

ComRails Volume 5: War Time History of the Commonwealth Railways

Volume5



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Volume 1 Overview and Articles Information

Volume 2 Carriage Information

Volume 3 Freight Rollingstock Information

Volume 4 Locomotive and Railcar Information

Volume 5 War Time History of the Commonwealth Railways

Volume 6 Route Information

Volume 7 Master Rollingstock List

TIMS1 Australian National Traffic Information Management System (TIMS) - Rollingstock Lists - this is a listing of all the rollingstock whose detailed records can be found in TIMS3 to TIMS6

TIMS2 Australian National Traffic Information Management System (TIMS) - Route Index - basically a listing of all the track speed restrictions and temporary works

TIMS3 Australian National Traffic Information Management System (TIMS) - Locomotive Rollingstock Records - this is the full detailed entry of all the locomotive rollingstock.

TIMS4 Australian National Traffic Information Management System (TIMS) - Railcar Rollingstock Records - this is the full detailed entry of all the railcar rollingstock.

TIMS5 Australian National Traffic Information Management System (TIMS) - Passenger Rollingstock Records - this is the full detailed entry of all the passenger rollingstock.

TIMS6 Australian National Traffic Information Management System (TIMS) - Wagon Rollingstock Records - this is the full detailed entry of all the freight wagon rollingstock.



**Commonwealth, Australian National and
South Australian
Railways Rollingstock
Volume 5**

War Time History of the Commonwealth
Railways

Chris Drymalik

This document is part of the printed version of the Comrails website. The site is where you will find various bits of information about the Commonwealth Railways, Australian National Railways, Great Southern Railways and the South Australian Railways.

The subject material is the South Australian, Commonwealth and Australian National Railways.

The Comrails web site can be found at <http://comrails.com>
You can email Chris at chris.drymalik@gmail.com, or chris@comrails.com

Chris Drymalik

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WAR TIME HISTORY OF THE COMMONWEALTH RAILWAYS

This document contains information obtained from a manuscript prepared by the Commonwealth Railways, that was published around 1947, as a guide to future generations in the event of another war.

1.1 War Time History of the Commonwealth Railways

1939 - 1945

At the outbreak of the second World War, as now, the Commonwealth Railways comprised the following:-

Trans-Australian Railway: Port Pirie Junction in South Australia, to Kalgoorlie, Western Australia - 1108 miles, 4'8½" gauge, single line.

Central Australia Railway: Port Augusta, South Australia, to Alice Springs, Northern Territory - 771 miles, 3'6" gauge, single line.

North Australia Railway: Darwin southward to Birdum, Northern Territory, 316 miles, 3'6" gauge, single line.

Australian Capital Territory Railway: Queanbeyan to Canberra in Australian Capital Territory - 5 miles, 4'8½" gauge, single line.

These railways are administered by the Commonwealth Railways Commissioner, whose office, with that of the Secretary of the Department and the Comptroller of Accounts and Audit and staff, is located in Melbourne. The general organisation is directed by officers who are responsible to the Commissioner for supervision of operations as described below:-



circa 1940 C 63 at Stirling North (*Chris Drymalik Collection*)

Trans-Australian and Central Australia Railways

Offices and Workshops at Port Augusta.

Chief Civil Engineer: Maintenance of the permanent way, buildings, signal, water services, etc..

Chief Mechanical Engineer: Maintenance of locomotives, rollingstock, motor vehicles, pumping and water treatment plants, workshops, running sheds, electric power supply, buildings and reticulation, etc..

Chief Traffic Manager and Comptroller of Stores: Combined office. The running of trains, safe workings, stations and goods sheds, Material and Provision (retail) Stores.

North Australia Railway

The whole of the administration of the North Australia Railway is under the direct supervision of the Manager, with office and staff at Darwin. The organisation is shown in detail on the annexed chart in comparison with that necessary when the Railway were at peak war-time capacity.

The declaration of a state of war in 1939 introduced problems and difficulties in railway working which were common to all railways, but many also which were peculiar to each particular railway. It is proposed, therefore, that the effects of war conditions should be described in sections -

1. Those common to the Trans-Australian and Central Australia Railways;
2. Those particular to the Trans-Australian Railway only;
3. Those particular to the Central Australia Railway;
4. The North Australia Railway.

A broad indication of the demand made on these railways as a whole is given in the following tables showing the train mileage run and the total staff employed during the years of the war:-

Train Mileage	Year ended 30th June						
	1939	1940	1941	1942	1943	1944	1945
T.A.R	577,156	624,269	714,414	944,688	1,182,231	846,532	831,988
C.A.R	282,181	290,405	423,830	1,103,074	1,742,547	1,854,747	1,050,334
N.A.R	32,364	32,501	84,883	263,203	536,779	741,527	534,508
A.C.T.R	10,215	10,430	10,585	10,955	11,315	9,770	8,855
	901,916	957,605	1,233,712	2,321,920	3,472,872	3,452,576	2,425,685
Total Staff	1,943	2,138	2,131	2,446	3,152	3,506	3,329

Trans-Australian and Central Australia Railways

During the years 1939 and 1940 it appeared that the greatest demand for service from the Commonwealth Railways would be on the Trans-Australian Railway, and long-range plans were made for enlargement of its capacity. These plans were subsequently curtailed as Australia's preparations for defence became centred on the Pacific theatre of war. Traffic on both the Trans-Australian and Central Australia Railways showed some increase during these two years. During 1940, equipment was railed to Alice Springs by the Department of the Army for construction of an all-weather road to Birdum, the southern terminal of the North Australia Railway to provide an alternative to the sea route to Darwin. Following the opening of this road, troops and equipment were moved in great volumes over the Central Australia Railway to Alice Springs, thence by the road to Birdum and rail to Darwin.

But it was upon the entry of Japan into the war in 1941 that activities on both railways were accelerated to a degree to cope with the great increase in traffic which was with precedent in their history. The Trans-Australian Railway, although its traffic was doubled, became of lesser importance when compared with the Central Australia Railway, on which the train mileage reached a figure between six and seven times greater than that of the last pre-war year.

Water Supplies As the whole locomotive power on these railways was steam-drive, and the country through which they passed was arid, the most important problem was water supply. On the East-West line, surface storage of

water was such that, in normal times, it was common for all reservoirs to be exhausted at least for part of each year, and recourse to underground supplies was necessary. It has been stated that on no other railway in the world are the supplies of underground water more deleterious to locomotive boilers than those which, at times, must of necessity be used on the Trans-Australian Railway. On one stretch of more than 400 miles, there is no permanent source of supply.

To meet the rapidly growing service a large programme of expansion of water supplied was undertaken. Reservoirs were built and enlarged, bores were sunk, water treatment and pumping plants were installed, tank storage was increased. Details of this work will be given later under the headings of the separate railways.

Coal Supplies Coal requirements were shipped or railed from New South Wales to Port Pirie or Port Augusta. The quantity used on these two railways rose from 30,844 tons in the year ended 30th June, 1939 (pre-war), to 104,098 in the year ended 30th June, 1944.



28.12.1939 Commonwealth Railways engine C 66 hauling the Trans-Australian at Port Augusta (*Chris Drymalik Collection*)

The increasing need for more and more coal during the war years was a constant source of anxiety. Shipping was, of course, greatly restricted, and hauling the coal by rail via Broken Hill entailed high expense and delays attendant on transfer of the coal at Broken Hill from standard to narrow gauge rail trucks. Railed coal from the Trans-Australian Railway was routed via Quorn to Port Augusta, where it was again transferred to standard gauge vehicles for transport to storage points along the railway.

To add to these difficulties, the coal supplied during the war was of an inferior quality. In normal times coal for these railways was supplied under contract, to the following specifications:-

1. Best quality screened locomotive engine coal, the product of mine or mines approved by the Commissioner.
2. Maximum moisture content - 3%.
3. Maximum ash content - 8%.
4. Calorific value to be stated.
5. Variations in excess of 1% moisture or ash content and $2\frac{1}{2}\%$ calorific value to result in a reduction in the price per ton of the shipment from which check analysis is made.

The extent to which supplied deteriorated during wartime is illustrated in the following typical analysis in which the figures under '(a)' represent coal supplied under contract, and those under '(b)' coal received during the war:-

	(a)	(b)
Ash content	2.5%	23.75%
Moisture	6.8%	1.3%
Calorific value	13,500 B.T.U.	11,070 B.T.U.

The greater consumption of this coal entailed increased tonnages to be shipped or railed at a time when loading space was vital, and consequently added to the difficulty of maintaining supplied. Furthermore, substantial waste resulted from the used of unscreened coal in high-draught locomotive engines, and smoke boxes required greater maintenance.

Workshops The maintenance of locomotive and other rollingstock used in the increased services placed a great strain on the workshops staff and facilities. The procurement of additional machine tools and equipment, due to universal shortages, lagged at all times behind the increasing demand. Difficulties and delays associated with obtaining material supplies, also common throughout Australia during this period, added much to the burden of keeping the rollingstock in condition to withstand the strain of the unprecedented traffic.

Materials In the matter of material supplied for workshops, buildings, track maintenance, etc., although the highest priority was granted for Commonwealth Railways requirements, there were many disheartening delays to urgent projects of all kinds during the critical years 1942/43.

Locomotives and other rollingstock Additional locomotives and other rollingstock were of prime and urgent importance and were obtained on loan or purchased from State railway systems, or purchased from any other available source. Details, and difficulties encountered, will be describe later in this article.

Staff Difficulties in obtaining enough suitable staff were common to all organisations in Australia during the war period.

Railway organisations are, of course, very different from most commercial organisations in which many grades of skilled workers are more or less interchangeable. The only services from which the train running staff, for example, could be augmented at short notice, were from other railway systems, or by the release from the Defence Forces of men with railway operating experience.

Track Maintenance Staff More intensive maintenance of the tracks was necessary as the wartime traffic increased in volume; and fettling gangs had to be strengthened. For this work, perhaps more than any other phase of the operations, the search for men was unceasing. Every possible avenue was explored.

It was fortunate that the gangs on the Trans-Australian Railway had been strengthened in the year 1938/39 consequent upon the introduction of 'C' class locomotives, with a maximum speed increased from 45 to 60 miles per hour. The number of gangs had been increased from 46 to 58. In the year 1939/40 the gangs were still further built up, and a heavy programme of re-sleepering and ballasting was carried out.

From May 1940, men began to drift away. Enlistments in the Defence Forces, and the attractions of higher wages and better amenities offering in the cities, claimed large numbers of the track staff.

The track forces had dropped to a dangerous degree when, in February 1942, the Commonwealth Railways was declared a protected undertaking under National Security (Manpower) Regulations. Advertisements in the newspapers, broadcasting on the National Radio stations, and notices at Police stations, were used to attract men. The maximum age at which new employees could be engaged was extended from 50 to 55 years, the eyesight test was reduced, and the severe medical test was dispensed with. In March 1942, Army Headquarters agreed to allow prospective military trainees, married and under the age of 35 years, the alternative of joining the Commonwealth Railways as civilian employees, if this were preferable to serving with the Forces. But all these efforts produced almost negligible results.

Prisoners of War In April 1942, approximately 300 Italian prisoners of war were put to work on the Trans-Australian Railway to expedite sleeper renewals.

These men were placed at six locations where camps had been prepared for them. Two gangs were established at each place, comprising approximately -

- 50 - Prisoners
- 18 - Military Guards and Sergeant-in-Charge
- 6 - Gangers - (Drawn from Railways staff)
- 2 - Cooks - (Drawn from Railways staff)

A Military camp was established at Cook (about the centre of the line) for the headquarters staff. During the twenty months the prisoners of war were engaged on this line, the highest effective strength was 240. By 10.4.1943, the total number was reduced to 182, with an effective working strength of 145. As 170 Army Officers and other ranks were engaged as Military Guards (inclusive of headquarters staff), the men were returned to Army custody, and members of the Civil Aliens Corps were obtained in replacement.

The main difficulty found with the employment of prisoners of war was that they had to be assembled in large gangs and could therefore only be engaged on resleepering or similar work involving considerable labor over comparatively short mileages. Owing to the large Army guard required for these prisoners, the supply camps, water, equipment, etc. were greatly in excess of that which was normal for other classes of labor. Also, the need for skilled gangers and fettlers to direct and guide the inexperienced prisoners was a severe drain on manpower needed for other work.

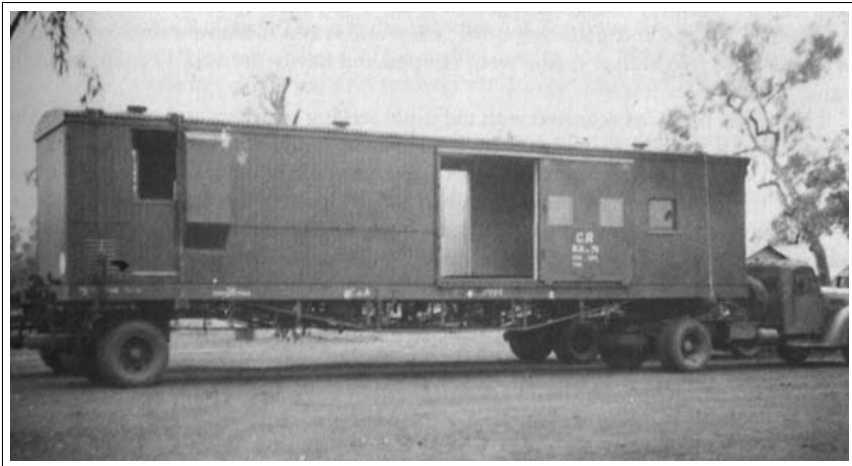
The relations between the railway gangers and fettlers on the one hand, and the prisoners and Army personnel on the other, were generally good. The gangers directed the work, and it was only when prisoners refused to obey orders that the Military guards had cause to interfere.

It was found that the rations provided for the prisoners, which were normal for internees, were inadequate for men engaged on the heavy work or track maintenance, and an improved diet was arranged for them with an increased meat allowance.

Payment was made to the Department of the Army on the basis of Award rates for all work done by the prisoners.

Civil Aliens Corps Men were first obtained from the Civil Aliens Corps in February 1943, and over the whole period of their employment 756 men were engaged for varying periods. The greatest number employed at any one time was 461, in September 1944.

Labor of this class was not as efficient as that engaged through normal channels. A great number of the men had never before carried out work of such an arduous nature, and being conscripted, they had no heart for the



circa 1944 NHA 71 being transferred

work. However, the maintenance of the track and the laying of new sidings, with the restricted field from which labor could be drawn, would probably have been impossible of achievement without their services.

A small minority of these aliens refused to work, and it was difficult to deal with them. Had it been possible to have had them re-interred for insubordination, the position would have been easier.

The Civil Aliens Corps was disbanded as from 16.6.1945, and those members who remained with these Railways were subject then to normal industrial conditions of employment.

Volunteers from other systems Fettleers for the Ways and Works Branch could be recruited from unskilled and inexperienced labor available, but there was a serious lack of men capable of taking charge of a maintenance gang, or of giving assistance to the ganger when the gang was composed largely of untrained men. As a result of the Manpower Conference on 24.8.1942, 87 experienced gangers and fettleers were obtained on loan from State Railway systems.

Volunteers were also obtained for skilled work in the Mechanical Engineering and Transportation Branches.

In February 1941, volunteer engine crews were obtained to cope with the increased traffic expected on the Trans-Australian Railway but which did not eventuate. They were all returned by 29th May, 1941. However, in December of that year it was found that crews were urgently needed on the Central Australia Railway, and, at the same time, additional skilled tradesmen were greatly needed in the workshops. Application was accordingly made for volunteer engine crews and tradesmen.

Additional experienced traffic employees were also needed and volunteers for this class of duty were also sought in February 1942.

The response to appeals for volunteers is indicated in the following table:-

Year Ended 30th June	Total number of Volunteers Employed			Total	
	Ways and Works Branch Wages	Mechanical Branch Wages	Transportation Branch Wages	Sal.	
1942	-	99	42	3	144
1943	87	270	83	17	457
1944	31	190	78	13	312
1945	3	137	50	9	199

Overtime The shortage of staff in all sections resulted in much overtime being worked.

On the Trans-Australian Railway the hours worked for the track forces were increased by 45 minutes daily from 15th December 1941, and clearance of leave was restricted.

In the Port Augusta workshops as much as 56 hours per week were worked in some sections. The volume of work in the machine shop made it necessary to work two shifts.

Train running employees, drivers, firemen, guards and section staff were called upon during the peak period of the war to work hours that were really approaching the limits of endurance.

