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KROKODIL. PROTOTYPE AND MODEL.

By Shane O'Connor.

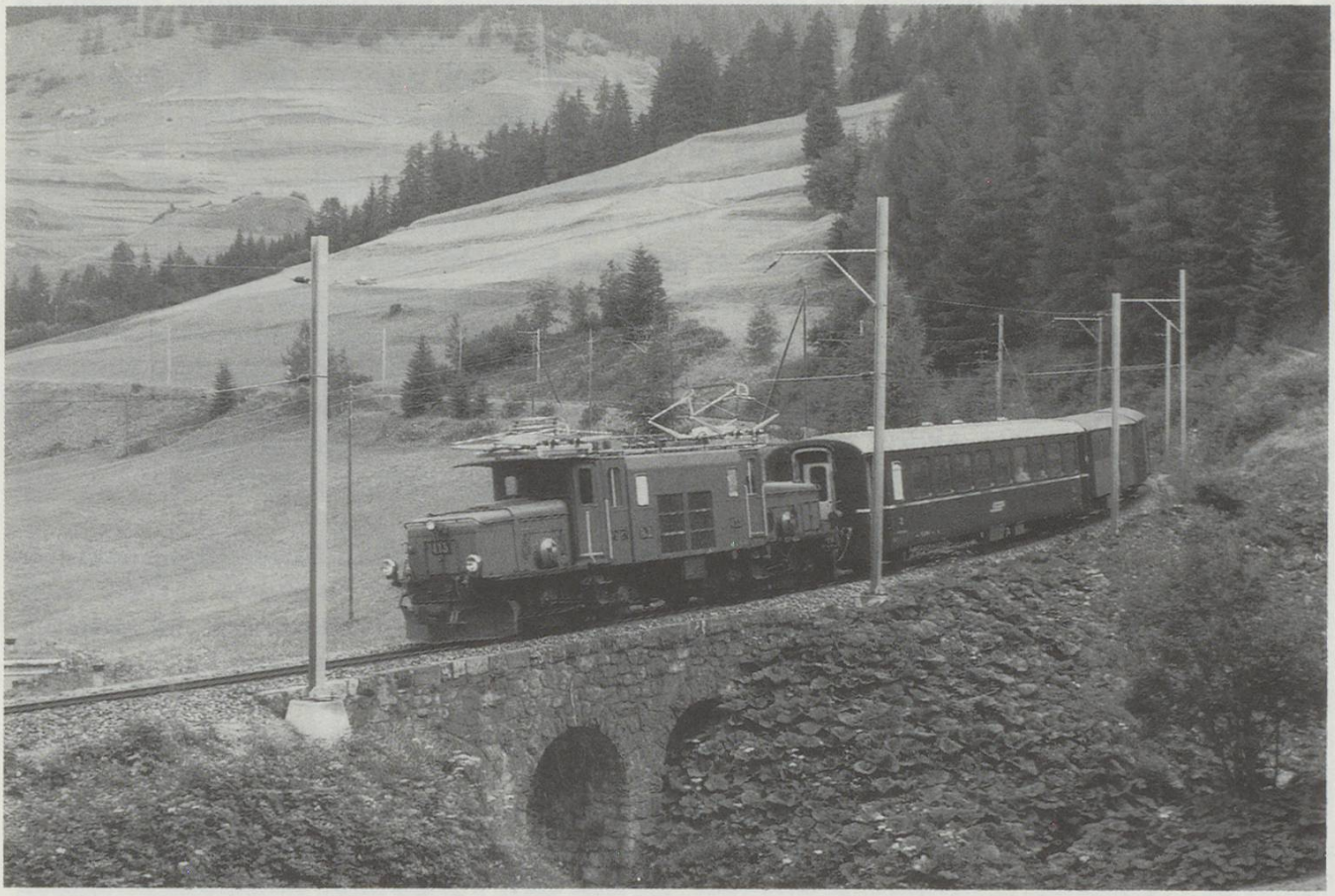
War seldom brings benefits, and for the Swiss the 1914-18 War caused severe concern about obtaining adequate supplies of imported coal for the country's railways, etc., coupled with increased cost. In a country already well industrialised where there are few natural resources, other than wood and asphalt, attention was focused on the most abundant local source of energy, water, and its application for producing electricity. By the turn of the century, there was already extensive use of electricity for energising machinery, local railways and trams. But, the application of electricity as an alternative power source for main line railways was in its infancy, and steam was still 'King'. Thus, by the end of the calamitous War, whilst in some countries experiments were made with diesel power as an alternative to steam, others examined electricity, and some fascinating designs lurched onto the tracks as a result, a few of which possessed the characteristics of the Crocodile.

