

Construction Machinery

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EX1200-7 Hydraulic Excavator

Hitachi Construction Machinery Co., Ltd. has launched the EX1200-7 mining excavator featuring a choice of engines for compliance with emission regulations in different jurisdictions as well as greater capacity than previous models and improvements in fuel economy, ease-of-use, maintenance, and comfort.

The main features are as follows.

(1) Better fuel economy

A larger bucket capacity that enables more work to be done, a larger oil cooler that allows for a slower fan speed, and optimization of hydraulic control

(2) Improved ease-of-use

Addition of a regeneration circuit for the bucket and optimization of the front flow control valve, and automatic shift down when steering the excavator

(3) Easier maintenance

Improved access to filters, elimination of the need to replace the radiator fan belt as a result of switching to

hydraulic drive for the cooling fan, automated cleaning of the radiator and oil cooler cores by running the cooling fan in reverse, addition of a starter disconnect switch to prevent the engine starting by mistake during maintenance work to make maintenance of electronic components more efficient through greater use of electronic control, a larger oil pan that enables longer intervals between oil changes, and the addition of automatic greasing of the backhoe bucket

(4) Improved comfort

Addition of Aerial Angle (360-degree vision system) and roller screen, and use of same cab interior as ZAXIS-6 series

(5) Compliance with emission regulations in different jurisdictions

A choice is offered of either an engine that complies with US Environmental Protection Agency (EPA) tier 4 emission standards and European stage V non-road emission standards or a fuel-efficient engine for use in other jurisdictions.

(Hitachi Construction Machinery Co., Ltd.)



1 EX1200-7 mining excavator



2 SR2000G-6 track-mounted soil recycler

2 SR2000G-6 Track-mounted Soil Recycler

The SR2000G-6 track-mounted soil recycler on sale in the Japanese market complies with the 2014 emission standards for non-road vehicles. Soil recyclers are machines for the efficient recycling of the spoil left over from activities such as earthmoving, dam construction, and dredging.

The main features are as follows.

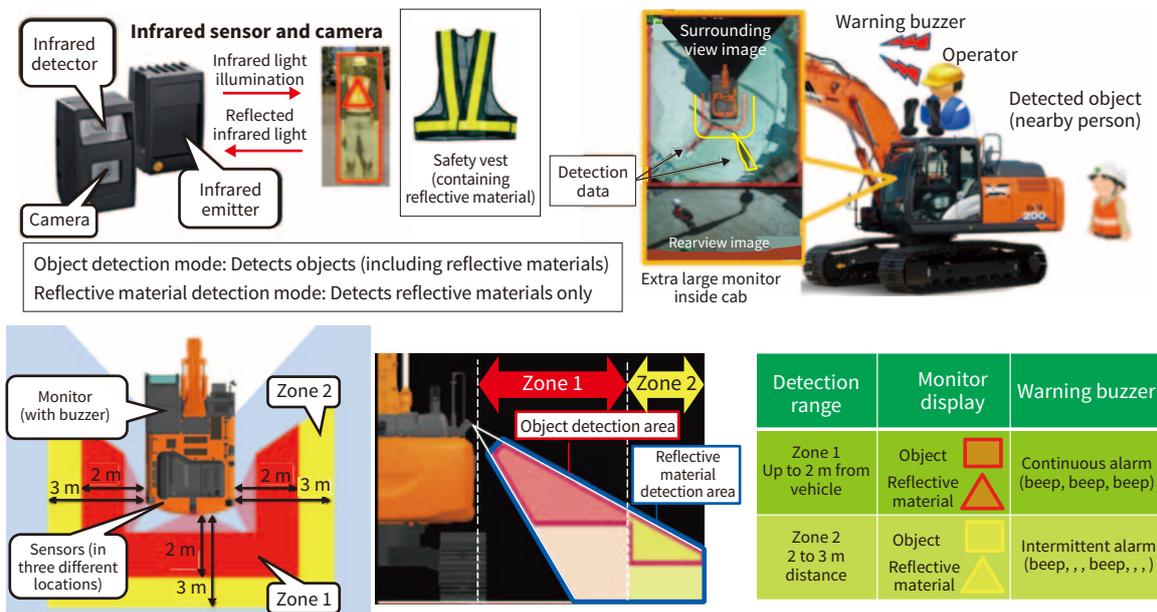
- (1) A swing gate that can add soil conditioning reagents to even heavy and moisture-laden soils, and a twin-shaft paddle mixer capable of efficient mixing. Together, these reduce the cost of caking agent and deliver high quality with large capacity.
- (2) Daily and monthly work reports can be printed out on the onboard printer (also included on previous models), viewed on the web, or downloaded for administrative use.

