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Mining Dump Trucks Komatsu

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Today freight transport is one of the most popular types of special equipment. Its main advantages are functionality, market liquidity and versatility. A dump truck (or as also known as a tipper truck) is classified as a special machinery and is used for transporting dumps and taking dumps, big ones (such as sand, gravel, or demolition waste) used in construction, as well as coal and in other activities. A typical dump truck is equipped with an open-box bed, which is hinged at the rear and equipped with hydraulic rams to lift the front, allowing the material in the bed to be deposited ("dumped") on the ground behind the truck at the site of delivery.

The world leader in the production of construction and mining equipment is the Japanese multinational engineering corporation Komatsu Ltd. Komatsu principles of work: quality, reliability, safety, environmental friendliness and innovation. All Komatsu dump trucks are divided into two drive groups: hydromechanical and electric transmission. A distinctive feature of the front suspension of all Komatsu dump trucks is the use of a McPherson design with a support arm and a shock absorber attachment to the upper support. This suspension provides both empty and fully loaded vehicles with the same high quality of ride and is not by any other competitors in the world. Due to the relative simplicity of the design, dump trucks with a hydromechanical drive have historically been widely used. Komatsu's production program includes the

production of HD (hydromechanical drive) dump trucks from 36.5 to 141.9 tons (Table 1).

Table 1 – Specifications of Komatsu HD1500-8

Gross vehicle weight (Includes optional equipment, operator (75 kg) and payload)	249 575 kg
Rated payload	142 t
Body Capacity	78 m ³
Displacement	50 l
Engine power ISO 9249 / SAE J1349* (net engine power)	1103 kW/1500 HP
Engine power SAE J1995	1175 kW/1598 HP
Max. travel speed	56,5 km/h
Minimum turning radius	11,2 m

This model has the most powerful retarder in its class. The truck is equipped with an Electronic Stability Control to optimize handling on slippery and / or soft surfaces. The model includes the latest energy-saving technologies, as well as an ECO-mode indicator that helps a driver to work economically.

The main frame, transmission, rear axle have been redesigned, which makes the model more durable and reduces repair costs. The radiator is lead-free and meets international environmental protection requirements. The use of hydromechanical transmission limits the carrying capacity of vehicles, and modern technological processes of open pit mining require dump trucks of higher carrying capacity. The electric transmission helps to lift it. Komatsu mining haulers with electric transmission are marked with the letter E. Recently, alternators and DC motors are giving way to alternators in these transmissions. These transmissions not only provide higher performance, but also are more compact.

Electronic transmissions are used in Komatsu 730E, 830E, 860E, 930E, 960E, 980E machines. The Komatsu 730E

family is a true long-liver. The first dump truck of this type was assembled back in 1996 (Table 2).

Table 2 – Specifications of Komatsu 730E

Gross vehicle weight (Includes optional equipment, operator (75 kg) and payload)	328,401 kg
Rated payload	181.4 t
Body Capacity	111 m ³
Displacement	50 l
Engine power ISO 9249 / SAE J1349* (net engine power)	1405 kW / (1910.3 HP)
Engine power SAE J1995	1492 kW/2029 HP
Max. travel speed	55 km/h
Minimum turning radius	13,6 m

An improved fuel system reduces noise and vibration levels for improved reliability and performance. The deceleration system provides the effective braking required for safe movement in steep slopes and ascents of mining quarries.

The automatic speed control adjusts the speed of each individual wheel, allowing a driver to make adjustments at any time while driving in difficult road conditions. A state-of-the-art monitoring system identifies maintenance periods and faulty parts, this reduces diagnostic time, indicates oil and filter change times, and displays fault codes to improve machine operating performance. The company also manufactures the Komatsu 980E-4 electromechanical transmission haulage truck, capable of carrying loads of up to 369 tonnes. This is the largest dump truck ever produced by Komatsu. 18-cylinder Komatsu SSDA18V170 3500hp diesel engine weighs 11.8 tonnes. Komatsu's new flagship is designed to work with giant mining excavators that can load it in 3-4 buckets. The truck's hydraulic system has fewer components than other manufacturers, so the design is simpler and more reliable (Table 3).

Table 3 – Specifications of Komatsu 980E

Gross vehicle weight (Includes optional equipment, operator (75 kg) and payload)	625,277 kg
Rated payload	369.4 t
Body Capacity	250 m ³
Displacement	53 l
Engine power ISO 9249 / SAE J1349* (net engine power)	2495 kW / (3393 HP)
Engine power SAE J1995	2610 kW/3500 HP
Max. travel speed	61 km/h
Minimum turning radius	15.9 m

Another novelty that represents the future of the industry is the Komatsu IAHV autonomous mining dump truck, developed as part of the Innovative Autonomous Haulage Vehicle project for testing serial unmanned technologies. The dump truck was not a complete stand-alone product, but was proposed as part of the Autonomous Haulage System (AHS). It cannot be bought without a management system for an autonomous cargo transportation complex. The absence of a cab made it possible to maximize the 15-meter length for the entire U-bottom body [1]. The use of dump trucks reduces the cost per ton-kilometer of goods transported. Expanding the fleet of these machines will increase productivity and reduce transportation costs. Komatsu is rapidly inventing heavyweight models and introducing them to the world.

References:

1. Komatsu [Electronic resource]. – Mode of access: <https://www.komatsu.ru/catalog/stroitel'naya-i-gornaya-tehnika/samosvaly-s-zhestkoy-ramoy/> – Date of access: 14.04.2021.