



CAT CONSTRUCTION



FIELD OPERATOR MANUAL

CONSTRUCTION VEHICLE FLEET

PROJECT ZOMBOID BUILD 42.20.4

PUBLIC RELEASE 0.2.0 | AUTHOR: ?

16 MACHINES
RIGGED + FUNCTIONAL

MANUAL IDENTITY

Read this first

This guide covers CAT Construction 0.2.0 for Project Zomboid Build 42.20.4. It describes the shipped controls and the verified behavior of the sixteen-vehicle fleet.

CORE OPERATING RULE

Operate from the driver seat. Start the engine, bring the machine to a complete stop, open the vehicle radial menu with V, choose CAT Construction, select an action, then click a valid highlighted ground tile.

Manual map

Section	What it covers
1 — Quick start	Entering, starting, selecting equipment actions and completing a cycle
2 — Controls and lockouts	Radial menu, target cursor, reach, safety and cancellation
3 — Material operations	Loading, unloading, tipping, scooping, grading, trees and concrete
4 — GroundWorks	Project roles, work/material requirements and release compatibility
5 — Fleet reference	Comparison table and illustrated profile for all 16 machines
6 — Service and troubleshooting	Hydraulics, fuel, batteries, storage, failures and server setup

CAPACITY TERMINOLOGY

Cargo, bucket and fuel figures are Project Zomboid balance values. Operating mass and governed speed identify the in-game machine class; they are not real-world manufacturer specifications.

Release evidence

All sixteen machines passed native graphical entry, engine preparation, forward travel, work/head/rear lamps, material load and unload, full-cargo reverse steering, and normal exit. Eight specialist actions also passed. A native Linux dedicated-server runtime check loaded all sixteen vehicles with GroundWorks and seven selected compatibility mods. Full two-client synchronization remains unverified.

SECTION 1

Quick start

Use this sequence for every loader, excavator, truck, roller, mixer and crane.

- 1

Approach and enter

Use the normal Project Zomboid vehicle interaction. Enter the operator/driver seat; passenger seats cannot operate equipment.
- 2

Inspect the machine

Check fuel, battery, engine condition, tyres or tracks, brakes, storage, and the CCHydraulics part. The hydraulic pump must be installed and at least 10% condition.
- 3

Start and position

Start the engine with the normal vehicle controls. Drive until the attachment can reach the work tile, then stop completely. Equipment locks out above 0.5 km/h.
- 4

Open equipment controls

Press V for the vehicle radial menu, choose CAT Construction, then select the required action. You may also use the CAT Construction submenu on a nearby ground square.
- 5

Select a target

Move the equipment cursor. Green means the tile is valid; red means reach, terrain, obstruction or another requirement failed. Click the green tile.
- 6

Hold position

Remain in the driver seat with the engine running and the machine stationary until the timed cycle ends. Movement, exit, loss of fuel or a failed recheck cancels the uncommitted operation.
- 7

Verify the result

Check the target tile, cargo inventory and project state. The game reports completion or explains why the operation stopped.

STOW / CANCEL

Choose Cancel work and stow equipment to stop an active cycle. An uncommitted cancellation consumes no materials. After a successful commit, world and inventory changes are final.

SECTION 2

Controls, targeting and operating lockouts

Universal controls

Control	Result
V → CAT Construction	Opens machine-specific equipment actions from the driver seat
Choose equipment action...	Opens the full action list and starts the ground-tile cursor
Left-click green tile	Requests the selected operation on that exact tile
Right-click or Escape	Cancels target selection before work begins
Toggle work lights	Switches equipment work lamps and the amber beacon state
Cancel work and stow equipment	Stops the current cycle and returns equipment to its stowed pose
Normal vehicle interface	Drive, start, refuel, inspect mechanics, repair, service and use road lights

A work request is accepted only when all checks pass

- The operator is alive, online when on a server, seated in the driver position and recognized as the driver.
- The vehicle supports the selected capability.
- Travel speed is 0.5 km/h or less, including physical creep the dashboard may under-report.
- The engine is running; a hydraulic pump is installed with at least 10 condition; cycle fuel is available.
- The target is a loaded ground square at Z=0, on the same level, with a floor and inside machine reach.
- The work tile is not blocked by solid geometry and contains no player, zombie or animal.
- Safehouse permissions allow the operator to interact with the target.
- Action-specific materials, capacity, project state and target identity still match at completion.