(3) Structural durability has been enhanced by improvements such as additional ribs in the mixer casing and use of thicker plate in the soil hopper, with stronger rotating parts in the mixer and swing gate.

(4) Improved maintenance features, including the provision of a battery cutoff switch, changes to grease supply locations, easier cleaning of the radiator dust net, and the addition of work platforms on either side of the mixer, and a hand rail around the engine bonnet. (Hitachi Construction Machinery Co., Ltd.)

3 Object Detection System for ZAXIS-6 Hydraulic Excavator

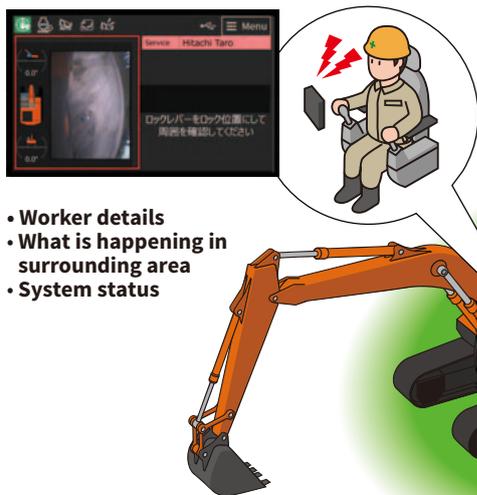
Hitachi Construction Machinery has developed an object detection system that provides the operator of the hydraulic excavator with an image of the region around the vehicle overlaid with detection information.



3 Overview of object detection system

Alerts for operators

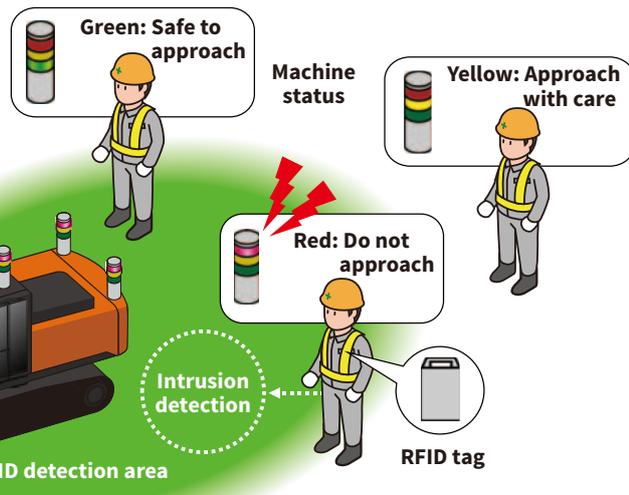
Indicated on monitor and by buzzer



- Worker details
- What is happening in surrounding area
- System status

Alerts for nearby workers

Indicated by warning light and buzzer



Green: Safe to approach

Machine status

Yellow: Approach with care

Red: Do not approach

Intrusion detection

RFID detection area

RFID tag

4 Operator Assistance system using RFID tags

The main features are as follows.

- (1) The excavator is fitted with three infrared sensors with a built-in camera that use infrared light to detect objects (using the Time-of-Flight method). By utilizing their ability to identify differences in the intensity of infrared light, the sensors are able to operate in two different modes: object detection mode for detecting objects (including reflective materials) and reflector detection mode for detecting reflective materials only. Reflector detection mode can be used to limit detection to people only, assuming that anyone nearby will be wearing a safety vest (which contains reflective material).
- (2) The camera images are merged to display an image of the surrounding area on an extra monitor in the cab, with detection information overlaid to help the operator identify nearby hazards.
- (3) The detection area is split up into two zones: an inner zone (zone 1) up to 2 m away and an outer zone (zone 2) of between 2 and 3 m in distance. Hazards detected in the inner zone are indicated to the operator in real time by displaying a red marker on the monitor and sounding a continuous buzzer alarm, while hazards detected in the outer zone are indicated by displaying a yellow marker and sounding an intermittent buzzer alarm.

(Hitachi Construction Machinery Co., Ltd.)

4 Operator Assistance System Using RFID Tags

Hitachi Construction Machinery has developed a solution for the safer coexistence of people and construction machinery in the form of an operator assistance system that can notify the operator when it detects other workers in the vicinity of the machine and also warn workers using detectors and alarms that can be retrofitted on existing machinery.

The main features are as follows.