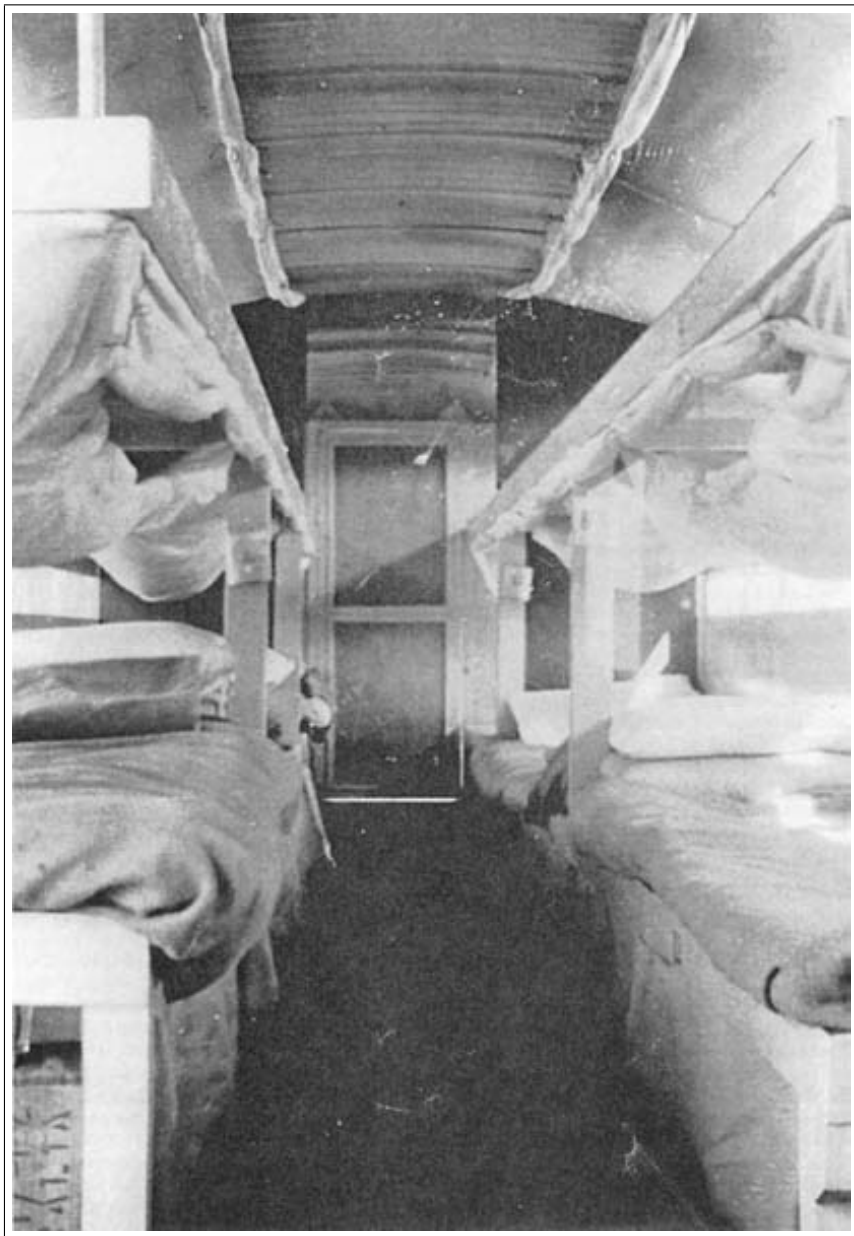
During this time, there were but slight increases in the numerical strength of the administrative staffs, and the strain of wartime was accordingly very heavy on them.

It should be recorded that the manner in which the staff as a whole shouldered their heavy burdens these grim years reflected great credit upon them, and was a very substantial contribution to Australia's war effort.

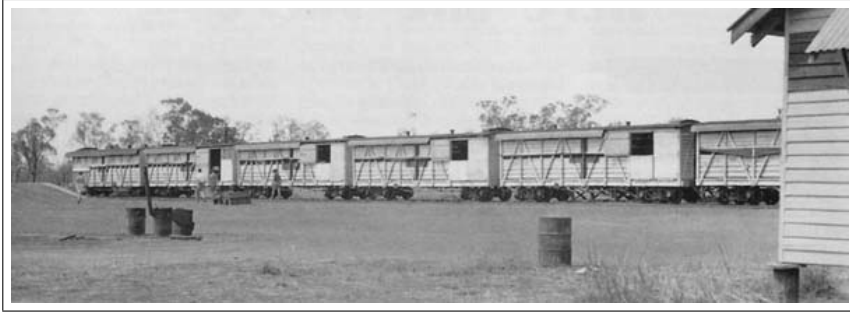
Diluttee Tradesmen Some use was made in the workshops of the wartime acceptance of 'diluttee' labor. Experienced tradesmen's helpers were up-graded to fitters, boilermakers, machinists, etc. to help relieve the shortage of skilled men.

Female Labor Limited relief of the staff shortage was gained by the employment in 1943 of female car cleaners and engine cleaners. A total of 33 women were employed in the peak year.

National Security (Manpower) Regulations It was of considerable help to this Department that the Commonwealth Railways was declared in February 1942 a protected undertaking under the National Security (Manpower) Regulations. This arrested the steadily increasing drain on staff caused by enlistments and the pursuit of higher wages.



1944 Interior of NOA class cars on the Hospital Train



28.09.1943 NOA class cars on the Hospital Train at Katherine

War Precautions At the outbreak of war, special precautionary measures were taken to watch vulnerable points on these railways during the hours of darkness - Port Augusta Workshops, Wharf Pumps, Station Building at Port Augusta, Locomotive Depots at Port Pirie Junction, Quorn and Parkeston. At Yorkeys Crossing Bridge, situated about seven miles from Port Augusta and carrying the railway permanent way across Spencers Gulf, a continuous watch was maintained. Special instructions were issued for the safe-keeping of documents, plans and forms which would be of value to enemy agents.

Following a review of these precautions by the Department of the Army, it was decided that the railways were not of sufficient strategic importance to warrant the employment of Military guards, and on 27.10.1939 all special watchmen were withdrawn.



circa 1944 NOS8 Hospital car

Blackout conditions were imposed in February 1942 on buildings, streets, trains, etc.. Station name-boards were removed from stations between Port Pirie Junction and Pimba, and Ooldea and Forrest on the Trans-Australian Railway, and between Port Augusta and Brachina on the Central Australia Railway.

On 13th July 1942, it was decided to remove black-out paint from the windows on the Port Augusta workshops and, as an alternative precaution, it was arranged that all lights would be switched off in the event of an air raid warning being given.

Organisation During the war period it was necessary to increase the supervising of staff as follows:-

Ways and Works Branch The position of Senior Roadmaster was created on 24.10.1941.

Mechanical Engineering Branch To provide relief of the burden of administration for this Branch, it was arranged in April 1943, through the courtesy of the South Australian Railways, for four of their technical officers to be made available to this Department. Their Chief Mechanical Engineer was attached, part-time, as Technical Assistant to the Commissioner. The Acting Locomotive Superintendent, South Australian Railways, Peterborough Division, was attached part-time supervising the locomotive running section; and one Boiler Inspector and one Locomotive Running Officer were loaned for full-time duty.

During the period 1942/43 supervision of the locomotive running section was sub-divided until on 9.6.1943 the following offices existed:-

Trans-Australian Railway	
Eastern Division - Port Pirie Junction to Barton (inclusive)	
Loco. Superintendent	1
Travelling Foreman	1
Running Inspectors	2
Western Division - Barton (exclusive) to Kalgoorlie	
Loco. Superintendent	1
Travelling Foreman	1
Running Inspectors	2
Central Australia Railway	
Loco. Superintendent	1
Travelling Foreman	1
Running Inspectors	2

In the workshops, the position of Works Manager, four additional foremen, Plant Engineer, and Production Officer, were created to provide more effective supervision.

Transportation and Stores Branch On 1.7.1940 appointments were made to the positions of Senior Traffic Inspector and Traffic Inspector.

On 7.4.1941 the supervision of train running staff was strengthened by the position of a Traffic Superintendent. This duty was later divided into two positions - Traffic Superintendents, Trans-Australian and Central Australia Railways; and a further position was created - Chief Train Controller and Timetables Officer.

1.2 War Time History of the Commonwealth Railways

Trans-Australian Railway

Pre-war Facilities



c.1943 Brake HRB68 (*Commonwealth Railways*)

To enable the reader to have a mental picture of this railway before the war, a brief description is given of its rollingstock and facilities in 1939:-

Locomotives

Class	Type	Number
'C'	4-6-0	8
'D'	4-4-0	6
'G'	4-6-0	19
'Ga'	4-6-0	7
'K'	2-8-0	8
'Ka'	2-8-0	26
'Cranes'	0-6-0	2
'Cranes'	Breakdown	2
		78

Coaching Stock and Brakevans

Type	Class	Number
'Special Car'		1
'Sleeping cars'	1st	12
'Sleeping cars'	2nd	13
'Sitting-Up cars'	1st & 2nd	3
'Sitting-Up cars'	2nd	4
'Lounge cars'		5
'Dining cars'		5
'Inspection car'		1
'Brakevans, bogie'		8
'Mail Bulk vans'		4
		56

Freight Vehicles

Type	Number
Open Goods Bogie	58
Open Goods 4-wheel	70
Louvre Vans Bogie	5
Louvre Vans 4-wheel	3
Covered (box) Bogie	14
Covered (box) 4-wheel	13
Cattle Vans Bogie	81
Sheep Vans Bogie	36
Flat Wagons Bogie	104
Brake Vans Bogie	3
Brake Vans 4-wheel	8
Equivalent in 4-wheeled vehicles to	558
	396

Service and Miscellaneous Stock

Type	Number
Hospital Vans	2
Pay Car	1
Employees' Vans	2
Hopper Ballast Wagons 4-wheel	236
Ballast Plough Bogie	5
Ballast Plough 4-wheel	7
Butchers' Shop	2
General Stores Vans	2
Water Tank Wagons Bogie	35
Water Tank Wagons 4-wheel	62
Breakdown Vans	3
Other Vehicles	4
	361

Water Supplies for Locomotives

Station	Mileage from Port Pirie Jc	Facilities
Port Pirie Junction		State Supply
Port Germein	14 $\frac{1}{4}$	State Supply
Nectar Brook	36 $\frac{1}{4}$	State Supply
Stirling	52	Depot Creek Supply
Port Augusta	56 $\frac{1}{4}$	Depot Creek Supply
Bookaloo	108 $\frac{1}{4}$	Reservoir 6,256,800 gallons
Wirrappa	150 $\frac{1}{4}$	Reservoir 5,248,000 gallons
Wirraminna	213	Wells
Kultanaby	245 $\frac{1}{4}$	Reservoir 7,987,000 gallons
Kingoonya	265 $\frac{1}{4}$	Wells
Wilgena	301 $\frac{1}{4}$	2 Reservoirs 6,882,000 and 5,771,500 gallons
Tarcoola	313 $\frac{1}{4}$	Reservoir (Quarry)
Wynbring	377 $\frac{1}{2}$	Reservoir 1,634,000 gallons
Barton	432	Overhead tank filled from rail tank wagons
Ooldea	483 $\frac{1}{4}$	Overhead tank filled from rail tank wagons
Cook	569	Overhead tank filled from rail tank wagons
Reid	688	Bore
Loongana	771 $\frac{1}{4}$	Bore
Nurina	800	Reservoir 5,883,000 gallons
Rawlinna	872 $\frac{1}{4}$	Well
Zanthus	977 $\frac{1}{2}$	Reservoir 3,403,000 gallons
Coonana	1,002	Reservoir 7,374,000 gallons
Karonie	1,039	Reservoir 4,180,000 gallons and Weir 2,722,000 gallons
Parkeston	1,105	Mundaring supply
Kaloorlie	1,107 $\frac{3}{4}$	Mundaring supply

Crossing Loops Their were 24 crossing loops each an average of 48 miles apart.

Goods Sidings Their were 48 goods sidings.

Coaling Points

Location	Mileage	Capacity
Port Pirie Junction		Joint facility with South Australian Railways
Port Augusta	56 $\frac{1}{4}$	Bin (100-tons) and pit 16,000-tons
Woocalla	127	80 tons
Pimba	169 $\frac{1}{4}$	50 tons
Kingoonya	265 $\frac{1}{2}$	130 tons
Tarcoola	313 $\frac{3}{4}$	200 tons
Wynbring	377 $\frac{1}{2}$	140 tons
Barton	432	50 tons
Immarna	463 $\frac{1}{4}$	50 tons
Ooldea	483 $\frac{1}{4}$	25 tons
Cook	569	200 tons
Hughes	623	500 tons
Loongana	771 $\frac{1}{4}$	50 tons
Rawlinna	872 $\frac{3}{4}$	200 tons
Naretha	902 $\frac{1}{2}$	280 tons
Zanthus	977 $\frac{1}{2}$	50 tons
Parkeston	1,105	260 tons

General

The normal pre-war service on this railway was provided by up to four passenger, on goods, and one mixed trains per week in each direction, plus local service between Port Augusta and Port Pirie Junction and water and coal trains as necessary. The impact of war conditions is show in the following table, in which statistics for the year 1938/39 are compared with the war-time peak year 1943/44:

	1938/39	1943/44
Train mileage	577,156	846,532
Goods ton-mileage	15,113,085	41,233,671
Gross ton-mileage	257,359,493	465,638,877
Staff (number)	1,394	1,902

The country through which this railway passes is sparsely populated. With the exception of Tarcoola, which was a mining town before the railway was constructed, and those persons engaged in pastoral activities between Port Augusta and Malbooma, almost the whole of the population along the route are there solely for the purpose of the working of the railway. The traffic on the line is, therefore, mainly the conveyance of passengers and freight between the Eastern States and Western Australia. Normally, too, the flow of freight is from

the Eastern States to the West. This involves a great deal of 'empty' return mileage by goods hicles.



circa 1937 Commonwealth Railways engine C 63 (*Chris Drymalik Collection*)

For the first two years after the outbreak of war, there was a steady increase in traffic on this line, but this was materially due to the increased popularity of the faster service introduced in 1938, and to the gradual restriction of shipping. But, before the sudden acceleration of activities caused by Japan's first attack in December 1941, plans had been made and some work done towards enlarging the capacity of this railway. It is proposed to describe the measure adopted to cope with the war-time traffic, under the following headings:-

1. Rollingstock
2. Sidings and Yard Accommodation
3. Water Supplies
4. Workshops, Running Shed, Machine Tools, etc.
5. Accommodation for Staff
6. Communications
7. Coal and Other Running Supplies

Rollingstock

The circumstances of the time made the obtaining of additional locomotive and other rollingstock probably the most difficult of all the problems attendant upon the increase in traffic. The possible sources of supply were

1. New construction
2. Purchase or hire from State Railway systems
3. Importation from overseas
4. Conversion of existing rollingstock to types more in demand for war-time traffic
5. Repair and recommissioning of locomotives and wagons previously regarded as obsolete.

Enquires for standard gauge locomotives through all known channels in Australia proved fruitless. Eventually, ten second hand superheater 4-6-0 type locomotives were obtained from overseas through the agency of the Lease-Lend organisation

-
- | | |
|---|---|
| 8 | from Canadian National Railway (re-classified 'CN') |
| 2 | from New York, New Haven and Hartford Railway, U.S.A., (re-classified 'CA') |
-

These engines were placed in commission in 1943.

As the service on this railway did not reach the density expected, these additional locomotives, with a number of 'K' and 'Ka' class which were re-commissioned, proved sufficient to meet demands.

The following vehicles were constructed in the South Australian Railways workshops at Islington for Commonwealth Railways:-

-
- | | |
|----|--|
| 58 | Bogies flat wagons (classified 'Rb') |
| 20 | Bogie water tank wagons, 9,000 gallons capacity (classified 'Tf'.) |
| 7 | Bogie Brakevans (classified 'HRb') |
-

In our own workshops the construction of the following new vehicles was completed during this period:-

-
- | | |
|---|---|
| 2 | First-class sleeping cars (classified 'ARa') |
| 3 | Second-class sleeping cars (classified 'BRa') |
| 1 | Bulk Mail van, bogie (classified 'M') |
-

and the following conversions and alterations to rollingstock were undertaken:-

Conversions

- 8 vehicles to covered goods vans
 - 2 vehicles to open goods vans
 - 2 service vehicles to flat wagons
 - 2 vehicles to brakevans
 - 2 vehicles to refrigerated butchers' vans
 - 1 4-wheeled brakevan to breakdown van.
-

Alterations

- 30 cattle vans altered for Military goods and rations.
 - 35 cattle vans altered to carry 'Wiles' Cookers and foodstuffs as mobile kitchens.
 - 18 cattle vans altered for conveyance of troops.
 - 102 flat wagons strengthened for conveyance of Army tanks.
 - 24 tank wagons improved or increased in capacity.
 - 1 louvre van fitted with cool chamber.
-

Sidings and Station Yard Accommodation



28.12.1939 Commonwealth Railways engine C 66 hauling the Trans-Australian at Port Augusta (*Chris Drymalik Collection*)

The first special action by the Way and Works Branch because of war conditions, followed advice that preparations were to be made for the transport of an Army division, complete with all equipment, from the Eastern States to Western Australia. To accomplish this, in addition to normal service, it was necessary to construct eight additional crossing loops, extend two existing sidings, and improve water and coal storage facilities.

On 19th November 1940, instructions were given for the work to be put in hand immediately. the only new material available for the work at this time was sleepers, and all other material had to be gathered from sidings, etc., not actually of primary importance, or new material then on order. the work was pushed forward to a point where, had it been necessary to use the sidings at short notice, leads could be thrown in, using laced sleepers as crossing timbers. It transpired that the sidings were not required until March 1942, and all were completed between 17th and 22nd of that month.

Particulars of these sidings follow:-

Detail	Standing Room	Mileage from Junc.	Station Name
New Crossing Loop	1,200	193 $\frac{1}{2}$	Burando
New Crossing Loop	1,200	285 $\frac{1}{2}$	(editor: is this Ferguson?)
New Crossing Loop	1,200	354 $\frac{1}{2}$	(editor: is this Lyons?)
New Crossing Loop	1,200	397	(editor: now known as Mt Christie)
New Crossing Loop	1,400	594 $\frac{3}{4}$	(editor: now known as Denman)
New Crossing Loop	1,400	655 $\frac{1}{2}$	Deakin
New Crossing Loop	1,400	741 $\frac{1}{2}$	(editor: now known as Mundrabilla)
Extension of existing loop to	1,400	800 $\frac{1}{2}$	Nurina
New Crossing Loop	1,400	1,002	Coonana
Extension of existing dead-end siding to provide	1,000	213 $\frac{1}{2}$	Wirraminna

In may 1943 a further programme of works was begun in anticipation of still heavier traffic being required. In October of that year, however, it became apparent that the expected traffic would not eventuate, and this programme was severely curtailed. The following works were completed

- 6 x New Crossing Loops
- 1 x New Goods Siding
- 3 x Extensions to existing crossing loops to 1,200-ft. standing room

and the following were partly completed when work was stopped on the programme

- 6 x New Crossing Loops
- 2 x Extension of existing loops

Water Supplies

In the country traversed by this railway, throughout the whole of its length of 1108 miles, there is not one permanent running stream. Supplies of locomotive water are obtained from reservoirs, wells and bores. On one section of the line for a distance of 423 miles there is no permanent supply, and requirements for locomotive and domestic consumption have to be railed in water tanks wagons and pumped into overhead tanks. Due to the low

rainfall, which averages about nine inches only per year, the reservoirs are very frequently empty and it becomes necessary to use bore and well water almost exclusively. In January 1941, for example, all reservoirs along this line were exhausted.

