Volvo Simulators - Excavator

Volvo EXC 500

Product description

Volvo Simulators – Excavator Features

The Volvo EXC 500 features authentic operator environment with original controls, a high performing motion system and industrial grade visualization system. It is designed for simplicity of use and to be as close to reality as possible.

Now available with Co-Pilot 2.0 as an option.

Technical data

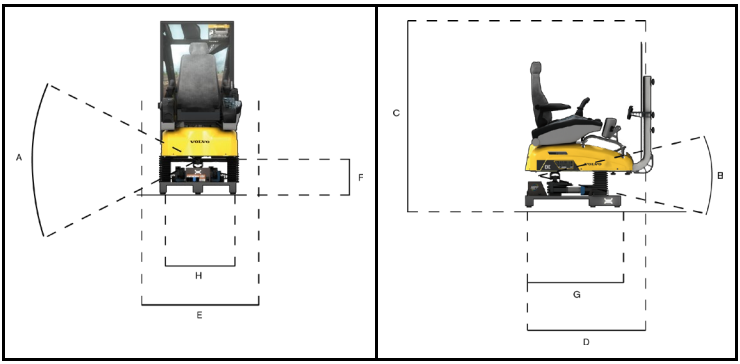
Simulator overview

1. Motion system
2. Operator's chair
3. Simulator screen
4. Left hand console
5. Right hand console
6. ECU display
7. Simulator numpad
8. External speakers
9. Removable chassis cover
10. External connections and main power switch

Power supply

Single-phase power:
115VAC, 50/60Hz, 20A
230VAC, 50/60Hz, 10A

Dimensions and weight



Motions system

The degrees of freedom are pitch and roll.

A	Maximum Roll Angle: Maximum Roll Velocity:	±23° 46°/s (115VAC operation)
B	Maximum Pitch Angle: Maximum Pitch Velocity:	±15° 30°/s (115VAC operation)

Static dimensions

C	Height (simulator)	1880mm
D	Length (simulator)	1530 mm
E	Width (simulator)	880mm
F	Height (base)	410 mm
G	Length (base)	1050 mm
H	Width (base)	800 mm

Weight

Simulator weight	275 kg

Simulator assembly

The simulator arrives fully assembled and ready to use.

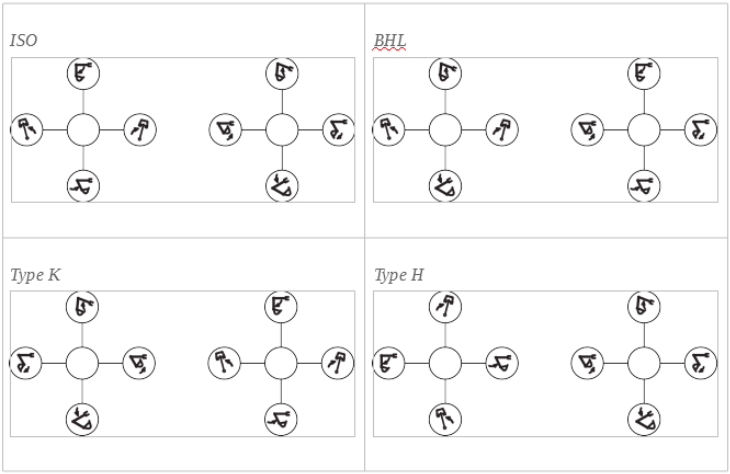
Volvo Excavator simulation

Understanding the machine and utilizing it in the correct way will boost your productivity and increase the lifespan of the machine. The Volvo Excavator simulator allows you to train your operators to perform at the machine's full potential.

The simulator comes with over twenty-five different scenarios that cover the basics of how to operate the Excavator. The operator is guided through starting, stopping and manoeuvring the vehicle as well as performing load and dig cycles in diverse real-life environments. The scenarios include both guided lessons and free operation playgrounds. As always, the focus is on getting the most out of the operator and maximizing productivity.

In addition, there is one extension available, Volvo Demolition. Volvo Demolition adds six new scenarios where the operator learns to use different attachments used for deconstructing buildings.

