

**FRONZ / ONTRACK**  
**APPROVED CODE OF PRACTISE**  
**FOR**  
**HERITAGE NETWORK OPERATORS**

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<b>Mechanical Schedule</b> <b>B3.1.3.01</b> <b>Maintenance and Overhaul</b> <b>Schedule Guidelines</b>
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<b>Issue</b>	<b>Prepared (P), Reviewed (R), Amended (A)</b>	<b>Approved by</b>	<b>Effective Date</b>
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**Reference Material**

<b>Source</b>	<b>Description</b>	<b>Date</b>

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### Amendment History

Version	Section	Amendment

## Maintenance and Overhaul Schedule Guidelines

### Index

1	Introduction	3
2	Maintenance Schedules	3
3	Overhaul Schedules	5
Appendix A	TGR - DJ Locomotive Daily Preparation Check Sheet	6
Appendix B	DTG - DE Locomotive 6 Month Check	8
Appendix C	DTG - DE Locomotive 12 Month Check	11
Appendix D	MLS – Overhaul Requirements for Steam Locomotives	13

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### 1 Introduction

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This code sets out guidelines for the preparation of schedules for maintenance and overhaul of rail vehicles and plant.

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### 2 Maintenance Schedules

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#### 2.1 Purpose

The purpose of maintenance schedules is to set out what inspection and/or maintenance work is to be carried out at set intervals.

#### 2.2 Intervals

Intervals may be based on:-

- Time (eg daily, 6 monthly, yearly, etc)
- Hours in operation (eg 1,000 hours, 5,000 hours, etc)
- Distance run (eg 10,000 km, 50,000 km, etc)

#### 2.3 Elements

Each schedule should contain the following information

- The vehicle or item of plant.
- The interval.
- The inspection and/or work to be carried out.
- The methods and standards for the inspection and/or work, or a reference to where the information can be readily found.
- The name and signature of the person carrying out the work.
- The name and signature of the person checking or certifying the work.

The work to be carried out should include all items that need to be inspected or have maintenance done. Intervals for each item should be based on the expected wear or deterioration between schedule periods.

## 2.4 Source

Sources for suitable schedules include

<u>Item</u>	<u>Source</u>
Brakes	B3.2.3.01 - Brake Service Schedule
Boilers	B3.3.3.01 - Boiler Service Schedule
Diesel and electric locomotives	NZ Railways schedules adjusted for amount of use eg 6 months → 12 months, 1 year → 2 year, 2 year → 4 year.
Steam locomotives	No source known
Plant	Manufacturers recommendations

## 2.5 Examples

- Appendix A includes a daily preparation / maintenance schedule for the Taieri Gorge Railway DJ locomotives.
- Appendices B and C include 6 monthly and 12 monthly maintenance schedules for the Diesel Traction Group's DE locomotive.

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### **3 Overhaul Schedules**

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#### **3.1 Purpose**

The purpose of an overhaul schedule is to specify the work to be carried out during an overhaul and the standards that must be met.

#### **3.2 Elements**

Each schedule should contain the following information

- The vehicle or item of plant.
- The type of overhaul (eg complete, partial etc)
- The inspection and/or work to be carried out.
- The methods for the inspection and/or work, or a reference to where the information can be readily found.
- The standards and limits to be met for the inspection and/or work. This should be based on either the “as-new” standard or an allowable margin before restoration needs to be carried out (eg, return to original, 50 % of allowable wear, etc)
- The name and signature of the person carrying out the work.
- The name and signature of the person checking or certifying the work.

#### **3.3 Example**

Appendix C includes an example of the elements to be included in a steam locomotive mechanical overhaul.

