

## A brief history of transport infrastructure in South Africa up to the end of the 20<sup>th</sup> century

### Chapter 3:

# The first roads – building the foundation for a country-wide road network

#### INTRODUCTION

The early development of road infrastructure in South Africa up to current times falls broadly into four phases. As mentioned in Chapter 1, the first was the period from 1652 to 1806 in which the Cape was considered valuable only as a service station for its owners' East Indian trade. Apart from a small length of street-work in Cape Town, no roads were built. Making the sands of the Cape Flats and the mountain barriers beyond passable by road transport was altogether beyond the financial ability or the needs of the settlement. Tracks of a sort led to Van Rhynsdorp, Tulbagh, Uitenhage and Graaff-Reinet, but these were not used by vehicles if pack animals or riding horses would do.


The second phase was the nearly 100 year period from 1806 to 1895 during which South Africa was opened up as the permanent home of a large and rapidly increasing settler population. Under various governments, ambitious and expensive road schemes, for that time, were undertaken, linking all parts of the country. The roads were rough at best, but they were developed in a very short time, they carried an immense amount of traffic, and they established the basic route system for the Transvaal, the Orange Free State, Northern Natal and the Northern Cape, which prevails to this day.

By 1875 there were 500, and 2 750 by 1893, miles of made road in the country, and 34 bridges.

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Herewith the third chapter in our series of around ten chapters (the first two chapters appeared in our January/February and March 2014 editions). This résumé of the development of transport infrastructure in South Africa is not intended to be a comprehensive one, but it might encourage readers to participate and add additional value to an understanding of this facet of our history. Readers are therefore invited to communicate with the author in sharing anecdotes and further relevant information.



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The third phase extends from the start of the 20<sup>th</sup> century, until approximately 1950. The economic development of the country that had produced a remarkable growth in road transport brought about its virtual extinction in the early part of the third period up to circa 1925, with the start of the large-scale construction of railways, which deprived transport riders, stage coaches and wagons of their custom, and soon destroyed them altogether. The construction of road infrastructure was held in abeyance in favour of this new form of transport, the steam locomotive.

By 1925 there could be no doubt that South Africa had lagged behind other countries in the provision of good roads. Whilst £125 million from the National Debt had been spent on the development of railways and harbours, virtually nothing from the Union Government, formed in 1910, had been spent on the building of roads. The total expenditure on roads by the other authorities since 1910 had been less than £20 million, most of which had come from revenue. Of the approximately 70 000 miles of road that had officially been recognised, nowhere did any continuous stretch of improved roadway exceed 40 miles in length.

The dependence on rail transport and the neglect of roads continued until the end of the First World War, when the combined effect of railway systems, which had suffered from the war, the ready availability of comparatively cheap and reliable mass-produced cars, and a fair amount of surplus money started the fourth, or motorised, phase of early road development (1920–1950).

In 1919 the roads were in a state of neglect; the road authorities had hardly any staff, money or technical knowledge; and legislators had no appreciation of the revolution that faced them, and were inclined to be hostile toward motor transport, so that a state of chaos was rapidly developing. The first gleam of hope was the discovery that large sums could be raised by motor taxation, and by 1925 all four provinces had their licensing systems in good working order, and had instituted the beginnings of sound roads departments. Unfortunately, construction continued to fall further and further behind demand, and the “we want good roads” campaign gave place to a preoccupation with the “low cost” road.

### INTRODUCING LOW-LEVEL BRIDGES

The first successful step towards this was the development of the submersible or “low-level” bridge, which gave 99% service of the orthodox high-level bridge for about 10% of its cost so that an adequate bridging programme became financially possible. The next step was the discovery that suitable sand, clays and natural gravels were not merely as good as, but were actually superior to the very much more expensive water-bound macadam for fast (in terms of the time) light motor traffic. This was

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followed by the introduction of the road grader from the USA – at first animal drawn, then tractor drawn, and finally self-propelled on pneumatic tyres. At about the same time (late 1920s) the idea of patrol or section maintenance was introduced, which subsequently was developed very successfully in the Orange Free State. By 1930 there seemed to be some hope of coping with the situation if the financial backlog could be made up, and if some method of dealing with road corrugations could be found.

### 1935 NATIONAL ROADS ACT

In 1935, with the passing of the National Roads Act, South Africa took a forward step, which not only put this country ahead of other Commonwealth countries, but which was to lay the cornerstone of the present vast network of high-standard national roads, setting a course of forward thinking in the sphere of roads in South Africa, and heralding the onset of the “getting out of the mud” era for road building in South Africa.

The National Roads Act levied a tax of three pence a gallon on imported petrol for road works, and took over-all responsibility for the most important 5 000 miles of main through-roads, as well as taking over all the provinces’ road debts. This relieved the provinces of their most embarrassing roads, gave them an example of what could be done without prohibitive expense by bold policy, and inspired them to attempt to show that they could do better than the National Road Board.

The Board realised early that it was impossible to cope with corrugations under heavy traffic, except by protective surfacing. It founded a laboratory and encouraged full-scale trial of overseas ideas. It was soon discovered that properly compacted bases of natural or blended sand-clay or gravel were just as effective as water-bound macadam costing three times as much, and that light surface treatment (chip-and-spray) is just as good as premix surfacing costing three or four times as much for the heaviest traffic on rural roads.

Unfortunately, good gravel was rather scarce, but this difficulty was largely overcome by the discovery in the early 1940s that the addition of from 2% to 5% of cement (or in some cases of even smaller amounts of lime) modified a rather unsatisfactory soil or gravel so that it made a perfectly satisfactory base. A little experimenting had been done with soil-cement in the States before this but the successful use of such extremely small quantities of cement or lime was a South African innovation, and in this period it is believed that South Africa led the world in modified soil-cement pavement layers.

