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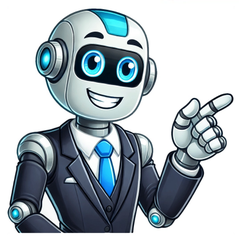

Using an excavator may sound overwhelming – almost impossible for first-time operators. However, it's pretty easy to run one of these machines. Excavators are incredibly versatile machines. You can use them to dig a ditch, to lift concrete, to grade some dirt, to move some concrete, or to tear through a hillside. Whether you're trenching, moving dirt from point A to point B, or pushing through a tough spot in the woods, you need to understand the basics of how to operate an excavator properly for safety and efficiency. Because people get scared of all the ropes, levers, buttons, and kicks in the pants, they don't know how to run a track hoe efficiently. Making rookie mistakes can cost you money, tear up your track hoe, or even kill you. Don't tear your machine up, cost yourself money, work to death, or worse by being an ignorant operator. If you're a brand new track hoe operator, don't run one until you get someone to show you how to operate one the right way. Don't drive over the edge of the hill. Install the attachment you can drop when you aren't using it, such as a bucket or a hammer. In this article, we teach you step-by-step how to operate an excavator safely and efficiently. By the end of this article, you will have a good understanding of the track hoe's controls, basic operations, and a few other tips to help you work a little better on the job site and a little safer. Before you try to operate an excavator, you need to study the controls. Modern track hoes have lots of controls. Each machine is a little different. But most track hoes have the same basic controls. Joystick Controls: Most excavators are operated by two joysticks. Usually, one controls the arm (the boom and the dipper), while the other controls the bucket and swing. Left Joystick: Controls the boom and the dipper (long arm and smaller arm). You push the stick forward, and the boom goes out. You pull the stick back, and the boom comes up. Right Joystick: Controls the bucket and swing. You push the stick forward and the bucket curls to scoop something up, then pull it back to uncurl it. Foot Pedals: You also have foot pedals. There are two of them. One runs the track forward; the other runs the track backward. On some machines, they use one pedal to run the track in both directions. The other pedal controls your swing. Travel Pedals: The right pedal goes forward, the left pedal goes backward. The more you press the pedal, the faster you go. Swing Pedal: Another pedal rotates the upper house. When you press on it, it turns the upper part of the excavator to the left. You press again (usually the other way) to turn to the right. Throttle: You have a throttle. The throttle is used to control your engine speed. Usually, the throttle is on the right-hand side. If you go full throttle, you give more power to the engine to help you dig or lift something heavy. Track or Wheel Pedals: You usually have foot pedals that control track speed. If you have a wheel machine, the pedal allows you to steer when you step on it. But since you're not using it to steer a track machine, what do you use it for? You can use it to rotate-the-house left or right. Let's say you know how to operate an excavator. The next thing they need to know is to start the machine. Here is a step-by-step guide to starting the excavator: Insert the Key: Take the key and put it in the ignition switch. Turn the key to the on position. Some excavators you may have to turn to the start position. Once the engine turns over, let the key go back to the run position. Check the Hydraulic System: Before you start it, check the hydraulic fluid level. Some machines have a hydraulic preheat button you hit before you ever start it, especially in cold weather. This button helps warm the hydraulic components up and makes your controls work easier when you start the machine. Activate the Parking Brake: Put on the parking brake so the machine does not roll while you start the engine. This is especially crucial if you're working on a slope or uneven ground. Start the Engine: Turn the key to the start position and let go. It starts the engine. Let it idle for a couple of minutes to make sure there is enough hydraulic pressure and the fluid is moving around in the machine like it should be. Test the Controls: After it idles for a minute, now play with all your controls and work your machine to make sure it's functioning correctly. Once the engine is running, you're comfortable with your controls, and you've checked that everything is working, it's time to move your excavator. To move your excavator, you control the travel, rotation, and lift of the excavator. Adjust the Seat: You need to be sure your seat is adjusted before you operate the machine. You need to be able to reach the controls and the pedals comfortably. Forward/Backward Movement: Your foot pedals control the travel speed. To move forward, gently press the right pedal. To move backward, press the left pedal. The more pressure you apply to the pedal, the faster your excavator moves. Practice pressing the pedal smoothly and gradually so you get the feel of how sensitive it is. Speed Control:The more pressure you put on the pedal, the faster the machine will go. You can control how fast the machine moves by how much pressure you put on the pedal. If you slowly apply pressure, the machine moves slowly. If you press harder, the machine moves more quickly. Rotation (Swinging): Rotating the machine, you use the foot swing pedal. Press right to swing the upper house to the right and press left to the left. The harder you press the pedal, the faster the machine swings. Practice pressing the swing pedal gently and smoothly. Now you have the basics of moving the excavator down. Digging is why we buy an excavator. An excavator is primarily used to dig. Learning how to operate an excavator to do that is key. Position the Excavator: You need to position your excavator so the bucket lines up with where you want to go. If you're digging a trench, get the boom at the right angle so you dig to the correct depth. Lower the Boom: You use the left joystick to lower the boom to the ground. Push that stick forward to extend the boom downward or pull the stick back to lift the boom. Extend the Dipper: Push the right joystick forward to extend the dipper arm, which puts the bucket into the ground. This is your first digging motion where you're starting to break through the soil. Curl the Bucket: Once you have the bucket where you want it, pull the right joystick back to curl the bucket into the soil. Now you're scooping dirt into the bucket. Lift and Transport: After the bucket is full, raise the boom and dipper arm and move the load where you want with the left joystick. One of the primary uses of an excavator will be to lift and load materials like rocks, dirt, or construction debris onto trucks or piles. Position the Excavator: Get the excavator close to the pile of material or truck bed that you want to load. Make sure the excavator bucket is in a stable place to scoop up material. Scoop the Material: Lower the bucket into the pile of material you want, and then you'll use the right joystick to stretch the dipper arm out and scoop up the material. Raise the Bucket: Once the bucket is full, you pull the left joystick back to raise the boom and dipper arms. As you do this, the bucket will lift the material. Transport the Load: Now you swing the excavator by gently pushing the swing pedal. Then, you'll drive over to the truck or to where you want to dump the material. Release the Load: Tilt your bucket by pushing the right joystick as hard as you wish forward to dump the material