Available operating patterns



	Dipper arm out		Dipper arm in
	Swing right		Swing left
	Boom lower		Boom raise
	Bucket close		Bucket dump

Scenario report

After the completion of every scenario a performance report is presented to help shed light on what the operator did right and where improvements can be made. Maybe the completion time and production score was great but at the cost of high fuel consumption and unnecessary wear and tear. The report helps highlight issues that when using a real machine could slip by unnoticed, saving on cost and improving safety.

Co-Pilot 2.0

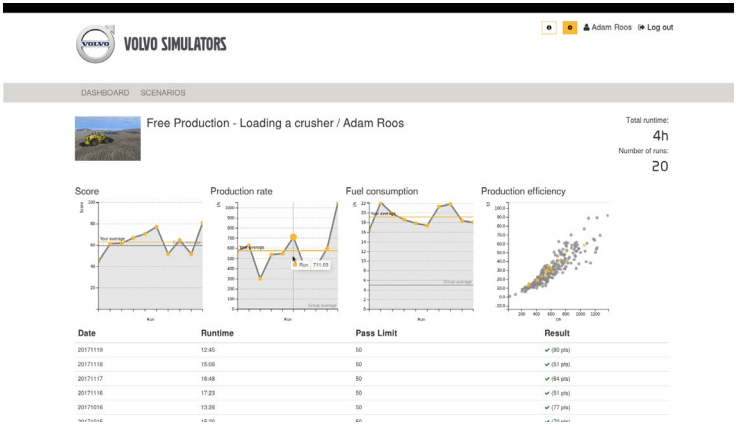
Volvo Co-Pilot 2.0 is an innovative assistance system for heavy equipment operators, now fully* integrated into the EXC 500 and available as an option for a highly realistic training experience. With advanced features such as Dig Assist with Onboard Weighing and Operator Coaching, operators can practice precision work, load optimization, and efficient material handling in a safe, virtual environment.

By training on the Volvo Co-Pilot 2.0 in the simulator before operating real machinery, operators become safer, more productive, more efficient, and fully prepared to perform at their best from day one.

*Currently not available for the Demolition Extension.

Operator Performance System (OPS)

The operator performance system is a user management system, combined with tools for setting up groups and available exercises, as well as a system for accessing operator performance records. The OPS logs simulator activity and key metrics for each exercise an operator has finished. The OPS also provide views and reports making this data easy to understand and accessible for instructors when evaluating the progress and skill-set of the operators.



Multiple Configurations

The EXC 500 simulator is available in a range of configurations to suit different training needs and environments—ensuring there's a solution for everyone:

- **Single Screen with Caster Wheels**
  A highly mobile option, ideal for flexible training spaces.
- **Single Screen with Motion Platform (MPF)**
  A compact setup enhanced with motion feedback for a realistic training experience.
- **Three Screens with Caster Wheels**
  Expansive visuals in a portable, easy-to-relocate format.
- **Three Screens with Motion Platform (MPF)**
  An immersive, full-field view combined with motion for advanced simulation realism

Volvo Excavator Scenarios

The simulator offers over 26 different training and demonstration scenarios, many of them set within a virtual replica of our Eskilstuna Demo Center. This allows operators to practice in realistic environments and prepare for a variety of real-world situations. From foundational skills to complex site operations, each exercise is tracked and evaluated through the integrated Operator Performance System (OPS).

Machine Operations

Build essential skills and develop a deep understanding of machine functionality and controls.

Productivity Training

Start by evaluating your current performance, then progress through guided scenarios designed to improve efficiency and on-site productivity.

Grouped Scenarios

Structured, goal-oriented training modules that streamline learning, boost operator independence, and maximize training outcomes.

Skills Package

The user is introduced to the machine through a set of simple instructions which explain a set of fundamental operations with the vehicle.

Basic Excavator Operations

This scenario guides the user through the most basic operating procedures and machine functions. Throughout the scenario the user is also introduced to some of the more advanced features of the excavator.

Open Training Area – Excavator

In this scenario, no specific tasks or instructions are provided. The area includes piles of rock and sand that the user can load into waiting trucks using the excavator.

The area also includes a slope for grading and an open field for ditch digging.

This scenario is designed to provide either additional machine training or instructor-led machine training, allowing the user to practise operating the excavator in a realistic and challenging environment.

Quarry Package

The quarry package focuses on production efficiency using an excavator, loading haulers and rock crushers.

