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# NEW TRIEBWAGEN TYPE ABeh 4/4II FOR THE BERNESE OBERLAND BAHN

By Norman Heath

The B.O.B. placed an order with SLM of Winterthur for the delivery of three ABeh4/4 Triebwagens for the busy passenger service from Interlaken Ost to Lauterbrunnen and Grindelwald. The three ABeh4/4II Triebwagens are No. 331 Grindelwald, No. 312 Interlaken and No. 313 Lauterbrunnen. The new units would have to be easy to service, have a higher adhesion rail speed and be capable of hauling more than the present 85 tonnes trailing load. It was also essential that delivery would take place before the 1986 summer season.

The bodyshell is built using the well proven method of corrugated steel sides — developed by SLM for use on many other projects — to give greatly increased strength. One unique feature for this particular construction is the ability to incorporate verticle sliding windows in the passenger compartments. The body is split into 5 sections; the downhill (Interlaken end) drivers cab and equipment area, 2nd class compartment, entrance and toilet section, 1st class compartment and the uphill (Lauterbrunnen end) drivers cab. The idea of fitting the push button controlled main entrance doors in the middle is to provide a free area around the bogie units, and with the steps being fitted inside the doors the risk of icing up in winter time is decreased. Cable ducts are provided in the floor and the roof with access being gained by simple screw locks. The body floor also provides for access to the bogies units via removable panels. The whole of the resistive braking pack, which is mandatory on all mountain railways, is fitted in one single unit which can be assembled onto the roof with minimum effort.

Under the chassis floor on the downhill side, which is easily identified by the Crest and system letters, is located the battery box and the charger along with the shunt wound screw type air compressor for the braking system. Under the floor on the uphill side are the traction motor shunts, the compensating resistors for the compressor and the motor switch gear.

The 12 seat first class and the 24 seat second class compartments are fitted with electrical heating units and all the windows are of the single element tinted glass type. Full length luggage racks are provided in both compartments with a removable ski rack being fitted in the main entrance area. The main colour theme in both compartments is Mahogany with a non slip brown floor covering in the second class area and a hard wearing carpet in the first class area.

The two bogies are fitted with Rigenbach rack and auxiliary rack braking systems as well as the normal adhesion mode brake shoes. The two BBC 750 volt DC motors in each bogie are specially sprung to take account of the very tight radius curves of up to 100 metre radius found on the BOB system. The motors can also be used for braking in the regenerative mode, with the output being sent to either the roof mounted resistors and dissipated as heat or to the overhead catenary. The motors are also fitted with a sensing device which checks for either slip or spin and passes the information to the control electronic system for the appropriate action to be taken. With a starting tractive effort of 300 kN and a continuous rating of 1256 kW this Triebwagen is now the most powerful Direct Current motive power unit in Switzerland.

The drive system is from the motor to a direct coupled gearbox and then via a cardan drive shaft to the axle. The axle drive then splits the power between either the adhesion or the rack drive to the wheels. All couplings are in accordance with the BOB — SBB Brünig — LSE systems which are the +GF+ automatic connectors, which allows for



through running to Luzern for the coaching stock. The Triebwagens are capable of operating in a multi unit mode, as is the case from Interlaken Ost to Zweilütschinen, or being controlled via a driving trailer. The compressed air lines are used to power the rear view mirror, windshield wipers, outside doors, pantograph, whistle, circuit breakers and wheel flange lubrication.

To comply with the regulations of the Swiss Federal Office for Transport the brakes are operated on both the adhesion wheels and the rack wheel. On top of this there is also a band brake fitted on the rack wheel which is controlled by the driver. The Emergency electrical braking system is controlled from the drivers cab and three places within the passenger area.



*BOB Triebwagen ABeh4/4II. No. 312*

Photo: SLM

**Data:**

Gauge:	1000m	Wheel dia:	870mm
Transmission ratio:			
Adhesion:	1:1.7686	Rack:	1:6.58
Motors:	4	Catenary supply:	1500v DC
Motor terminals volts:	750v DC	One hour rate:	1256 kW
Tractive effort:	144 kN	Tractive effort. Starting:	300 kN
Trailing load. Max:			
12% gradient. 30 Kmph:	110 Tonnes		
Triebwagen weight:			
Mechanical parts:	34.6 Tonnes	Electrical parts:	10.1 Tonnes
Seats 1st Class:	12	Seats 2nd Class:	24
Standing (6/m <sup>2</sup> ):	60		

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