**Appendix A  
Taieri Gorge Railway - DJ Locomotive Preparation Check Sheet**

Day & date prepared	/ /	Day & date prepared	/ /
Locomotive No / Train	DJ	DJ	

	Pass		Fail		Pass		Fail	
<b>Pre-Start</b>	Check log book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Aux gen belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	TMB1 belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Flags & detonators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fuel quantity	gal			gal			
	Water level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Compressor oil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fan drive belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	TMB2 belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fan drive oil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Comp room fire extinguishers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Jumper cable & spare hoses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Start Up</b>	Warning lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Engine room gauges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engine oil		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Governor oil		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Battery charging		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Brake &amp; Ground</b>		Brakes working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Dead engine cock closed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	TM sight glass & brush covers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Bogie cut out cocks open	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Brake travel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Brake shoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Sanders working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Headlights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Ground lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Spare kidney hook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Drain water traps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Sand tank levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Visual inspection OK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<b>Misc Cab</b>	Instrument lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cab lights		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cab fire extinguishers		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
First aid kit & tool box		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Drinking and wash water		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cab clean and tidy		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Equipment Tests</b>	Brake pipe leakage	<input type="checkbox"/>	<input type="checkbox"/>	kPa	<input type="checkbox"/>	<input type="checkbox"/>	kPa	
	Main reservoir leakage	<input type="checkbox"/>	<input type="checkbox"/>	kPa	<input type="checkbox"/>	<input type="checkbox"/>	kPa	
	Event recorder test	<input type="checkbox"/>	<input type="checkbox"/>	secs	<input type="checkbox"/>	<input type="checkbox"/>	secs	
	A side vigilance	<input type="checkbox"/>	<input type="checkbox"/>	secs	<input type="checkbox"/>	<input type="checkbox"/>	secs	
	B side vigilance (secs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Radio test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>MU Tests</b>	Brakes (all locos)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Control (all locos)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Locomotive Status

Brake settings	LEAD	TRAIL	CUT OUT	LEAD	TRAIL	CUT OUT
Handbrake	ON		RELEASED	ON		RELEASED
Engine	RUNNING		SHUT DOWN	RUNNING		SHUT DOWN
This locomotive is fit to run except for the following defects						
Preparer						

**Brake Pipe Leakage Test**

- Headstock cocks closed and engine running.
- Automatic brake reduction of at least 75 kPa.
- Brake cut-out valve to OUT.
- Record pressure drop on brake pipe gauge.
- Drop must not exceed 20 kPa over one minute.
- Brake cut-out valve to IN and release brakes.

**Main Reservoir Leakage Test**

- Hand brake applied and engine running.
- Independent brake valve to RELEASE
- Brake cut-out valve to OUT.
- Master handle to OFF to load compressor.
- When main reservoir pressure reaches 850 kPa move master handle to ON to unload compressor.
- Record pressure drop on main reservoir gauge.
- Drop must not exceed 20 kPa over one minute.
- Brake cut-out valve to IN and apply independent brake.
- Restore headstock connections and report any faults.

**Event Recorder Tests**

- Turn on test switch and record time between flashes

Normal operation	1 flash each 20 secs
Faulty operation	1 flash each 2 secs or continuously ON or OFF

- Report any faults

**Vigilance Device Tests**

A Side

- Master handle to ON and reverser to FOR or REV
- Momentarily engage notch 1 to throw reverser.
- Press A side button and start timing until buzzer sounds. Record the time.
- Time allowed from pushing button to buzzer:-  
3 minutes ± 15 seconds
- Check that the buzzer cancels when button pushed.
- Allow buzzer to sound again and check that it cancels when reverser handle is placed in opposite direction and control handle place in notch 1 momentarily.

B Side

- Release independent brake. Wait until lamps light.
- Check that all 3 lamps light.
- Check that lamps cancel on operation of:-
  - Control handle
  - Horn
  - Push button. Start timing cycle when button pushed
- The following times must be met

From operation of push button: To illumination of lamps	50 secs ± 3 secs
To warning whistle	10 secs ± 2 secs
To penalty brake application	10 secs ± 2 secs
Total cycle time not to exceed	77 secs

- Record times
- Reset penalty brake. Report any fault

**Brake Settings**

	Brakes cut out	Single or Lead Engine	Trailing Engine	Dead Engine
<b>Cut off valve</b>	OUT	IN	OUT	OUT
<b>MU2 valve</b>	LEAD	LEAD	TRAIL	LEAD
<b>Automatic brake</b>	HANDLE OFF	RELEASE	HANDLE OFF	HANDLE OFF
<b>Independent brake</b>	RELEASE	FULL SERVICE	RELEASE	RELEASE
<b>Dead engine cock</b>	CLOSED	CLOSED	CLOSED	OPEN