Loading a Crusher – Productivity Assessment

In this scenario, your productivity when loading a crusher will be assessed. Be careful not to damage the machine while operating. Exposing the machine to excessive wear will reduce your final score. Your score will be based on your productive skills, as well as on your ability to work in a fuel efficient manner.

Rear Loading – Operating Procedures

In this scenario the operator will be taught a complete workflow for rear loading haulers. The operator will learn how to position the excavator and haulers to facilitate efficient load cycles, how to prepare the loading area and direct the haulers and also how to efficiently load the haulers.

Side Loading – Productivity Assessment

In this assessment scenario you will side load 10 haulers as efficiently as possible. To maintain short load cycles, reposition the excavator and direct the haulers to the appropriate positions.
Your result will be based on your production rate as well as your ability to operate the machine in a safe and fuel efficient manner while minimizing the wear and tear on the machine and the haulers.

Side Loading – Operating Procedures

In this scenario the operator will be taught a complete workflow for side loading haulers. The operator will learn how to position the excavator and haulers to facilitate efficient load cycles, how to prepare the loading area and direct the haulers and also how to efficiently load the haulers.

Expo Scenario - Side Loading

In this four-minute scenario, you should load incoming haulers as fast and efficient as possible. Be careful not to damage the machine while operating. Exposing the machine to excessive wear will reduce your final score. Your score will be based on your productive skills, as well as on your ability to work in a fuel efficient manner.

Expo Scenario - Loading a crusher

In this three-minute scenario, you will load a crusher with as much material as possible. Be careful not to damage the machine while operating. Exposing the machine to excessive wear will reduce your final score. Your score will be based on your productive skills, as well as on your ability to work in a fuel efficient manner.

Free Production - Loading a crusher

Load a crusher with as much material as possible. Be careful not to damage the machine while operating. Exposing the machine to excessive wear will reduce your final score. Your score will be based on your productive skills, as well as on your ability to work in a fuel efficient manner.

Volvo EXC 12.3

Machine Walkaround

In Machine Walkaround exercise the operator will be pointed to different parts of the excavator and presented with some brief information about each part. Terminology covered is the different machine parts (dipper arm, two-piece/mono-block boom, bucket, tracks, shoe direction, counterweight), how to enter the machine and some basic information about attachment locks (E.g. quick fit systems). It also introduces the rear-view camera (optional equipment).

Primary Learning Points:

- Terminology
- Elementary knowledge

No action except going through the guide is required to complete this exercise.

Machine Knowledge 1

The Machine Knowledge 1 is the first exercise the student performs in order to start the machine. It runs some simple movements with the digging equipment and shut down the machine.

A detailed step-by-step instruction is given how to start the excavator correctly. The operator learns how to run the digging equipment in all directions. Firstly, with basic lever introduction, then to solve simple tasks as touching the ground on different distances and pushing/pulling concrete blocks. The operator is graded with 100 points for completing the exercise and 10 points penalty is subtracted for each hydraulic or rotational warning.

Primary Learning Points:

- Main functions
- Basic movements
- Start/Stop in a safe manner
- Safety zone

Wrecking Ball

This exercise is designed for precision operation where the operator will under calm circumstances practice operating the machine with high precision. The objective is to guide a wrecking ball attached to the digging equipment through obstacles and targets throughout the course. Completing the exercise gives 100 points at maximum. Trainee expected to knock over wooden blocks and avoid moving red obstacles (penalties are given for disturbing red obstacles). Penalties for rotational or hydraulic warnings are also given.

Primary Learning Points:

- Precision movement
- Simultaneous usage of main functions
- Secondary Learning Points:
- Repeat start/stop sequence (less verbose than the Machine Knowledge exercise)
- Dynamics when lifting objects with chains

Whack-a-mole

The main focus of this exercise is speed, for the operator to succeed; he or she will have to learn how to operate the main functions subconsciously. The warning system will at the same time remind the operator that he or she need to consider the equipment and not exert too much stress on the hydraulic system. The operator will be exposed to a certain amount of stress and need to be able to handle this with not losing, neither focus nor precision.

Primary Learning Points:

- Simultaneous usage of main functions
- Speed
- Secondary Learning Points:
- Precision
- Machine dynamics

Driving 1

This exercise will give a brief introduction to how to crawl with the excavator. The operator learns how the pedals function and practice crawling by moving through an obstacle course of various objects. Operator will also get exposed to some basic lifting/digging exercises. Operator will get visual feedback of how the machine behaves when operating throughout the course.