in the truck or pile. When you need to dump the material you've scooped, you'll need to operate the bucket to let the load out. Position the Bucket: Swing the excavator until the bucket is above the truck bed or your dump area. Make sure the bucket is directly above your target. Tilt the Bucket: Push the right joystick forward to tilt the bucket and dump the material. Retract the Bucket:After you dump, return the right joystick to the back position to return the bucket to its starting position. Make sure the bucket is in the safe up, right position before moving away. When you are finished with your work, you'll need to safely stop using the machine. Engage the Parking Brake: Always engage the parking brake before you turn off the machine. This will keep the machine in place and prevent it from moving unexpectedly. Turn Off the Engine: Turn the key to the "off" position to kill the engine. Some machines will have a separate "kill" switch to kill the engine. Inspect the Machine:After you stop the machine, check the machine over for any issues, or for any maintenance that needs to be done. Check hydraulic fluid levels, look at the tires or the tracks, and check for any damage or wear on the machine. Safety is always first. Here are a few essential tips to stay safe while operating an excavator: Before you ever get on an excavator, always do a full pre-operation inspection to make sure the machine is ready to go. Check Hydraulic Systems: Make sure there are no leaks or damaged hoses. Inspect the Tracks or Tires: Make sure they are in good condition and properly tensioned. Test Controls: Ensure all the controls are responsive and not damaged. Verify Safety Features: Check safety features such as alarms, lights, and fire extinguishers to make sure they are working. Always wear the right personal protective equipment (PPE) to protect yourself from potential hazards. Helmet: Protects your head from falling objects or impact. Safety Boots: Steel-toed boots are essential to protect the feet. High-Visibility Clothing: To ensure you are visible to others on the job site. Hearing Protection: Ear protection is crucial in noisy environments. Each excavator will have a specified operational capacity. This includes the maximum load you can lift or dig with. Always: Check the Load Chart: Be aware of the maximum lifting or digging capacity to avoid overloading. Avoid Excessive Reach or Load: Do not extend the boom or bucket too far or overload the machine; you will tip over. Before starting work, always walk around the site to see what's there, understand the terrain, and identify any hazards. Check for Underground Utilities: Make sure there are no hidden cables or pipes you could damage. Clear Obstacles: Make sure there's nobody around, there's nothing in your way or in the area to be damaged by the bucket, the swing, or the tracks. Be Mindful of Overhead Hazards: Look for power lines, bridges, or trees that could get in the way of the boom or the bucket. Operating on uneven or unstable ground increases your risk of tipping over. Be aware at all times: Position on Stable Ground: Make sure the machine is operating on level and stable ground.. Use Stabilizers: When you operate on slopes or uneven ground, you put the stabilizer down on the downhill side. This gives you a little bit more reach and also helps prevent tipping. Make sure nobody is within the swing radius of the boom or the arm. Establish a Safe Zone: It is important for workers to stay out of the swing radius of the excavator to avoid being struck by the bucket or boom. Communicate with Ground Personnel: Use hand signals or two-way radios to communicate with others on the site when moving the machine. When operating the excavator for digging, be aware of the following best practices: Dig in Layers: Dig in layers to avoid overloading the bucket and to ensure stability. Excavate Gradually: Avoid jerky, sudden movements that could cause instability or damage. Don't Overreach: Avoid extending the arm too far; it can cause the machine to be unstable. Excavators have significant blind spots, especially when operating in tight spaces. Use Spotters: In confined areas, use a ground worker to guide you and ensure there are no obstacles or personnel in the way. Check Your Surroundings: Always double-check your surroundings before moving the excavator to avoid accidents. Modern excavators come equipped with various safety features that should never be ignored. Safety Belts: Always wear your seatbelt to prevent ejection in the event of a sudden stop or rollover. Operator's Cabin: Ensure that the cabin door is properly closed before operating, as it provides additional protection. Excessive speed and abrupt movements can lead to machine instability or loss of control. Always: Operate Smoothly: Use smooth and controlled movements when operating the excavator, especially when lifting, lowering, or rotating the boom. Slow Down in Tight Areas: When operating in confined spaces, reduce your speed to maintain control. When moving the excavator from one job site to another: Secure the Machine: Make sure the machine is properly secured when transporting on a flatbed truck or trailer. Follow Road Safety Rules: Abide by road laws, and use the appropriate signage and safety equipment when moving the excavator on public roads. After finishing the workday, follow proper procedures to safely shut down the excavator. Lower the Boom and Bucket: Always lower the boom and bucket to the ground before exiting the machine. Turn Off the Engine: Ensure the engine is turned off and the keys are removed when not in use. Clean the Excavator: Perform a quick cleaning of the excavator to remove any debris that could interfere with future operation. Operating an excavator is a rewarding skill, and with practice, you can become efficient and confident in handling the machine. By understanding the controls, mastering basic movements, and always prioritizing safety, you'll be able to perform a variety of tasks with precision and control. Always remember to practice regularly, and take the time to learn all the nuances of the machine to ensure long-term success in your excavation projects. If you have never operated a piece of heavy equipment or are a seasoned-vet in the construction industry, you never stop learning. We put together this tutorial to help those looking for some direction on how to operate an excavator. We will go over five important aspects to operating an excavator, including controls, driving/operating, digging, backfilling and parking. ControlsLearning the controls is essential to becoming efficient as an excavator operator. There are two different types of control patterns for excavator: ISO & SAE. Typically, ISO controls are standard, which we will be using. It is important to note that most machines now have a valve that you can switch to the control pattern that you are most comfortable with. Right Joystick: Controls the Boom & BucketBoom: The boom is an angled arm that is attached to the excavator itself that moves up & down. It is controlled by pushing the right joystick forward (boom down) and backward (boom up). Bucket: The bucket is located at the end of the stick. It is controlled by tipping your wrist to the left (bucket open) & to the right (bucket closed). Left Joystick: Controls the Stick & SwingStick: The stick is pinned to the boom and moves forward and backwards. It is controlled by pushing the left joystick forward (away from the cab) and backwards (towards the cab). Swing: The swing can rotate the excavator cab 360 degrees. It is controlled by tipping your wrist to the right or left. So how to operate excavator when you are starting out as an excavator operator, learning how to