an excavator-style boom. While this may initially attract attention, customers have determined that it's not a major revolution in the loader/backhoe market.

This report will compare the CAT 416B with the Case 580SK, covering background, features, benefits, and differences between the two units. Both loader/backhoes compete in the 14 to 15 foot class, and compete for the largest segment (73%) of the market. This report will show CAT's weaknesses, and point out the value that Case equipment provides to the customer.

BACKGROUND



CAT Line

Case has been the market leader in loader/backhoes for the past 36 years. CAT started making loader/backhoes just eight years ago, and has built just over 25,000 units, compared to Case's ongoing legacy of more than 300,000!

However, in that short time, CAT has reached the number two position in the North American loader/backhoe market, tied with John Deere. The B-Series is a direct challenge to Case. CAT is banking on its strength in the crawler/excavator market by adding a distinct excavator-type boom feature to a loader backhoe. The competition is intensified now because Case is also competitive in excavators and wheel loaders.

The B-Series represents a new family of machines for CAT, with several nice features blended into one machine. Although it is a new family, it is still an evolved product, and many of the improvements CAT advertises are improvements over their own previous products. It is also a patchwork machine, with components from Perkins, Dana-Spicer, Ford and Z-F. Assembly has been moved from England to Clayton, North Carolina. Case continues to build it's equipment in Burlington, Iowa.

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CAT'S TOP TEN WEAKNESSES

1. The excavator-type boom transfers the center of gravity on the loader/backhoe further to the rear, resulting in poor roading stability and performance.

CAT Backhoe Boom

Case Backhoe Boom

CAT's backhoe is not over-center. This results in poor tractor roading stability, with almost no under-bucket ground clearance. The excavator boom is a new CAT signature on the 416B, 426B and 436B. CAT used this design on the larger 446 a few years ago.

CAT is promoting extra reach with the excavator-type boom. It's possible to get extra reach with the CAT, but only when the object you are reaching over is nested in the boom arch. This doesn't happen very often so this feature doesn't add value to the customer. CAT also offers an extendable dipper for added reach.

Case has the over-center backhoe for good tractor roading stability and good under-bucket ground clearance. This has been a Case signature since 1971. This is a hoe with excellent features and performance.

Case has excellent reach benefiting productivity and versatility. When added reach is needed, the Case Extendahoe® feature will give the dipper 3-1/2 feet of extra reach.

2. Poor visibility—the four-wheel drive large front tires (18" or 20") block visibility to the loader, while the excavator boom blocks visibility when working.

CAT Visibility

CAT uses 11L x 16 two-wheel drive tires, which are common to the U.S. market, and 10.5 x 20 and 12.5 x 18 four-wheel drive tires which are not common on North American four-wheel drive tractors. The CAT four-wheel drive tires are also larger in diameter than the tires on the two-wheel drive unit (38" versus 31"). The additional height restricts visibility to the bucket and makes it difficult to see the corner of the bucket, which reduces cycle time.

The Case 11L x 16 two-wheel drive tires and 12.00 x 16.5 four-wheel drive tires are a common tire used on loader backhoes. Tires for both the Case two-wheel drive and four-wheel drive units are 31" in diameter. This low profile allows good visibility to the bucket and makes it easy to see corners for faster cycle time.

The overall width of the CAT boom is 10". CAT talks about having good visibility into the trench, but doesn't talk about visibility when the big excavator-style boom is above grade. That's when the boom significantly impedes visibility.

Case Visibility

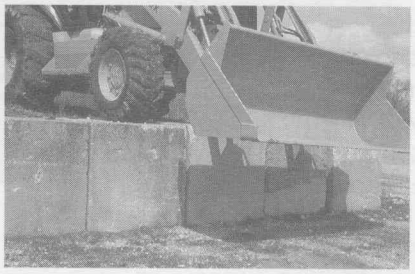
The Case boom is 11" wide, with excellent visibility both above and below grade. It doesn't have the additional mass of the CAT boom blocking visibility when working above ground.

The pictures to the left tell the story. Look at the top photo, of the CAT 416B. Where's the operator? The boom is blocking him out of sight. Next is the Case 580SK, in a similar position. You can clearly see the operator in the cab. Now imagine yourself in each cab, operating the equipment. Which one do you think offers better visibility?

3. On 4WD models, the operator can't control the loader bucket below-grade dig depth, providing only one-inch below-grade depth.