- (1) Detection of nearby workers
Detects workers nearby who are wearing radio frequency identification (RFID) tags.
 - (2) Alerts for operators
The system uses a variety of methods including a monitor and buzzer to provide the operator with details of the detected workers, of what is happening in the surrounding area, and the system status.
 - (3) Alerts for nearby workers
The system uses a variety of methods including a warning light and buzzer to inform nearby workers of the status of the machine (whether it is safe to approach, to be approached with care, or not to be approached).
- In the future, the company intends to accelerate development toward practical deployment by looking at the addition of a collision mitigation function that enables the system to depower the machine's engine,

and an event data recorder that records images around the machine along with operational information. (Hitachi Construction Machinery Co., Ltd.)

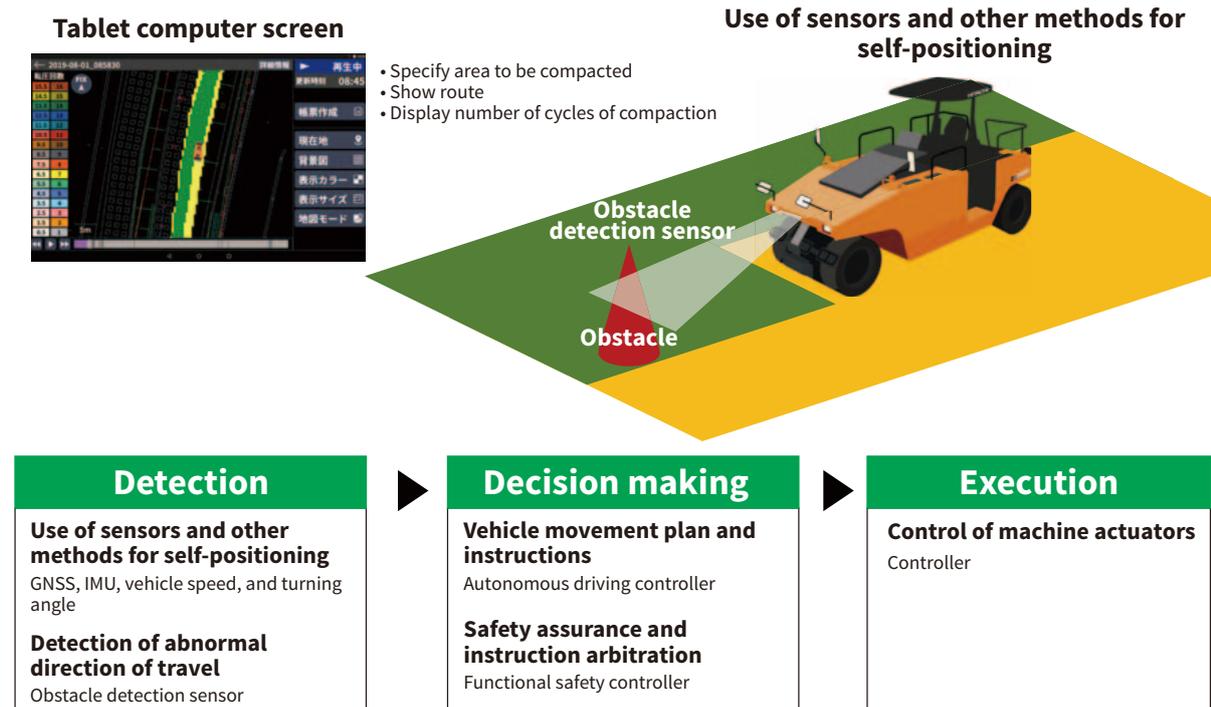
5 Autonomous Driving System for Compaction Equipment

Compaction equipment is used for compaction in a variety of different applications, with pneumatic tired rollers used for the compaction of soil in embankment and other forms of earthmoving as well as the compaction of road beds and asphalt. The labor shortage in the civil engineering and construction industry has worsened over recent years. This labor shortage, together with a high incidence of disasters, has raised the importance of improving productivity and safety. Under these circumstances, the Ministry of Land, Infrastructure, Transport and Tourism has

been promoting the greater use of information and communication technology (ICT) in construction and, although its “Embankment Compaction Utilizing TS/GNSS Management Guidelines” have become widely adopted, there is still a need for automation technologies to further improve productivity and safety.

Accordingly, Hitachi Construction Machinery has developed a prototype pneumatic tired roller with an autonomous driving system that is equipped with additional sensors, controllers, etc. that enable it to perform compaction work over a predefined area without a human operator. The prototype was exhibited at the 2019 Construction & Survey Productivity Improvement Expo. A collision damage reduction system that uses some of this technology is now on the market and the company intends to continue working toward its practical deployment.

(Hitachi Construction Machinery Co., Ltd.)



GNSS: global navigation satellite system IMU: inertial measurement unit

5 Autonomous Driving System for Compaction Equipment