use an excavator the right way is essential for safe operation as well as efficient and long-life operation of the machine. Doing it the right way will keep you out of trouble and out of the shop. If you've recently bought an excavator, you might feel overwhelmed by the complexity of its controls. This guide on how to operate an excavator will walk you through the basics, safety tips, and common mistakes that new operators should avoid. Now that you know why it's important to master the operation of an excavator, let's break down the key things you need to know to get started. One of the first things you need to understand when you are learning how to operate an excavator is the key controls for an excavator. Every control lever, button, and pedal operators need to touch is there for a reason and designed to help them dig more efficiently and more safely. The key controls on an excavator are the hydraulic control levers, foot pedals, and joystick on the right of the machine. These control everything from the movement of the machine to the digging power of the bucket. The better you are with these controls, the more you can move with precision and confidence. The main control components you need to familiarize yourself with include the boom and arm levers, the swing control, and the throttle. The foot pedals control the speed and direction of the tracks. Let me break this down for you real fast. Control ComponentFunctionDescriptionBoom LeverControls the lifting and lowering of the boomAllows the boom to extend and retract.Arm LeverMoves the arm of the excavatorHelps in digging, reaching, and unloading materials.Swing ControlMoves the cab of the excavatorRotates the entire machine for better maneuverability.Foot PedalsControls the movement of the tracksForward, reverse, and turning directions.ThrottleRegulates engine powerAdjusts engine speed for various tasks. The better you know and are comfortable operating these controls, the better and more safely you will be able to operate an excavator with no mistakes because you know exactly what you're doing. Operating an excavator for the first time can be a little daunting, but know this: the number one reason you need to know is how to operate an excavator safely. You don't want to kill yourself. You don't want to kill somebody else. You don't want to tear up or break the equipment. From understanding your environment to operating the controls, learning how to operate an excavator safely is always front and center in your thought process. Safety is number one when you're learning how to operate an excavator, especially for those new to the machine. Every time you plan to get on an excavator, always check your machine out, wear the appropriate personal protective gear, and get to know what's beneath and behind you in the area you plan to work. Run through your safety checklist, and you won't be surprised by kids racing up to you or any other potential accident waiting to happen on your job site. Before starting the excavator, make sure to check out key components like the hydraulic system, engine oil levels, and fuel. Also, make sure nothing is in your way in the area where you're working. Here's a quick list for you: Safety CheckPurposeDescriptionHydraulic System CheckPrevents leaks and pressure failureEnsure that the hydraulic fluid is full and there are no leaks.Engine Oil CheckKeeps engine running smoothlyMake sure the engine oil is at optimal levels to prevent engine failure.Working Area InspectionIdentifies obstacles and hazardsEnsure the area around you is clear of large obstacles.Seat BeltEnsures your safetyAlways wear the seat belt to minimize injury risk. These safety checks can make sure you're ready to rock-n-roll and begin operating your excavator without any unpleasant surprises. Typical mistakes operators make when they are new to an excavator are avoidable. By identifying these common fail points, you can improve your skills and make the excavator last longer without incurring expensive repair bills after you destroy something from your lack of knowledge. The most common mistakes newbies make using an excavator are running the controls too rough, not looking around the machine before you start to use it, and not respecting the limitations of the machine. Paying attention to these tricks on how to operate an excavator will go a long way in helping you avoid those pitfalls and lose some of the fear you may have when working the machine. The most common problem that you need to look out for when starting out is to not run the machine smoothly, especially before you get used to the controls. It will tear stuff up and cause you to be inefficient. Here are some other mistakes to avoid: MistakeConsequencesHow to Avoid ItAbrupt control movementsCauses jerky operation and damageLearn smooth, gradual control movements.Ignoring the machine's limitationsCan damage components or overstrain the machineUnderstand the load capacity and avoid overworking the machine.Failing to inspect the machineIncreases the risk of breakdownsPerform daily inspections before use. And that is how you avoid those mistakes. You won't be down as much, and you won't tear up your excavator, causing it to break as much if you understand those things. Keep your excavator running longer is the key to making money. Plus, learn many other ways you can use it. Maintenance of your equipment is crucial to the longevity of the machine and of your career stringing things together with that job. You check the hydraulics for leaks. You check the engine oil and the fuel. Check to see nothing's in your work area that could get torn up when you swing the machine around. Do these things, and the next thing you know, you can operate an excavator without any downtime. Check the hydraulics to make sure they do not have any leaks. Check the engine oil level and the fuel. Nothing is around you in your work area that can get torn up when you spin that machine around. Do those things, and the next thing you know, you can run an excavator without having any downtime. Maintenance TaskPurposeFrequencyTrack InspectionPrevents track damage and failureWeeklyHydraulic Fluid CheckEnsures smooth operationBi-weekly or as neededOil and Filter ChangeKeeps engine running efficientlyEvery 250 hours of operationAir Filter CleaningImproves engine performanceMonthly or as needed The end is to prevent costly repairs and ensure your machine continues to function like a Swiss watch. To operate the excavator properly, you need to know how to use the basic controls. The whole game is to use the controls so that you can move, dig, and load materials into trucks and offload trucks quickly and efficiently. Then you can become a very stellar operator. Once you know how to use the basics, you're ready for the next step of learning how to operate an excavator. The basics are running the hydraulic levers, the foot pedals, and the hydraulic joysticks. That's it. Those are all the controls you have to learn to run an excavator. They let you gracefully move the machine and dig. Practice, and you'll know how to use an excavator in yards, dirt, rock, sand, mud, or water. Let's break down the main components: Control ComponentFunctionDescriptionJoysticks (Hydraulic)Control arm movement, boom, and bucketUsed to maneuver and operate the machine's arms, boom, and bucket.ThrottleAdjusts engine speedIncreases or decreases engine RPM for smoother operation.Foot PedalsControls the tracksUsed for moving the machine forward, backward, and turning. Mastering these controls ensures that you are fully capable of operating an excavator effectively in any situation. When you're first learning how to operate excavator, it's just as important to know what not to do as it