CAT Digging Below Grade

The unusual tires on the CAT four-wheel drive units also impact the loader's below-grade digging operations. With the two-wheel drive tires, the 416B can dig five inches below grade, but the four-wheel drive with the large tires will only dig one inch below grade. Because the bucket is placed so far forward, the operator cannot judge the below-grade depth, so the tractor will follow the tires, preventing a smooth cut. This results in extremely poor performance for a four-wheel drive loader.



Case Digging Below Grade

Case can dig five inches below grade with the loader bucket, using two or four-wheel drive tires. When making a below-grade cut, the front tires don't pull the bucket out of the excavation, maintaining a level grade and smooth cut.

4. The loader has only one working gear. Second gear is too fast to function as a good pushing/working gear—it creates torque converter overheat.

While both CAT and Case offer a four-speed transmission, there is a difference in the speeds and applications. CAT offers only one true working gear. Its second gear doesn't have adequate pushing power and is too fast for a working gear. Case offers two working speeds and two roading speeds. Its second gear provides fast cycles and 10,550 pounds of second gear push, 28 percent more than CAT's 8,250 pounds.

5. Serviceability is poor. Removable side panels add time and effort even simple jobs. Per SAE, Case is 23% easier to service than CAT.

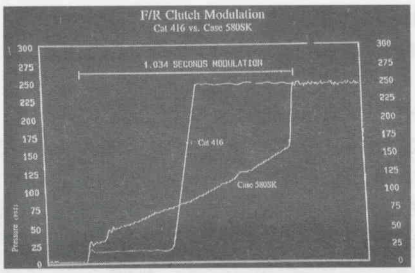
CAT Hood Side Construction

CAT offers small access panels for minor engine servicing. The access panels are not hinged, so they can be lost, leaving the equipment vulnerable to costly vandalism. The CAT side panels are mounted in place with bolts. If the hardware is lost, these panels can get lost, too. Hand tools must be used to remove a side panel, making it difficult to service the engine. The small service doors are secured with turn locks. and can also be lost if not secured properly.

Case Tilt Hood

Case uses a single lever to open the hood for servicing the engine compartment. Two cylinders allow the hood to tilt open easily and stay open securely. Service can be done without removing any panels. No tools are required, either. The Case hood, sides and access panels are all bolted to the tractor and hinged for accessibility, so they cannot get lost when servicing or working on the unit.

Overall, serviceability on the Case models is superior, designed to save the customer time and money. Case has an SAE serviceability value of 17,000 compared to a 23,000 value for CAT. This means that service on Case could be accomplished 23% easier, saving valuable time and effort.



6. Because there's no forward and reverse shuttle modulation, operator fatigue is increased.

CAT purchases a Dana-Spicer non-modulated shuttle, four-speed synchronized transmission. The non-modulated system can result in shift shock for the operator.

The 580SK transaxle is Case-built, with a modulated, soft-shift shuttle, and four-speed synchronized transmission to shift up or down on-the-go.

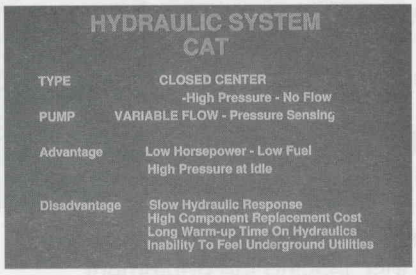
CAT Backhoe Bucket Clearance

Case Backhoe Bucket Clearance

7. Poor backhoe underbucket clearance means there's no room for attachments.

Without an over-center backhoe, CAT has very little clearance (34") between the ground and bucket, or boom. This results in poor maneuverability on job sites and also makes it difficult to mount hydraulic attachments such as breakers. If they did mount a breaker on the backhoe, it would be necessary to extend the dipper in order to transport. CAT already has a balance problem and installing a rear attachment could make it worse.

Case's superior under-bucket clearance (50") provides excellent maneuverability. This shortens tractor cycle time for more production and less damage to job site materials. Using attachments is easy—they can be mounted between the dipper and boom without hitting the ground or extending the dipper for clearance. This lets the operator tuck the attachment close to the tractor for good roading stability.