Primary Learning Points:

- How to use the tracks
- Rabbit mode
- Machine movements/behavior while operating
- Secondary Learning Points:
- Lifting/picking up an object + Center of gravity

Playground 1

This exercise has no rules or instructions it's just a big playground where you can acquaint yourself with the excavator at your own pace. Included in this scenario are obstacles to climb and objects to move.

Primary Learning Points:

- Acquaint yourself with the excavator simulator

Pyramids

This exercise will expose the operator to even more precision movements. The main task is to remove small boxes placed in between some larger ones using a stick attached to the bucket. The operator also will be introduced to the machine's dynamics and center of gravity as he or she needs to pass a couple of ramps between the three pyramids.

Primary Learning Points:

- Precision movement
- Simultaneous usage of main functions
- Machine's dynamics and center of gravity
- How to adjust the center of gravity by using the stick
- Crawling/driving the excavator

Rock Factory

In this exercise the operator should place stones in concrete cylinders with considerable speed. The main purpose of the exercise is to practice usage of simultaneous functions while operating under stress. The main key point here is repetition – the exercise will continue until the operator completes three stones within the given time. A warning system will recognize failure to operate the hydraulics in a safe manner.

Primary Learning Points:

- Precision movement
- Operating under stress
- Swing behavior (acceleration/retardation)
- Digging/picking up objects
- Simultaneous usage of functions

Driving 2

This exercise exposes the operator to steep slopes and how the machine functions in such conditions, with focus on how the digging equipment moves the center of gravity in uphill and downhill orientation.

Primary Learning Points:

- Center of gravity
- Usage of boom/stick to operate in a safe manner
- Machine dynamics
- Safe operating of the machine

Attachments

The Attachments scenario teaches the quick fit system, with complete step-by-step instructions for connecting attachments. The operator practices connecting and disconnecting buckets of different shapes and forms, in both outward and inward orientations. A flawlessly executed run is given 100 points. Swinging with an unsecured attachments gives 55 penalty points (33 the second time, 12 the third time). 10 penalty points are redacted for each hydraulic and rotational warning.

Primary Learning Points:

- Attachment bracket controls and indicators
- Connecting and disconnecting attachments
- Attachment safety

Secondary Learning Points:

- Digging equipment controls

Trailer Loading

Loading the excavator on a trailer requires knowledge which can be obtained from this exercise. Instructions are given how to load, park and unload the excavator. The operator can practice climbing the ramp (using the digging equipment for balance) and how to place the machine. Once in place on the trailer, optional instructions on how to secure the machine are given.

Primary Learning Points:

- Using digging equipment for controlled climbing
- Machine placement
- Climbing ramp

Secondary Learning Points:

- Securing the machine

Trailer Loading Reverse

This exercise is similar to Trailer Loading, but with a different trailer where the excavator must be loaded in reverse.

Primary Learning Points:

- Using digging equipment for controlled climbing
- Machine placement
- Climbing ramp

Secondary Learning Points:

- Securing the machine

Rock Handling Playground

In Rock Handling Playground the operator is given a chance to acquaint self with moving rocks, the only given task is to move rocks around in four different quadrants.

Primary Learning Points:

- Entering rock piles.
- Moving rocks efficiently

Rock Handling: Side Loading

A complete loading workflow is taught in the “Side Loading” exercise, where planning the position of the excavator and preparation between haulers are essential for good results.
Before starting the main activity, the operator chooses between four different kinds of buckets, each has a brief description of typical application. One of them is more suitable than the others. There are some hints of where it is optimal to place the excavator together with instructions on how to use the digging equipment optimally. However the operator is free to decide where to place the excavator and can operate the excavator as he or she see fits. The operator also signals to the haulers when to park and when to leave. Between haulers there is a pause where the operator may prepare for the next hauler by clearing the parking area and stacking up the stone heap.

Primary Learning Points:

- Excavator placement
- Planning ahead, organizing action
- Common workflow

Rock Handling: Rear Loading

A complete loading workflow is taught in the “Rear Loading” exercise, where planning the position of the excavator and preparing between haulers are essential for good results. There are some hints of where it is optimal to place the excavator together with instructions how to use the digging equipment optimally. However the operator is free to decide where to place the excavator and can operate the excavator freely. The operator also signals to the haulers when to park and when to leave.