is to know the correct actions. Mistakes can result in safety hazards, equipment damage, or inefficiency. On a Final Drive: Don't forget to put the key back in your pocket. The best way to forget to do something is to do it just once. The drive assembly will not allow a batten to seat with the key in place. You will not be able to tighten your nuts on the batten. Don't panic if you forget; you can wind the work out looked for the key and then wind it back in and install the key. Here are some things you should never do when operating an excavator: Action to AvoidWhy You Should Avoid ItConsequencesFailing to secure the machineIncreases risk of accidentsCan lead to the machine moving unexpectedly.Using excessive forceDamages components and the groundLeads to mechanical failure or inefficiency.Ignoring the environmentRisks safety hazardsCould lead to accidents or inefficient work. To avoid making these common mistakes, be sure never to fail to secure the machine properly, use excess force, or ever blindly enter an area without making sure it's safe for the machine to operate. This month we'll share some more tips to help you operate an excavator successfully in different terrains. Whether you're digging in mud, working on rocky ground, or operating on sand, knowing how to handle the machine is your key to success. This month we'll share a couple more chat questions and tips to help you operate an excavator successfully in different terrains. Whether you're working in mud, rocky ground, or sand, knowing how to properly handle the machine is the key to success. This month we'll share a couple more chat questions and tips to help you operate an excavator successfully in different terrains. Whether you're working in mud, rocky ground, or sand, knowing how to properly handle the machine is the key to success. Terrain TypeRecommended ActionKey ConsiderationsRocky TerrainUse caution, reduce speed, and monitor stabilityWatch out for sudden movements or shocks.Sandy TerrainAvoid sudden turns and use low speedTracks may sink; control speed to prevent tipping.Muddy TerrainUse additional equipment for tractionEnsure the excavator is not bogged down.Sloped TerrainOperate on the slope's lower end for stabilityKeep the cab's weight distribution in check. When you are on steep terrain, short, sharp, jerky movements are what you want. When you push a lever abruptly, it increases your speed, so you speed up equipment on the downhill side. This same application would not be appropriate working around a gas line on flat terrain. In a straight flat p ar Throughout ology is, "If you can't go in the direction you want. Your movIt is also good to kick and thrash your way through a swampy area. Conversely, calmly walking with slow, controlled movement in a straight line is the way to get what you want when you are after a deer or raccoon in a cornfield. Swirling doesn't worse to When it comes to your operation, you need to build a path as directly and quickly as you can to get to whatever it is you are looking for. If the terrain dictates you can't go in a straight shot path, then build a path to get around obstacles. But the rule is to find the quickest, most efficient way to get back on a straight path to where you were headed. Even if you don't spoil it, you can dig a trench faster than you can brand a calf. You can adjust how much you put into the spoil by pushing the boom out more. How you control the boom while you dig determines how much spoil ends up on the ground beside you. Use enough boom and stick to get the bucket to the depth you want, no more and no less. Closing the bucket is how you remove the dirt. The amount of the boom and stick unloaded through the bucket determines whether you're digging a hole as big as a pickup or digging one as big as an old Cadillac. Remember, the electric motors in a mini-excavator are inside the house. The dirt outside the house won't hurt them. So keep digging. If you can't go where you want, go where you need. Your movements create the movement of the equipment and the performance of the equipment in the direction you want to go. Think of it this way — move with a purpose. It is not chaotic. You are not out of control. You are in complete control of the equipment. However, you're moving the equipment in a manner consistent with where you want to go. If you move your equipment in direct linear fashion to the common goal you all share, you are productive. Do what it takes to get where you want to go as quickly as you can get there. If you can't go in the correct direction, move in the right direction to get back to where you want to go. Digging is the primary function of an excavator. Whether you're digging to put in a foundation or to dig a trench to bury a pipeline, you want to be good and fast at it. Especially if you dig the trench to put the gas line in place, then have to cover it back up when you are finished. Being able to dig correctly and fast is the key. StepActionExplanationPosition the BucketAngle the bucket at 45 degrees for better diggingEnsures effective penetration into the ground.Use the Boom and ArmUse controlled movements to reach the required depthKeeps operation smooth and avoids excessive wear.Maintain Consistent SpeedKeep a steady pace without jerky movementsAllows for smoother digging and reduces strain.Watch the Excavator's LoadDon't overload the bucketOverloading can strain the hydraulic system. Good luck with your digging! Follow these techniques, save yourself a whole lot of grief, and prevent spending thousands of dollars repairing broken pipes. Mastering an excavator is all about the basic controls, safety measures, and techniques for the task at hand. Whether it's the correct way to handle an excavator on a slope or how you dig, every step counts. Following the best practices, and eliminating the common newbie excavator mistakes, will help you to become a better operator. It will also save you money by not tearing up the equipment or breaking parts. At the same time, you must eliminate the natural tendency to make more money by being more careless. It's a fine line, but it helps to operate an excavator safely and to do a better job digging and moving dirt. Then, your boss will be happy too. Contact with us for more information! top of pageWorkshop Locations Durban: Bux Farm Johannesburg: BenoniTelephone/WhatsApp 083 639 1982 (Justin Cope) - Durban 071 351 9750 (Ralph Cope) - Johannesburg©2019 by Vikfin (PTY) Ltd. bottom of page The dependency of the construction industry on heavy equipment operations cannot be denied; among them, excavators are quite common. When it comes to operating heavy machinery safely, understanding its working mechanisms is crucial. Every component must be understood, and knowing about the safety protocols is significant for the safety of the people working on the construction site. If you are inclined to learn about the different conditions attached to the operation of excavators safely, you are at the right place. The guide below features in detail everything you need to know about operating an excavator safely and helps not just new operators but even experienced operators. So, let's take a look. Before operating an excavator, you must first understand its essential components. Below, we have discussed the main parts of the excavator and related controls. Main Parts of an Excavator There are various essential components of the excavator and some of these are given below. The cab is the operator's main workstation, which is enclosed and has large windows followed by comfortable seating. It comprises all the controls that help operators to operate the excavator. Boom is attached to the cab and is the arm section that conducts the outward and