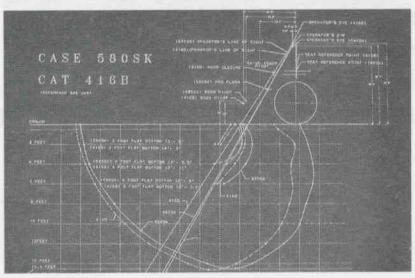


8. Closed center hydraulics offer slower response and hinder the operator's ability to "feel" objects.

The CAT 416-B utilizes a closed-center hydraulic system with a variable flow, pressure-sensing pump. It offers the advantage of being a low horsepower, low fuel system. However, there are several disadvantages, such as slow hydraulic response, high component replacement cost, a lengthy warm-up time for the hydraulics and limited operator load feel.

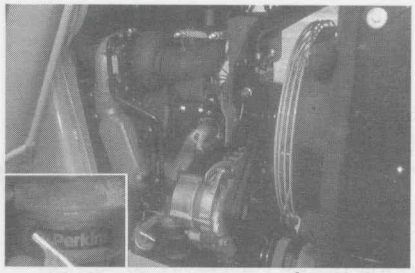
Case uses an open-center hydraulic system with a gear-type pump. This is a constant flow system, with pressure on demand. This system also offers several important advantages, such as fast response, the ability for the operator to "feel" underground utilities, better durability and a low component replacement cost.

9. Compare the backhoe working profile. Case can dig close to a unit and to a greater depth. At a 2' depth, CAT can dig only about 6" closer.

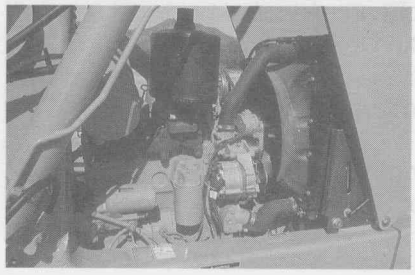


CAT has a dig depth of 14' 6" on the standard backhoe and 18' 2" inches with its extendable dipper.

Case has a dig depth of 14' 3" with the standard backhoe and 18' with the Extendahoe® feature. This is a good balance for optimum production. While CAT promotes more dig depth and the ability to dig closer to the tractor, Case measured dig depth and found that in most situations, Case could dig closer to the tractor! CAT could dig closer only when digging a 2' deep trench.



CAT Engine



Case Engine

10. Perkins 1000 Series Engine, alias CAT 3054.

In 1992, CAT signed a one billion dollar, ten-year contract to buy engines from Perkins. The engine used in the 416B is called a CAT Model 3054, but in reality it is a Perkins 1000 Series engine. The Perkins name is cast into the right side of the engine, and the nameplate clearly states "Made to Caterpillar specifications by Perkins." It is a dry-sleeve design, rated at 74 net horsepower, 79 net horsepower turbo. It doesn't have the high efficiency of the Case-built engines.

The Case engine is a state of the art design, representing the latest in diesel engine technology. The engine used in the 580SK is the Case 4-390, rated at 70 net horsepower, 78 net horsepower turbo. It's sleeveless, with built-in water and oil pumps, and self-adjusting fan belts. It has 25 percent fewer parts, for lower maintenance costs than a conventional wet-sleeved engine. Many of the components on the Case 4-390 have been designed for 119 horsepower. The 580SK is using only 63% of the design criteria. With this design reserve and proper maintenance, engine life can be greatly extended. The Case engine has proven over time to be reliable, and has set the industry standards for uptime and efficiency.

1. Case uses two loader bucket cylinders for a stronger, more durable design.

CAT Bucket Cylinder Design

CAT loader arms are divergent (narrow at the top, wider at the base) to support the back of the bucket, since the single bucket cylinder provides less support. The divergent arms and heavy-duty buckets are necessary to reduce twisting of the loader frame and arms, which reduces the life of those components. Divergent arms are more difficult to repair, because the parts are not in-line.

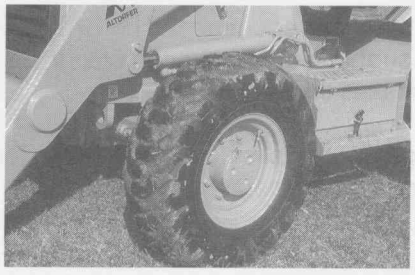
CAT's loader and bucket cylinder can be unstable and have a great deal of twist—so much twist that rub blocks had to be added between the loader and radiator wrapper to minimize twist!

Case Bucket Cylinder Design

Case loader arms are straight and in-line when pushing into a stock pile. There's less twisting, good support and good bucket visibility. Case's loader arms provide a good balance between material, push power and hydraulics.