Between haulers there is a pause where the operator may prepare for the next hauler by clearing the parking area and stacking up the stone heap. The haulers park in the same place every time in this exercise.

Primary Learning Points:

- Excavator placement
- Planning ahead, organizing action
- Common workflow

Rock Handling: Hauler Positioning, Rear Loading

A complete loading workflow is taught in the “Side Loading” exercise, where to position the excavator and the hauler for loading are up to the operator. There are some hints of where it is optimal to place the excavator together with instructions of how to use the digging equipment optimally. However the operator is free to decide where to place the excavator and can operate the excavator as he or she decides it fits. The operator signals when and where the haulers park and when they leave.

Between haulers there is a pause where the operator may prepare for the next hauler by clearing the parking area and stacking up the stone heap.

Primary Learning Points:

- Excavator placement
- Hauler placement
- Planning ahead, organizing action
- Common workflow

Excavating: Ditch Digging 1

In this exercise the operator will practice the techniques and work flow of ditch digging. The target ditch is about three buckets wide and straight. The operator is instructed of where it is optimal to place the excavator while excavating. The operator is however free to decide where to place the excavator and can operate the excavator as he or she sees it fits. The exercise is completed when the ditch is of adequate quality.

Primary Learning Points:

- Ditch digging techniques
- Efficient excavator positioning
- Digging cycle

Excavating: Ditch Digging 2

Similar to Ditch Digging 1 the operator practices a complete ditch digging workflow, but the target ditch contains a 90 degree angle.

Primary Learning Points:

- Ditch digging techniques
- Efficient excavator positioning
- Digging cycle

Excavating: Ditch Digging 3

Similar to Ditch Digging 1 the operator practices a complete ditch digging workflow, but the target ditch is curved and only about two buckets wide.

Primary Learning Points:

- Ditch digging techniques
- Efficient excavator positioning
- Digging cycle

Excavating: Soil Loading 1

Similar to Rock Loading: Hauler Position, Rear Loading the operator practices a complete workflow, which in this exercise is to load soil onto trucks. The operator practices the situation where the excavator on top of a plateau and the trucks parks on the plain.

Primary Learning Points:

- Excavator placement
- Truck placement
- Planning ahead
- Common workflow

Secondary Learning Points:

- Digging/loading soil efficiently

Excavating: Soil Loading 2

Similar to Soil Loading 1 this exercise teaches a complete workflow where the operator practices loading. The main difference is that the excavator is placed on the same level as the hauler in this exercise.

Primary Learning Points:

- Excavator placement
- Truck placement
- Planning ahead
- Common workflow

Secondary Learning Points:

- Digging/loading soil efficiently

Tilt Rotator: Position Bucket (1 & 2)

In these exercises the operator will practice basic movements with the tilt rotator. The operator will try to position the bucket as indicated by the green “ghost” bucket.

Primary Learning Points:

- Tilt rotator controls
- Simultaneous use of controls

Tilt Rotator: Bucket Level (1 & 2)

In these exercises the operator will practice simultaneous function usage by trying to keep the bucket in level while he rotates it 3 full revolutions. If the bucket deviates from the correct orientation this will be indicated by the bucket turning red.

Should the bucket deviate to much the operator have to start over from the beginning again.

Primary Learning Points:

- Tilt rotator controls
- Simultaneous use of controls

Excavating: Precision jobs

In this exercise set the operator will practice precision jobs by creating different shapes (diamond shape, flat ground and slope). These exercises are available both with and without tilt rotator.

Primary Learning Points:

- Working with a tilt rotator
- Precision
- Planning ahead
- Simultaneous use of controls

Secondary Learning Points:

- Efficient use of material
- Machine positioning

Excavator demo scenarios

All the demo exercises are designed as competitive events where the operator have a limited time to complete a mission. In those exercises the operator will see how well he places himself on a high score list rather than the normal scoring system.

Earth moving demo (long)

In the long earth moving demo exercise the target is to load the truck with 7 m^3 of dirt. The maximum time the operator can spend completing this task is 7 minutes.