SERVER AUTHORITY

The target is validated when work starts and again immediately before the result is committed. Inventory, fuel, pump wear, project writes and operation state are owned by the game authority. Animation never consumes materials by itself.

SECTION 3

Material operations

The fleet moves the original Project Zomboid inventory objects. Supported cargo keeps its identity rather than being replaced by abstract counters.

Action	Time	Machines	Behavior
Load loose materials	6 s	All 16	Loads every supported empty loose item on one tile that fits; overflow remains
Unload one	6 s	All 16	Places one supported cargo item on the target tile
Tip a batch	12 s	Tipplers	Places a bounded batch: contractor up to 55, mining truck up to 100
Lift heavy cargo	12 s	Cranes	Dedicated precision action that moves one supported loose object
Scoop ground	8 s	Loaders / skids / backhoe	Consumes one empty sack and creates one native ground-material yield
Excavate & bag	10 s	Excavators / backhoe	Consumes one empty sack and creates one native ground-material yield
Grade vegetation	8 s	Loaders / skids / excavators / backhoe	Removes eligible low vegetation from one clear tile
Clear tree/stump	16 s	Loaders / skids / excavators / backhoe	Fells one tree and removes its stump, or removes one existing stump
Mix concrete	20 s	Mixer	Consumes powder + metal bucket containing 10 L pure water
Pour concrete	12 s	Mixer	Supplies one accepted concrete use to a compatible project
Supply project	8 s	All 16	Supplies one still-required material unit from vehicle storage
Compact	10 s	Road roller	Advances an active GroundWorks surface project
Groundwork	10 s	Excavators / backhoe	Advances an active excavation project by machine work rate

Supported cargo families

Logs, planks, branches, saplings, twigs, splinters, unusable wood, stones, sharp stones, limestone, flat stones, stone blocks, dirt/sand/gravel/clay sacks, empty sacks, concrete powder, water or concrete buckets, plaster and clay-cement containers, scrap metal, pipes, sheet metal, bars, ingots, steel pieces, and fired or unfired clay bricks.

BATCH LOAD

Load examines the entire selected tile in one cycle and reserves space across every eligible vehicle container. Filled inventory bags are excluded. Unrelated items and overflow remain on the ground.

TREES AND TERRAIN

Tree, stump, scoop and grade procedures

Clearing a standing tree

- 1

Step 1
Position a supported loader, skid steer, backhoe or excavator within its listed reach and stop.
- 2

Step 2
Choose Clear a tree or stump and target the tree tile. The cursor rejects oversized trees and blocked tiles.
- 3

Step 3
Hold position for 16 seconds. Native tree felling produces the full normal wood yield.
- 4

Step 4
The same successful cycle removes the resulting stump and leaves one Base.UnusableWood, matching vanilla stump salvage.
- 5

Step 5
Use Load loose construction materials on that tile to collect all supported logs and salvage that fit in one shot.

Machine class	Largest native tree size
Skid steers	3
Excavators below 8,000 kg	5
Loaders, backhoe and excavators at/above 8,000 kg	8 (all native sizes)

WHAT IS PRESERVED

Floors, unrelated tile objects and neighboring stumps remain. Walls, fences, solid props, occupied tiles and buildings cannot be cleared by this action.

Scooping or excavating terrain

Place an empty sack in any vehicle storage container. Target suitable dirt, sand, gravel or clay. One cycle consumes the empty sack and produces one native material sack. Poured-ground collection restores its recorded underlying floor; already-collected natural surfaces cannot be exploited repeatedly.

CONCRETE OPERATIONS

Mixer procedure and material conservation

Mix one concrete batch

- 1** Load powder
Place one Base.ConcretePowder in mixer storage.
- 2** Prepare water
Fill a metal Base.Bucket with at least 10 litres of pure water. Mixed or contaminated fluid is rejected.
- 3** Reserve output space
Leave enough free capacity for one Base.BucketConcreteFull.
- 4** Run Mix
Enter the driver seat, start the engine, stop, choose Mix concrete batch, and hold for 20 seconds.
- 5** Deliver
Drive to a compatible project, stop within 5 tiles, and choose Supply concrete or Pour concrete.