Appendix B

# DIESEL TRACTION GROUP

## DE 511 – 6 MONTH SERVICE

DATE \_\_\_\_\_

KILOMETRES \_\_\_\_\_

ENGINE HOURS \_\_\_\_\_

WORK TO BE CARRIED OUT	E.E. INSTRUCTION No.	COMPLETED BY
<b>FILTERS:</b>		
(a) Drain and clean fuel filter	649/2	(a) _____
(b) Clean fuel strainer element	649/2	(b) _____
(c) Check and, if required, clean or replace turbo blower intake filters	493/1	(c) _____
(d) Check and, if required, clean or replace carbody filters	493/1	(d) _____
<b>TURBO BLOWER:</b>		
(a) Clean air restrictor plugs	760/3	(a) _____
(b) Clean rain drain pipe	760/9	(b) _____
(c) Check sump oil levels	760/3	(c) _____
<b>LUBE OIL SYSTEM:</b>		
(a) Check operation of hand pump		(a) _____
(b) Check pipes and fittings for leaks	648/2	(b) _____
(c) Check oil supply to valve gear	633/2	(c) _____
(d) Carry out oil viscosity test	648/3	(d) _____
(e) Take oil sample for analysis	648/2	(e) _____
(f) Change oil if required		(f) _____
<b>EXHAUST SYSTEM:</b>		
(a) Check for security		(a) _____
(b) Check for leaks		(b) _____
<b>FUEL SYSTEM:</b>		
(a) Clean fuel tank gauges		(a) _____
(b) Check pipes and fittings for leaks	649/2	(b) _____
(c) Check high pressure connections for security and leaks	649/2	(c) _____
(d) Drain sludge and water from fuel tank		(d) _____
<b>COOLING SYSTEM:</b>		
(a) Check pipes and fittings for leaks	647/1	(a) _____
(b) Clean radiator fins	647/1	(b) _____
(c) Check operation of radiator fan		(c) _____
(d) Check fan belts for damage and correct tension		(d) _____
(e) Check inhibitor concentration	W755/2	(e) _____



WORK TO BE CARRIED OUT	E.E. INSTRUCTION No.	COMPLETED BY
INTAKE MANIFOLDS: Check for leaks		
DRAINS: Drain sludge and check all bedplate drains are clear		
LUBRICATION: (a) Lubricate fuel pump rack linkages (b) Lubricate handbrake mechanism (c) Grease all bogie grease points (d) Check traction motor gearcase lubricant level (e) Check traction motor suspension bearing oil level	637/2  Pg 64  Pg 43	(a) _____ (b) _____ (c) _____ (d) _____ (e) _____
CONTROL EQUIPMENT: (a) Check for earth faults (b) Check operation of warning lights (c) Check voltage regulator setting	Pg 175	(a) _____ (b) _____ (c) _____
BATTERIES: Clean and check electrolyte level	Pg 162	
CAB EQUIPMENT: Check operation of all equipment		
BREAKDOWN EQUIPMENT: Ensure correct equipment is supplied		
FIRE EXTINGUISHERS: Ensure extinguishers are full and sealed		
SANDING EQUIPMENT: (a) Check sandpipe alignment (b) Test operation		(a) _____ (b) _____
AIR BRAKES: (a) Service according to schedule (b) Carry out operating efficiency test		(a) _____ (b) _____

WORK TO BE CARRIED OUT	E.E. INSTRUCTION No.	COMPLETED BY
<b>RUNNING GEAR:</b> (a) Inspect springs, bolsters and brake rigging (b) Inspect axleboxes and liners (c) Inspect traction motor suspension bearing caps, nose suspension packs, gearcases and bellows for security (d) Inspect drawgear for wear and spring packs for tension (e) Inspect cowcatchers for defects and security	Pg 42 W548/6	(a) _____ (b) _____  (c) _____ (d) _____ (e) _____
<b>MAINTENANCE CERTIFICATE:</b> Complete as required and attach		
<b>ADDITIONAL WORK:</b> Visually inspect all locomotive equipment and repair any defects found Note any additional work carried out below		

**SERVICE COMPLETED \_\_\_\_\_ (MAINTENANCE MANAGER)**

**WHEN COMPLETED IN CONJUNCTION WITH THE LOCOMOTIVE MAINTENANCE CERTIFICATE THE SAFETY COMPLIANCE CERTIFICATE MAY BE ISSUED.**

