

Giant-sized Electric-Hydraulic Excavators and AC-drive Rigid Dump Trucks

Features

- ◆ Giant-sized electric-hydraulic excavators
They are mainly used for excavating earth and ores and loading them on dump trucks in open cut mines. The replacement of diesel engines with a motor-driven system with 6,000 V and 6,600 V motors has improved the energy efficiency, eliminated exhaust gas emission and improved both the working environment at the place of work and that for the drivers with noise reduction.
- ◆ AC-drive rigid dump trucks
They are mainly use for the transport of earth and ores in open cut mines. Overall energy efficiency of AC-drive trucks is better than that of mechanical-drive trucks. The use of an AC-drive truck reduces the fuel cost by approx. 10%. The use of AC-drive trucks reduces the maintenance cost as they do not have devices requiring high maintenance costs, such as torque converters and automatic transmission. It is possible to drive loaded AC-drive trucks on uphill slopes with the trolley system which supplies electricity to the trucks from the cables installed above the slopes. The use of this system reduces the fuel cost of the diesel engine by 30 - 50%. They are highly appreciated for their powerful acceleration and strong braking performance.

Basic Concept or Summary

(Giant-sized electric-hydraulic excavators)

- 5 models, *i.e.* EX1900E-6 (190t-class), EX2500E/2600E-6 (250t-class), EX3600E-6 (350t-class), EX5500E/EX5600E-6 (550t-class) and EX8000E-6 (800t-class)
- They are equipped with AC motors and cubicles, instead of diesel engines. They are driven by commercial power sources at 6,600 V, etc. supplied through cables.

(AC-drive rigid dump trucks)

- 3 models, *i.e.* EH3500AC-3 (180t load-class), EH4000AC-3 (220t load-class) and EH5000AC-3 (300t load-class)
- A diesel engine drives an alternator, the electric power generated by the alternators is rectified by a rectifier and, then, re-converted to AC by an inverter in the control cabinet and the generated AC drives the AC motors on the left and right wheels which drive the truck.
- As an AC-drive truck does not waste fuel by revolving the engine at a high speed while the truck is decelerating or running with the engine idled as is the case with a mechanical-drive one, the use of AC-drive trucks reduces the fuel cost by approx. 10%.
- A trolley dump truck is driven by electric power supplied from overhead cables. The overhead cables are installed above uphill slopes used by loaded trucks. The power taken from the commercial supply is supplied to the cable after having been transformed and rectified at a substation. A truck receives the electric power from the overhead cables through its pantograph. As this system uses 30 - 50% less fuel than the conventional one with diesel-engine-drive trucks, significant reduction in the fuel cost can be achieved with it even if the cost of electricity in the cables are included in the fuel cost. As this system also allows the trucks to be driven twice as fast as in the conventional system on uphill slopes, the time required for trucks to make a round trip can be reduced and the shorter trip time leads to improved productivity. While AC-drive dump trucks can be used in the trolley system, mechanical-drive ones cannot.



EX2600E-6 Kazakhstan



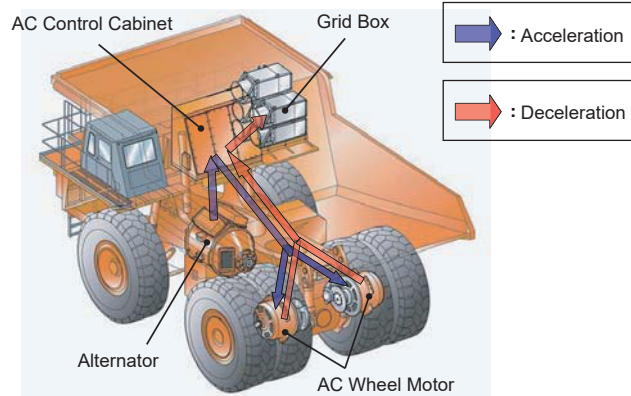
EX3600E-6 Kazakhstan



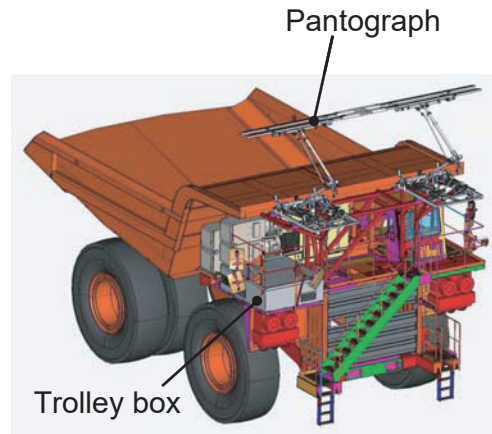
EX8000E-6 China



AC-drive rigid dump truck: EH4000AC-3



Trolley rigid dump truck: EH4000AC-3



Effects or Remarks

- ◆ An AC-drive rigid dump truck uses approx. 10% less fuel (energy) than a mechanical-drive one.
- ◆ The cost of fuel and electricity used by a trolley dump truck is 60 - 80% of the cost of fuel used by a diesel dump truck.
- ◆ The investment on additional facilities required for introducing trolley dump trucks, instead of diesel dump trucks, can be recovered in two to three years.
- ◆ The use of these electric-drive vehicles can achieve at least 80 % reduction in CO2 emissions in Brazil and Zambia. (The reduction rates differ because the state of grid power supply differs between these countries.)

Installation in Practice or Schedule

Domestic	AC-drive rigid dump truck One unit
Overseas	Giant-sized electric-hydraulic excavators More than 100 units AC-drive rigid dump trucks More than 470 units Trolley dump trucks More than 70 units

Contact: Hitachi Construction Machinery Co., Ltd., Planning Dept., Sales & Marketing Div.
Tel: 03-3830-8040 Fax: 03-3830-8217
URL : <http://www.hitachi-kenki.co.jp>