vertical movement of the bucket as well as the arm. It allows the excavator to reach at different distances and heights to conduct the task. The arm is attached to the boom and offers flexibility and reach; it even helps the boom to keep the position of the bucket accurate. The excavator bucket is used for moving materials and for the purpose of digging. There are different styles and designs of the bucket that are selected according to the project requirements. The undercarriage in an excavator has wheels and rollers which ensures support to the excavator's upper part and helps it with mobility. The tracks are made using rubber or steel and let the excavator move with stability on challenging ground conditions. The machine can move smoothly over uneven terrains with the help of tracks. Controls Overview The control pattern of the excavators is crucial to be understood as it helps in operating the excavator. These essential controls are discussed below. The joysticks in an excavator are used to control movements. The rotation of the excavator and boom is controlled by the left joystick. To lower the boom, you can push the joystick, and to raise it back, you can pull it. Also, you can move left or right to rotate the cab. The right joystick controls the arm and bucket. It is also used for dumping the bucket by moving it, and to extend the arm, you need to push it forward. When you pull it backward, the arm comes back to its actual position. The travel pedals in the excavators control the movements in the reverse and forward directions of the tracks. The swimming pedal is used for operating the swing of the upper part to ensure precise position. Switches in the excavators are used to control them. The excavators comprise a throttle switch, which helps in adjusting the engine speed. It also has an auxiliary switch that controls attachments like hammers. The safety lock switch that helps disable the controls when the excavator is not in use. When operating heavy equipment like excavators, some of the essential precautions are undertaken for the safety of the operator as well as the ground staff. Some of these safety precautions consist of the following: Pre-Operation Inspection The pre-operation inspection is very crucial as it helps identify any issues before using the machine. This consists of assessing the fluid level, which includes hydraulic fluid, engine oil, and fuel, so that you can assess their availability. Also, conduct a check on the undercarriage and tracks to ensure there is no wear and tear to avoid obstacles. The functions of all the controls, like switches, pedals, and joysticks, and its right and left hand controls are also important to assess. The bucket must be checked to ensure it works properly and has no cracks. Operator Training and Certification The old as well as new operators must be equipped with proper training and certification so that they can operate the excavator ensuring a safe working environment. The driver's license must be obtained, and certifications must comply with the local regulations. It helps to reduce the risk of potential hazards and accidents as a trained operator has more experience and capability. The operators of excavators must be hired based on their training and certifications to avoid any hazardous situation. The safety of the site, as well as the staff working there, is important and is determined by how well-trained an operator is. The experience and the skills of the operator are vital and responsible for ensuring the efficiency of the overall process. Wearing the Right Protective Gear The operators need to wear hard hats that protect them against the debris that ends up falling and gloves to ensure a stable grip. The boots must be made of steel toes so that they protect the feet and safety glasses to protect the eyes from fluid or dust. The protective gear worn ensures protection against different types of injuries and helps minimize their impacts on the staff and operators. When the staff is working at the site, all sorts of safety protocols are crucial, and among that, wearing the right PPE is highly stressed to ensure that in case of any accident, the injuries are minimal. Operating an excavator is also a technical matter; operators must be experienced enough to operate them. Most excavators are equipped with an owner's manual, which is important to refer to before operating them. Starting the Excavator Starting excavators requires careful preparation to avoid accidents. A site inspection should be conducted to identify potential hazards, such as obstructions that need to be removed. The excavator should have stable soil conditions, and safety locks must be powered properly. The seatbelt should be fastened, and every control must be neutral. Once everything is sorted, the operator presses the button to start the excavator. Operating the Controls Operating controls are essential for efficient excavator use. The left controls of the joystick are meant to control the cab rotation and boom, whereas the right handles the bucket and arm. Precise movements help to extend and lift the bucket as required. Make sure to avoid jerky motion, as it can make the machine unstable. Digging Techniques The digging technique plays a vital role in the efficiency of excavation. The bucket teeth are used for soil penetration as they are angled downwards. A steady pressure is applied on the boom and digging arm to ensure efficient digging. Make sure not to overload the bucket and maintain balance. Moving the Excavator You can use travel pedals while moving the excavator so that the tracks are under control, ensuring slow movements. Make sure to maintain stability and avoid sudden moves when turning. The visibility must be clear when moving forward, and if you feel any jarring movement, make sure to stop the excavator. Working with Attachments The attachments in the excavator need to be operated safely and precisely. When the engine is turned off, make sure the parts are attached and detached, and the excavator is in a stable position. When changing the attachments, make sure the hydraulic system is secure, and there are no leaks in the hydraulic control. Safety practices are vital when operating an excavator, even if you are among experienced operators. Some of the safety practices to maintain are discussed below. Maintaining Awareness Operators should remain alert while operating the excavator so that a safe operation is undertaken. Make sure to monitor surroundings for other workers, obstacles, and other machinery. Consider using mirrors in the excavators and communicate with the ground staff to ensure clarity. When needed, stop operating and make sure to avoid distraction while operating the equipment. Avoiding Overloading To maintain safety and stability during excavator operation, avoid overloading it. When you overload the excavator, it impacts the hydraulic system and even damages components. When the weight limits are crossed, the risk of tipping prevails. Ensure that uniform load distribution is carried out. Safe Working Distances Preventing injuries and collisions is an important factor to consider when operating heavy equipment like excavators. Ensure maintaining safe working distances with the staff, vehicles and other machinery in the work area. Keep a check on the position of the bucket ensuring no staff is positioned in its radius. Once the process excavator has been finished, some post-operation procedures are conducted associated with its parking and shutdown. Shutdown and Parking Lower down the bucket and all the attachments towards the ground and keep the machine in a stable position. Make sure the entire control pattern is in neutral and the parking brake is engaged. Turn