There existed large areas of particularly poor soils, the so called “black turfs” in particular, where ordinary methods of construction failed badly. The solution to this problem was provided in the middle 1940s by the adoption of the California Bearing Ratio test, which showed that there is a far greater range of soil strengths than was then supposed, and supplied a means of designing a road bed of successively better layers until the surface is reached in such a way that no layer is thicker or more expensive or more heavily compacted than it needs to be.

Although the original ideal of a surfaced road which is so cheap that its overall cost is less than that of building and maintaining a gravel road was never attained, these tools and techniques made it economically possible to provide a bituminous surface on any road carrying 3 000 or so vehicles a day, below which point the lack of kneading action by traffic allowed the bitumen to harden and crack. Ordinary maintenance of gravel



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roads could cope with traffic of up to 300 vehicles per day, so that the rural road problem appeared to be solved except for the solid slog of doing and paying for the work.

The Second World War and its aftermath delayed this goal, as it disorganised the roads departments by denuding them of men and plant, and raised the price of plant and imported materials to about three and a half times what it had been, and of everything else to about two and a half times. In addition to this the war was followed by a virtual revolution in motor transport in which the tremendous increase in the number of vehicles created a clear justification for an increased construction programme.

### DECIDING ON SPECIFIC ROUTES

The Board settled on fourteen specific routes for recommendation to the government. The density of population, volume of traffic and the existing road assets and vested interests motivated the choice of these routes. It also took into account the need for progressive improvement of capacity and standards. Finally, routes were selected which would best serve the existing and future requirements of through traffic – taking into account local feeder traffic – between the main urban centres in the Union, traffic to and from adjoining territories, seasonal traffic to coastal holiday resorts and national centres of scenic interest such as the Kruger National Park and the Cango Caves, overseas tourist traffic, and national defence.

The Board was particularly proud of the specifications prepared for the system of national roads. These provided for an all-weather traffic speed of 60 mph (96 km/h), which was considered high in those days. On two-lane roads, the width of the gravelled section would be 18 ft (5.4 m) or 20 ft (16 m) when the intention was to provide an asphalt surface. The formation width would be 32 ft (9.7 m) and the distance between the fences at least 100 ft (30.4 m).

Initially the intention was to provide both single- and double-traffic way bridges, but the Board subsequently decided that all bridges should be double-lane structures.

When the National Road Act of 1935 was passed, the majority of roads in South Africa were still relics of the days of the ox wagon. Paths followed by the indigenous population had become wagon tracks and then earth roads, and in time the earth roads were gravelled. However, the general attitude of the National Roads Board was that, while many of the physical elements of the new national roads would wear out or be damaged or destroyed, their location would forever remain a monument to competent engineering rather than a reminder of poor alignment.

The National Road Scheme of 1935 was an enormous undertaking, the extent of which was not properly appreciated at the time, and by 1938 the five-year programme was well behind schedule. Trouble was being experienced with vested local interests in respect of route location, and added to this, the Board's engineers were confronted with extremely complex road building problems for that time on several routes, notably Route 2 from Cape Town to Durban where really difficult topographical conditions were experienced. Some of the rivers and gorges to be crossed required the most spectacular bridges ever to be built in South Africa.

Nevertheless there was hope that by 1942 all the earthworks, excepting some heavy construction in mountain passes,



would be complete. Unfortunately the outbreak of the Second World War eliminated any possibility that the road programme would be adhered to.

During the war the national road programme had to be largely suspended because of the war effort, in which the entire organisation was placed at the disposal of the government for purposes of war.

### SETTING THE STAGE FOR “MODERN” ROADS

Following the war, the National Roads Board was established in 1948 and its function entrusted to the National Transport Commission. The national road programme of 1935 was well behind schedule, and in March 1950, 2 379 miles of bituminous surfaced roads had been completed (out of 5 173 miles on the original scheme) and earthworks had been completed over 3 681 miles. At this stage investment in rural roads and bridges in the Union was less than 60% that for railways. The total length of rural roads in South Africa at the time was of the order of 85 000 miles, the majority being provincial roads. The scene was now set for the newly constituted National Transport Commission, together with the four provinces and the municipalities, to move into the “modern” era of road infrastructure development.

In the words of Colonel F E Vincent, then head of the road engineering staff of the National Roads Board, “The goal which seemed so remote in 1919 – getting the traffic out of the mud and joining all places in the (then) Union with good, safe, all-weather roads – has been virtually achieved, but the

traffic problem seems as far from a complete solution as ever. Traffic congestion is such that the towns which we set out to join together have become obstacles to free passage, just as difficult to negotiate as the original roads (or lack of them) and far more dangerous. Bypasses will assure free-flow of traffic not desiring to visit the cities, and expressways and throughways, while sounding very promising, must be seen in the light that even the best of them cannot continue to accept traffic at one end any faster than it can get rid of it at the other. This means that the amount of traffic any road can carry into a city is limited by the amount of parking available in the city for this traffic. While there is every hope of solving the problem it is obvious that the authorities concerned will have to do a lot of very bold, hard and clear thinking; a considerably greater share of road user taxation will have to be devoted to urban road problems and vested interests will have to accept the inevitable changes in the pattern of urban life which the modern revolution in motor transport is bringing about. Finally, the individual citizen will have to realise that, in spite of all that engineering can do, his own restraint, co-operation and self-discipline are essential if he – or she – is to enjoy the full benefits that motor transport can bring.”

The stage was now set for the advent of “modern roads”, a development which commenced in the 1950s, and was largely based on North American practice and design criteria, as the required expertise was not generally available in South Africa at the time. □

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