EXACT RECIPE

The successful mix consumes one concrete-powder item and one metal bucket containing 10 L of pure water, then creates one full concrete bucket. Planning and failed validation consume nothing.

Drainable project materials

For gravel, soil, sand and concrete, one project material unit equals one drainable use. Only the amount accepted by the project is consumed. When the final use is depleted, the native replacement container is returned to vehicle storage.

SECTION 4

GroundWorks integration

GroundWorks is optional. CAT Construction supplies machines and server-authoritative work actions; GroundWorks owns the project record and finished effect.

Project	Work	Materials	Primary machines	Release status
Trench	100	None	Excavators / backhoe	GroundWorks 0.2 tested
Basement	500	None	Excavators / backhoe	GroundWorks 0.2 tested
Constructed path	100	2 gravel uses	Loader/skid + roller	GroundWorks 0.2 tested
Constructed road	250	4 gravel + 4 concrete	Loader/skid + roller + mixer	GroundWorks 0.2 tested
Moat	120	None	Excavators / backhoe	Newer compatible API
Grave cavity	80	None	Excavators / backhoe	Newer compatible API
Open pit	80	None	Excavators / backhoe	Newer compatible API
Burn pit	80	None	Excavators / backhoe	Newer compatible API
Foundation	200	8 concrete uses	Excavators / backhoe + mixer	Newer compatible API

Typical path or road crew

- 1** Start the project
Use a loader, skid steer, excavator or backhoe with Start path / Start road on a valid tile.
- 2** Supply materials
Carry gravel and, for roads, concrete. Any fleet vehicle can run Supply required materials when the target project accepts the stored item.
- 3** Compact the surface
Use the road roller inside its 3.5-tile reach. Repeat Compact until the work requirement is complete.
- 4** Confirm both gates
A project completes only after required work and required materials are satisfied.

Typical excavation crew

Start the trench or basement from an excavator/backhoe, then repeat Groundwork. Each normal machine contributes 12 work units per cycle; MiniExcavator contributes 8, WheeledExcavator 20, and CAT Tracked Excavator 24.

VERSION BOUNDARY

GroundWorks 0.2.0 trench, basement, path and road project behavior received native specialist testing. Optional newer 0.11 volume/job hooks add moat, grave, open-pit, burn-pit and foundation entries when the matching API exists. Their live geometry path is not part of the 0.2.0 graphical acceptance.

SECTION 5

Fleet comparison

Values below come from the shipped 0.2.0 fleet catalog. Reach is measured in game tiles; storage and fuel use Project Zomboid capacity units.

Machine	Type	Reach	Cargo	Tool	Mass kg	Speed	Fuel	Work
Backhoe Loader	backhoe	5	100	120	8,200	35 km/h	140	12
Tracked Excavator	excavator	8	70	220	22,000	12 km/h	320	24
Heavy Wheel Loader	loader	5	100	320	17,000	35 km/h	260	12
Compact Wheel Loader	loader	4.5	75	180	9,800	38 km/h	170	12
Skid Steer	skid	3	35	80	3,500	20 km/h	75	12
332D Contractor Skid Steer	skid	3	40	100	4,200	20 km/h	90	12
Tandem Road Roller	roller	3.5	40	—	9,500	16 km/h	160	12
Contractor Tipper	dump	5	1,100	—	12,000	60 km/h	260	20
Mining Haul Truck	dump	7	4,200	—	46,000	45 km/h	750	40
Concrete Mixer	mixer	5	160	800	14,000	55 km/h	250	18
Rough Terrain Crane	crane	12	180	450	29,000	32 km/h	380	12
Lattice Crawler Crane	crane	15	220	700	65,000	8 km/h	650	12
Mobile Telescopic Crane	crane	12	200	600	42,000	45 km/h	500	12
Compact Tracked Excavator	excavator	5	40	110	7,000	12 km/h	120	12
Wheeled Excavator	excavator	7	80	190	17,000	30 km/h	250	20
Mini Excavator	excavator	3.8	25	55	2,800	10 km/h	55	8

Cargo is total construction storage. Tool is the equipment/bucket storage value when present. Work is the GroundWorks progress rate per applicable cycle. The physical chassis uses calibrated simulation mass so B42 suspension can support full cargo; listed operating mass remains available for project traffic effects.

