Energy storage for oil pumping units

Oil producing energy consumption caused by beam pumping unit accounts for one third of the total energy consumption in oilfields. However, due to the structure of the system and operating conditions, the average load rate of pumping unit motor is ...

Meanwhile, the flywheel begins to release energy to power the oil pump together with the motor to overcome the load and perform the work. Then, in the t 3 stage, the motor speed with FESS increases with the decrease of the load pressure, and takes about 0.5 s to re-reach the rated speed to complete the energy storage of the next cycle.

Following the addition of the energy storage system, the power consumption of the oil pumping units significantly decreased. Notably, the power savings for Pump No. 3 reached 27.0%, ...

The system uses a pump-motor element and an accumulator device as the secondary conversion of intermediate energy and storage system. When the wind speed is high, the unit generates excess energy. The variable displacement pump/motor in the energy storage system is in the pumping condition.

So most of the researches on the energy-saving technology of pumping units still focus on the mechanical structure or intelligent control of conventional pumping units, such as the variable speed drive and its save mechanism by Song et al. [9], the beam follow-up balance during the working by Yang et al. [10], and a flywheel energy storage

In order to keep reducing the energy consumption of oil wells, scholars all over the world have made extensive energy-saving research effort on the mechanical structure and ...

Li ZH, Song JC, Huang YJ, et al. Design and analysis for a new energy-saving hydraulic pumping unit. Proc IMechE, Part C: J Mechanical Engineering Science 2018; 232(12): 2119-2131. Crossref. Web of Science. Google Scholar. 2. Liu YH, Jiang JH, Yu QT, et al. Study on the energy-saving principle of hydraulic oil pumping unit with secondary ...

energy. Conventional beam pumping units are widely used in oil field of our country. Due to the inherent load imbalance of the beam pumping unit, as well as excessive load caused by cold start and tubing waxing, the overload condition must be considered when selecting the motor of the pumping unit. Therefore, the installed

Adding a flywheel energy-storage device saves 15.7% of energy and has an obvious energy-saving effect, and it serves as a reference for the use of flywheel energy-storage systems in beam pumping units to achieve energy saving and consumption reduction. Key words: pumping unit, flywheel energy storage, system design, energy saving, experiment

In the proposed strategy, the energy storage system with spring set could not only assist the motor in reversing motion of pumping unit, but also store the extra energy and ...

Contact us now for Motor Reversing Intelligent Pumping Unit quotation. Beam pumping unit is the most widely used mechanical equipment in oil field, but it has many inherent defects. Such as high energy consumption, low mechanical efficiency, not easy to achieve a long stroke. Non-beam pumping unit is developed to solve the inherent defects of ...

Sanjack produces Intelligent Pumping Unit, International Standard series pumping unit, and unconventional pumping unit, the annual production reaches 1200 sets. Sanjack is one of Schlumberger suppliers, among 5 chinese suppliers of Schlumberger, Sanjack pumping unit has the lowest failure rate, and enjoys high reputation among end users.

The motor power ranges from 30kW to 110kW, applicable wells include horizontal, vertical and inclined wells, and the adapted working temperature ranges from -20°C to +60°C. The pumping units are widely used in onshore oilfields, offshore oilfields, marginal oilfields, and unconventional oil and gas resources (e.g., shale oil, tight oil).

Pumped hydraulic energy storage system is the only storage technology that is both technically mature and widely installed and used. These energy storage systems have been utilized worldwide for more than 70 years. This large scale ESS technology is the most widely used technology today where there are about 280 installations worldwide.

Energy Storage Transformer Energy "IN" 100% Energy "OUT" 70 - 80% Transformer Variable speed asynchronous motor-generator (GE) Pumped Storage Technology 7 VARIABLE SPEED UNITS By adding an asynchronous (induction) motor-generator or a frequency con verter with a synchronous motor- generator, the rotational speed of a pump turbine can be ...

Conventional beam pumping units have traditionally been the dominant type of sucker rod pumping equipment due to their simple structure, easy manufacture, high reliability and convenient maintenance [1,2,3,4].There are approximately 92,000 oil-producing wells in the world, and 61% of which use beam pumping units [5,6].However, the beam pumping unit is a four-bar ...

Taking appropriate steps to reduce the inertia of the mov-ing parts and improve the balance performance is the key to reducing the energy consumption. In recent years, some scholars ...

Keywords Beam pumping units Energy-saving ... 160,000 wells using sucker-rod pumping in 2014, and the oil pumping units were about 80% in the ... multi-balance device, flywheel-energy-storage ...

How to solve the problems of high energy consumption and low mechanical efficiency of beam pumping

units? ----A new type of RM pumping unit. The beam pumping unit is one of the main types of pumping units currently used in oil fields. It is mainly composed of four parts: donkey head-travel beam-connecting rod-crank mechanism, reduction box, power equipment, and ...

The pumping unit is the main pumping equipment in the oil field. However, there widely exist such defects as low pumping efficiency, high energy consumption, much time and great efforts consumption in stroke adjustment etc. in the current pumping unit, resulting in serious waste of energy. Some energy-saving technologies in pumping units have been developed, ...

A hydrogen energy storage system was designed, constructed, and operated to power zero-carbon pumping units, integrating traditional energy sources, renewable energy, ...

An energy-saving pumping system with novel springs energy storage devices: Design, modeling, and experiment January 2017 Advances in Mechanical Engineering 9(1):168781401668745

Beam pumping units play a key role in oil extraction. There is an increasing demand for optimal oil-extracting performance as operational environments are becoming more challenging and complex. Therefore, it is ...

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the study of long-stroke and low-stroke pumping units, an augmented hydraulic pumping unit is adopted as the main research content. Firstly, by comparing the hydraulic pumping unit with the beam pumping unit, it is concluded that the hydraulic pumping unit has good advantages in exploiting deep well oil, high water cut oil and heavy oil.

Beam pumping units are widely used in the oil production industry, but the energy efficiency of this artificial lift machinery is generally low, especially for the low-production well and high ...

Application environment. The new block oil extraction energy system connects power sources such as grid power, photovoltaic power, wind power, and energy storage to multiple pumping unit loads ...

The beam pumping unit, commonly known as "nodding donkey", is the main equipment in oil pumping industry, of which the number reaches more than 100 thousand units. The total installed capacity of

motor is 35 million kW, and the annual power consumption is over ten billion degrees. The power consumption of pumping unit is about 40% of the total power consumption in ...

It"s more efficient and uses less energy. The RM pumping unit has changed the connection mode between the beam and the beam, and the tail of the beam is at an Angle of 20°. According to calculation, this structure can make the four-bar mechanism of the pumping unit operate more stably, reduce the impact force of load on the connecting bolts ...

Therefore, in situations where workers utilize manual controls (ex. starting or stopping the controls manually), only a limited amount of schedules are available for the pumping unit. While a pumping unit can operate 24/7, it does not mean it will result in a higher oil production. Another option for lease pumpers is to turn on the pumping unit ...

Beam pumping unit is a main oil production equipment in land-based oilfield. Oil production energy consumption caused by beam pumping unit accounts for one third of the total energy consumption in ...

Results show that the flywheel releases energy when the pumping unit works in the upstroke mode and absorbs energy when the pumping unit works in the downstroke mode. Therefore, the installation of an energy storage flywheel in a beam pumping unit could effectively reduce the initial torque of the motor and reduce the fluctuation amplitude with ...