The prospect of increased traffic was, therefore, one calling for immediate attention to supplies. This work involved:-

Nature of Work	No. of Locations
Increasing capacity of water treatment plant	1
Installation of high capacity centrifugal pumps	8
Installation of water treatment plants	4
Provision of two 40,000 gallon reinforced concrete sumps	3
Construction of new six inch bores with pumping equipment	4
Improved water mains	2

Some of the difficulties encountered in this work are briefly described hereunder.

At Wirraminna, drives were constructed in the existing wells, increasing the capacity from 36,000 to 50,000 gallons per day. However, after a considerable quantity had been drawn from the supply, the water showed a gradual deterioration in quality and eventually was unsuitable for boiler use without treatment. A Mollinite Base Exchange treatment plant was installed but, with the continued deterioration of the water, only 23,800 gallons per day could be maintained. Finally the salt content of the water became so high that it was necessary to rest the wells to await rainfall replenishment.

Drives were constructed also in the wells at Kingoonya to increase the capacity from 120,000 gallons per day to a figure above the 146,000 gallons needed for the increased traffic. An improved type of treatment plant - the Kennicott Lime-Soda Continuous type - was constructed, with a capacity of 7,500 gallons per hour.

The supply at Reid was considered the most important of all. The supplies from bored had to be increased from 36,000 to 124,000 gallons per day. The first new bore resulted in the loss of the tools at 158 feet. The second bore was abandoned at 420 feet because of drifting, Boring on the third sire was stopped at 415 feet, and, after acid treatment, a pumping test revealed a supply of 1,000 gallons per hour. Although this was below expectations, a pumping plant was installed with an 8-H.P. high speed diesel engine. Boring to 446 feet on the fourth site selected, after acid treatment, resulted in a further supply of 3,000 gallons per hour. The existing water treatment vats were used for storage of rain water, and a Kennicott Lime-Soda Continuous treatment plant was installed with a capacity of 6,000 gallons per hour.

At Loongana the original supply was obtained from two bores which were fitted with walking beams and draw plunger pumps. It was decided to increase the supply by sinking a new bore and installing a high capacity plant, and to leave the old plant as a standby. The new bore, acid treated at 545 feet, resulted in a flow of 8,000 gallons per hour. A Mollinite treatment plant was installed, with a capacity of 3,400 gallons per hour.

Boring operations were abandoned at the following locations:-

360 $\frac{1}{4}$ Miles	Hard quartzite at 200 feet.
424 $\frac{1}{4}$ Miles	Grey granite at 345 feet.
Cook	Water struck at 424 feet showed analysis of 480 g.p.g. At 742 feet a second stream was worse, and at 1208 feet worse still.
Zanthus	Hard quartzite at 161 feet.
Coonana and Karonie	Strata formations.

At Rawlinna the existing well supply was successfully augmented by a bore which at 269 feet produced, at the rate of 5,760 gallons per hour, water capable of treatment in the existing plant.

Workshops, Running Sheds, Machine Tools, etc.

The existing main workshops building at Port Augusta - a steel framed building with saw-tooth roof - was extended by 144 foot for the full width on the south end. This work was done under contract arranged and supervised by the Director-General of Works, under the control of the Allied Works Council. Two additional 60-ton overhead electrical travelling cranes were provided in each of the extensions to the Fitting and Boiler Shops.

A new building for the Plumbers' Shop, measuring 40-feet by 40-feet, was constructed, and this released space greatly needed in the Car and Building Workshops.

With the traffic which developed, it was not necessary to increase the number of running sheds on this railway. These are located at:-

- Port Pirie Junction (0 miles)
- Port Augusta (56 miles)
- Tarcoola (314 miles)
- Cook (569 miles)
- Rawlinna (873 miles)
- Parkeston (1108 miles)

Machine Tools

The extensions of the workshops at Port Augusta, and the shortage of manpower, made necessary a large increase in workshops plant, particularly machine tools. It proved possible to purchase some of Australian manufacture, but the great majority of the additional machines were obtained from the Lease-Lend Pool.

Accommodation for Staff

Accommodation for staff on the Trans-Australian Railway did not present any great difficulties. An extensive housing programme, began in February 1940, relieved the position and permitted the progressive release of single and double tenthouses for transfer to locations where they were required as a result of the war operations. This programme, carried out under Railway Capital authorities, was a summarised hereunder:-

Residences at Port Augusta	12
Residences at stations along this railway	106
Resthouses for train crews	5
Single men's quarters (2-rooms)	2
Single men's quarters (3-rooms)	7

To meet war emergency conditions on this railway, thirty-two (32) timber framed, 2-roomed quarters were built, each consisting of a 20-ft. x 23-ft. building, lined with 3-ply timber and sub-divided into a 10-ft. x 12-ft. bedroom and a 10-ft. x 8-ft. kitchen, with stove. Fifteen of these were used as living quarters at Port Augusta and seventeen were distributed as resting quarters for train crews at the following locations.

Pimba	1	Reid	2
Taroola	4	Loongana	1
Barton	2	Rawlinna	2
Cooka	4	Zanthus	1
Total			17

Communications

At the outbreak of war, trains were worked under the Electric Train Staff Regulations, and crossings and general movements of rollingstock were arranged by Stationmasters on a party line telephone circuit with audibility restricted to about 150 miles.

To meet the increased traffic, it was arranged that the Postmaster-General's Department's staff erect an additional 200-lb. copper wire between Port

Augusta and Parkeston in conjunction with the erection of an additional 300-lb. copper wire for the use of that Department.

On 10th May 1943, using the new circuit as far as it had then progressed, a modified form of Train Control was installed to operate in conjunction with the existing safeworking regulations. When through telephone communication between Port Augusta and Parkeston was completed, the Train Control system operated over the whole line. Under Train Control all traffic and rollingstock movements are directed and co-ordinated from the central office at Port Augusta with greater efficiency than was possible under the previous short communication system.

Automatically operated electric staff stations were opened at various locations, and attended electric staff equipment was installed where required for the denser traffic. The automatic attachment for these stations were constructed wholly in Commonwealth Railways workshops.

Coal and other Running Supplies

Coal consumption rose from 22,031 tons in the pre-war years 1938/39 to 59,844 tons in the years 1942/43.

Difficulties met in respect of this important fuel were described in the section devoted to circumstances common to both railways.

It was necessary to install or enlarge facilities for coaling of locomotives at the following depots:-

Pimba	Two 60-ton coal stages constructed of sleepers.
Kingoonya	Two 30-ton coal stages constructed of sleepers.
Barton	Four 30-ton coal stages constructed of sleepers.
Cook	Electrical coal handling plant consisting of grab and 70-ton overhead bin; and provision for storage of 1,000 tons of coal, with sidings necessary.
Hughes	Two 30-ton sleeper coal stages.
Reid	One 30-ton sleeper coal stages.
Loongana	Three 30-ton sleeper coal stages.
Zanthus	Three 30-ton sleeper coal stages.

A statement showing the annual consumption of the various kinds of running supplies on both railways is included in the Appendices.

1.3 War Time History of the Commonwealth Railways

Central Australia Railway

Pre-war Facilities

A brief outline of the rollingstock and facilities on this railway at 30th September 1939, is given in the following :-

Note: The rollingstock on this railway is for narrow gauge 3'6" track.

Locomotives

Class	Type	Number
'NB'	0-6-0	2
'NG'	4-6-0	1
'NM'	4-8-0	21
		24

Coaching Stock and Brakevans

Type	Class	Number
'Special Car'		1
'Sleeping cars'	1st	1
'Sleeping cars'	2nd	1
'Sitting-Up cars'	1st & 2nd	8
'Sitting-Up cars'	2nd	1
'Dining cars'		1
'Composite Relay vans'		8
'Brakevans, bogie'		5
		26

Freight Vehicles

Type	Number
Open Goods Bogie	19
4-wheel	99
Louvre Vans Bogie	1
4-wheel	8
Covered (box) Bogie	3
4-wheel	7
Cattle Vans Bogie	88
4-wheel	6
Sheep Vans Bogie	12
4-wheel	11
Flat Wagons Bogie	33
4-wheel	6
Equivalent in 4-wheeled vehicles to 449	293

Service and Miscellaneous Stock

Type	Number
Hospital vans, bogie	1
Coal Hopper van, bogie	1
Water tank wagons, 4000-gallons, bogie	18
Water tank wagons, 2000-gallons, 4-wheel	25
	45

Water Supplies for Locomotives

Station	Mileage from Port Augusta	Facilities
Port Augusta		Town Supply, 6,741,400 gallons
Quorn	25	Reservoir, wells and bores
Hawker	65	Reservoir 4,365,600 gallons
Mern Merna	87	Two reservoirs, 2,641,700 and 2,524,200 gallons
Brachina	107	Two reservoirs, 4,896,700 and 3,750,000 gallons
Parachilna	121	Spring
Beltana	144	Reservoir 5,078,400 gallons
Copley	163	Reservoir 4,562,600 gallons
Farina	198	Two reservoirs, 5,334,900 and 2,576,475 gallons
Marree	231	Bore
Callana	240	Reservoir 7,444,400 gallons
Alberrie Creek	264	Reservoir 4,963,200 gallons
Beresford	326	Reservoir 8,141,500 gallons
Anna Creek	373	Well
Edwards Creek	414	Well
Mt. Dutton	453	Reservoir 7,400,000 gallons
Alberga	504	Reservoir 18,000,000 gallons
Pedirka	544	Reservoir 38,000,000 gallons and well
Adminga	587	Bore
Finke	629	Bore
Bundooma	683	Well
Alice Springs	771	Wells

Crossing Loops Their were 50 crossing loops each an average of 16 miles apart.

Goods Sidings Their were 48 goods sidings.

Coaling Points

Location	Mileage from Port Augusta	Capacity
Port Augusta		Bin (100-tons) and pit 16,000-tons (used also for Trans-Australian Rly.
Quorn	25	100 tons
Hawker	65	30 tons
Parachilna	121	30 tons
Beltana	144	30 tons
Copley	163	30 tons
Farina	198	30 tons
Marree	231	200 tons (elevated bin)
William Creek	356	150 tons
Edwards Creek	414	200 tons
Mt. Dutton	453	25 tons
Abminga	587	100 tons
Alice Springs	771	100 tons

General

The normal pre-war traffic on this railway consisted of two 'mixed' trains weekly to Marree (231 miles), and one mixed train to Alice Springs, plus special livestock and supply trains, which varied according to season and conditions.

The country through which this railway passes is similar to that traversed by the Trans-Australian Railway, in that beyond Hawker - 41 miles north of Quorn - it is not suitable for agricultural development and is sparsely settled. Along this route too, there is not one permanent running stream. The rains are seasonal.

Some activity existed along the route in the direction of mining for ochre, talc, mica, wolfram, tantalite and other minerals, but the principal sources of traffic were from pastoral properties, the gold mining industry at Tenant Creek, and the township of Alice Springs.

There were indications of an increase of passenger traffic prior to the war as interest quickened in the tourist attractions of Central Australia and the pleasant winter climate at Alice Springs.

During the year 1940/41, the movement to the Darwin area of a great concentration of troops and equipment made necessary an urgent enlargement of all facilities on the Central Australia Railway. Locomotive and rollingstock were hired from the South Australian Railways Department, and additional volunteer running staff was obtained from State Railway systems. After this first big movement was completed, the heavy traffic on this line continued.

Japan's entry into the war late in 1941 brought the overland route via this railway, the North-South road and the North Australia Railway, even more prominently into the spotlight of immediate strategic need and importance. In February 1942, the bombing of Darwin showed clearly the perils of sea transport round the northern coastline, and great volumes of troops, equipment and supplies were thereafter transported overland to operational areas in the North. The traffic on the Central Australia Railway rose dramatically from three to fifty-six trains per week, with a corresponding increase in the number of Departmental trains for the conveyance of coal and other essential supplies.

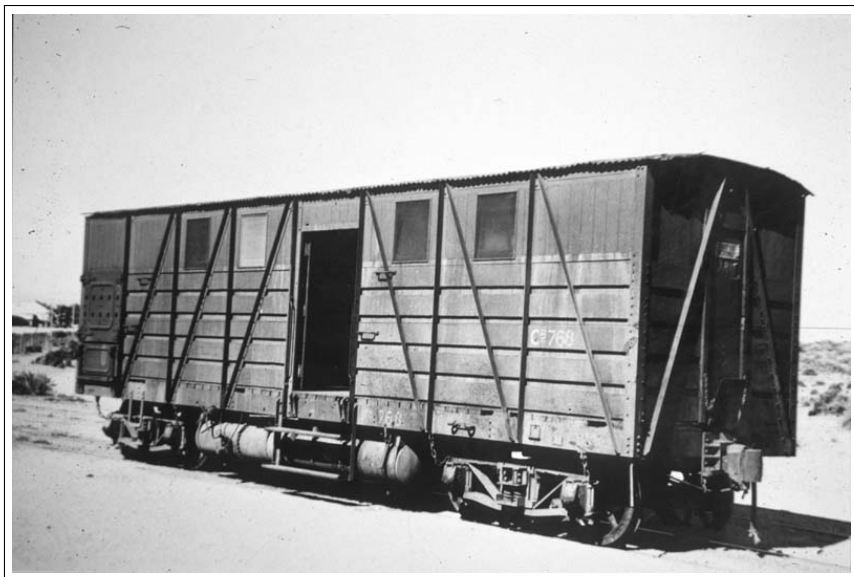
The following table of basic statistics illustrates the meteoric increase in the service given by this railway:-

	For Twelve Months Period		
	1938/39	1942/43	1943/44
Train mileage	282,181	1,742,547	1,854,747
Goods ton-mileage	87,596,314	562,816,419	595,520,409
Working Expenditure	£207,510	£820,251	£1,044,157

1. Rollingstock
2. Sidings and Yard Accommodation
3. Water Supplies
4. Workshops, Running Sheds, etc.
5. Accommodation for Staff
6. Communications
7. Coal and Other Running Supplies

Rollingstock Immediate relief of the position in regard to locomotive power was available through the hire of 3'6" gauge 'T' class locomotives from the adjoining South Australian Railways. The number of 'T' class locomotive hires during the war period varied of course, with the traffic and the availability of other locomotive power. In November 1941, two were hired, and by May 1942, the number had increased to thirty-four (34).

Towards the end of the crucial year 1942, the strain on the main workshops at Port Augusta in the maintenance of locomotives and rollingstock required to provide the tremendously increased services, was approaching breaking point. As a result of successful tests of through running of engines between Terowie and Alice Springs, an agreement was entered into with the South Australian Railways for that Department to take over the full servicing of 'T' class locomotives engaged on the 'through' running.



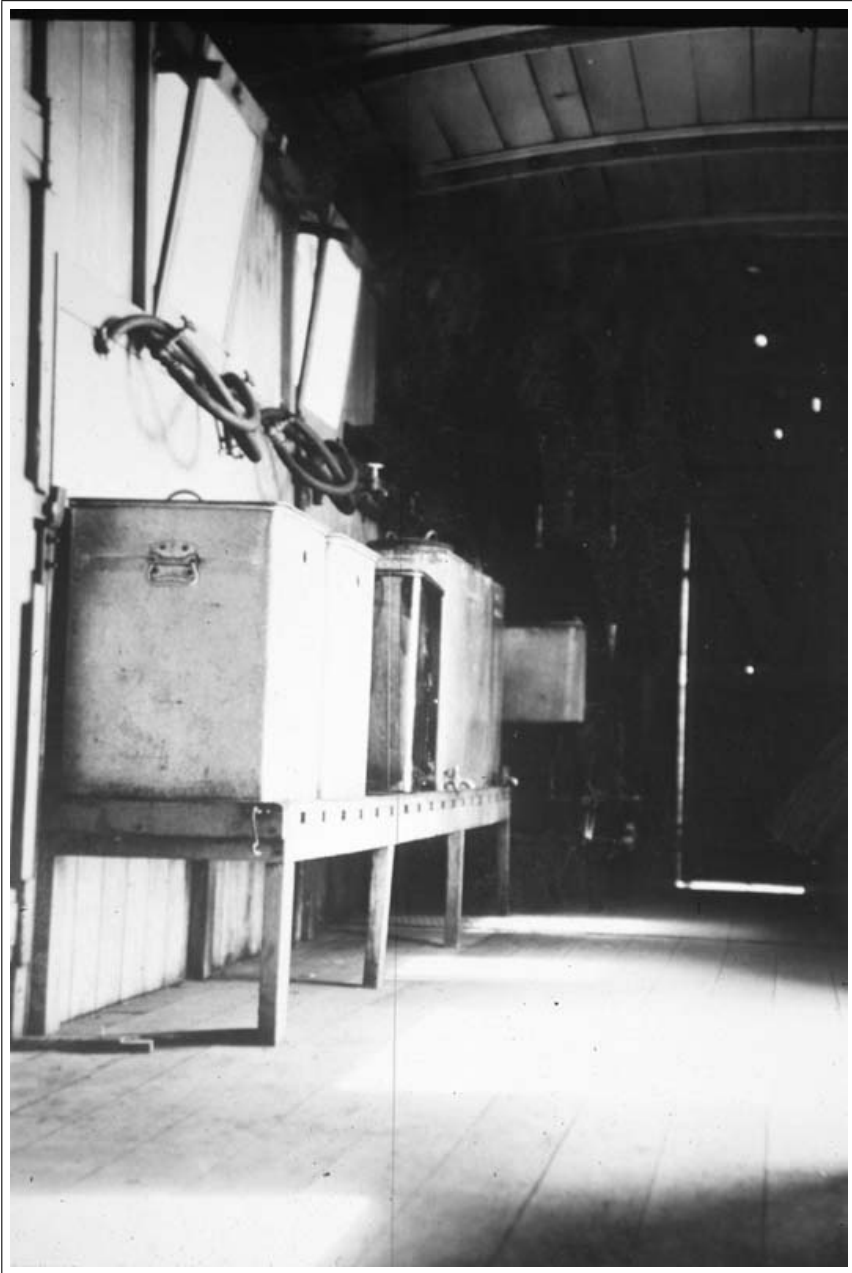
circa 1940, Wiles Cooker - CB 768 (*Chris Drymalik Collection*)

In addition, the South Australian Railways undertook the overhaul of a number of 'NM' class locomotives, and standard gauge boilers. This work proved a great relief to the overtaxed Commonwealth Railways workshops, and was of much assistance in the task of keeping locomotives in good running condition.