Fleet profile 01 / 16

CAT Backhoe Loader



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Dual-purpose excavation and loading	DRIVE	Wheeled
REACH	5 tiles	GOVERNED SPEED	35 km/h
CARGO	100 units	TOOL STORAGE	120 units
OPERATING MASS	8,200 kg	FUEL CAPACITY	140 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Size 8

Capabilities

Load all • Unload • Scoop • Excavate • Grade • Tree/stump • GroundWorks

Operator notes

Use the front bucket for loading, grading and surface work; use the rear boom for excavation. The 8.2-tonne class handles every native tree size.

Fleet profile 02 / 16

CAT Tracked Excavator



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Heavy tracked excavation	DRIVE	Tracked
REACH	8 tiles	GOVERNED SPEED	12 km/h
CARGO	70 units	TOOL STORAGE	220 units
OPERATING MASS	22,000 kg	FUEL CAPACITY	320 units
PROJECT WORK	24 units/cycle	TREE LIMIT	Size 8

Capabilities

Load all • Unload • Excavate • Grade • Tree/stump • GroundWorks

Operator notes

The fleet's primary digging machine. Its 8-tile reach and 24 work units per cycle suit trenches, basements and major earthwork.

Fleet profile 03 / 16

CAT Heavy Wheel Loader



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	High-capacity loading and site clearing	DRIVE	Wheeled
REACH	5 tiles	GOVERNED SPEED	35 km/h
CARGO	100 units	TOOL STORAGE	320 units
OPERATING MASS	17,000 kg	FUEL CAPACITY	260 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Size 8

Capabilities

Load all • Unload • Scoop • Grade • Tree/stump • GroundWorks surface

Operator notes

A 320-unit work bucket, full-size tree clearance and strong road speed make this the main yard and forestry loader.

Fleet profile 04 / 16

CAT Compact Wheel Loader



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	General construction loader	DRIVE	Wheeled
REACH	4.5 tiles	GOVERNED SPEED	38 km/h
CARGO	75 units	TOOL STORAGE	180 units
OPERATING MASS	9,800 kg	FUEL CAPACITY	170 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Size 8

Capabilities

Load all • Unload • Scoop • Grade • Tree/stump • GroundWorks surface

Operator notes

Balances a 180-unit bucket, 4.5-tile reach and 38 km/h governed speed. Suitable for material collection, grading and full-size tree clearing.

Fleet profile 05 / 16

CAT Skid Steer



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Tight-site loading and grading	DRIVE	Wheeled
REACH	3 tiles	GOVERNED SPEED	20 km/h
CARGO	35 units	TOOL STORAGE	80 units
OPERATING MASS	3,500 kg	FUEL CAPACITY	75 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Size 3

Capabilities

Load all • Unload • Scoop • Grade • Tree/stump • GroundWorks surface

Operator notes

The smallest wheeled loader profile. Use around constrained yards; tree clearing is limited to native sizes 1–3.

Fleet profile 06 / 16

CAT 332D Contractor Skid Steer



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Contractor skid steer	DRIVE	Wheeled
REACH	3 tiles	GOVERNED SPEED	20 km/h
CARGO	40 units	TOOL STORAGE	100 units
OPERATING MASS	4,200 kg	FUEL CAPACITY	90 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Size 3

Capabilities

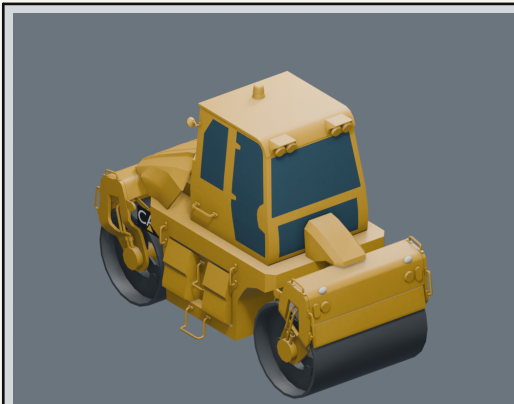
Load all • Unload • Scoop • Grade • Tree/stump • GroundWorks surface

