



Plate 1: British Borneo Timbers Bettotan Line after conversion to Diesel. 1946-7. Robert Macpherson.

It did not take long after the beginning of the industry in the early 1880s for loggers to realise that 'kuda-kuda' or hand hauling of logs direct from stump to river side became uneconomic if the haul distance became excessive. In the western world at this time, although road haulage using horses or oxen took care of feeder and distribution needs, the most efficient land transport systems were all rail based. This was the era of railroad expansion worldwide. The British North Borneo Company dreamt of a trans-Borneo Railway connecting Weston to Cowie Harbour, "to gain access to the riches of the interior" was to dominate their thinking for two decades and put the Company irretrievably in debt, so it is hardly surprising that the next step was the introduction of light railway or tramway systems to the North Borneo logging industry.

The major advantage of light railway haulage systems is the relatively low cost of installation. However, by virtue of the fact that it is supported by closely laid 'sleepers' (sometimes called 'cross ties'), rail track exerts a very low ground pressure and can be laid across swamp and wet ground making it ideal for gaining access to swampy river banks. Another advantage is that the rail itself can be readily uplifted and laid elsewhere almost *ad infinitum* and some of the rail used in Borneo was probably 50 years old.

The major disadvantage is that, due to the limits of traction between steel track and steel wheels, even with high powered locomotives, gradients on rail cannot exceed 2-3%. If it is necessary to negotiate rougher

terrain this has to be overcome by the construction of expensive viaducts, cuttings and tunnels which was obviously not practical in Borneo logging operations. As a result the rail operations in North Borneo were, and remained, restricted to flat terrain. However, the early logging concessions, concentrated in the flat coastal forests around Sandakan Bay and the Kinabatangan, were ideal for rail operation.

The first reported rail was imported by the North Borneo Timbers and Planting Company to Sandakan in 1888 and consisted of "half a mile of light track, trucks and dollies". Thereafter, logging by rail in conjunction with 'kuda-kuda' became the standard practice in the industry and remained unchanged until the introduction of crawler tractors, in the late 1940s after World War II.

The standard light logging railway was, and still is to this day, constructed of 32lb rail laid to a 2.0 ft gauge secured by dog spikes to rough cut round wooden 'sleepers' which were cut by axe from the adjacent understory. Initially, single logs were loaded on dollies and pushed out to the river bank by hand labour. (Plate 2) In the early days distances were fairly short and although light steam locomotives were readily available at that time, and already deployed in North Borneo, not only by the North Borneo Railways, but by the early 1900s at the Silimponon Coal Mine, the short lived Taritipan manganese operation at Marudu Bay and at Lahad Datu with the Darvel Bay Tobacco Co. there is no record of any steam locomotives being deployed in the logging



Plate 2: “Loading a Rail Dolly”. Photographer unknown. Probably pre 1920 (Sabah Museum)

industry until the British Borneo Timber Company brought in the American built Shay locomotive to their Bettotan Camp in 1920. It is also believed that BBTC later added a second steam locomotive of unidentified manufacture Taikoo No 1, purchased second hand from Hong Kong, presumably from the Whampoa-Taikoo Dockyard, to this operation. This was an 0-4-2 side tank with outside motion and Salter valves. Unlike the other rail operations of the time the Bettotan line was intended to be a permanent main line and utilised a 66lb rail laid to a 3.0ft gauge on a ballasted track which was eventually extended to 22 km. (Plate 3) This track remained in use until the 1950s, although the steam locomotives were scrapped in the late 1940s and replaced by diesel driven engines. (Plate 1) BBTC also had an old 2.0ft gauge steam locomotive at their Sapagaya camp of German manufacture, probably Orenstein and Koppel. This was a very unstable locomotive which frequently jumped the track! (Plate 4)

The Forestry Department Annual Report for 1922 states that there were 12 steam yarders and 5 locomotives employed in the industry but does not give any details of the type of equipment or where it was deployed. It is possible that some early locomotives driven by internal combustion engines were in use in Borneo by this time. Small narrow gauge locomotives powered by internal combustion engines were developed to supply the trenches during World War I and by the 1920s these were finding their way into many industrial applications, so this is quite possible. However, these locomotives have not the same appeal to enthusiasts as steam and have remained largely unnoticed and unreported. There is no record of any other steam locomotive being employed in the industry until the reported acquisition by the North Borneo Timbers and Planting Company of two of the

Andrew Barclay locomotives from the Cowie Harbour Coal Company after it closed the Silimpopon Coal Mine in 1932.