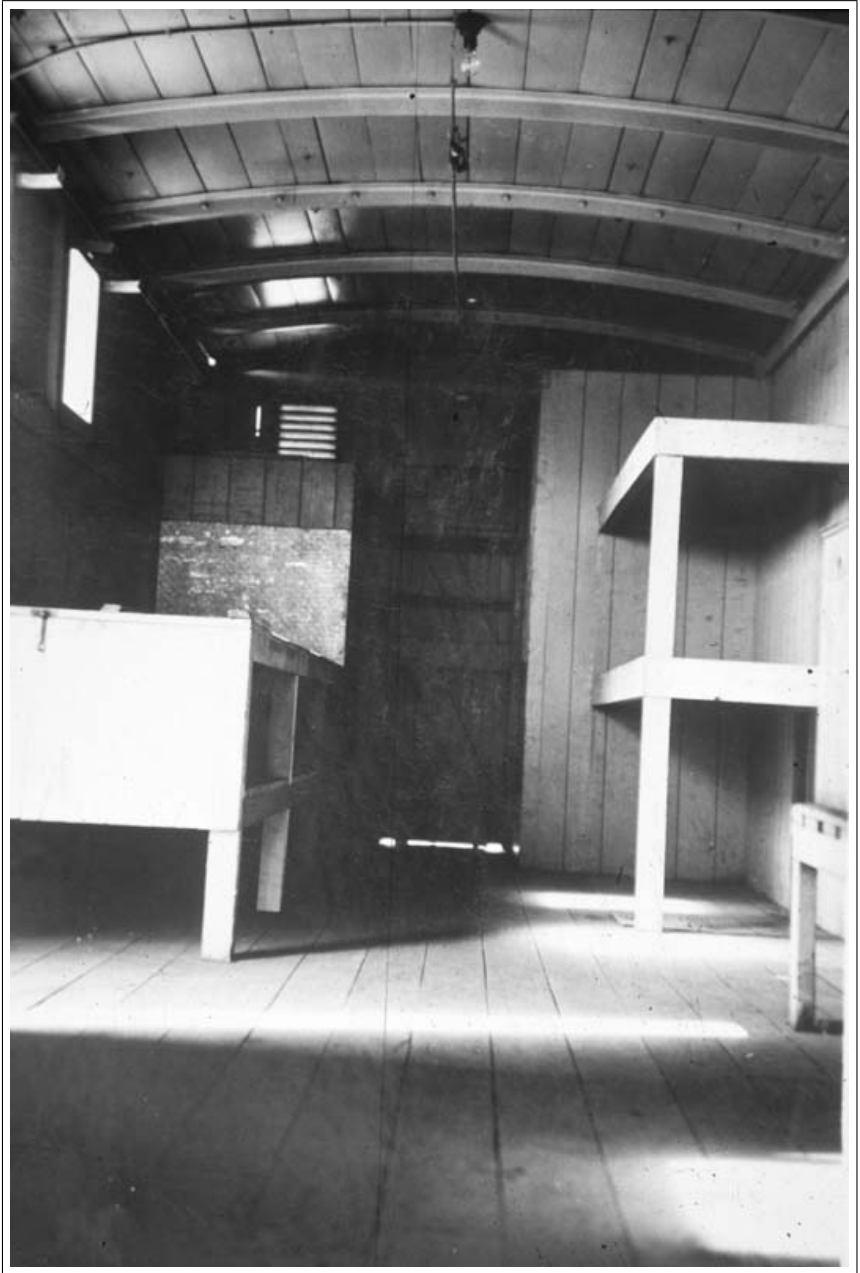
From the Queensland Government Railway eleven (11) 'C16' class locomotives and 110 wagons (60 bogie and 50 4-wheel) were hired. The locomotives were placed in service progressively from 5th June 1942, but, owing to difficulty in obtaining material required to place the wagons in serviceable condition, the first of these was not available for traffic until November 1942. In June 1943 it was decided to return to Queensland the whole of the wagon stock hired, together with three locomotives that were in bad condition. The last of the remaining eight locomotives was released from traffic in October of the same year, and all were returned to Queensland after workshops attention.

In the third year of the war, fourteen (14) brakevans were hired from the South Australian Railways for use as relay vans.

During 1943/44 the Directorate of Locomotive and Rollingstock Construction, Land Transport Board, made available to Commonwealth Railways a total of 373 standard 40-ft. narrow gauge bogie underframes. Of these, 263 were used for the construction of the following bogie vehicles for the Central Australia Railway:-



circa 1940,Wiles Cooker - CB 768 (*Chris Drymalik Collection*)



circa 1940,Wiles Cooker - CB 768 (*Chris Drymalik Collection*)

Type of Vehicle	Quantity
Open goods wagon ('NGc')	120
Covered goods wagon ('NVb')	41
Louvred wagon ('NLa')	20
Flat wagon ('NRf')	65
Composite relay van ('NARb')	17
	263

The remainder (110-No.) were sent to the North Australia Railway, and particulars will be given under that heading.

The following vehicles were constructed in the Commonwealth Railways Workshops during the war period:-

Type of Vehicle	Quantity
Dining car	1
Sleeping car, 1st and 2nd class	1
Louvre van, bogie	1
Covered goods wagon, 4-wheel	1
Explosives van, 4 wheel	1

Constructed on Australian Land Transport Board standard underframes and bogies:-

Type of Vehicle	Quantity
'NHRb' class Composite relay vans (partly constructed by South Australian Railways)	13
Employees' vans (2 'NE' class, 2 'NEa' class)	4
'NGc' class low-sided open goods wagons, bogie	120
'NRf' class flat wagons, bogie.	65

The following conversions and alterations also were carried out in the Commonwealth Railways workshops

Conversions	
2	cattle vans, bogie, to covered goods vans
2	cattle vans, bogie, to brakevans
2	brakevans (1 'NYAb', 1 'NYb' class) to 'NYR' class with sleeping accommodation.
1	composite relay van, 'NHBR' class, to brakevan 'NHR' class with sleeping accommodation.
1	2nd class brakevan ('NYBa') to Pay car.
32	cattle vans to flat wagons (re-converted 1944)
5	sheep vans, bogie, to flat wagons for transfer to North Australia Railway.
Alterations	
4	cattle vans, bogie, for conveyance of Army personnel
4	cattle vans, bogie, for use as mobile kitchens
20	flat wagons bogie, strengthened for conveyance of Army tanks.

It is necessary, too, for the Port Augusta organisation to contribute a considerable amount of work in the direction of supply of rollingstock to the North Australian Railway. 'Yx' class locomotives, purchased from the South Australian Railways, were transported by rail to Alice Springs and thence by road to North Australia. Where necessary, parts were stripped and packed, wheels were turned and axle boxes overhauled before dispatch.

During the period that the traffic was at peak density on this line, it was impossible to transport livestock southward by special trains. To overcome this difficulty, cattle vans were utilised for the conveyance of service goods on a number of Military trains, and used in their normal capacity for transport of cattle in the return direction from Alice Springs to Adelaide.

As on all other railway systems in Australia, the weight of war operations most effectively demonstrated the great disability caused by the differences in track gauges. On the Trans-Australian Railway, apart from the many other difficulties encountered through this cause, the fact that no adjoining system was of the same gauge meant that emergency rollingstock purchased or hired, could be obtained only by transport as freight. Whilst this did not apply to the Central Australia Railway, the activities on the latter system highlighted the enormous spending of manpower and equipment at the break-of-gauge point, Terowie in South Australia. There the whole of the vast movements of troops, equipment, supplies and engines of war that were railed to the Northern Territory, had to be transferred from broad gauge (5'3") to narrow gauge vehicles. Had the tide of warfare moved to the Western coastline, necessitating perhaps the withdrawal of forces from the North, the facilities at Port Augusta for the transfer of equipment from narrow to standard gauge vehicles would have proved a serious bottle neck.

Sidings and Yard Accommodation

The first work carried out as a result of war conditions was directed on 14th February 1941, and comprised the construction of four additional crossing loops between Oodnadatta and Alice Springs, and the extension of seven existing sidings between Copley and Oodnadatta. The whole of this work was completed within twelve days.

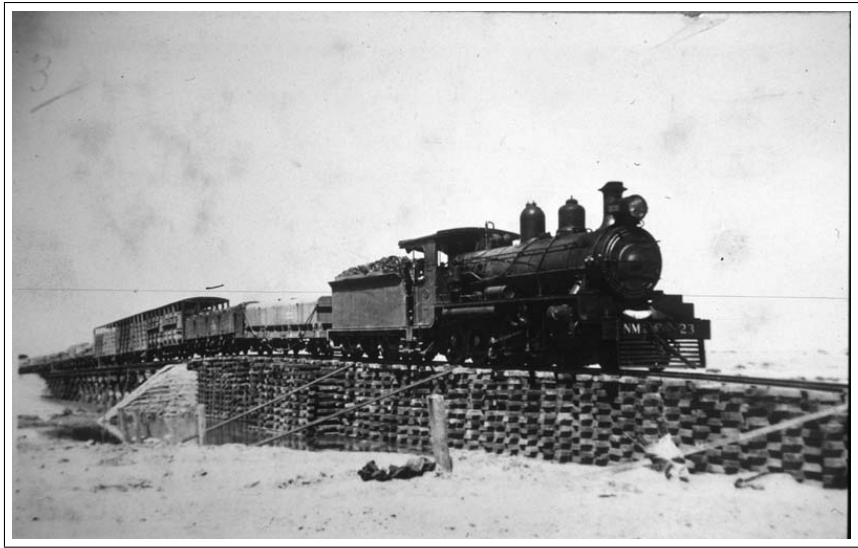
Later, further work was carried out at Alice Springs. Details of these works are as follows:-

- Construction of crossing loops each of 900-ft. standing room, on east at:
 - 732 Miles
 - $818\frac{1}{4}$ Miles
 - 874 Miles
 - 940 Miles
- Extension of sidings to provide greater standing room at:
 - Copley - to 845 feet.
 - Telford - to 800 feet.
 - Alberrie Ck. - to 900 feet.
 - Bopeechee - to 900 feet.
 - Strangways - to 900 feet.
 - Boorthana - to 900 feet.
 - Algebuckina - to 900 feet.
 - Alice Springs - (several).

Sidings for the sole use of the Defence Department were laid down at Alice Springs in 1941 to facilitate the handling of the huge quantity of stores required to go forward over the North-South road. In May 1942, a siding (820-ft. standing room) was opened at $976\frac{3}{4}$ Miles (just south of Alice Springs) where a petrol depot was established by the R.A.A.F.

In April 1942, work began on a programme which became known as 'Project 52' because this was the reference to special funds provided for the work by the Department of the Army. This programme was intended to provide facilities for the movement of personnel and 500 tons of loading per day, and comprised, in addition to enlarged traffic siding accommodation, the provision of locomotive running sheds, coal handling plants, water supplies, accommodation for staff, and equipment for additional gangs (all of which will be described later), and the extension of workshops at Port Augusta (to which previous reference has been made).

Details of the siding and accommodation provided under 'Project 52' are given hereunder:-



2.3.1938 NM 23 crossing pig sty Margaret 505.5 Miles *(Chris Drymalik Collection)*

Additional Crossing Loops		
Station	Mileage from Port Augusta	Standing Room (feet)
Puttapa	154	1,100
Lake Eyre	284	1,100
Margaret Siding	303	1,100
Douglas	364	1,100
Peake Creek	433	1,100
North Creek	464	1,100
Macumba	511	1,100
Mt. Rebecca	533	1,100
Mt. Emery	555	1,100
Abminga (second loop)	587	930
Wall Creek	599	1,100
Crown Point	619	1,100
Musgrave	639	1,100
Mt. Squire	658	1,100
Engoordina	669	1,100
Maryvale	697	1,100
Deep Well	723	1,100
Mt. Polhill	741	1,100
Mt. Ertiva	761	1,100

Extension of Existing Sidings and Provision of Dead-end Sidings			
Station	Mileage from Port Augusta	Crossing Loops extended to (feet)	Dead-end Sidings Provided (feet)
Woolshed Flat	14	990	-
Willochra	35	1,100	-
Gordon	46	1,100	-
Wilson	55	1,100	-
Hawker	65	1,100	-
Hookina	77	1,100	-
Mern Merna	87	1,100	-
Edeowie	101	1,100	-
Brachina	107	1,100	-
Commodore	114	1,100	-
Nilpena	132	1,100	200 (extended by 150)
Telford	169	1,100	-
Lyndhurst	183	1,100	-
Callana	240	1,100	-
Wangianna	253	1,100	-
Alberrie Creek	264	1,100	-
Bopeechee	274	1,100	100
Curdimurka	294	1,100	100
Coward Springs	311	1,100	-
Beresford	326	1,100	-
Strangways	334	1,100	-
William Creek	356	1,100	-
Anna Creek	373	1,100	-
Box Creek	383	1,100	-
Boorthana	393	1,100	100
Duff Creek	403	1,100	-
Warrina	424	1,100	-
Algebuckina	443	1,100	-
Mt. Dutton	453	1,100	-
Oodnadatta	478	1,100	-
Todmorden	492	1,100	-
Alberga	504	1,100	100
Mt. Sarah	522	1,100	-
Pedirka	544	1,100	100
Ilbunga	564	1,100	100
Abminga	587	1,100	-
Duffield	609	1,100	100
Finke	629	1,100	100
Rumbalara	649	1,100	-
Engoordina	669	1,100	100
Bundooma	683	1,100	100
Rodinga	709	1,100	100
Ooraminna	730	1,100	-
Ewaninga	751	1,100	100

Also under this project the following work was carried out:-

Station	Mileage from Port Augusta	Particulars of Work
Brachina	107	Provision of 200-ft. loop for water gins, extensions of 10-ft. rail decked culvert.
Beresford	326	Provision of short goods loop 200-ft. off crossing loop.
Edwards Creek	414	Apex of triangle extended by 450-ft.
Oodnadatta	478	Goods siding extended north by 635-feet.
Abminga	587	Re-location and extension of triangle removal and re-erection of goods shed, goods loading ramp, platform, and signals; associated with provision of new crossing loop and extension of siding loop.
Alice Springs	771	Additional sidings to serve marshalling sidings. Extension by 400-ft. of cattle siding. Construction of additional goods shed 40' x 30' with 12' x 10' interior office. Extension existing goods shed & goods platform.
Port Augusta	-	Extension of Stores Yard.

Water Supplies

Water supplies on the Central Australia Railway were not sufficient to cope with the greatly increased traffic requirements, and conditions in 1941 were similar to those on the Trans-Australian Railway. Of seventeen reservoirs, water was not available in eleven for periods varying from four to nine months, and one reservoir was dry for the whole year. One of these reservoirs had been previously dry for twice in forty years. Extensive haulage of water in rail tank cars was necessary. these conditions made the preparations for the conveyance of vastly increased tonnages very much more difficult than might otherwise have been expected.

In the following year, 1941/42, surface supplies of water were very low for about nine months, and the use of bore water was necessary on a large scale. The underground water proved very inferior and interfered with engine working. To overcome this, water treatment plants were installed at many locations.

A brief description follows of the work done to improve water supplies:-

Quorn Previously the water supplies at Quorn were drawn from the railway reservoir and, when that was exhausted, from the town supply at Mt. Arden, and the Corporation bore. Because of the low pressure in the mains, this was not entirely satisfactory, and to improve the supply, a bore was sunk to a depth of 305-ft., and a flow of 9,000 gallons per hour was obtained.

Hawker At this location the normal supply was from a reservoir, and a five-inch bore with a capacity of 2,880 gallons per hour. Another bore was sunk to 350 feet for a flow of 4,000 gallons per hour.

Hookina Here a bore was put down for use in case of emergency. Details are - depth 90ft., capacity 2,800 gallons per hour. The water obtained was a potential source of heavy scaling in locomotive boilers, but was capable of successful treatment.

Brachina The original provision for water supply was one reservoir and one bore. To meet the war conditions the supply was duplicated to the following detail:-

- New reservoir - capacity 4,510,000 gallons.
- Depth of new bore - 335 feet.
- Capacity of new bore - 10,000 gallons per hour.

The quality of the water in the bore was scale forming, but capable of treatment.

Beltana A new bore was put down at this location to replace the existing well, which had a supply of only 1,000 gallons per hours. The bore, 303 feet deep, produced only 1,500 gallons per hour, and the water was not so good in quality as was expected, but it nevertheless was an improvement on the well supply.

Copley The advisory geologist considered it would be valueless to bore a Copley, so an additional reservoir was constructed adjacent to the existing catchment, the capacity being 5,100,000 gallons.

Farina An additional reservoir was constructed, with a capacity of 6,480,000 gallons.

Marree The casing on the existing bore was so corroded it could not be withdrawn. Another bore was sunk to a depth of 392 feet, and this resulted in a flow of 3,000 gallons per hour. The water was capable of treatment for locomotive use.

Callana An additional reservoir was built, with a capacity of 4,720,000 gallons. This brought the total storage capacity at this place to 9,271,000 gallons.

Alberrie Creek A bore was sunk here to meet requirements when the reservoir became exhausted. At 690 feet the artesian flow of 480 gallons per hour, which started at 220 feet, had not increased. As the capacity was not sufficient for locomotive requirements, the bore was not developed further.

Curdimurka There being no watering facilities at this place, a bore was constructed which at 450 feet produced a flow of 3,200 gallons per hour. The water, if used raw, would cause priming in a locomotive but was capable of treatment by the lime-soda process.