Operator notes

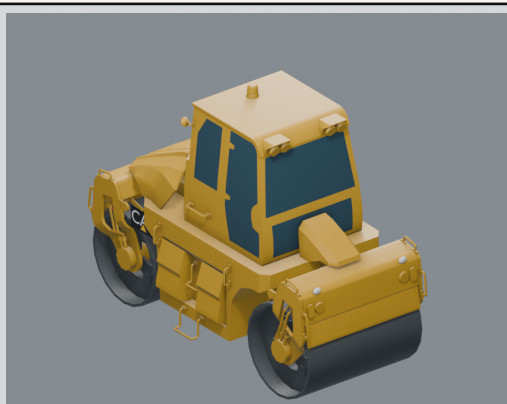
A slightly larger skid steer with 40 cargo and 100 equipment-storage units. Native tree clearing is limited to sizes 1–3.

Fleet profile 07 / 16

CAT Tandem Road Roller



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	GroundWorks surface compaction	DRIVE	Wheeled
REACH	3.5 tiles	GOVERNED SPEED	16 km/h
CARGO	40 units	TOOL STORAGE	—
OPERATING MASS	9,500 kg	FUEL CAPACITY	160 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Not equipped

Capabilities

Load all • Unload • Compact • Supply materials

Operator notes

Supplies surface materials and advances active path or road projects. It has no digging or tree-clearing attachment.

Fleet profile 08 / 16

CAT Contractor Tipper



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Contractor material transport	DRIVE	Wheeled
REACH	5 tiles	GOVERNED SPEED	60 km/h
CARGO	1,100 units	TOOL STORAGE	—
OPERATING MASS	12,000 kg	FUEL CAPACITY	260 units
PROJECT WORK	20 units/cycle	TREE LIMIT	Not equipped

Capabilities

Load all • Unload one • Tip batch • Supply materials

Operator notes

Two cargo bays provide 1,100 total units. The tip action releases up to 55 supported cargo items per work cycle.

Fleet profile 09 / 16

CAT Mining Haul Truck



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Maximum bulk haulage	DRIVE	Wheeled
REACH	7 tiles	GOVERNED SPEED	45 km/h
CARGO	4,200 units	TOOL STORAGE	—
OPERATING MASS	46,000 kg	FUEL CAPACITY	750 units
PROJECT WORK	40 units/cycle	TREE LIMIT	Not equipped

Capabilities

Load all • Unload one • Tip batch • Supply materials

Operator notes

Five cargo bays provide 4,200 total units. The tip action releases up to 100 supported items per cycle; plan generous turning clearance.

Fleet profile 10 / 16

CAT Concrete Mixer



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Concrete production and delivery	DRIVE	Wheeled
REACH	5 tiles	GOVERNED SPEED	55 km/h
CARGO	160 units	TOOL STORAGE	800 units
OPERATING MASS	14,000 kg	FUEL CAPACITY	250 units
PROJECT WORK	18 units/cycle	TREE LIMIT	Not equipped

Capabilities

Load all • Unload • Mix concrete • Pour concrete • Supply materials

Operator notes

Mixes one concrete powder with one metal bucket containing 10 L of pure water, then supplies concrete to compatible projects.