S.B.B. Ce6/8II No.14253 at Erstfeld. *Photo: Minirex. AG Luzern.*

The legendary Swiss 'Crocodile' locomotive is a design which is immediately recognisable, although it can hardly be said to be beautiful in appearance, it does exude a feeling of power and purposefulness. The body comprises three articulated parts, a central cab, two sloping bonnets resembling the snout of a crocodile, hence the German '*Krokodil*'. The wheel arrangement 1-C-C-1, required the wheels to be mounted in two long bogies, housing both motors and gearwork,with the necessary control and transformer equipment carried in the body suspended between the two trucks. This technique was conceived to allow one motive power unit to negotiate relatively tight curves, and yet

through the distribution of weight over a number of driving axles, coupled by outside motion, obtain a higher power output from the complete unit than would otherwise be possible. This also retained availability for virtually any section of the system without restriction by axle weight loading.

In 1919 the prototype on which subsequent 'Krokodils' were based, started revenue service between Bern and Spiez, affectionately called the 'Schlotterbeck' (shambling trunk) because of its box-like body and ambling speed. This Ce6/8[I] locomotive was constructed with a full length rigid body, with two short bonnets at either end, thus introducing the section construction, mounted on two huge bogies which carried all the running gear, and used coupling rods to six drivers. This was no speedster,with maximum speeds of 65km/h on the level, and 35km/h on a 2.6% gradient, but it could haul up to 1200 tonne loads and was reliable. The initial success of the trial workings lead to its transfer to the Gotthard line for which it had originally been designed, with the locomotive being based at Biasca.



Rh.B. Ge6/6I. No.413 near Bergün. July 1989. *Photo: S HOROBIN.*

The valuable experience gained with the trials, culminated in the appearance of the first real Krokodil in 1920, which embodied the famous sloping bonnets, large centrally placed cab, and again, six coupled axles. Here then was the solution of housing motors large enough to create power, and yet not too large to prevent useful work being achieved. As traction knowledge expanded, designs were to appear where the motors became smaller and more efficient, and could be placed directly onto the axles, thereby avoiding energy consuming motion gear. This also led to smaller wheels allowing greater rates of acceleration.

The Krokodil Ce6/8, could manage 65km/h on the level, and 30km/h on a gradient respectively, and was a success! By 1922 there were 33 of these ungainly looking

beasts in service, hauling both passenger and freight up the long ramps of the Gotthard Tunnel approaches. S.B.B. economy is based largely on the large volume of freight that is transported in-transit between Northern Europe and Italy. It is only in comparatively recent years the S.B.B. has moved away from its concept of reliability first, and speed second, today both are classed as of equal importance. This change of attitude became necessary after the Second World War with a demand for a reduction in the freight transit times. The alternative routes provided by the S.N.C.F. and Ö.B.B. whilst not as direct, were promising shorter times, and it was this fact which overcame the Swiss reluctance to keep rail wear and energy costs down. This awareness of the need for an improvement in speeds first became apparent in 1944 when a number of these locomotives were rebuilt, and released for service with a revised speed classification of Be6/8^{II}, evidencing their improved speeds of 75km/h and 45km/h, on the ramps, respectively.

