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Position switches used to monitor the step treads of part of the light railway system in the city of Bielefeld were increasingly failing, making higher levels of maintenance necessary. The operator moBiel started looking for an alternative solution – and found one very close by. Following a successful test phase, the trains are now being successively fitted with long-life position switches.

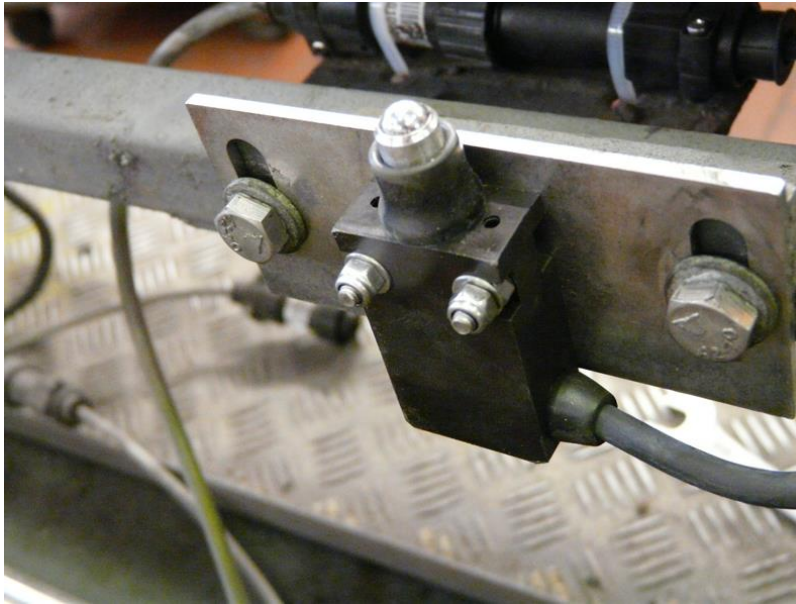
Safely on and safely off!

Position switches inside step treads of Bielefeld light railway

Four train lines, 76 trains and approx. 34.8 million passengers per year: these are the key parameters of the Bielefeld light railway system. Due to growing passenger numbers, moBiel is investing further in its "rolling material", gradually replacing old trains with new

ones. Over the next two years, the company will be installing one new Vamos light railway vehicle manufactured by the Leipzig-based company Heiter-Blick every four weeks.

Parallel to this investment, existing trains of the first, second and third genera-



The carriages are successively being refitted with ES 14 safety position switches from the steute range. Ball plungers guarantee safe switching operations even when the step treads are loaded unevenly.

tions need to be maintained and sometimes overhauled. This task is being performed by the railway's central workshop, which some time ago became aware of multiple defects in the extendable steps of its M8D vehicle series (built 1994/-98).

Each step tread contains four position switches. They detect whether there is a passenger standing on the step and, if so, prevent the door from opening and the steps from extending down to a lower-level platform.

It is therefore a safety function which is at stake here. And the requirements regarding the reliability of the switches are correspondingly high – not least because of the adverse environment. The switches are subject to extreme stress through the mechanical load they have to bear and their frequent switching cycles: every time a passenger steps onto or off the train, a switching process is triggered in the step tread. Soiling of the switches mounted

outside and below the cabin, for example through sand which is blown onto the tracks when the trains have to brake, also contributes to the high level of wear and tear.

The search for a new supplier

If just one of these position switches fails prematurely, the annoying consequence is an unplanned visit to the central workshop for an immediate repair. For this reason, Stefan Biermann, a technician working in the workshop office, went searching for an alternative to the failing switches and found a solution very close by.

The company steute has in its product range the ES 14 series of position switches. These switches feature a safety function and achieve long lifetimes even in adverse conditions. In addition, they can be perfectly adapted to suit the application in question due to different optionally available actuators and connectors.

Own test device for electrotechnical equipment

In a first step, the maintenance technicians from moBiel tested a single switch. The test was 100% significant because it was performed using a test device built some years ago by an enthusiastic moBiel employee specifically for this purpose, i.e. step tread monitoring. "The switches are loaded with test weights in exactly the same way as during normal train operations, and every switching status and cycle time is recorded and displayed. The results are therefore definitely representative", Stefan Biermann told us.

moBiel – in agreement with steute – opted for a variant of the ES 14 range which differs from the basic version by having a connector complying with German rail standards. The chosen actuator is a ball plunger which permits a switching operation even when the step tread is loaded unevenly (up to 15% displacement). A sealing cuff guarantees that no soiling can enter the switch enclosure.

Having first removed the step tread from the train carriage, the switches are then mounted on a retainer plate, adjusted and connected. Replacement of the previous brand is 1:1.

No failures to date

In the meantime, the electrical maintenance technicians in the main workshop have refitted 10 out of 36 model M8D trains. 24 switches need to be installed per 6-door vehicle. "With two of us working together, we can refit one complete vehicle in a day", Jan Stieghorst, electrical maintenance technician, told us. Vehicles come for refitting as soon as one of the old switches fails, or as part of the regular maintenance routine.

Stefan Biermann is convinced that it is beneficial for moBiel to conduct such projects themselves and not to rely on replacement parts being supplied by the manufacturer: "We, and ultimately our passengers, profit from the fact that we know our vehicles inside out and can plan, as well as execute, extensive maintenance and modernisation measures ourselves." This includes refitting the step treads with robust position switches. To date, not a single steute switch has failed. This is why moBiel has opted to continue replacing its position switches and thus to increase the availability of its M8D light railway trains.

Author:



Jens Lindemeier
Sales Engineer
steute Technologies

Images: moBiel GmbH