Fleet profile 11 / 16

CAT Rough Terrain Crane



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Off-road lifting	DRIVE	Wheeled
REACH	12 tiles	GOVERNED SPEED	32 km/h
CARGO	180 units	TOOL STORAGE	450 units
OPERATING MASS	29,000 kg	FUEL CAPACITY	380 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Not equipped

Capabilities

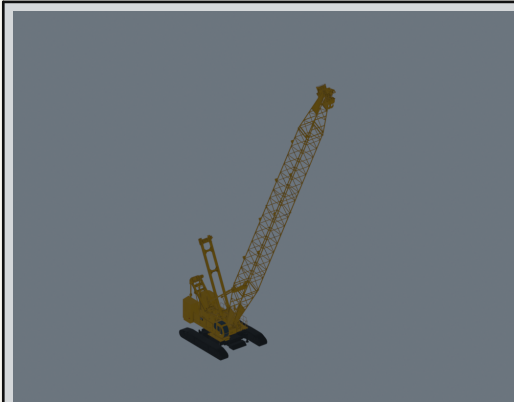
Load all • Unload • Lift one • Supply materials

Operator notes

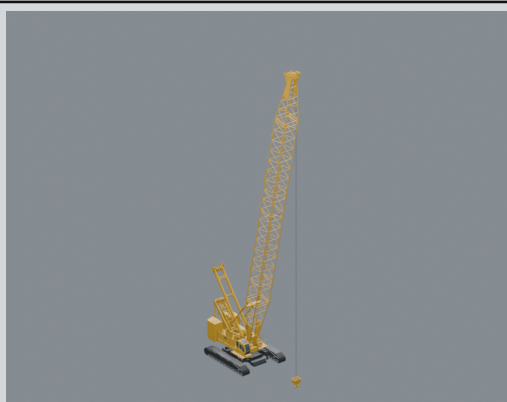
A 12-tile equipment reach and 450-unit tool storage suit remote jobs. Dedicated Lift transfers one heavy loose object per cycle.

Fleet profile 12 / 16

CAT Lattice Crawler Crane



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Long-reach heavy lifting	DRIVE	Tracked
REACH	15 tiles	GOVERNED SPEED	8 km/h
CARGO	220 units	TOOL STORAGE	700 units
OPERATING MASS	65,000 kg	FUEL CAPACITY	650 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Not equipped

Capabilities

Load all • Unload • Lift one • Supply materials

Operator notes

The fleet's greatest reach at 15 tiles. Slow travel and a large footprint reward careful staging before work begins.

Fleet profile 13 / 16

CAT Mobile Telescopic Crane



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Road-mobile telescopic lifting	DRIVE	Wheeled
REACH	12 tiles	GOVERNED SPEED	45 km/h
CARGO	200 units	TOOL STORAGE	600 units
OPERATING MASS	42,000 kg	FUEL CAPACITY	500 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Not equipped

Capabilities

Load all • Unload • Lift one • Supply materials

Operator notes

Combines 12-tile reach with 45 km/h governed travel. Dedicated Lift handles one supported object per cycle.

Fleet profile 14 / 16

CAT Compact Tracked Excavator



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Medium compact excavation	DRIVE	Tracked
REACH	5 tiles	GOVERNED SPEED	12 km/h
CARGO	40 units	TOOL STORAGE	110 units
OPERATING MASS	7,000 kg	FUEL CAPACITY	120 units
PROJECT WORK	12 units/cycle	TREE LIMIT	Size 5

Capabilities

Load all • Unload • Excavate • Grade • Tree/stump • GroundWorks

Operator notes

A 5-tile reach and tracked chassis suit smaller excavations. Its 7-tonne class clears native trees through size 5.

Fleet profile 15 / 16

CAT Wheeled Excavator



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Road-mobile excavation	DRIVE	Wheeled
REACH	7 tiles	GOVERNED SPEED	30 km/h
CARGO	80 units	TOOL STORAGE	190 units
OPERATING MASS	17,000 kg	FUEL CAPACITY	250 units
PROJECT WORK	20 units/cycle	TREE LIMIT	Size 8

Capabilities

Load all • Unload • Excavate • Grade • Tree/stump • GroundWorks

Operator notes

Combines a 7-tile reach, 20 work units per cycle and 30 km/h travel. It clears every native tree size.

Fleet profile 16 / 16

CAT Mini Excavator



STOWED / TRAVEL CONFIGURATION



REPRESENTATIVE WORK POSE

ROLE	Precision light excavation	DRIVE	Tracked
REACH	3.8 tiles	GOVERNED SPEED	10 km/h
CARGO	25 units	TOOL STORAGE	55 units
OPERATING MASS	2,800 kg	FUEL CAPACITY	55 units
PROJECT WORK	8 units/cycle	TREE LIMIT	Size 5

Capabilities

Load all • Unload • Excavate • Grade • Tree/stump • GroundWorks

Operator notes

The smallest excavator, with a 3.8-tile reach and 8 work units per cycle. It clears native trees through size 5.