By the early 1950's the S.B.B. recognised a new design would have to take over this work, and in consequence the first two Ae6/6 locos appeared in 1952, followed by another 22 between 1955 and 1958. This design was a success and, 94 more appeared in 1966. The increasing numbers of replacement locomotives and better speeds meant the inevitable withdrawal of the Krokodil from main line service on the Gotthard.

However, this was by no means the end of their working days, as they came off the arduous duties of the Gotthard, the best, about 11, were converted for use as shunting locomotives, with the removal of one pantograph, giving them a somewhat lopsided appearance. Their slow speeds and 128 tonnes tractive weight making them ideal for such duties. Between 1968 and 1984 these aging monsters could be found at work throughout the Swiss shunting yards as far apart as Basel-Muttenz, Lausanne and Buchs and sometimes were even occasionally allowed to run local freight. By 1983 all but one had been taken out of service, and in March 1986 the last, No.14276, shedded at Basel ceased daily duties. To-day no more than six remain, of which No.14253 on loan from the Verkehrshaus Luzern, repainted in the original brown livery is allowed to work weekly freight specials from Erstfeld to Altdorf and the occasional special passenger service. As to the remainder, Ce6/8^{III} No.14305 is based at Basel but does not work any regular service, and No.14270 is on permanent display on the plinth at Erstfeld.

The Swiss conservation of their locomotives is well established, as one has only to consider the Ae4/7 introduced in 1927, which are still to be found at daily work throughout the country, mainly working local passenger, and double headed for freight.

The Krokodil name has been applied to other locomotives such as the S.B.B. De6/6 introduced in 1926, with a modest 73 tonnes, and a top speed of 50km/h. Metre-gauge claimants include the Rh.B.'s Ge6/6^{I}, and the B.V.Z. HGe4/4, the former being genuinely articulated, with outside motion, the latter has a single body frame with bonnets. The only real contender for the Krokodil name outside of Switzerland is by the Ö.B.B. whose own Krokodil appeared in 1923. Intended for the Arlberg ramp, this was slightly lighter at 118 tonnes, and classed BR1100. By the early 1970's they had been relegated to freight traffic working in the Salzkammergut, and have since been withdrawn completely. One, No.1089.06 is on display at the Verkehrshaus Luzern, having been exchanged for S.B.B. Be6/8^{II} No.13257. The similarity in the design of these two main line work-horses is strong indeed, the outward difference is the flush footplate of the S.B.B. version whilst that of the Ö.B.B. has two levels, and if such a thing can be said, the cab of the S.B.B. Krokodil is more streamlined, the Ö.B.B. version being very 'chunky'.

Inevitably perhaps, the romantics within the German Railways felt that they too should not miss out! Interestingly, although no such claim was made for the BR191, released in 1933, again with an articulated 3 part body and powered through outside motion to the 6 coupled axles, the term Krokodil has been applied to two classes. On the basis of an articulated 3 part body, both Co-Co, and direct drive, BR193 introduced 1933-5, and BR194 batch released after 1940 through to 1955, (the latter being the Ö.B.B.'s BR1020),

and both classes now withdrawn from regular service. Is it a coincidence that a few of the BR194 monsters have recently been on hire to the S.B.B.?

For the modeller wishing to reproduce Krokodil hauled services on their layout, there is an excellent selection of models from which to choose, especially in 'HO'. ROCO offer versions in either S.B.B. green, or brown, and are of a perfection in appearance and running to satisfy anyone, their Ö.B.B. green and red models are almost as good, spoilt only by noisy mechanism. Both Fulgurex, and Metropolitan (in my opinion the best), offer a selection in their limited editions of slightly differing versions, if you track them down and dig deep enough into your pocket. The Ce6/8 'Schlotterbeck' is/was available from Metropolitan, who also offer a De6/6. The Rh.B. version is represented by the delightful BEMO model. The D.R., D.B., and Ö.B.B. German designs are available from ROCO, Märklin, and now out of production, Liliput, which is perhaps just as well, as this model as supplied would not run under catenary without modification to the locomotives circuit.

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