Beresford The existing supply from a 7 million gallon reservoir was considered too unreliable. A bore was sunk to a depth of 310 feet adjacent to the catchment area, and resulted in a flow of 5,000 gallons per hour. The water was a little worse than that found at Curdimurka.

Anna Creek Efforts to improve supplies at this location were of no avail. The original supply was from a well of a depth of 85 feet and a capacity of 1,000 gallons per hour. Drives were constructed in the well with a view to increasing its capacity, but these resulted in an improvement of only 100 gallons per hour. A bore was sunk to the south of the well, but after reaching, at a depth of 410 feet, a flow of 4,000 gallons per hour, it was found that the water had a total salt content of 3 grains per gallon, and the bore was abandoned.

Edwards Creek The capacity of the existing bore - 1,500 gallons per hour - was insufficient. A new bore at 623 feet struck a supply with a capacity of 7,000 gallons per hour. The water was capable of successful treatment.

Mt. Dutton Here a reservoir was the only source of supply. A bore was put down to a depth of 367 feet and, although a flow of 6,500 gallons per hour was obtained, the water was very poor in quality and not capable of successful treatment.

Alberga The reservoir at this location, although having a capacity of 18 million gallons, was not very reliable. With a view to increasing this supply, a bore was put down to a depth of 1,127 feet, resulting in a flow of 6,500 gallons per hour. The quality of the water was poor, but capable of successful treatment. The main disadvantage was the temperature, which was about 127 deg. Fahr., and for continual use some means of cooling would have been required.

Pedirka The reservoir at Pedirka was abandoned because of high percolation losses. A bore was put down to a depth of 1,310 feet for a supply of 14,000 gallons per hour. This water was scale-forming and if required for extensive use would have needed treatment.

Abminga The original bore here was always a source of trouble, due to sand. A second bore was sunk to a depth of 860 feet for a supply of 1,000

gallons per hour. This water was suitable for use in locomotive boilers only in very small quantities.

Later a weir was constructed on the creek side of the station yard. When filled to capacity this banked the water back for about a mile and ensured an almost permanent supply of good water.

Finke Twin bores existed at Finke, sunk when the railway was constructed to Alice Springs, but these frequently became defective through sanding-up. A new bore was constructed just north of the old site and, at 364 feet a good supply was struck, having a capacity of 6,100 gallons per hour. Although the water from the new site was a little more saline than that from the old bores, it could be used extensively without treatment.

Deep Well There was no railway water supply here at all, and to avoid the hauling of water tanks wagons from Bundooma (40 miles away), a bore was sunk, with the following results:-

Total depth	286 feet
Water level	173 feet
Capacity	7,920 gallons per hour.

Water Treatment Plants Water treatment plants were at the following locations:-

Location	Type of Plant	Capacity (gallons per hour)
Quorn	Kennicott	5,000
Hawker	Kennicott	5,000
Marree	Kennicott	5,000
Curdimurka	Kennicott	6,000
Beresford	Kennicott	6,000
Edwards Creek	Kennicott	5,000
Oodnadatta	Mollinite	6,500

Pumping Plants At seventeen locations, new and more powerful pumping plants were installed to lift the water from new bores or to improve on existing plants which were not capable of meeting the increased demands.

Workshops, Running Sheds etc.

The details given under the heading of 'Trans-Australian Railway' of the extensions necessary to the Port Augusta workshops apply also to the Central Australia line, because these facilities are common to both railways.

It was necessary also to extend locomotive running shed facilities at Quorn, a completely new shed being constructed, and to construct and establish new

sheds at Marree, Oodnadatta and Alice Springs. The buildings, ashpits, drop-pits, etc. were constructed under contract. Track work for the four new depots was carried out Departmentally, involving the laying of fifty leads and 11,800 lineal yards of track.

Accommodation for Staff

Accommodation for the additional staff required for all Branches constituted a major problem. In the main, accommodation for single men was needed.

In May 1942, a contract was let for the construction of 19 single-room station buildings, 23 two-roomed living quarters, and 5 sets of living quarters, each consisting of 3 bedrooms and a kitchen dining room. These were for the use of Traffic staff at outlying stations on the Central Australia Railway.

At Quorn, accommodation for the big influx of train crews and additional locomotive shed staff was alleviated by taking over three shops in the town, and by renovating and equipping these and an old Departmental house. For Traffic staff, the existing resthouse was extended by six rooms.

To provide additional resthouses for locomotive engine crews, and living accommodation for shed staff at other locomotive depots, a contract was let in September 1942 for the construction at Port Augusta of 41 two-roomed living quarters and 2 single-roomed station buildings.

Later, an additional 25 two-roomed quarters were built under contract, and further quarters were constructed Departmentally.

Between February and October of 1942, the track maintenance staff was increased from 127 to 259. The additional men were housed in tents. In December of the same year it was decided to reduce all gang lengths to 20-miles, and establish 17 new gangs at the following locations:-

- Hookina
- Beltana
- Mundowdna
- Alberrie Creek
- Curdimurka (2nd gang)
- Beresford
- Anna Creek (2nd gang)
- Edwards Creek (2nd gang)
- Mt. Dutton (2nd gang)
- Alberga

- 732-Miles (Mt. Sarah)
- Ilbunga
- $818\frac{1}{2}$ -Miles (Duffield)
- Rumbalara
- Bundooma
- $932\frac{3}{4}$ -Miles (Deep Well)
- Alice Springs

At those locations where gangs were already established, the second gang was accommodated in the barracks already provided. At Hookina, Mundowdna and Beresford, old maintenance cottages which had not been used for many years were repaired.

Married gangers were established at Beltana, Edwards Creek (2), Oodnadatta and Alice Springs, and three two-roomed quarters were provided at each locality for those men not otherwise accommodated.

Modern barracks, each comprising six rooms with eight-foot verandah surrounding, were built under contract at eight locations, viz., Alberrie Creek, Alberga, Ilbunga, $818\frac{1}{2}$ -Miles (Duffield), Rumbalara, Bundooma and $932\frac{3}{4}$ -Miles (Deep Well).

Communications

At the outbreak of war, trains were worked under the Permissive Block system of safeworking. In this system, orders are issued by Stationmasters over long distances, and arrangements for crossings are planned far in advance. As the density of war-time traffic increased on this railway, it became necessary to institute a system capable of providing greater flexibility of working and, at the same time, of handling efficiently a greater number of trains.

It was decided to introduce working under Train Control, and the Postmaster-General's Department's engineers devised and installed the necessary telephone lines, and improvised instruments which enabled the system to be established in May 1943. Train Control centres were established at Quorn, Marree, Oodnadatta and Alice Springs, and from these four points Train Controllers took charge of all train movements on the Central Australia Railway.

Coal and other Running Supplies

Late in 1941 the increased traffic being handled made it imperative that the methods of handling coal should be improved. At that time locomotives were fuelled by manual labor at all depots excepting Marree, where there was an

elevated road and bin. At Quorn and Abminga, engines were coaled direct from rail trucks, involving of course, delay to the vehicles which were greatly in demand for movement of other loading.

The problem was reviewed on the basis of traffic expected, viz.:-

Port Augusta to Quorn	28 trains weekly
Quorn to Marree	44 trains weekly
Marree to Alice Springs	38 trains weekly

with a coal consumption of approximately 60-lbs. per mile for each locomotive. The estimated quantities of coal to be handled were as under:-

Coaling Depot	Mileage from Quorn	Distance between Coaling Points	Average Weekly Coal Requirements (tons)	Capacity of Existing Coal Stages (tons)
Quorn	-	-	266	100
Marree	207	207	504	210
Oodnadatta	454	247	364	-
Abminga	562	108	301	250
Alice Springs	747	185	189	100

An efficient scheme to supply requirements was sought, embodying the following points:-

1. Provision for quick unloading of coal from trucks.
2. Provision for fast coaling of engines.
3. Storage for at least 400 tons, all of which could be mechanically handled.

Four schemes were considered. Briefly, these were:-

1. A crawler mounted diesel-operated grab bucket of about $1\frac{1}{2}$ cubic yards capacity, to unload trucks to storage stack or 100-ton elevated bin, or from storage stacks to engine tenders, the grab bucket to handle not less than 40 tons per hours.
2. Provision of a 10-ton concrete hopper into which coal could be offloaded by tilting trucks with side tipping arrangement; the coal then to be elevated to a 100-ton bin by means of a $1\frac{1}{2}$ -ton skip hoist. Coal to be stored in excess of the capacity of the bin would be offloaded by manual labor.
3. Trucks to be tilted to an angle of 21 degrees, and offloaded by hand on to a concrete floor with storage capacity of 350 tons. (it was estimated that by this method two men could offload eight tons in three minutes). Coal then to be bulldozed on to a 14-inch rubber belt conveyor about 228 feet in length, with a capacity of 20 tons per hours. The belt would be provided with a tripper which would tip the coal on to a steel scraper conveyor capable of being traversed the full length of a 50-ton coal bin.

4. A mechanical grade transporter similar to those in use at Broken Hill and Tocumwal for handling iron ore. The plant would have a capacity of 70 tons per hoppers and would require modification for filling of a 50-ton coal bin. The transporter would need to be elevated about 13 feet. (This scheme was limited to localities where electric power was available, as three motors would be required for hoisting and traversing movements.)

Of the four schemes, the first was considered the most suitable.

Two (2) secondhand 'Ruston' $2\frac{1}{2}$ -cubic yards steam navvies, fitted to traverse on 5'3" gauge track, were purchased in 1942. These had been in use on the South Australian Government's South Eastern Drainage Scheme.

Three (3) 'Thole' 6-ton locomotive steam cranes, owned by the Netherland Harbour Works Construction Company, were also purchased. These were fitted for traversing on rails at 7'10" centres, and had had considerable use.

It was necessary to fit the cranes and one steam navvy with single-line self-dumping grabs of 38/46-cubic feet capacity. These were purchased from Morison & Bearby Ltd., Newcastle. Special pulleys were cast for each machine required to operate a grab.

The whole of the work done for the improvement of coal handling is summarised hereunder:-

Location		Work carried out
Port Augusta	Au-	<ul style="list-style-type: none">• Installation of one (1) $2\frac{1}{2}$-cubic yard 'Riston' steam navy as additional facility for loading coal from bin into trucks.• Existing bin widened and sidings altered to accommodate navy.• Special tracks laid for navy.
Quorn		<ul style="list-style-type: none">• Installation of $2\frac{1}{2}$-cubic yard 'Riston' steam navy and self-dumping grab, on special $4'8\frac{1}{2}"$ gauge tracks.• Construction of overhead coal bin of 50-tons capacity.
Marree		<ul style="list-style-type: none">• Installation of 'Thole' 6-ton steam crane and self-dumping grab, on special 8-ft gauge tracks.• Construction of overhead coal bin of 50-tons capacity.
Oodnadatta		<ul style="list-style-type: none">• Installation of 'Thole' 6-ton steam crane and self-dumping grab, on special 8-ft gauge tracks.• Construction of overhead coal bin of 50-tons capacity.
Adminga		<ul style="list-style-type: none">• Installation of 'Thole' 6-ton steam crane and self-dumping grab, on special 8-ft gauge tracks.
Alice Springs		<ul style="list-style-type: none">• Construction of coal stage of 100-tons capacity (transferred from Quorn and rebuilt).

The overhead coal bin at Abminga was constructed Departmentally, but those at Quorn, Marree and Oodnadatta were built under contract.

Consumption figures for coal and other running supplies are given in the appendices.

1.4 War Time History of the Commonwealth Railways

North Australia Railway

The North Australia Railway consists of 316 miles 40 chains of single line, 3'6" gauge track, running southward from Darwin to Birdum.

At the outbreak of the war, the administration of this railway was located in Darwin, and the main workshops were situated at Para parap, $2\frac{1}{2}$ miles out of Darwin. In addition to running the railway, the wharf and sorting shed at Darwin were controlled by the Commonwealth Railways.

Two ships each month brought to Darwin the requirements of the Northern Territory population, the preponderance of which was concentrated in or about Darwin. One vessel was from the Eastern States, the other from Western Australia. On the railway one train each week met transport demands.

But it was over this small part of the Commonwealth Railways system that the tide of war conditions was to follow with greatest force.



circa 1941, Leyland Rail carriage (*Chris Drymalik Collection*)

During the year 1939 began the establishment by the Defence Services of new garrisons at Darwin, and the strengthening of existing organisations. These activities considerably increased the work in the port of Darwin, but they had

little influence on rail transport until the latter part of 1940 when the Overland Road was constructed between Alice Springs and Birdum, and defence materials began to be conveyed by this route.

Shipping continued to increase until it reached its peak in January 1942, when the port was working 24 hours daily, often with two ships at the wharf simultaneously for long periods.

Towards the end of 1941 it was known that Darwin, and surrounding areas, were within range of enemy aircraft, and defence activities were rapidly rising in tempo. The Civil Administration arranged for the evacuation from the Darwin area, of women and children and those people not employed in essential services.

Plans for the transfer of the Railway Administration to Katherine, 200 miles southward, were made in anticipation of an enemy attack upon Darwin. Instructions were issued to key staff regarding action to be taken to avoid disruption of the service should this transfer prove necessary.

On the morning of 19th February 1942, a strong force of Japanese bombers raided Darwin and wrought great destruction on ships in the harbor and on the R.A.A.F aerodrome at 4 miles from Darwin. Direct hits on the wharf and the sinking of one of the ships, the 'Neptuna', at the wharf, rendered it temporarily useless.

One locomotive, standing on the wharf, was lost in the harbor, and eighteen trucks were destroyed. The only damage done to the railway in this first raid was at $4\frac{1}{4}$ miles, adjacent to the aerodrome, where the main lines was broken. But it was apparent from the accuracy of the bombing of selected objectives, that the same force of aircraft could return and completely destroy the railway installations in one raid. Immediate action was taken, therefore, to put into effect the pre-arranged plans for the movement of administration, workshops, rollingstock and equipment out of the confined danger zone. All civilian establishments in Darwin were at once closed and some other Government Departments also moved their staffs inland. The Department of the Army assumed control of the Northern Territory, and the section southward to the 20th parallel of latitude (which passes through Katherine) was declared an Operational Area.

Due to the serious disruption of communications following the first air raids, it was necessary to divide the railway administration into two sections; one to remain in Darwin and the other to transfer to Katherine. For a considerable period the only means of communication was by the Army Signal Service which, of course, was seriously overloaded. The difficulties attaching to the safe working of trains and locomotives out of Darwin without telephone communication can well be imagined.

After the first raid, all locomotives in the Darwin area were put under steam, and running crews were instructed to stand by for duty as required. A programmer for the movement of civilians, and rollingstock and equipment

not immediately required was brought into urgent operation, and functioned extremely well.

Under the terrible menace of a return air raid, it was remarkable with what calm the public, including many women, attended for conveyance inland by rail, most of them in open trucks. Typical of the spirit of the people was one old man who was weeping inconsolably, not because of fear but because the train could not be held whilst he went back to his house for a large box of linen treasured by his wife.



circa 1940s, Commonwealth Railways 'NF 5' (*Chris Drymalik Collection*)

The train used to transport women, children and aged men from Darwin, was provisioned from the Railway Department's store.

On the day following the raid, work began on dismantling the machinery and equipment at the workshops, for loading and transport to Katherine. In the first week of March, makeshift workshops were operating on a site previously known as the Construction Dump at Katherine.

The Administrative staff were accommodated at Katherine in existing buildings and, of course, suffered cramped conditions for the period needed to erect new quarters and office buildings. The Stationmaster's house was taken over for the main office and mess, and for a long period was used also as quarters. This house was of a type common in the tropics, in that it was erected on concrete pillars which raised the building about seven feet from the ground. The section beneath the floor was used for the main office. With these primitive facilities the service was carried on, and the lag caused by the period of transfer was quickly overtaken.

It is proposed that the war history of this railway should be related under the following headings:-

1. Air Raids
2. The Wharf and Sorting Shed
3. Traffic Operations
4. Rollingstock
5. Track and Station Yard Facilities
6. Water Supplies
7. Workshops Facilities
8. Staff - Accommodation, Messing etc.
9. Coal and Other Running Supplies.

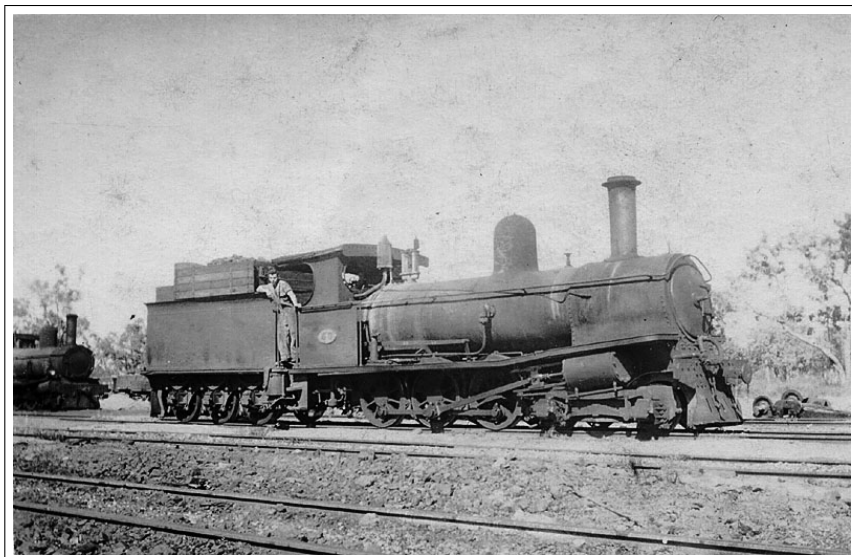
Air Raids

Events proved that the first air attack on 19th February 1942, was the most severe of all the raids made on the Darwin area. Of the frequent subsequent occasions on which the bombers came over, the only one that caused severe damage to railway installations occurred on 15th March 1943, when the Sorting Shed suffered damage; the goods shed, carriage sheds, one residence and the weighbridges were destroyed, and the tracks in the yard were broken in eight places. The track was broken by bombs on five other occasions, but no serious delays to traffic resulted.