Earth moving demo (short)

In the short earth moving demo the operator has three minutes to load as much dirt as possible on the truck. The more dirt loaded onto the truck the more points, but make sure you do not operate in an unsafe manner as this will deduce points from your total score.

Rock handling demo

In the rock handling demo the objective is to load the hauler with as many rocks as possible in three minutes. Points are deducted for unsafe operating technique.

Tilt rotator slope demo

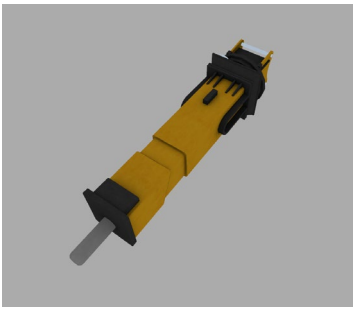
In the tilt rotator demo the operator has three minutes to create as good a slope as possible. Using the tilt rotator properly will increase task efficiency.

Pallet forks demo

In the pallet forks demo exercise the operator will operate an excavator equipped with tilt rotator and pallet forks. The task at hand is to place three pallets where indicated by the green transparent pallets. The maximum time the operator has to finish this task is three minutes.

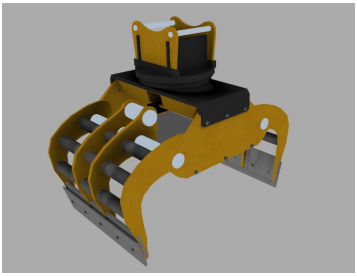
Volvo Demolition (Optional Extension)

Learn how to operate use different demolition tools to deconstruct buildings. Volvo demolition is a separate addon that comes with six new scenarios to provide a safe environment to learn how to handle tools used for demolition contracts. The scenarios involve tools such as a hydraulic hammer remove concrete foundations, a shear to cut down steel frames as well as a concrete crusher and sorting grapple.

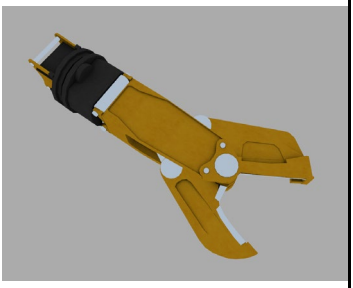


Hydraulic Hammer

Crusher



Grapple



Shears

Volvo Demolition: Breaking

Break the concrete slab into loose pieces.

Volvo Demolition: Crushing

Crush the concrete off the concrete beams, leaving the rebar intact. Place the rebar in the container.

Volvo Demolition: Cutting

Cut the steel I-beam and H-beams into manageable pieces and place them in the container.

Volvo Demolition: Sorting

Sort the pile of debris into the three containers for wood, metal and plastics.

Volvo Demolition site playground - High reach excavator

Take down the steel building frame following the prescribed cut order.

Demolition site playground - Short boom

With the high reach boom setup, this exercise includes processing, sorting and concrete slab removal.

Volvo Simulator Support Agreement

All aftermarket support is provided by Oryx Simulations AB.

Always included

Simulator Support Agreement is included with all new Volvo Simulators for a period of three years*. At the end of the three-year period, it is possible to extend the Support Agreement for a period of one or three years.
* For simulators sold after 2019-06-01

Support services

The agreement includes technical support (online and/or e-mail) . Oryx will respond to all support requests within 24 hours during Swedish business hours. Availability may however be delayed in July. The Simulator Support Agreement does not include on-site support or spare parts. Support issues that require special conditions will be offered separately (e.g. On-site support, spare parts or freight costs for repair in Umeå, Sweden). A Simulator Support Agreement is required if a Software Upgrade is requested. If a Software Upgrade is requested (ordered separately), Oryx will install the new software onto the designated simulator and verify the new functionality (Internet connected Simulator).

Internet connected

Simulators connected to the Internet can be supported and/or upgraded on-line. For simulators that don't have access to the Internet, the support services are limited to instructions and file transfers.

Contact

When help is required, please use the contact form available at www.oryx.se/support, and our technical team will contact you within 24 hours (Swedish business hours)

Clarification, Support agreement/year/simulator, Extension.
Extension is valid when an agreement is extended, continuously. If you have a simulator without Simulator Support Agreement, you will have to choose the restart option.