off the engine and remove the key. Also, ensure that the excavator is parked on stable ground. Daily Maintenance The optimal working condition of the excavator is assured by daily maintenance. It not only keeps the working condition of the excavator on point but also prevents expensive repairs. Once the operation is finished, remove dirt and debris and clean the machine. Inspect all the tracks for any sort of damage, and if there is any obstruction, remove them. Keep a check on all types of fluid and coolants, and look for signs of leakage and loose bolts. Immediately replace the damaged components and lubricate the moving parts to avoid wear and tear. Excavator operators need to stay aware of the advancements that take place in the industry and ensure continuous development and training. It helps in improving their skills and also makes them comply with regulations. The operators must make the best use of development and training and maintain safety protocols. The guide above must have given you a detailed idea of how you can ensure a safe working environment in the presence of excavators and how important the training of operators is. Ensuring safety at the construction site plays a vital role for the operators as well as the ground staff. By following the tips shared above, you can ensure a safe excavator operation. At Everstar Machinery, you can have hands on the latest backhoe loaders equipped with innovative safety features, ensuring a smooth excavating operation. So, are you looking forward to having versatile equipment that offers the task of backhoe loader, excavator, tractor, and truck? Look no further and contact us at Everstar Machinery to find out more about our all-in-one backhoe loaders for all your operations. You will get high-quality advanced equipment for your construction site with multi-tasking capabilities. How do I operate an excavator safely? In order to operate an excavator in a safe way, make sure to wear PPE, inspect the excavator before operation, and keep up with the appropriate procedures of operations. What should I check before operating an excavator? Before operating an excavator, check the fluid level of the machine, the controls, and the tracks for wear and tear. Also, ensure that the bucket and other attachments are in good condition. Is training necessary to operate an excavator? Yes, to ensure safety while operating an excavator, proper training is important. What should be done to the excavator once the operation is performed? Once you have performed the operation of the excavator, park it softly on stable ground and perform the maintenance checks after shutting it down. How to protect one's feet and eyes while working on sites where excavators are used? To protect the feet and eyes on the construction sites, you can wear safety glasses and opt for boots that have steel toes. How to Operate an Excavator – 2020 Tutorial, entry level excavator controls overview. We've taken feedback from our viewers on our previous Excavator 101 videos to bring you new and improved training. We will go over the basics of controls, driving and parking in our Komatsu PC210 Excavator. Have a question or comment? Notice: The views stated herein are those of Extreme Sandbox and/or the applicable individual only, and do not necessarily reflect the views of Komatsu or its personnel. Here we cover important aspects of properly reading the instrument panel, understanding levers and switches, and knowing everything about all moving parts on most mini-excavator, medium, and the larger heavy duty excavators. Heavy Equipment Operator Training – How to Operate a Mini-Excavator. Don't let the word "mini" fool you. The mini excavator—a smaller cousin to the large excavators—is extremely important in its own way. In this video, we are going to show you how to operate our mini excavators. We will go over the basics of controls, driving, digging and parking in our Komatsu PC35 Mini Excavator. Have a question or comment? Leave one below! The basics. Instruction from cockpit. Let's face it - operating a heavy excavator feels a lot like piloting a powerful mechanical beast. Whether you're digging trenches for a pipeline or moving tons of earth on a construction site, learning how to operate an excavator the right way can dramatically improve job site safety, efficiency, and productivity. But don't worry! you don't have to be a specialized engineer to get it right. You just need the right guidance, some hands-on practice, and a good understanding of your machine's capabilities. Whether you're new to the scene or thinking of investing in your own excavator for sale, this guide walks you through the basics, technical insights, and insider tips to get the job done like a pro. 1. Know Your Machine Before climbing into the cab, it's important to get familiar with the specific type of excavator you're operating. What's your excavator brand? Are you working with a Kobelco excavator, a Komatsu excavator, or a used mini excavator that's just joined your fleet? Each brand and model has its own control layout, weight class, hydraulic features, and technology. Quick Specs Snapshot (Example: Kobelco SK380LC) Operating weight: 38,300 kg Engine power: 268 HP Digging depth: 7.56 meters Fuel-efficient system: Up to 15% lower fuel consumption with the ECO-mode Modern Kobelco excavators like the SK850LC or the SK520XDLC-10 are loaded with smart tech, like automatic idle-stop, built-in diagnostics, and customizable work modes. They're designed not just for performance, but also for operator comfort and environmental efficiency. At Al Marwan Machinery, we offer a wide selection of brand new and used excavators, including top brands like Kobelco, CAT, Hyundai, Hitachi, and Komatsu. Whether you're looking for specific specs or expert guidance, the right machine is just a click away. Kobelco SK380 excavator in action, trenching with precision. 2. Safety First, Always Operating heavy equipment isn't just about moving dirt. It's about doing it safely. Here's your must-check list before operating any excavator: Walk-around inspection (fluids, hoses, tracks, attachments) Check backup alarms, lights, and horn Make sure mirrors and cameras (if equipped) are clean Wear your PPE: helmet, gloves, steel-toe boots, and hi-vis vest Secure seat belt once inside the cab Also, make sure to identify any underground utilities before digging, as no one wants to be "that guy" who hit a water or gas line! 3. Get Comfortable with the Controls Most heavy machinery brands follow a standard joystick layout, but again, always review your operator's manual. Here's a simplified version of what the controls do in most excavators: Most excavators also have a mode selector for various operations: Power mode for tough jobs Eco mode to save fuel Lifting mode for precise handling Quick tip: Take your time on a flat, open surface to practice each movement individually. Gradually start combining them, like curling the bucket while lifting the boom, to achieve smooth, fluid motion. 