For a considerable period after the first bombing, blackout restrictions were severe, and trains ran at night for the 76 miles between Darwin and Adelaide River without headlights. The reader will appreciate that this duty made no small demands upon the courage of the train crews, particularly the enginemen.

Great credit is due, also, to the staff who were called upon to remain at Darwin for the preparation of locomotives and for the dispatch of trains from the Darwin yard. These men had seen that the enemy had within range a heavy force of aircraft which was capable of obliterating the railway installations. For their first experience under enemy fire, they had felt the terror of a raid that has since been described as comparable, for intensity over a given area, with any endured in Britain during the war. They remained in the danger zone, then, with a clear knowledge of the risk involved, and enabled a most essential service to function without interruption.

The precautions taken by the railway organisation against air raids were simple. Instructions were issued to the staff regarding observance of the



9.5.1943, Commonwealth Railways engine NGA 50, prior to renumbering NGA 86 at Katherine Loco (*Chris Drymalik Collection*)

customary siren warnings, blackouts, the building of 'V' slit trenches, bomb disposal, and security of essential documents. In the Darwin area, the construction of deep shelters was difficult because of the rock formations below the surface of the earth; and the humid climate made unattractive the idea of being below ground level for long periods.

Blackout conditions were rigidly enforced by the Army authorities for a period, until it became obvious that enemy aircraft had the area identified and could bomb their objectives by moonlight. From then on the area was 'blacked out' only when the air raid warning were sounded.

The Wharf and Sorting Shed

The wharf at Darwin was 'L' shaped, and the movement of rail trucks along it was effected by a steam-driven turntable at the angle. Cargoes were unloaded by casual labor employed by the Commonwealth Railways, into rail trucks and were shunted to the Sorting Shed in the Darwin yard for delivery to consignees.

The rapid increase in the volume of shipping cargo handled from the time of the outbreak of war until the wharf was put out of action by bombs on 19th February 1942, is illustrated by the following figures:-

	1938/39 (tons)	1939/40 (tons)	1940/41 (tons)	1.7.1941 to 19.2.1942 only (tons)
Regular vessels	31,021	54,528	83,659	74,200
Coal		2,277	7,060	2,086
Inflammable Products (packed) Special Ship- ments	1,937	2,053	6,916	3,108
Petrol, bulk	1,015	390	2,182	1,500
Crude oil, bulk	1,203	25,404	9,466	24,518
Vessels trading in North- ern Territory	465	74	70	120
	35,641	84,726	109,353	105,532



circa 1943, Commonwealth Railways engine NGA 83 ex Western Australian Government Railways G 134 on North Australia Railway (*Chris Drymalik Collection*)

It will be seen that for the $7\frac{1}{2}$ months from the first of July 1941, to 19th February 1942, almost the same tonnage was handled over the wharf as for the whole of the preceding year, for which the figure was more than treble that for the previous year 1938/39.

In December 1941 and January 1942, labor was brought into Darwin to cope with the increased volume of shipping; but the port facilities were heavily overloaded. The stacking space in the Sorting Shed of the railway yard proved unequal to the burden, and some cargo had to be shunted to the Vestey's sidings ($2\frac{1}{2}$ miles away), then serving a large Military establishment.

Working under these conditions, there was a considerable lag between the discharge of cargo from the ship and its offloading from trucks, and subsequent delivery. Consequently, when there was no break in the continuity of discharge of cargo from the ships, there was no opportunity to balance the discharge with the unloading of rail trucks and the delivery from the Sorting Shed and stacking sites. Under these circumstances delays in the discharge of cargoes from ships became unavoidable.

The experience gained in working the Darwin wharf in wartime, showed that facilities at so strategically important a port should be so constructed as to enable ordinary merchandise to be taken direct from ship's slings into sorting sheds for delivery; and only cargo of a heavy nature should require to be transported to a stacking site away from the wharf.

After the air raid on 19th February 1942, the control of the wharf was taken over by the Department of the Army for the remainder of the war period.

When the railway wharf was damaged, then only port facility remaining for sea cargoes was the jetty attached to the submarine boom depot, which was able to receive only ships with a maximum draft of sixteen feet. Shipping traffic to Darwin was consequently curtailed drastically, and the whole of the requirements of the area had to be conveyed overland. The action taken to handle the resulting flood of material for rail transport will be described briefly in the pages which follow.

Traffic Operations



Commonwealth Railways carriage NABP 5 on the North Australia Railway
(Chris Drymalik Collection)

Much ill-informed criticism was levelled at the North Australia Railway by many who visited the Territory for the first time during the war. The fact remains, however, that the services provided and the task accomplished, despite the isolation of the railway, its limited initial resources associated with its necessarily light construction and the small pre-war traffic needs of the Territory, the difficulty of obtaining staff and material under war conditions, and the fact that for a long time the railway was part of the front line, subject to numerous enemy raids, played an extremely important part in Australia's war effort. The manner in which that part was played, and the effectiveness of the railway service and its contribution to victory, was the subject on more from Australian Service Departments, but also from our American and Dutch Allies.

The following comparison of the pre-war traffic and the traffic handled in 1943/44 shows clearly the extent of the transport demands which a country at war made on this hitherto small and practically unknown railway:-

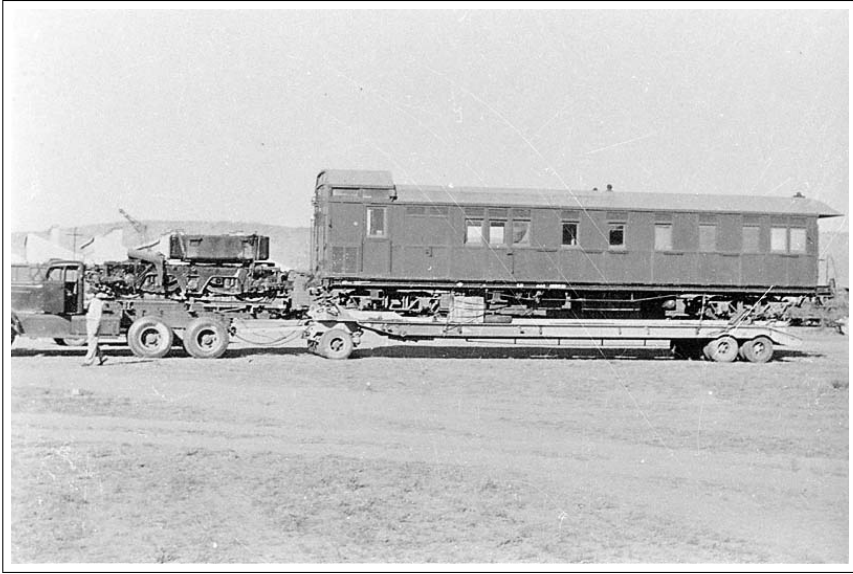
Item Item	1938/39 (Year preceding declaration of war)	1943/44	Increase per cent.
Train mileage	32,364	741,527	2,191
Goods Ton mileage	599,129	38,617,708	6,346
Gross Ton mileage	4,137,720	134,683,883	3,155

The passenger traffic after February 1942 was almost wholly Service personnel. The peak year for passenger traffic was 1943, when 91,488 passengers were carried.

The goods and material traffic reached its peak in the twelve months ended 30.9.44.

It will be seen that to service this operational area, the demands on the railway were enormous. From the peacetime running of one train weekly it was necessary to supply up to 147 trains per week to meet requirements for the conveyance of Service personnel, materials and supplies.

The rapidity and volume of the increase in traffic on this line are more fully illustrated in the comparative figures supplied below: the year ended 40th June 1939 has been taken to supply a basis of the traffic conveyed during a peacetime year:-



North Road - Relay van NHBR23 (G Bond Collection) *(Barry Lewis Collection)*

Year Ended 30th June	No. of Passengers	Tonnage of Goods Hauled	Locomotive Mileage	Vehicle Mileage	Gross Ton Mileage
1939	2,323	7,697	55,354	474,607	4,137,720
1940	2,434	13,766	72,140	500,504	4,385,293
1941	14,021	27,057	138,902	1,244,354	13,787,965
1942	43,167	62,601	348,788	3,597,635	46,144,357
1943	91,488	161,006	644,230	8,996,022	103,791,570
1944	90,469	213,452	870,145	11,764,826	134,683,883
1945	63,237	142,437	691,444	7,393,521	98,243,356

Following the first air raid, shipping to the port was greatly curtailed, with the result that Service personnel, materials and supplies from the south had to be conveyed overland to Larrimah - the military siding at the southern end of the North Australia Railway - and at that point loaded on railway vehicles for onward transportation to Adelaide River and Darwin.

The possibility of enemy action forcing a closure of the port of Darwin had been anticipated by suitable arrangements to increase the capacity of the railway. Particulars of action taken in this direction follow under relevant headings.

At the beginning of the war, the North Australia Railway traffic was operated under the Train Staff and Ticket regulations. The 'attended' stations on the line were: Darwin, Pine Creek (145 miles), and Katherine (200 miles). As the volume of traffic increased, it was necessary to open more 'attended' stations,

and in May 1942, Southport, Howley, Burrundie, Horseshoe, Maranboy, Mataranka and Larrimah were staffed.

The density of traffic also necessitated the crossing of trains at points which were not Train Staff Ticket stations. This entailed the modification of the standard Train Staff and Ticket Regulations.

On 24th June 1943, construction of a new railway metallic telephone circuit from Darwin to Birdum had been completed, and traffic from that date was conducted under Train Orders under Train Control System. This provided a more flexible means of controlling the traffic, gave greater supervision over train movements and enabled the station staff to be withdrawn from Southport, Howley, Burrundie and Horseshoe.

The Army 5th Australian Movement Control Group was established in Darwin to co-ordinate the transport requirements of all sections of the Armed Forces. At Katherine an officer bearing the title of Deputy Assistant Director of Transportation, was stationed to receive from Movement Control Headquarters, bulk orders for rail transport, which he would personally deliver to the railway Traffic Office. The officer occupying this post was a trained railwayman and was, therefore, able to understand and assist in rail transport problems as they arose. Relations between the Traffic Officers of this Department and the Army representative were at all times cordial and of great mutual advantage. This organisation was most effective and ensured that loading was so arranged that the maximum use was made of locomotive power and rollingstock available.

Rollingstock

The locomotives and other rollingstock on hand at September 1939, were sufficient only for the normal service of one train weekly. Because of the light nature of the railway, they were limited in respect of axle load. Listed hereunder are particulars of the whole stock on hand at that time:-

Locomotives

Class	Type	Number
'NA'	0-4-0	1
'NF'	2-6-0	6
'NG'	4-6-0	5
Sentinel Steam Motor	0-4-0	1
		13

Coaching Stock and Brakevans

Sitting-up cars, 2nd-class	1
Sitting-up cars, composite	3
Brakevans	4
Steam coach	1
Other Vehicles	2
	11

Freight Vehicles

Open goods wagons, 4-wheel	137
Louvre vans, 4-wheel	2
Refrigerator vans, 4-wheel	21
Flat wagons, bogie	19
Flat wagons, 4-wheel	17
Brakevan (goods) bogie	1
Cattle wagons, bogie	28
Bolster wagons, bogie	2
Bolster wagons, 4-wheel	5
Powder van, 4-wheel	1
	233

Service and Miscellaneous Stock

Water tank wagons, 4-wheel	5
Ballast wagons, 4-wheel	37
Ballast plough	2
Workmen's van, 4-wheel	1
Cranes	3
Hospital van, 4-wheel	1
	49

The numerical inadequacy of this stock was accentuated by the condition of the vehicles, which was referred to by the Commonwealth Railways Commissioner, in his Annual Report of 1939, in the following terms:-

In previous reports attention has been invited to the age of the locomotives and rollingstock, some of which has been in use since the line from Darwin to Pine Creek was opened for traffic in 1889. The renewal of this equipment has been contemplated for a number of years, but has been deferred on account of consideration of costs, etc..

All the locomotives are very old and were in use prior to being sent to Darwin. Several of them have been placed out of commission

permanently, whilst others are reaching the stage when they have outlived their usefulness.

With the exception of one passenger carriage, and a brakevan added within recent years, the carriages are now so old and costly to maintain that consideration will require to be given to their replacement.

Similar remarks to the above can also be applied to a considerable portion of the wagon stock. Most of the wagons are of timber construction and, owing to climatic conditions, frequent repairs are necessary. When replacements are effected, consideration will be given to the provision of wagons of steel construction.

The above brief resume of the rollingstock available, when considered in the light of the traffic what was to come to the railway in the immediately following years, will clearly show the magnitude and the urgency of the task that suddenly confronted the Department.

By October 1943, bases for a vast offensive force of arms had been formed by the Services along the route served by the North Australia Railway. Large airfields had been constructed, and were served at Firdan, Adelaide River, Brocks Creek and Katherine. An Army Meat Works and a farm unit were established at Katherine. At Snake Creek, on the northern side of the Adelaide River, the Navy had erected a large ammunition depot. Gorrie was the site of a R.A.A.F workshops and supply depot; and a substantial Ordnance Depot functioned at Mataranka.

A summary of the locomotives and other rollingstock obtained to meet these demands is given in the following:-

	Number Obtained	Total
Locomotives		
Western Australian Government Railways 'G' class	26	
South Australian Government 'Yx' class	18	44
Brakevans - Bogie		
Western Australian Government Railways 'Z' type	15	
New 'NHA' class	6	21
Covered Vans - Bogie		
Western Australian Government Railways 'U' type	2	
New 'NVb' class	10	12
Louvred Vans - Bogie		
New 'NLA' class	30	30
Open Goods Wagons - Bogie		
Western Australian Government Railways 'R' type	46	
Queensland Railways 'H' class	40	
New 'NGC' class	40	126
Open Goods Wagons - 4-wheel		
Western Australian Government Railways 'GC' type	112	
Western Australian Government Railways 'G' type	30	142
Flat Top Wagons - Bogie		
Western Australian Government Railways 'U' type	2	
New 'NRF' class	24	26
Refrigerator Vans - Bogie		
New underframes and bodies 'NF' class	6	
New bodies mounted on Western Australian Govern- ment Railways 'R' wagon underframes at Katherine, 'NFA' class	8	14
Refrigerator Vans - 4-wheel		
New bodies mounted on Commonwealth Railways 'NIS' underframes, 'NFS' class	4	4
Bulk Oil Tank Wagons - Bogie		
Western Australian Government Railways 'U' type	112	
New 'TS' class	16	
New 'NTO' class	20	47
Total Number of Vehicles		422

The additional stock of 422 vehicles represented an increase of 144% on pre-war stock, whereas the vehicle mileage run during the peak year 1943/44 discloses an increase of 247% on the mileage run during the peace year 1938/39.

To meet special traffic demands it was necessary to convert some rollingstock, and briefly the conversions made were as follows:-

	Number Obtained	Total
Vans for Conveyance of Service Personnel		
‘NC’ Bogie Cattle vans roofed, walls closed up and shutters fitted	5	
Queensland Bogie Open Goods Wagons converted to covered vans and fitted with shutters	17	22
Ambulance Cars		
‘NC’ Bogie Cattle Vans; bodies reconstructed, fitted with berths, lavatories, water service and electrically lighted	6	
‘NC’ Bogie Cattle Van; converted into Ambulance Kitchen car, body reconstructed, water service, oil burning stoves, sinks and cupboards fitted (These cars were worked as a Unit on the Hospital Train)	1	7
Flat Top Wagons		
‘S’ Bogie Sheep Van underframes supplied from the Central Australia Railway, and converted into flat top wagons	5	
‘NC’ Cattle Vans; bodies removed, underframes decked and used as flat wagons	6	11
Covered Vans - 4-wheel		
‘NIS’ Insulated Vans. Bodies removed and replaced by ordinary covered van bodies	8	8
Tank Wagons		
4-wheel Ballast Hopper Bodies removed and small tanks, obtained from the bowzers in Darwin, mounted on the underframes for the conveyance of bulk flux	7	7
Refrigerator Vans - Bogie		
Western Australian Government Railways ‘R’ Open Goods Wagon Bodies removed and replaced by new ‘NFA’ Refrigerator Bodies	8	8
Refrigerator Vans - 4-wheel		
‘NIS’ Insulated Van Bodies removed and replaced by new ‘NFS’ Refrigerator Van Bodies	4	4
Total Number of Vehicles Converted		67

Action to procure the additional rollingstock was, of course, taken promptly upon receipt of advice of expected demands to be made by the Defence Services, but the rapidity of the progress of the Allied offensive strategy, coupled with the difficulties encountered in obtaining the rollingstock and of transporting it to the North Australia Railway, resulted in delays which greatly added to the heavy burden carried by the organisation.

The light nature of the track construction placed a limitation of 8-tons axle load on the rollingstock required. The transfer of twenty six ‘G’ class

locomotives by the Western Australian Government Railways was, of course, a serious drain upon their own resources, and involved negotiations on a high Government level and restrictions upon transport offered by that system. It was a matter of determining that the urgency of the need for locomotives in the Northern operational area warranted their supply at the expense of another system's traffic.

Locomotives from Western Australian Government Railways

The first two 'G' class locomotives were shipped from Fremantle on 14.9.40 and were in service in Darwin on 7th October 1940.

The next two engines were delayed by the breaking of the jib of the lifting gear on the M.V. 'Koolama' whilst loading the frame of the first engine. The frame dropped fifteen feet into the hold, fortunately without damage to the frame or the ship, but the jib could not be repaired immediately, and the ship sailed without the heavy lifting gear. On the return of the vessel from Darwin the lifting gear was fitted, and the balance of the first locomotive, and also the second, were loaded. The ship sailed on 9th December 1940. Both locomotives were in service on 8th January 1941.