The Case loader and bucket cylinders are stable, with minimum twist. Clearance between the arms and hood is adequate, and no wear plate is needed along the hood because the in-line linkage maintains clearance.

2. Case's front tires are readily available. The unusual front tires on CAT four-wheel drive models are difficult to obtain, resulting in additional downtime.



CAT Front Tire

The 18" and 20" tires CAT uses are not often seen on North American four-wheel drive tractors. These tires are not commonly manufactured in North America and must be special ordered or obtained through CAT. Waiting for the correct tires can result in lengthy downtime.

The Case models use a common tire which is supplied by most manufacturers in North America.

3. Case has 42% more glass in the cab, providing substantially better ground visibility than CAT.

CAT Cab

The CAT cab has 42 square feet of glass, which is 42 percent less than the Case cab. CAT also uses a wide (5-1/2") mounting frame to support the glass and the cab structure, which further limits visibility for work and travel.

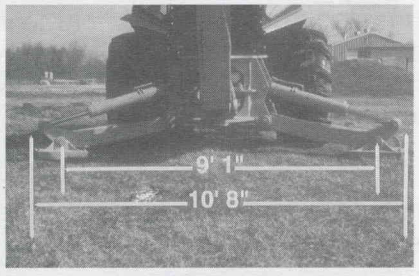
CAT's lower cab window stores behind the upper cab window. When ventilation is required, the upper panels swing overhead into the cab roof. The lower panels either stay in place or can be stored behind the upper panels. This design limits cab ventilation to an open or shut system. The rear wiper does not have a store position. An overhead latch, which is difficult to operate, hold the window and panel in place.

Case Cab

Case has 59.6 square feet of glass for a full panoramic view of the job site. A narrow seal supports the upper and lower glass for maximum visibility to the front tires or bucket corner.

The Case cab rear window slides down to store when total cab ventilation is required. The window can be partially opened if less ventilation is needed. It is very easy to raise and lower the rear panels. Case stores the rear wiper on the left-hand panel.

4. Case's stabilizer spread is wider which improves stability.



CAT Stabilizer Spread

CAT advertises a stabilizer spread of 10' 8". But when we checked a 416B four-wheel drive unit, the width was measured at 9' 1-3/4" to the center of the pad which is in accordance with SAE. Indications are that CAT may have poor stabilizer spread because of its narrow width, resulting in poor off-side stability.

Case Stabilizer Spread

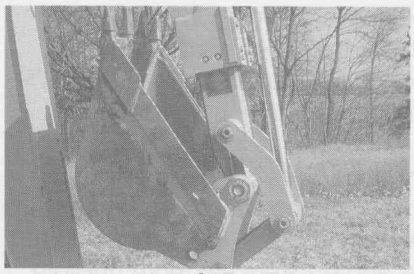
Case's stabilizer spread is 9' 6", for good stability when working off the side of the unit or when lifting heavy objects. The wide stance offers good hillside stability also.

5. A time-saving quick coupler is standard on the 580SK, but optional on CAT.

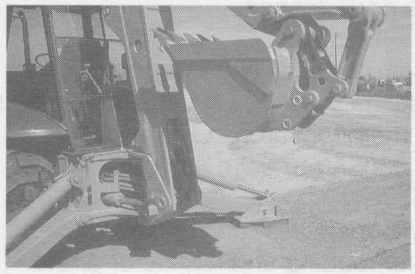
Case Quick Coupler

CAT does not offer a quick coupler as standard equipment. The CAT owner must go to an allied equipment supplier for this attachment. It costs approximately $700.00 and then takes time to install.

Case's quick coupler is standard equipment. This is a real time-saver, for quick replacement of backhoe buckets or attachments.



CAT Backhoe Bucket



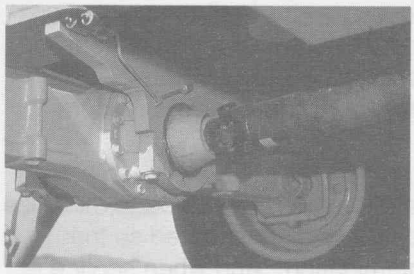
Case Backhoe Bucket

6. The 580SK comes equipped with a heavy-duty backhoe bucket, while CAT's standard equipment is only a light-duty bucket.

CAT's backhoe bucket is designed similar to the Case bucket, but it only weighs 326 pounds (100 pounds less than Case). Less material means less durability. Bucket curl is 170°, which is less than Case's. This makes it more difficult to retain a load when truck loading or digging straight wall trenches, resulting in lower production.