4. Basic Excavator Maneuvers You Should Master Few tasks every excavator operator should be able to perform confidently: a) Dig a Trench Trenching is one of the most common tasks for any excavator operator, especially in utilities, foundation work, and pipelines. To do it right: Lower the boom slowly, then extend the stick outward toward your trench line. Curl the bucket in gently as you lower to scoop the soil—avoid aggressive moves that could damage underground utilities. Always dig in a straight line, ideally working from front to back, so that spoil piles are neatly placed beside the trench, making it easier to backfill later. Use depth indicators (if equipped), or periodically check with a measuring rod or laser level to avoid over-digging. b) Load a Truck Loading a dump truck efficiently can dramatically increase your site productivity, especially when you're renting or operating high-cost heavy machinery. Position your excavator at a 90-degree angle to the truck. This minimizes the swing radius and saves time per cycle. Begin by scooping material from the stockpile or dig site, then swing the boom smoothly toward the truck bed. Keep your swing path short and tight to reduce cycle time. Dump the load from a safe height to avoid damaging the truck bed or overfilling. Don't forget to check for even load distribution. Loading too much on one side of the truck can cause tipping on the road. c) Backfill a Hole First, rotate the upper structure so that the bucket is facing the spoil pile. Using the flat underside of the bucket (called the bucket heel), push the soil into the trench gently, don't dump and smash it down. Alternate between pushing and light tapping to level each layer of soil. You may need to repeat the pass several times to distribute it evenly. If you're dealing with compacted backfill, a vibratory plate compactor attachment can be used in place of the bucket. d) Grade a Surface Grading requires a delicate touch and a steady eye. Start by curling the bucket slightly inward, so its bottom edge becomes flat and parallel to the ground. Set the machine to low speed or precision mode, especially when working with modern Kobelco excavators that offer operator-friendly grading functions. Pull the bucket backwards, gently dragging it across the surface while maintaining even pressure. Check your grade regularly with a laser level, stakes, or even a simple string line for accuracy. 5. Pay Attention to Machine Limits Overloading, overreaching, or operating on steep inclines can lead to equipment failure or tipping. Check your load chart, it's usually found in the cab. This chart tells you how much weight you can safely lift depending on boom angle, stick length, and operating radius. Example (Kobelco SK350LC-10): Max lifting capacity at 6m radius: ~6,200 kg Max digging depth: 7.38 m Max reach: 11.45 m Overextending the stick or swinging too quickly with a heavy load can unbalance the machine. The rule? If it feels unsafe, it probably is. Al Marwan operators: professionally trained and HSE-certified for safe operations. 6. Practice Makes Perfect No manual can replace hands-on experience. That's why many professionals opt for heavy equipment rental before committing to buying. At Al Marwan, we offer flexible rental options, including a 5-ton mini excavator up to large models up to 120 tons. Our machines are regularly serviced, so you're always getting peak performance. 7. Keep the Machine in Top Shape Operating heavy equipment goes hand-in-hand with maintaining it. Basic daily maintenance includes: Check engine oil and hydraulic fluid levels Clean air filters weekly Inspect bucket teeth and pins for wear Monitor battery terminals for corrosion Grease joints regularly, especially if the machine works in dusty conditions Skipping maintenance is a shortcut to costly repairs or equipment downtime. Take some time to review our quick handy guide on excavator maintenance tips and daily checks. Komatsu excavator PC850 with long-reach boom at work on Al Jaraf marine project. 8. Level Up with Advanced Features Today's excavators aren't just brute force; they're smart. High-end Kobelco excavators come with features like: Geoscan remote monitoring: track location, hours, fuel usage, and error codes remotely iNDr cooling system: reduces noise levels to just 70 dB and protects the engine from dust Auto idle stop: saves fuel when the machine is inactive for a few seconds One-touch deceleration: instantly cuts RPM for precise maneuvers Spacious, ergonomic operator cab: designed for all-day comfort with easy-access controls and wide visibility Quick tip: If you're comparing used excavators for sale, look for units with such features, especially if operator efficiency and fuel savings matter to you. Excavators Operation Guide Download Article Download Article An excavator is a large piece of machinery used to dig dirt and debris out of construction sites. Using one on a construction site requires operator training and a state operator license.[1] To get started, become familiar with the controls. Learn how the right and left joysticks control the cab, boom, stick, and bucket. Then drive the excavator with its foot pedals. Finally, combine all of these motions to complete your first dig. 1 Determine if the machine is in an ISO or SAE control pattern. These are the two standard control patterns for excavators. The difference between the two is that in ISO, the left hand controls the swing and boom and the right hand controls the stick and bucket motions. SAE reverses this pattern, so if you've been trained on one, switching to the other is difficult. Most newer excavators have a display in the cab that tells you which control pattern the machine is in. Confirm the pattern before you start using the machine.[2] Change the control pattern if it isn't in the setting you want. Some excavators have a button or switch in the cab that makes this change. Look on the display screen for a button to switch the control pattern. On other excavators, the control pattern lever is in the back near the engine. Open the back section and look for a blue or red lever. It should have a mark for each pattern setting. Slide the lever from one setting to the other to switch the pattern. Always consult your owner's manual before changing the control pattern so you follow the right procedure. If you're just learning how to drive an excavator, learn in ISO pattern. This is more common in excavators.[3] 2 Climb into the cab and adjust your seat position. Excavator seats slide back and forth when you pull a lever under the seat to accommodate people of different heights. Check the seat position when you sit down. Make sure your feet can reach the pedals in the front and you can grab all of the handles comfortably. Pull the lever and adjust your seat if you have to. Then fasten your seatbelt for safety.[4] If you won't be running the excavator with the door open, then also shut the door. Most excavators have a handle that locks the door, so secure this before starting the machine. Most operators run their machines with the door closed to keep debris out. Sometimes operators keep the door open to communicate with other workers. Advertisement 3 Turn the key and let the machine idle to warm up. Climb into the cab and look to your right. There is a key and a knob with different positions near the right armrest. Make sure that knob is set to "I" for Idle. Then turn the key to start up the engine. Let the machine run in idle for 5-10 minutes before operating it to warm up. If the weather is cold, run the hydraulic controls through a few cycles before doing any digging. Advertisement 1 Unlock your controls by raising the red lever on your left. All excavators have a locking lever on the left side of the cab attached to the armrest. It's usually red. When the lever is down, the joystick controls are locked. Push the lever up until it clicks. This unlocks the controls so you can move the arm and cab.[5] Never unlock your controls before checking around you to make sure no people or objects are nearby. If someone approaches the cab or you get close to an object you don't want to damage, flip the lever back down until your cab is clear again. 2 Move the right joystick back and forth to raise and lower the boom. The boom is the section of the digging arm closest to the cab. In ISO control, the right joystick controls the boom height. Find this joystick in front of the right armrest. Pushing forward raises it and pulling backward lowers it.