In March 1942, as the Japanese menace came nearer our shores, the Right Honourable the Prime Minister wrote the Premier of Western Australia in the following terms:-

It is of the utmost importance and a matter of extreme urgency that the lines of communication with the 7th Military District should be improved immediately to meet defence transportation needs. Undoubtedly some dislocation of the railway operation in Western Australia is bound to result with the withdrawal of locomotives and rollingstock, but this dislocation could be met to a degree by rationing tonnages and cutting out the rail transportation on non-essential commodities.

Following this correspondence, the Western Australian Government Railways agreed in April 1942, to transfer from their system a further 22 locomotives and other rollingstock requested for the North Australia Railway. The movement of this rollingstock, however, proved such a task that nineteen months were to elapse before the last vehicles were landed in Darwin.

It was first arranged with the Movement Section of the Department of the Army that the entire consignment, comprising 22 locomotives and 120 other vehicles (more particulars of which will be given later), could be lifted at once from Fremantle to Sydney by an overseas vessel, and that onward shipment to Darwin could be arranged at the rate of five locomotives per month.

In view of the uncertainty of movement from Sydney, the possibility of unloading the overseas vessel at Port Augusta and of forwarding the

rollingstock from there to Darwin overland, was considered and rejected because the draft of the vessel was too great for Port Augusta.

Shipment by S.S. 'Clan Macpherson' from Fremantle was arranged, but it was found after the ship sailed on 14th May 1942, that only 13 locomotives and 74 other vehicles had been loaded, leaving 9 locomotives and the other vehicles at Fremantle. The loading left behind was eventually lifted by ships as under:-

Date of Sailing	Ship	Locomotives	Other Vehicles
10.7.1942	'Clan Mcauley'	9	28
28.7.1942	'Perthshire'	-	18

It was expected that vessels which were to carry the rollingstock onward from Sydney would have lifting gear with a maximum capacity not exceeding twelve tons. The New South Wales Railway Department agreed to break down the vehicles into sections that would conform to this limitation, and to arrange protection, branding for re-erection, crating, storage and onloading as space was made available on ships for Darwin. Because of the limited shipping space available, it proved necessary on four occasions to tranship at Cairns the vehicles loaded at Sydney.

The delay to the movement of this rollingstock from Sydney is detailed in the following:-

Date of Shipment from Sydney	Route	Quantities shipped	
		Locomotives	Other Vehicles
8.7.1942	Cairns	2	30
13.7.1942	Direct	2	
18.7.1942	Direct	2	
26.8.1942	Direct	3	
5.9.1942	Cairns	2	6
26.10.1942	Direct	4	8
11.11.1942	Cairns		18
30.11.1942	Direct	6	10
5.1.1943	Cairns		2
9.1.1943	Direct	1	14
31.3.1943	Direct		3
7.4.1943	Direct		2
27.4.1943	Direct		10
26.7.1943	Direct		4
20.8.1943	Direct		9
13.10.1943	Direct		4
		22	120

In the course of transhipment of these locomotives at Sydney, three were dropped into the harbour, but were recovered without sustaining any considerable damage.

Damage to six of the locomotives was discovered when these engines were offloaded from S.S. 'James Cook' on 21.12.1942, and was attributed to rough handling during loading operations at Sydney. Delay was occasioned in the placing of these engines in traffic, as replacement parts had to be obtained from the Western Australian Government Railways for the extensive repairs that were found necessary.

Locomotives from the South Australian Railways

On 8th August, 1941, purchase of four (4) 'Yx' class locomotives from the South Australian Railways was arranged, with the option of a further two at a later date. The engines were withdrawn from their Port Lincoln Division, from whence it was decided they should be shipped to Fremantle and from there by the west coast to Darwin.

The first two locomotives (No.s 166 and 116) were shipped from Port Lincoln direct to Fremantle by the S.S. 'Allara' on 5.9.1941.

The Adelaide Steamship Company agreed to issue a 'through' Bill of Landing, Port Lincoln to Darwin, on the understanding that the Western Australian Government Railways should accept, on behalf of this Department, responsibility for the storage and maintenance of the vehicles whilst awaiting transhipment at Fremantle, and for their on-carriage to Darwin, and also liability for all expenses.

The through Bill of Landing was accordingly issued with the following clause forming part of the conditions:-

'Shippers agree to accept all responsibility for on-carriage of cargo from Fremantle to Darwin, and to make all necessary arrangements in connection therewith also in connection with storage and/or maintenance whilst awaiting transhipment at Fremantle, and to accept liability for all expenses incurred.'

The two locomotives were shipped from Fremantle on 10.10.41 by the M.V. 'Koolama', arrived at Darwin on 23.10.41, and were placed in service during the following month.

The next two 'Yx' class locomotives (No.s 156 and 178) were forwarded from Port Lincoln to Adelaide by the M.V. 'Moonta' where they were transferred to the S.S. 'Eidsvold' for carriage to Fremantle. A through Bill of Landing was again issued as in the case of the 'Allara' shipment, but in this case it was arranged that the freight charges Fremantle to Darwin would be paid direct to the State Shipping Service, Fremantle. These locomotives left Port Lincoln on 25.9.1941,

but were not shipped from Fremantle until 15.11.1941, and arrived at Darwin thirteen days later. They were both in service by the 14th January 1942.

In January 1942, two more 'Yx' class locomotives were purchased for Darwin. These engines, Nos. 126 and 138, were shipped from Port Lincoln by the M.V. 'Moonta' on 5th February and transhipped at Adelaide to the 'Kaituna' which sailed from Fremantle on 9.2.1942.

Before these locomotive were despatched from Fremantle, the first air raid occurred at Darwin and shipping arrangements were disorganised. At the end of March 1942, the locomotives were still at Fremantle, and it was decided to return them to Port Augusta by rail for their conveyance overland to the North Australia Railway. Instructions to that effect were issued on 30th March in accordance with advice received from the Shipping Control Board that shipping would not be available, but on the following day Bills of Lading were received indicating that the locomotives had already been shipped from Fremantle on 19.3.1942.

While this uncertain state of affairs existed, it had been decided in view of developments, to transfer another two (the seventh and eighth) 'Yx' class locomotives to the North Australia Railway, and these (Nos. 132 and 160) were shipped from Port Lincoln to Port Augusta for dispatch overland. They were both in service by 22nd May 1942.

In the meantime, no definite advice was obtained regarding the movements of the ship conveying the fifth and sixth locomotives purchased, until it was learned that it had discharged them at Sydney. Their adventures were described in a letter written on 20th April 1942, by the Movements Control Officer (Shipping), Department of the Army, as follows:-

'At your request these locomotives were booked by sea from Port Lincoln to Fremantle for onward carriage to Darwin, and, at that time, no difficulty was expected in securing on-carriage to Darwin from Fremantle.

On arrival at Fremantle they were booked for on-carriage in the 'Centaur' which was to proceed to Darwin, but was subsequently loaded for Wyndham, Broome and Derby only.

The 'Gorgon' was then put on for the Darwin voyage and loading commenced accordingly, but, while loading was in progress, the route to Darwin via the West was closed. On completion of loading, therefore, the Navy instructed this vessel to proceed to Sydney presumably with the idea of sending her on to Darwin via the East coast. Later, however, all sailings to Darwin were suspended except for vessels of small size and suitable draught, and, as the 'Gorgon' was not suitable in this way, it became necessary for all her cargo to be discharged at Sydney.'

An officer of this Department visited Sydney to inspect the locomotives and arranged their dispatch by rail to Port Augusta. Due to the limited capacity of the crane at Broken Hill, and because of the necessity for road cartage between broad and narrow gauge systems, it was necessary further to dismantle the engines. They left Sydney on 29.4.1942 and reached Larrimah on 30.5.1942.

The following table shows the extra distance over which these two locomotives were conveyed:-

Intended method of dispatch		Actual route dictated by circumstances	
	Miles		Miles
Port Lincoln to Adelaide	154	Port Lincoln to Adelaide	154
Adelaide to Fremantle	1,347	Adelaide to Fremantle	1,347
Fremantle to Darwin	1,840	Fremantle to Sydney	2,141
Darwin to Katherine	200	Sydney to Alice Springs (via B/Hill and Quorn)	1,709
		Alice Springs to Larrimah (road)	621
		Larrimah to Katherine	111
Total Miles:	3,541	Total Miles	6,083

In July 1943, further locomotive power was required on the North Australia Railway, and the South Australian Railways Department advised that eleven (11) 'Yx' class locomotives could be made available.

The Department of Army advised in October 1943 that there would be an increase of traffic on the North Australia Railway of 66% on the previous year's mileage, which would aggregate on that basis, 1,100,100 miles.

In estimating the locomotive power required to handle this increased traffic, the Manager, North Australia Railway, reported on 21st October 1943, as follows:-

'The average engine miles per four-weekly period during year ended 1943 was 49,556 miles, and adding the suggested increase, the total for a period would be 82,593 miles. If 26 engines were engaged in running this mileage, this would average 3,176 miles each engine for the period of four weeks. The best individual mileage being obtained from any engine is 3,384 miles, but the mileage run by individual locomotives rarely exceeds 2,500 miles. In estimating the requirements of 26 engines, an improvement in locomotive power is visualised.

In service at present there are 24 locomotives, but the majority of these engines are due for overhaul. At present there are 3 engines being overhauled, and 7 out of traffic awaiting overhaul.

With the addition of 11 'Yx' locomotives from South Australian Railways, it would permit the replacement of some of the engines

in traffic for overhaul and also maintain satisfactorily the increased service demanded.'

The eleven locomotives offered by the South Australian Railways were accordingly purchased.

A suggestion was made that the engines be steamed to Alice Springs for dismantling at that town and loading on road vehicles for overland transport to Larrimah, and the Chief Mechanical Engineer was requested to report on the relative merits of this method, as an alternative to freighting by rail on the Central Australia Railway. An extract from the Chief Mechanical Engineer's report, dated 1st November 1943, is as follows:-

'In regard to the suggestion that the engines might be steamed to Alice Springs, the relative freight charges have been obtained from the Chief Traffic Manager, and on examination it is considered the most advantageous method is for dismantling at Islington and freighting to Alice Springs, having regard to the fact that it would be necessary to send staff to Alice Springs to dismantle, pack etc. the engines for dispatch to Larrimah.

The estimated cost per engine dismantled at Islington freighted to Alice Springs and including transfer costs at the latter place is £300, as against steaming the engines, which is estimated to cost in the vicinity of £370, including dismantling etc. at Alice Springs.

The question of haulage of the locomotives dead to Alice Springs has also been examined, but this is not considered desirable as it would be necessary to send staff to Alice Springs for dismantling etc.. As the engines will go forward separately, a lot of idle time would be involved if mechanical staff were sent to Alice Springs waiting the arrival etc. of the engines.'

It was decided that the engines should be dismantled at the South Australian Railways Workshops at Islington, and freighted to Alice Springs for transfer to road vehicles for overland transport to Larrimah.

In October 1944, following advice from the Department of the Army that traffic on the North Australia Railway would decrease, the South Australian Railways were advised that the eleventh locomotive, then being reconditioned at their Islington Workshops, would not be required.

Details of the dates of dispatch from Alice Springs, and of entry into traffic of the ten locomotives, are given in the following:-

Engine No.	Left Alice Springs	Date entered traffic at Katherine
Yx135	19.11.43	10.12.43
Yx154	11.1.44	1.2.44
Yx119	7.3.44	2.4.44
Yx121	9.3.44	26.3.44
Yx127	17.3.44	21.4.44
Yx38	12.4.44	3.5.44
Yx108	14.5.44	26.6.44
Yx169	24.5.44	8.7.44
Yx117	27.6.44	17.8.44
Yx140	18.9.44	19.1.45

Overland Transport of Locomotives and Other Rollingstock

For the transport overland of the locomotives and railway wagons (details of which will be given later) from Alice Springs to Larrimah, specially designed road trailers were built. It was necessary to 'break down' the locomotives to particular units to enable them to be carried in the trailers, but the wagons were loaded by the simple expedient of removing the bogies.

The trailers were hauled by prime movers supplied from the Army Transport Pool.

The loading and unloading of the trailers was done by gantries specially erected for the purpose at Alice Springs and Larrimah.

Freight Vehicles and Brakevans

The first purchase of freight vehicles was made from the Western Australian Government Railways in 1940, when 44 goods wagons and 5 brakevans were ordered for delivery with the first two locomotives obtained from that system. these vehicles were shipped from Fremantle.

The goods wagons comprised:-

16	open goods wagons, bogie
24	open goods wagons, 4-wheel
2	covered goods wagons, bogie
2	flat top wagons, bogie
5	brakevans, bogie

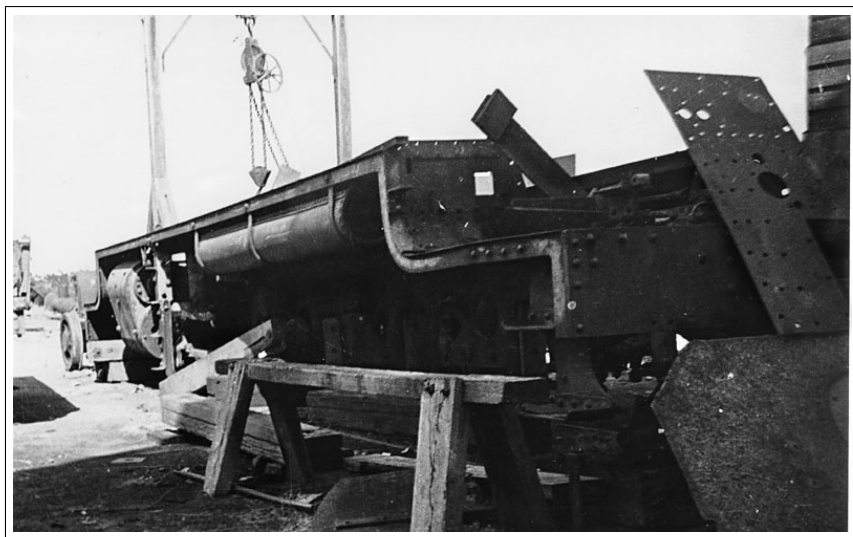
The transfer of forty (40) bogie open goods wagons from the Queensland Railways was arranged in August 1941. The wagons were shipped from Townsville for Darwin on 12th October of that year. The terms of transfer, decided later, were the payment of a hire charge, such payments to be considered if later it became possible for any or all of the wagons to be sold to

the Commonwealth Railways. These vehicles proved of assistance in the emergency for which they were hired, and in August 1944 they were purchased outright.

Early in 1942, after the bombing of Darwin, further purchases of freight rollingstock were made from the Western Australian Government Railways, as follows:-

10	brakevans, bogie
30	open goods wagons, bogie
118	open goods wagons, bogie

Delivery of much of this rollingstock, shipped with the 22 locomotives referred to earlier in this history, was considerably delayed by the disruption of shipping services.



c.1940, Darwin - NM38 - disassembling (T G Mawhinney) *(Chris Drymalik Collection)*

Following the Army's warning in October 1943, of a 66% increase in traffic, the Directorate of Locomotive and Railway Construction (Department of Land Transport), supplied to the Commonwealth Railways 373 narrow gauge 40-ft. bogie underframes of a total of 1,000 constructed. Of these, 110 were used for the North Australia Railway, fitted as follows:-

6	brakevans
10	covered goods vans
30	louvred vans
40	open goods wagons
24	flat wagons

Bodies for the brakevans, covered goods vans and louvred vans, were constructed and fitted by the South Australian Railways. The open goods wagon bodies, and the floors for the 24 flat wagons, were constructed and fitted by the Commonwealth Railways at their Port Augusta Workshops.

For the conveyance of fresh meat from Katherine Meat Works and from ships at Darwin, six (6) bogie refrigerator vans complete, and eight (8) bogie and four (4) four-wheeled refrigerator van bodies - for mounting on existing underframes - were constructed by the South Australian Railways and transferred to North Australia.

Anticipating heavy traffic in petrol, eleven (11) bogie oil tank wagons were obtained from the Western Australian Government Railways, and sixteen (16) from the South Australian Railways, and a further twenty (20) were specially built by the latter Department for the North Australia Railway.

The whole of the 110 vehicles erected on Land Transport underframes, and the refrigerator wagons and bodies, and the tank wagons, were conveyed to Katherine overland.

In addition to the vehicles described in the foregoing, a total of sixteen (16) flat wagons (five from the Central Australia Railway and eleven built in Western Australia) were transferred to the North Australia Railway before the port of Darwin was closed to shipping.

Standardisation of Braking Power on Rollingstock

Originally the locomotives and other rollingstock on the North Australia Railway were equipped with Westinghouse brakes, or with handbrakes only. Those obtained during the war period from South Australian, Queensland and the Central Australia Railways, were similarly fitted. But the locomotives and other vehicles purchased from the Western Australian Government Railways were equipped with Vacuum Brakes, and, as these were in the majority, it was decided to standardise the braking power on this type. The conversions necessary totalled 91 vehicles fitted with vacuum brake complete, and 58 fitted with train pipe only.

Track and Station Yard Facilities

Additional crossing loops were built at the following points:-

- Workshops (2½ miles)

- Beetson (46 miles)
- Simms (62 miles)
- Goodilla (86 miles)
- Boomleera (131 miles)
- Cullen (160 miles)
- Helling (183 miles)
- Blain (214 miles)
- Collings (246 miles)
- Mataranka (264 miles)
- Elsey (281 miles)
- Hobler (296 miles)

The loops at Cullen, Collings, Elsey and Hobler each had standing room of 900-feet, and at Mataranka 1,000-feet. All others were built with 800-feet in the clear.

Additional yard facilities were installed as under:-

Larrimah Concurrently with the construction of the 'all weather' road between Alice Springs and Birdum in 1940, an Army depot for the handling of defence supplies, etc., was established on the railway at a point 311 miles south of Darwin - 5 miles north of Birdum. This location was subsequently named 'Larrimah'. There were previously no railway facilities at Larrimah, but on the opening of the road, the following were provided:-

- Dead-end sidings 1,740-feet long, with three turnouts on the east side of the line;
- Crane (transferred from Grove Hill) for handling heavy lifts;
- Goods Shed for protection of goods.

