

Project Information



Subject: Fuel-cell drive system for mobile applications in hard-coal underground mining

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Project Description:

Fuel cell systems promise considerable benefits for applications in underground mining. Today's vehicles used underground are mostly powered by diesel engines; as they produce exhaust gases which pollute the air, their use is restricted. The alternative use of battery-systems for electrical drives is afflicted with severe draw-backs – e.g., short operating time between recharging and high maintenance requirements. The benefits of fuel cell systems in this regard are, however, faced with considerable safety requirements, especially as regards the handling of flammable fuels in mining.

It is therefore the aim of this R&D project carried out by DSK to develop a fuel-cell drive system with fuel management system suitable for application in underground mining that meets the safety standards applicable in underground mining (e.g., use in areas with explosive gas atmospheres) and test it in underground operations.

The development project's first objective is to replace a battery in a suspended monorail drive unit used for material transport (see picture above); in this application the development efforts can focus mainly on the power source. The economic feasibility of the developed fuel-cell system and the successful completion of technical testing underground is the precondition for subsequent replacement of diesel engines and batteries. The technical concept is based on a PEM fuel cell (Proton Exchange Membrane) in combination with a hydrogen storage system based on compressed gas cylinders. Due to safety reasons it is projected to place the fuel cell system in a pressure-resistant casing.

With more than 10,000 vehicles currently used underground, the international mining industry is considered as a main market for this development; the research project supports the leading role of the German mining equipment supply industry and creates new business areas.



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