SECTION 6

Service and maintenance

Construction functions depend on the standard vehicle systems and one serviceable hydraulic pump.

Pre-shift inspection

- Engine starts and remains running; battery has charge; fuel exceeds the next cycle requirement.
- CCHydraulics is installed and above 10 condition. Service it through the vehicle mechanics interface.
- Tyres, brakes and suspension support the planned load. Damage reduces effective storage capacity.
- Headlights, rear lamps and work lamps illuminate. Work lights also depend on installed parts, condition and battery charge.
- Cargo is distributed within the available bays and no essential output container is completely full.
- Equipment is stowed before road travel and there is adequate clearance for the machine footprint.

Service behavior	Value / result
Fuel consumed per successful equipment cycle	0.08 fuel units
Hydraulic wear	1 condition after every 12 successful work cycles
Minimum hydraulic condition to start work	10
Maximum operating speed	0.5 km/h
Work interruption	Movement, operator exit, engine/fuel/hydraulic/target failure cancels before commit
Hydraulic pump sourcing	Mechanical, garage and tool-storage loot; removable and repairable in mechanics

FULL-LOAD HANDLING

The vehicle scripts use calibrated physics mass and a native travel governor to keep the fleet driveable with real cargo. Inventory weights and capacities remain real. Slow physical creep is included in work lockout even if the dashboard rounds speed to zero.

TROUBLESHOOTING

Use the on-screen message as the first diagnosis. Most failures are an unmet operating prerequisite.

Message / symptom	Likely cause	Corrective action
Operate from the driver seat	Passenger seat or not entered	Use the normal vehicle menu and take seat 0
Stop the vehicle	Dashboard or physical creep over 0.5 km/h	Release throttle, brake fully and wait for motion to settle
Start the engine	Engine stopped or failed to start	Use normal start controls; inspect engine, battery and fuel
Hydraulic pump needs repair	Missing pump or condition below 10	Install/repair CCHydraulics in vehicle mechanics
Not enough fuel	Less than 0.08 available	Refuel through normal vehicle systems
Target beyond reach	Selected tile exceeds machine reach	Reposition closer and stop before reopening controls
Work area obstructed	Solid prop, fence, wall, missing floor or occupied tile	Clear the tile or choose another target
Tree requires a larger vehicle	Tree size exceeds class limit	Use loader/backhoe/heavy excavator; skid limits to 3, light excavator to 5
No material fits	Unsupported cargo, filled bag or no capacity	Use supported loose items and free cargo/bucket space
No room for output	Concrete or bagged output has no destination	Unload enough storage before retrying
GroundWorks required	Missing/incompatible partner API	Enable a supported GroundWorks build before CAT Construction
Project is wrong domain	Roller on excavation or excavator on surface stage	Use the correct machine for project domain
Work cancelled	Moved, exited, disconnected or a condition changed	Restore prerequisites and begin a fresh cycle
Lights do not illuminate	Battery, part condition or lamp item	Charge battery and inspect lamp/work-light parts

IF A RESULT LOOKS WRONG

Stow the equipment, stop the engine, reopen vehicle mechanics, and inspect cargo plus the target tile. On servers, confirm every player has the same CAT Construction and GroundWorks versions before reproducing the issue.

INSTALLATION AND SERVER OPERATION

The mod package contains one Build 42 vehicle mod. GroundWorks is optional and must load before CAT Construction when enabled.

Single player installation

- 1

Install

Copy Contents/mods/CATConstruction to the Project Zomboid mods directory, or subscribe through Workshop after publication.
- 2

Enable

Enable CAT Construction in the Build 42 mod list. Enable groundWorks first if project actions are wanted.
- 3

Start or load

Enter a Build 42.20.4 world. Existing saves can spawn vehicles through configured zones or administrator tools.