**SAFETY COMPLIANCE CERTIFICATE TO BE DISPLAYED IN CAB OF LOCOMOTIVE CONCERNED.**

Appendix C

# DIESEL TRACTION GROUP

## DE 511 – 12 MONTH SERVICE

DATE \_\_\_\_\_

KILOMETRES \_\_\_\_\_

ENGINE HOURS \_\_\_\_\_

WORK TO BE CARRIED OUT	E.E. INSTRUCTION No.	COMPLETED BY
6 MONTH SERVICE SHEET: Complete and attach		
GOVERNOR: Clean oil strainer		
TURBO BLOWER: (a) Drain sumps and examine oil for any indication of bearing failure	760/3	(a) _____
(b) Clean breather gauzes and refill sumps with new oil. Add 30 ml "Molyslip E" to each sump	760/3	(b) _____
CONTROL EQUIPMENT: (a) Check adjustment of GUS and GLS switches	Pg 154	(a) _____
(b) Examine and clean all contactors, relays, resistors and wiring	Pg 98	(b) _____
(c) Examine and clean Torque regulator contacts	Pg 181	(c) _____

WORK TO BE CARRIED OUT	E.E. INSTRUCTION No.	COMPLETED BY
<b>ELECTRICAL MACHINES:</b> Examine and clean brushes, holders, commutators and vee rings on: (a) Main generator (b) Traction motors (c) Auxiliary generator (d) Radiator fan motor (e) Blower motor (f) Fuel pump motor (g) Torque regulator	W530/5 W545/5 W546/3 W541/1 Pg 37	(a) _____ (b) _____ (c) _____ (d) _____ (e) _____ (f) _____ (g) _____
<b>AIR BRAKES:</b> (a) Service according to schedule (b) Carry out full code test		(a) _____ (b) _____

**SERVICE COMPLETED \_\_\_\_\_ (MAINTENANCE MANAGER)**

**WHEN COMPLETED IN CONJUNCTION WITH THE LOCOMOTIVE MAINTENANCE CERTIFICATE THE SAFETY COMPLIANCE CERTIFICATE MAY BE ISSUED.**

**SAFETY COMPLIANCE CERTIFICATE TO BE DISPLAYED IN CAB OF LOCOMOTIVE CONCERNED.**

Appendix D  
**Mainline Steam  
Steam Locomotive Mechanical  
Overhaul Requirements**

Item	Requirements
<b>Axles</b>	<b>Ultrasonic crack test</b>
	<b>Visual inspection for damage or loose wheels</b>
	<b>Journals check for damage and wear</b>
<b>Wheels</b>	<b>Visual inspection for cracks, any suspected cracks mag particle test</b>
	<b>Loose or damaged Gibson rings, and or missing lock screws</b>
	<b>Flats, tire damage, flange condition and nicks</b>
	<b>Tire readings using gauges, record results</b>
<b>Piston Rods</b>	<b>Measure diameter for wear, limits in code book, record sizes</b>
	<b>Ultrasonic crack test</b>
<b>Roller Bearings</b>	<b>Clean and visually inspect</b>
	<b>Any damage or pitting must be inspected by bearing expert</b>
<b>Crank pins</b>	<b>Main driver pins to be ultrasonic crack tested</b>
	<b>All pins measured for wear, limits in codes, record results</b>
<b>Pistons, Valves</b>	<b>Check piston clearances, check ring groove and ring wear</b>
	<b>Clean and check for cracks, check nut seated on piston</b>
<b>Cylinders, Valves</b>	<b>Check bores for damage</b>
	<b>Measure bores for wear, record</b>
<b>Side rods</b>	<b>Visually check for damage and cracks</b>
	<b>Check bushes tight and for wear</b>
	<b>Return crank wear plates securing rivets, replace if loose</b>
	<b>Return crank bolts to be drive fit in return crank</b>
<b>Drawbar pins</b>	<b>Replace if worn more than 1/8 inch</b>
<b>Drawbars</b>	<b>Repair if elongated by more than 1/2 inch</b>
<b>Brake Hangers</b>	<b>Rebush if total lift at shoe is more than 10mm</b>
<b>All pins &amp; bushes</b>	<b>Replace if worn through hardening (all to be case hardened)</b>
<b>Springs</b>	<b>All springs to be re tempered at 1<sup>st</sup> overhaul</b>