Commenting on the closing down of the steam yarding operations in the 1936 Forestry Department Annual Report the Conservator, Harry Keith, stated that “rail transportation in conjunction with kuda-kuda hauling had become standard practice in the industry although petrol/diesel driven locomotives were replacing steam.” (See “The Early Days of the Logging Industry” by the writer in the Forestry Department Annual Report for 2004),

This was the beginning of the boom in rail transportation which was to continue until the late 1960s by which time many hundreds, probably thousands, of miles of track had been built. The location of many of these can be found recorded in the 1:50,000 maps of Sabah compiled by the U.K. Department of Overseas Surveys from aerial photographs taken in 1968-70. The tracks shown on these maps were almost certainly in use at the time as discarded rail alignments would very quickly become indiscernible from the air. In



Plate 3: “Shay locomotive on Bettotan Line” British Borneo Timbers about 1930. Photograph Keith Wookey collection. Courtesy of Robin Wookey

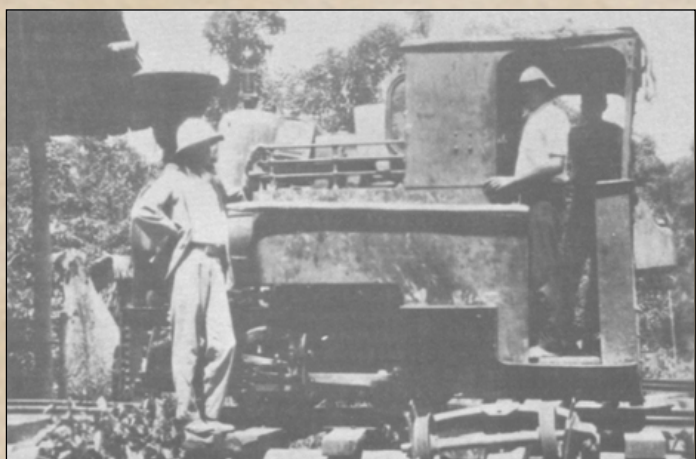


Plate 4: “Orenstein and Koppel Locomotive”. British Borneo Timbers, Sapagaya. A.N.M. Garry circa 1925

fact rail operations have an extremely low impact on the environment particularly in the days of 'kuda-kuda' hauling. The tracks were laid out between stumps with hardly any ground or lower canopy disturbance other than that achievable with parang and chongkal. After logging the track was uplifted to be laid elsewhere and the spikes recovered. All that was left behind were the rough cut pole sleepers which soon rotted away. (Plate 5) Unfortunately, most of the flat lowland forest logged in this manner has been converted to oil palm.

The late 1940s and early 1950s saw the introduction of crawler tractors and logging trucks into the industry. Although eventually this would mean the end of the use of rail except for swamp logging, crawler tractors were used to replace *kuda-kuda* hauling and loading in a number of the larger rail operations until the late 1960s. (Plate 6) However, although the supporters of rail claimed that their new mechanized operations were cheaper and less affected by weather than conventional truck and tractor road logging, there were a number of serious limitations.

With the exception of the Bettotan track all the logging railways were 2.0ft gauge which restricted loading to one log per bogie, so logging tended to be selective with



Plate 5: "Rail Operation at Bukit Garam" 1952. Photo George Brown

only the larger diameter logs harvested. There is also a limit to the length of logs that could be carried without causing the bogies to jump the tracks so logs were relatively short. Derailment was a perennial problem, and it was an arduous and time consuming task to reload a log train away from the main working area, so this was taken seriously. In the early days when logs were sold for sawmilling length was not a problem but with the advent of the Japanese plywood market in the 1950s longer lengths began to be preferred.

The maximum number of logs that could be carried on a log train on 2.0ft track was about 15, which bearing in mind the relatively short length, amounted to about 75m³. This was less than the load that could be carried by a single off-highway logging truck. Another limitation was caused by the fact that the lines were all single track and as the haul distances increased passing sidings had to be constructed to keep the return traffic flowing. (Plate 7) The overall speed was relatively slow, 7-10 miles per hour, so round trip times were protracted, further limiting productivity.

However, the main contributing factor to the demise of rail operations was the lack of flat terrain. The areas around Sandakan Bay and the Kinabatangan River were finally worked out and the big logging companies were working new concessions in the interior of the country where the terrain was totally unsuitable for rail operations. What was probably the last major rail operation, that of the North Borneo Timbers in the Kretam Forest Reserve, from where some of these photographs were taken, was closed in 1969. Some smaller contractors continued with rail operations in pockets of upland forest for a few years after this, but in recently rail has been confined to areas of swamp forest where road construction is not practical.

Note : The writer of this article, Ross Ibbotson, is researching material for a book on the *History of Logging in North Borneo* and would appreciate any information or copies of photographs pertinent to this subject. Please contact by email ibbotson@pd.jaring.my



Plate 6: "Loading Log on Rail Dolly using Caterpillar D7E" North Borneo Timbers, Kretam. Photo K.V.Robinson circa 1968. Courtesy of Mrs. Judith Robinson.



Plate 7: "Log Trains Passing at Siding" No 7 is a Ruston Locomotive. North Borneo Timbers, Kretam. Photo K.V.Robinson circa 1968. Courtesy of Mrs. Judith Robinson.