Dedicated server

Setting	Value
Mods=	groundWorks;CATConstruction (omit groundWorks when not used)
WorkshopItems=	Add the published Workshop IDs after release
Client requirement	Every client uses the same CAT Construction and dependency versions
Large-machine spawning	CATConstructionYard custom vehicle zone or administrator placement
Validated server	Native Linux Build 42.20.4 startup/runtime; 16 vehicle definitions passed

Compatibility

The native acceptance configuration loaded GroundWorks 0.2.0 with Common Sense Reborn, Buildcraft Reborn, Faded Vehicles Reborn, Faded Field Operations, Project Faded Car, Clearview GPS and Water Expanded from the owner's local working copies. This is focused coverage, not a guarantee for every revision or every mod on the E: drive.

MULTIPLAYER STATUS

Dedicated-server startup and runtime passed. Full two-client synchronization—observer animation, replicated cargo and reconnect behavior—remains unverified in release 0.2.0.

INTEGRATION BRIDGE

How GroundWorks and third-party actions connect

CAT Construction exposes a stable shared API so another mod can add an equipment action without replacing the controls or editing the fleet scripts.

Built-in synchronization flow

Stage	Owner	Purpose
Action registration	CAT shared catalog / extension	Same capability metadata exists on client and server
Menu and target cursor	CAT client	Shows supported actions and selects exact integer tile coordinates
Authority validation	CAT server/solo authority	Checks operator, machine, fuel, hydraulics, speed, reach and world safety
Project validation	GroundWorks / extension	Checks project type, domain, materials and target rules without mutation
Timed work state	CAT authority	Replicates action, pose, start time and duration
Commit	GroundWorks / extension	Consumes accepted inputs and writes the authoritative result once
Completion event	CAT API	Emits WorkCompleted with vehicle, actor, operation ID and result

Extension contract

Register an action with a bounded ID, label, capability, 1–300 second duration, animation, and paired `validate(ctx) / execute(ctx, plan)` callbacks. Validation must not mutate inventory or world state. Execute receives a unique `operationId` for deduplication and runs only after the authority revalidates the target.

Third-party vehicles may register a definition with a qualified script, capability table, positive reach, cargo, work rate and cycle fuel. Their vehicle script still must supply `CCControl`, `CCHydraulics`, `GasTank` and applicable cargo parts; registration does not generate meshes, physics or animation rigs.

VISUAL SYNCHRONIZATION

Work clips are cosmetic phase slices. Native B42 Lua does not expose animation-track seeking, so a newly streaming client resumes within one eighth of the cycle. World and inventory commits do not depend on the visual frame.

QUICK REFERENCE

Cab card

Keep this page nearby while learning the fleet.

START WORK

DRIVER SEAT → ENGINE RUNNING → FULL STOP → V → CAT CONSTRUCTION → ACTION → GREEN TILE → HOLD POSITION

Need	Use
Move every supported loose item on a tile	Load loose construction materials — 6 s
Move one cargo item	Unload one cargo item — 6 s
Move a large batch	Contractor or mining tipper — 12 s
Move one heavy object precisely	Crane Lift — 12 s
Collect soil/sand/gravel/clay	Empty sack + Scoop/Excavate — 8/10 s
Remove vegetation	Grade — 8 s
Fell tree and remove stump	Clear tree or stump — 16 s
Mix concrete	Powder + metal bucket with 10 L pure water — 20 s
Build path/road	Start + supply gravel/concrete + roller compact
Dig trench/basement	Start + repeat excavator/backhoe Groundwork
Night operation	Toggle work lights; maintain lamps and battery
Cancel safely	Cancel work and stow; no uncommitted material loss

FLEET LIMITS

Skid tree limit: 3 • light excavator tree limit: 5 • heavy loader/backhoe/excavator: 8 • work speed: ≤0.5 km/h • hydraulic minimum: 10 • fuel/cycle: 0.08

Release 0.2.0 validation

16/16 graphical fleet acceptance • 8 specialist operations • 94 imported mesh parts • 656 animation clips • 12 production Lua files compiled • 19 contract checks • 18 operation checks • 16/16 dedicated-server runtime checks.

CAT CONSTRUCTION

Functional heavy equipment for Project Zomboid Build 42.20.4