With the subsequent heavy increase in traffic from the south it became necessary to extend the facilities at Larrimah, and the following were added:-

- A second goods shed;
- Two loop sidings, totalling 2,563-feet standing room;
- Four dead-ends, totalling 4,280-feet standing room;
- Gantry siding, 200-feet; Li.Two dead-end sidings for U.S.A. Army with total standing room 2,842-feet.

Darwin

- Sidings for distillate and flux traffic (500-feet), and depot coal road to serve Naval coal dump.
- Double spur sidings (each 250-feet in clear) near Peel Street for oil tank wagon loading.
- Siding (900-feet) to serve Naval victualling depot one mile from station.

Winnellie (7 miles)

- Loop sidings and dead-end (800-feet) and loading ramp.

Firdan (27 miles)

- Loop siding with dead-end and spur siding to serve Field Supply Depot, with total standing room 4,500-feet.

Noonamah (29 miles)

- Triangle to permit of turning and crossing trains.

Batchelor (60 miles)

- Existing loop siding 298-feet extended to 1,856-feet with intermediate crossover. (This work carried out by Army personnel).

Adelaide River (76 miles)

- Siding (700-feet) between legs of triangle;
- Spur siding to emergency running shed (1,080-feet);
- Extension of apex of triangle for standing hospital train.

Pine Creek (146 miles)

- Coal road and extension to engine shed (510-feet);
- Extension to goods shed dead-end road (200-feet). train.

Katherine (200 miles)

- Traffic road between legs of triangle (1,056-feet);
- Tracks and sidings in new workshops yard - 17,896-feet. (23 turnouts)

202-Miles

- Goods siding, 600-feet.

Gorrie (303 miles)

- Loop siding (900-feet) to serve R.A.A.F Depot.

At the depots for defence traffic constructed at Snake Creek, Adelaide River North, Brocks Creek (petrol dump), and Field Supply Depot, Katherine, the track laying was carried out by Service Units or Allied Works Council, under the supervision of Railway staff in some cases, but all leads to the main line were laid Railway staff.

Service personnel or Allied Works Council employees also laid the track for a number of the crossing loops and other works, but the whole of the permanent way material, including points and crossings, was supplied by the Railway Department.

Ballasting To fit the track for the heavy traffic being carried and the still further increased traffic which was anticipated, re-ballasting was commenced in 1941/42 and continued up to December 1945, Due to shortage of labor, progress was slow until men from the Civil Aliens Corps were made available. The track was lifted and ballasted 'on a face' from Adelaide River to Pine Creek, and as necessary on other sections of the Railway.

Water Supplies

The North Australia Railway operates in an area where there is an assured tropical rainfall during the summer months. The average annual rainfall exceeds 40 inches, which provides a permanent supply of water from the Darwin, Adelaide, Fergusson, Katherine and Roper Rivers.

In pre-war years sufficient water for the needs of the railway was obtained by pumping from Darwin, Fergusson, Katherine and Roper Rivers; and also from reservoirs located at Adelaide River, Burrundie, Pine Creek and Birdum.

The source of supply and storage capacity at various locations on the railway at the commencement of the war were as follows:-

Location Line	on	Source of Supply	Overhead Storage Ca- pacity (gals.)	Remarks
Darwin		Manton River and 1-Mile Reservoir	25,000	Unlimited supply
1-Mile from Darwin		Reservoir (5,000,000 gals.)		
Paraparap miles from Darwin)	(2½)	Manton River and Reservoir (2,300,000 gals.)	25,000	Unlimited supply
Darwin River		Darwin River	25,000	Unlimited supply
Adelaide River		Reservoir (3,800,000 gals.)	25,000	
Howley		Reservoir (3,500,000 gals.)	25,000	
Burrundie		Reservoir (3,800,000 gals.)	25,000	
Pine Creek		Reservoir (2,800,000 gals.)	25,000	
Fergusson River		Fergusson River	26,000	Unlimited supply
Katherine		Katherine River	26,000	Unlimited supply
Mataranka		Roper River	26,000	Unlimited supply
Birdum		Reservoir on Birdum Creek	26,000	Small supply which invariably fails during 'dry' season.

The water was of good quality for locomotives at all locations excepting Mataranka, where the quality was only fair. The capacity of the reservoirs proved inadequate for the requirements of the heavy war traffic, and it became necessary to augment supplies by sinking bores at the undermentioned locations:-

- Batchelor (60 miles)
- Howley (100 miles)
- Burrundie (123 miles)
- Pine Creek (146 miles), and
- Birdum (316 miles).

The bores at the four places first mentioned were sunk by the Department of the Army for this Department, and produced first-class locomotive water. The bore at Birdum was sunk by the United States Army and was later taken over by the Railway. The water in this bore was of only fair quality.

All of the bores were equipped with necessary overhead tanks, pumps and engines by Commonwealth Railways. In addition, a pumping plant was

installed on the Adelaide River, and the Manton Gap - Darwin Water Scheme pipeline was tapped at Noonamah (29 miles) for locomotive purposes. Water for the Darwin depot was drawn from the Manton Gap - darwin water supply from the time that scheme came into operation.

The Department of the Army also sank two bores close to the railway at Larrimah (311 miles), and the Railway Department erected and made available to the Army a 25,000-gallon overhead tank, to which the two bores were connected. The water from these bores was unsuitable for use in locomotives, but was reticulated throughout the Army staging and other camps at Larrimah.

Workshops Facilities

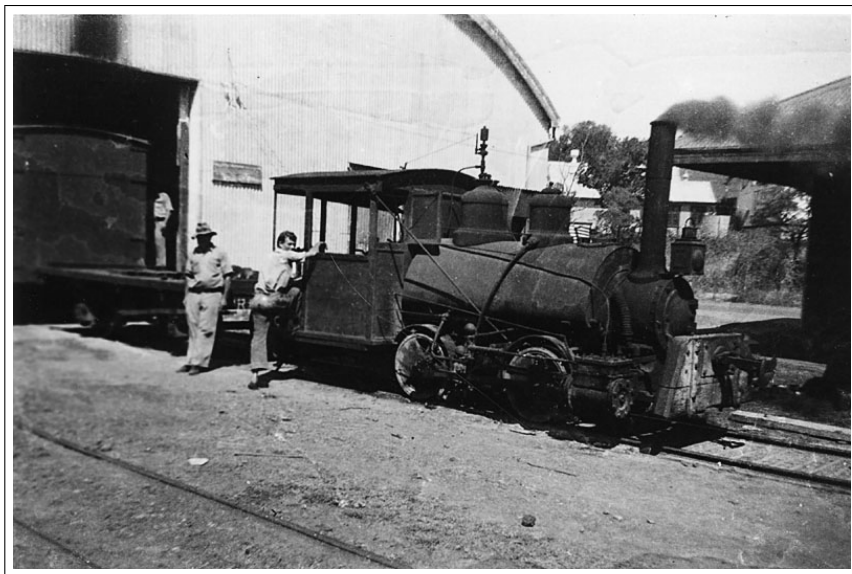
The construction of a permanent running shed and workshops at Katherine to replace the temporary facilities installed at the old Construction Dump, was a major undertaking. To obtain the necessary material from other State would have presented problems associated with the great distance from the source of supply, and the transport overland of heavy steel sections. To overcome this, use was made of steel telegraph poles and Army huts which were available in the Northern Territory. The actual construction of the sheds, workshops, engine pits, tacks, etc. was undertaken by the Allied Works Council, and the machinery was installed by the Railways Department. Despite the difficulty obtaining men and material, the new running shed was in use in February 1943, and the workshops were available for use in May of that year. The length of the railway tracks in the new workshops, and workshops yard, totalled $3\frac{1}{4}$ miles.

The continued upward trend of traffic in 1943 placed a heavy strain on the workshops facilities particularly as arrears of work had accumulated during the period in which only temporary facilities were available. Following advice from the Department of the Army that a further increase in traffic was anticipated, arrangements were made in October 1943, to increase the workshops substantially in size, provide additional machines, overhead cranes, and generally re-organise. The extension of the workshops and the re-organisation were completed in that year, and enabled arrears of work on locomotives and rollingstock to be overtaken, and, at the same time, facilitated the assembly of locomotives and rollingstock received from other systems, and the conversion of vehicles to vacuum brake working.

Staff, Accommodation, Messing, etc.

Staff At 30th June 1939, three months before the outbreak of war, the staff in the Northern Territory Railway, in all grades (wharf labourers excluded) totalled 116 persons.

The increased traffic on this railway, made necessary a greatly increased staff. Additional men could be obtained only with difficulty, particularly as in many grades, i.e. enginemen, guards, station staff, etc., trained railwaymen were



c.1940, Darwin Yard - NA1 Sandfly (T G Mawhinney) (*Chris Drymalik Collection*)

essential; but every man available was engaged, and gradually the staff built up.

With the co-operation of the Commissioners of the State Railways, themselves hard pressed for staff, volunteers to serve on the North Australia Railway were called for from other Railway systems. the response was goods, and as many as 281 volunteers were serving on the railway at 28.10.44.

The Department of the Army loaded, altogether, 168 men from their Army duties (most of them with railway experience) to serve on the railway, and from January 1944, began to discharge men from the Army to take up railway duty. Up till the end of May 1944, 180 service personnel were released in this way.

A large gang from the Civil Aliens Corps was made available for ballasting.

At 28.10.44 the number of employees of all grades engaged on the railway, including 93 aliens and a small gang of aborigines cutting firewood, reached the peak figures of 846, and increase of 629% over the number employed in 1939.

As will be observed from perusal of the organisation charts included in the annexures, a considerable increase in the supervising staff was necessary during this time. The following positions were created during the war period:-

- Traffic Officer,
- Assistant Engineer,

- Chief Train Controller,
- Traffic Inspector,
- Locomotive Superintendent,
- Senior Roadmaster,
- Roadmaster (additional).

Manpower Regulations The difficulty of obtaining labor was due very largely to keen competition existing on extensive works being undertaken by contractors for Defence and other Government services, and also to the higher earnings available for casual work on the wharf or in the Sorting Shed where the rates of pay had been fixed at a time when only limited work was available from shipping activities.

After the North Australia Railway had been placed under Army control from 19.2.42, civilians were supplied with Army rations on the same basis as Service personnel. As was to be expected from men living in communal camps, there was considerable discontent, and the wastage of staff was high. This position was alleviated when Railway service was declared a reserved occupation under Manpower Regulations. Had this control not been available, a very serious condition might have arisen. The regulations placed certain restriction on the engagement and dismissal of employees, which presented difficulties in administration and in many cases were detrimental to discipline; but on the whole the regulations were of considerable assistance.

Alien labor To obtain sufficient labor for ballasting proved a big problem. Men were needed for the additional work of gulletting, spreading ballast and lifting the track, and it became necessary to employ enemy aliens allocated to work for the Allied Works Council. This alien labor proved unsatisfactory and very expensive. The major difficulty was that the railway officers had control of the men only during their working hours on the track; their camps etc. were under the jurisdiction of The Allied Works Council, and were very costly. It was apparent too, that because the work in the ballasting gangs was much heavier when compared with other work available to aliens, there was an inclination on the part of many of the aliens to 'go slow' in the hope that they would be returned to that Council. One gang, employed at Adelaide River, proved entirely unsatisfactory, and the whole gang had to be returned.

Each new gang received from the Allied Works Council took some time to settle down to the railway work, but after the uncontrollable element was weeded out, they returned a fair day's work.

Accommodation and Messing Facilities for Employees When the administration of the Northern Territory was assumed by the Department of the Army in 1942, it became necessary for the Railways Department to set up

an organisation on Army lines to obtain rations and supply employees with prepared food.

The re-organisation rendered necessary by the transfer of the workshops and administrative office to Katherine and the substantial increase in staff required to conduct the war traffic, also presented a big problem in the provision of accommodation for the staff.

The problem of feeding the employees was met by the establishment of railway messes at Darwin, 2 $\frac{1}{2}$ -Miles, 22-Miles, 46-Miles, 58-Miles, Adelaide River, Howley, Burrundie, Pine Creek, Fergusson River, Katherine (3 messes), Mataranka, Larrimah and Birdum.

These messes were, in the first place, established in the existing buildings, and equipment required for them was obtained from various sources in the Northern Territory. The erection of suitable buildings for the messes was taken in hand at once and at the close of the war an up-to-date mess, fully equipped, had been in operation for a considerable period at each location.

The Department of the Army continued to be the sole source of supply for rations until the 24th February 1946, when it became practicable to revert to normal conditions in regard to the purchase and supply of provisions, etc..

The provision of quarters for the staff was an undertaking of considerable magnitude. In the early stages of development of the Katherine depot, the Allied Works Council was given the work of building hutments for the Administrative and Workshops staff, but later the building of accommodation necessary for the additional staff employed as the traffic became greater, was carried out by the Commonwealth Railways.

Coal and other Running Supplies

The consumption of coal in locomotives rose from 849 tons during the year ended 30th June 1939, to 21,035 tons in the peak twelve months ended 30th September 1944. This, possibly more than any other single item, throws into relief the tremendous impact of war conditions on this small railway.

Consumption of other supplies of course, increased in proportion. Details of these are given in the appendix.



Volume5

APPENDIX



APPENDIX

The original document only had appendix 3 thru 5, as presented here.

A.1 War Time History of the Commonwealth Railways

Appendix 3

Average Number of Staff Employed

For Year Ended		Branch (All Railways)						Totals
30th June		Commissioner's and Secretary's Office	Accounts and Audit	Mechanical Engineering	Traffic	Stores	General (including Provision Stores, Bakeries etc.)	
				Ways and Works				
1939	Salaried	15	30	35	65	8	13	166
	Wages	2	1	1454	260	27	33	1777
	Total	17	31	1489	325	35	46	1943
1940	Salaried	18	37	38	72	9	11	185
	Wages	2	1	1572	316	28	34	1953
	Total	20	38	1610	388	37	45	2138
1941	Salaried	20	38	24	72	9	11	191
				17				
	Wages	1	1	679	379	27	36	1940
				817				
	Total	21	39	703	451	36	47	2131
				834				
1942	Salaried	20	10	28	76	9	14	205
				18				
	Wages	4	3	871	443	29	39	2241
				852				
	Total	24	43	899	519	38	53	2446
				870				
1943	Salaried	25	42	40	99	9	17	253
				21				
	Wages	3	2	1253	422	37	42	2899
				1140				
	Total	28	44	1293	521	46	59	3152
				1161				
1944	Salaried	25	44	54	120	9	16	301
				33				
	Wages	2	-	1487	416	41	48	3205
				1211				
	Total	27	44	1541	536	50	64	3506
				1244				
1945	Salaried	24	51	52	122	8	19	312
				36				
	Wages	1	-	1530	366	32	43	3017
				1045				
	Total	25	51	1582	488	40	61	3329
				1081				

A.2 War Time History of the Commonwealth Railways

Appendix 4

Consumption Running Supplies Trans-Australian and Central Australian Railways

Material	Units	Year ended 30th June						
		1939	1940	1941	1942	1943	1944	1945
Oils, Lubricating:								
Compressor	gallons	203	213	170	204	311	348	348
Car and Wagon		6,899	6,241	7,202	10,598	14,538	8,830	7,981
Castor		2,011	1	-	-	-	-	-
Castrol		48	48	78	168	310	496	220
D.T.E.		1,204	1,152	1,155	1,674	2,714	3,589	2,465
Loco. Bearing		9,015	10,322	9,144	17,551	25,875	25,815	19,870
Super Cyl.		4,743	4,088	5,058	10,351	16,868	13,800	10,677
Mobiloil		237	328	292	358	1,591	686	603
Austral		1,689	1,746	1,693	1,938	2,012	2,137	1,950
Algol		1,576	1,541	2,083	3,205	5,708	5,132	2,761
Windmill		168	116	145	112	136	53	84
Various		-	-	-	-	-	726	4,593
Benzine		45,775	44,877	40,309	45,923	46,278	54,074	51,587
Kerosene		14,499	11,588	15,607	23,063	32,888	30,240	33,228
Fuel Oil:								
Power House	gallons	66,977	69,906	72,785	83,611	103,923	113,122	114,056
Pumps etc.		15,077	12,700	23,696	27,751	63,707	70,376	69,231
Coal (Newcastle):								
T.A.R. locos.	tons	22,031	22,974	27,566	37,020	59,844	46,412	45,455
C.A.R. locos.		8,813	8,743	12,867	33,569	55,043	53,940	33,279
Sales etc.	-		323	281	276	88	69	24
		30,844	32,040	40,714	70,865	114,975	100,421	78,758
Waste Cotton								
	lbs	39,783	32,891	33,420	36,297	51,044	59,955	57,400

A.3 War Time History of the Commonwealth Railways

Appendix 5

Consumption Running Supplies North Australia Railway

Material	Units	Year ended 30th June						
		1939	1940	1941	1942	1943	1944	1945
Oils, Lubricating:								
Loco. bearing	gallons	338	977	1,048	2,494	5,476	8,910	7,024
Car and Wagon		395	485	720	1,662	1,912	2,185	1,877
Loco. cylinder		176	356	810	2,060	4,879	6,459	5,408
Algol		36	40	8	12	-	-	-
Mobiloil, 'B' class		135	465	201	458	445	995	504
Mobiloil, 'BB' class		88	52	96	164	968	1,615	994
Mobiloil, 'DTE' class		-	-	-	-	295	248	181
Mobiloil, 'C' class		-	-	-	7	-	19	53
Fuel Oil:								
Crude	gallons	1,429	2,074	660	484	-	-	-
Diesoline		-	-	176	132	2,508	5,847	18,744
Super Diesel		-	49	132	132	-	-	479
Motor Spirit								
	gallons	7,200	8,394	8,228	16,760	27,579	37,475	18,461
Kerosene:								
Lighting	gallons	540	1,380	780	2,644	5,337	9,464	13,877
Power		296	472	288	600	1,576	1,088	971
Coal:								
for Loco use	tons	849	1,146	2,124	6,535	13,343	19,212	14,593
for pump use etc.		81	-	76	65	164	282	68





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