[6] Instructions are given in ISO because this is a more common excavator setting. For SAE, reverse the controls to the opposite side. 3 Open and close the bucket by moving the right joystick right and left. The bucket is at the end of the digging arm. The right joystick also controls the bucket position. Push the joystick right to open up the bucket. Push it left to close the bucket.[7] 4 Press the left joystick forward and back to move the stick forward and backward. The left joystick is located in front of the left armrest and controls the stick and swing for the excavator. The stick is the bottom portion of the arm attached to the boom, and looks like it's a shin attached to a knee. Press the left joystick forward to push the stick further from the cab. Pull the joystick backward to bring the stick closer to the cab.[8] Use smooth motions when operating the stick and boom. These use hydraulic systems, so the machines will move as fast as you pull the joysticks. Don't suddenly let go of the joysticks or the machine will rock quickly. 5 Rotate the cab around by moving the left joystick left and right. Finally, you can rotate the cab with the excavator's swing control. Pushing the left joystick swings the cab in the direction you're pressing.[9] The cab moves freely and can complete a 360-degree turn. If you hold the joystick in one direction, the cab will keep spinning. Advertisement 1 Decide if you want to drive the machine with your hands or feet. Excavators have 2 pedals with handles attached to them in front of the cab. The handles extend up so they're straight in front of you. These pedals can be operated by either stepping on them with your feet or grabbing the handles with your hands. Both work the same way, so it's a matter of preference for which you choose.[10] If you're a beginner, driving with your hands may be easier. Most expert operators prefer using their feet to drive. 2 Push both pedals up to move forward. Excavator driving controls are simple. To move forward, press both pedals forward at the same time. You can do this with your hands or feet. The amount of pressure you apply determines how fast the excavator moves.[11] If you're using your feet, rest them on the top of the pedals and push down there. Always make sure no one is around you before moving the excavator in any direction. An excavator's stop speed is around 8 mph (13 km/h), so even if you press down as hard as you can, you won't move very fast. 3 Pull both pedals back to move backward. If you want to move backward, just do the opposite motion. Pull back on both handles at the same time to move in reverse.[12] If you're using your feet, press on the bottom of the foot pedals to move backward. Shift your feet down with your heels on the floor of the cab. Then press down with your toes touching the bottom of the pedals. Always check behind you before reversing. Some newer excavators have cameras on the back to help while you reverse. 4 Press 1 pedal at a time to turn the excavator. The pedals each control 1 of the excavator's tracks. When you want to turn, press down the pedal on the opposite side that you want to turn. Pressing the left pedal turns the excavator right, and pressing the right pedal turns it left.[13] If you're already moving, ease off one of the pedals rather than letting go with both and pressing one again. This results in smoother driving. The same rules apply whether you're turning backward or forward. Press the left pedal back to move back and to the right. Press the same pedal forward to move forward and to the right. Advertisement 1 Adjust the cab so it's perfectly square over the tracks. This position is the most stable and balanced for an excavator. Use the left joystick and rotate the cab until it's square with the tracks.[14] Most excavators will stay stable if you dig when they aren't perfectly centered, but while you're a beginner, always make sure the cab is square until you gain more experience. Once you've gotten to the desired position, remove your feet from the foot pedals so you don't accidentally move while you're digging. Don't try to drive and dig at the same time until you're an experienced operator. 2 Extend the stick all the way out in front of you. Press the left joystick forward until it stops rising. This is the general starting position to prepare for a dig.[15] Experienced operators can dig with the stick in different positions. While you're still learning, however, extend the stick completely before digging. 3 Adjust the bucket so the teeth line up with the stick. If you're digging into dirt, you need a happy medium between opening the bucket all the way and having it entirely closed. Imagine a line continuing out from the end of the stick. Adjust the bucket with the right joystick so the teeth rest on top of that imaginary line.[16] Don't try to dig with the bucket fully extended. This drives dirt and debris into the joints and could damage the machine over time. 4 Lower the boom until the bucket enters the dirt. Press the right joystick backward to lower the boom. Continue lowering until the toothed-section of the bucket enters the dirt, then stop.[17] Only enter the dirt about halfway up the bucket. Any more and you won't get an effective scoop. 5 Curl and lift the bucket to scoop the dirt. Start by pushing the right joystick left to curl the bucket. When the bucket is almost closed, the ground will start bulging up and form a hill. At this point, stop curling the bucket and lift the boom. Push the right joystick up to raise the boom up and complete the scoop.[18] 6 Rotate the cab and open the bucket to drop the dirt. Once you've scooped the dirt, the last step is dumping it. Use the left joystick and rotate the cab either left or right, depending on where you want to dump the dirt. Hover the bucket over that position. Then push the right joystick to the right and open the bucket, dumping the dirt.[19] Leave the dirt nearby in case you need to backfill the hole. Repeat this process as many times as you need to finish the dig. 7 Set the cab square with the tracks before shutting the machine down. When you've completed the job, rotate the cab so it sits square with the tracks, facing forward. Disconnect your joystick controls by pushing the control lever back down. Then bring the throttle down to Idle by turning the knob by your right hand. Let the engine sit in idle for 1 minute so it cools down. Then turn the key and remove it to shut down the machine.[20] Watch your step when exiting the cab. Injuries from falls are common on construction sites. Advertisement Ask a Question Advertisement Thanks Advertisement This article was reviewed by Charley Helvy. Charley Helvy is an Automotive & Diesel Expert based in Avondale, Arizona. He is the founder of Charley's Garage, an educational YouTube channel focusing on simple videos for automotive and truck enthusiasts. He has over 31 years of experience in the automotive world. He is a Diesel Instructor at the Universal Technical Institute and is a certified ASE Master Heavy Truck Technician. He offers training on gas and diesel engines on his YouTube channel, along with other DIY and explanation videos for beginners and enthusiasts alike. In 2024, he published a complete guide on Emissions Systems in Automotive and Diesel Vehicles. This article has been viewed 99,622 times. Co-authors: 7 Updated: February 24, 2025 Views: 99,622 Categories: Driving Vehicles Print Send fan mail to authors Thanks to all authors for creating a page that has been read 99,622 times. "I acquired wisdom, knowledge and understanding." Share your story

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