Case designed a heavy-duty "Universal" bucket to fit current models and models prior to the 580B. The bucket weighs 426 pounds for long life and durability. The additional bucket and coupler weight results in less boom and dipper lift. This bucket also has excellent bucket curl of 185° for straight wall trenching and truck loading.

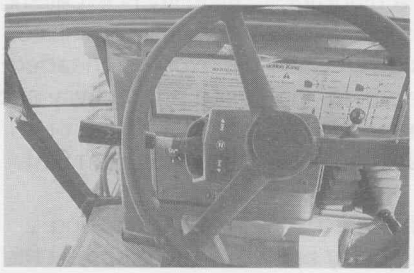
7. Case has 36 years of market leadership. It just doesn't compare to CAT's limited reputation in the loader/backhoe market.



CAT Axle Mount

8. An axle shaft guard is standard on Case, but a $555 option on CAT.

This is just one of several Case standard features that is optional on the CAT 416B. Why should customers have to pay more to get the basics?



Case Shuttle Lever

9. Forward and reverse detent on the Case shuttle lever hold it in position, preventing it from accidentally slipping into or out of gear.

CAT has a flip-type mechanical detent to hold the shuttle lever in forward or reverse. It must be engaged by the operator.

Case has a positive detent for the forward and reverse shuttle lever. All the operator needs to do is to raise the lever, then shuttle. A detent is a positive means to hold the lever in neutral so the lever cannot be bumped into forward or reverse if the engine is left on when the operator leaves his seat, which is not a recommended practice.

10. A front bumper is standard on Case, but not on CAT.

Many of the features that Case owners come to expect as standard are optional on CAT models. Here's a look at how much more a customer would spend on options to get a loader/backhoe equipped like a standard Case model.

Description	Case	CAT	Case $	CAT $	Difference
Counterweight	Standard	Optional	—	$1320	$1320
Lights (4)	Standard	Optional	—	$171	$171
Guard (4WD)	Standard	Optional	—	$555	$555
Quick Coupler	Standard	Optional	—	$624	$624
24" Heavy-Duty Bucket	Standard*	Optional**	$945	$1650	$705
Shuttle Modulation	Standard	Optional	—	$200	$200
Backup Alarm	Standard	Optional	—	$117	$117

VALUE TO THE CUSTOMER

The Caterpillar B-Series of loader/backhoes is getting a lot of attention with its excavator boom and plenty of hype from CAT. But when you compare the B-Series head to head with Case, the market leader, you'll find that there isn't that much to get excited about.

Every detail and feature of the 580SK reflects Case's expertise and attention to customer needs. This loader/backhoe was designed for high productivity, efficient operation and low maintenance. Key components, like the loader arms, steering cylinders. and buckets are more durable. The Case diesel engine is known for its performance.

While CAT claims that its excavator boom provides extra reach and dig depth, that only applies in certain situations, such as when the object that the boom is reaching over is nested in the boom arch. Otherwise, performance features of the 416B and 580SK are quite comparable.

Special features make the 580SK easy to maneuver on tight job sites. The weight transfer ratio is well suited for roading and hillside or grade operations. Case's over-center backhoe helps give this equipment good stability and excellent under-bucket clearance.

The 580SK has superior performance in below-grade digging situations. The transmission beats CAT's, with not one, but two working speeds and a faster fourth gear for site-to-site transportation. The hydraulic system provides a good balance between fast response and lower pressure levels that extend component life.

When it comes to serviceability, Case equipment is designed to minimize repairs. Important components are located and constructed so that there's very little risk of damage or contamination. And when service is necessary, hinged access panels and a fully-tilting lift-up hood make routine maintenance or repairs fast and easy.

The 580SK is an operator's helper, not a hindrance. Visibility is excellent, controls are easy to use, and the cab is comfortable and well-organized. Years of building loader/backhoes has given Case the expertise needed to create equipment that's easy to operate, for increased productivity and efficiency. Time-saving features, like a quick-coupler and a full set of working lights are standard on the Case machines, but optional on CAT.

The bottom line is that while CAT is trying hard, they aren't producing loader/backhoes with the features and quality of Case. The 580SK is the perfect example of why Case remains number one, not just in numbers of machines sold, but in customer satisfaction and performance!

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A Tenneco Company
700 State Street, Racine, WI 53404 U.S.A.

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