

# **General Instruction Pages**

Train Operating Conditions Manual



## **SECTION 6** **TRAIN INSPECTION**

Version: 2.0

Issued: October 2016

## Document control

Revision	Date of Approval	Summary of change
1.0	18/10/11	For publication
2.0	19/10/16	As shown below

## Summary of changes from previous version

Section	Summary of change
	Correction to footer and version No added to the front page
	Minor grammatical corrections
	ONRSR replaces ITSR

### TRAIN INSPECTION

Trains and vehicles must be inspected in accordance with the Office of the National Rail Safety Regulator (herein after referred to as ONRSR) approved Operator Specific Procedures (OSP's) before operating on the CRN to ensure that they are safe to travel and are fit for purpose.

Vehicles covered by an ONRSR approved programmed preventative maintenance (PPM) are permitted to operate for an approved extended period of time between full train inspections.

#### Locomotive hauled trains

There are two (2) levels of train inspection for locomotive hauled trains.

The first level of inspection, the **full train inspection**, must be performed by a qualified employee. This inspection includes a **full mechanical inspection**, brake pipe leakage test, air brake inspection and test, brake holding test and brake pipe continuity test.

The second level of inspection, the **general train inspection**, must be performed by the train crew. This train inspection includes a **general mechanical inspection**, brake pipe leakage test, air brake inspection and test, brake holding test and brake pipe continuity test.

Freight trains that are required to descend grades of 1 in 33 or steeper, and are not fitted with fixed exhaust chokes on at least 80 per cent of the train mass, are required to undergo an HP grade inspection before attempting a descent.

A **partial train inspection** must be carried out by the train crew after the train consist has been altered in any way, such as changing or attaching locomotives, attaching or detaching vehicles, amalgamating trains, attaching assisting locomotives or running locomotives around to the other end of the train.

There must be a stable air supply, locomotive or ground plant, available to meet the pressure requirements of the air brake test.

The last three (3) vehicles or the last three (3) control valves on a train must have operative air brake, handbrakes and have passed the brake pressure holding test.

#### Multiple unit trains

There are various levels of inspections for multiple unit diesel trains. General, reservoir and brake inspections. Multiple unit trains also undergo daily preparation by train crews.

### FULL MECHANICAL INSPECTION

As a minimum, a **full mechanical inspection** includes a visual inspection of each vehicle with respect to the adjustment, condition and/or security of the following items of equipment (where fitted):

#### Brake equipment:

- Relevant coupling hoses are correctly coupled and appropriate coupling cocks open.
- Brake block/disc pad thickness.
- Brake blocks are correctly aligned, that is, not permanently overhanging the edge of the wheel.
- Brake rigging (levers, rods, pins, cotters, bogie safety loops, etc.) is secure.
- All load compensating and grade control equipment is correctly set.
- Air pipes, pipe fittings and securing clips intact.
- Reservoirs, variable volume device, control valves, relay valves and safety valves

## FULL MECHANICAL INSPECTION (Continued)

- Slack adjusters and fittings
- Brake cylinders and cylinder travel
- Load compensation equipment (automatic or manual)
- Grade control valve, securing brackets and bolts
- Release valve and operating chain or wire

### Vehicle equipment:

- Automatic couplers are secured and the difference in height of connected coupler knuckles does not exceed half the depth of the knuckle.
- Knuckle pins, knuckles, drawgear carrier plates, murray keys, yokes, draftgear, uncoupling rods and associated brackets.
- Doors, container securement, trailer hitches and wheel chocks.
- Securing of loads and loading within gauge.
- Centre sills, side sills, end sills and stanchions.
- Steps, handrails and ladders.
- Doors and twistlocks secure.
- Gangway beams and diaphragms.
- Correct centre casting engagement.

### Bogie and wheel equipment:

- Wheel profiles and tread condition.
- Wheels discs and axles
- Handbrake assemblies and linkages.
- Bogie springs and damping devices.
- Side bearers and side bearer clearances.
- Centre castings, bolsters, bogie frames/side frames.
- Bogie springs, ride control equipment (ie friction wedges and other damping devices) and specialized bogie equipment.
- Roller bearing end caps, seals, backing rings, axle box plugs, adapters and horn stays (con straps).
- Loose axle box liners or loose horn cheek wear liners.
- Trip valve assembly.
- Air ride suspension.

---

## GENERAL MECHANICAL INSPECTION

As a minimum, a **general mechanical inspection** includes a visual inspection of each vehicle with respect to the adjustment, condition and/or security of the following items of equipment(where fitted):

### Brake equipment:

- Relevant coupling hoses are correctly coupled and appropriate coupling cocks open.
- Brake block/disc pad thickness.
- Brake blocks are correctly aligned, that is, not permanently overhanging the edge of the wheel.
- Brake rigging (levers, rods, pins, cotters, bogie safety loops, etc.) is secure.
- All load compensating and grade control equipment is correctly set.

### Vehicle equipment:

- Automatic couplers are secured and the difference in height of connected coupler knuckles does not exceed half the depth of the knuckle.
- Doors, container securement, trailer hitches and wheel chocks.
- Securing of loads and loading within gauge.
- Centre casting engagement.

### Bogie and wheel equipment:

- Wheel profiles and tread condition.
- Side bearer clearance.
- Handbrake assemblies and linkages.
- Axle box plugs, bearing end caps, adapters.
- Bogie springs and damping devices.

### AIR BRAKE INSPECTION AND TESTS

The following items must be checked, with the brakes fully applied, that:

- the brakes on all vehicles (within the limits for allowable cut-outs) are applied, that is, brake cylinder pistons are extended and brake blocks are hard against the wheels.
- the brake block thickness is not less than 10 mm at any point and is of sufficient thickness to last until the next scheduled train inspection.
- all load compensating and grade control equipment (where fitted) are correctly set.

**Note:** For freight trains when a holding test has not already been carried out the **brake pipe must be fully exhausted**: XPT and multiple unit diesel trains are tested with a **full service** brake application.

The following items must be checked, with the **brake pipe fully charged**, that::

- the brakes are fully released and clear of discs/wheels on each vehicle.
- handbrakes are fully released.
- Air leaks - These should be repaired if possible

### WHEN IS A TRAIN INSPECTION REQUIRED?

All trains shall be inspected prior each trip. However, some trains/vehicles are under an approved programmed preventative maintenance regime (PPM) and may be allowed to operate for a number of trips without being inspected each trip.

#### *Freight trains*

##### **Notes:**

- Unless a train is under programmed preventative maintenance cycle, two (2) consecutive **general train inspections** are not permitted.
- Some trains approved by the ONRSR are permitted to operate for a round trip between general train inspections.
- Some trains approved by the ONRSR are permitted to operate for specified periods between general train inspections.

A HP grade inspection is specified in the appropriate Section pages of the TOC manual, covering trains with grade control valves travelling on specific grades. A HP grade inspection must be carried out by a qualified employee and may be performed during a **full train inspection**. In this test, the grade control valves are tested to ensure that brake cylinder release is retarded when in the 'IP' position.

### BRAKE PIPE LEAKAGE TEST

The brake pipe leakage test determines whether there are excessive air leaks in the train which may interfere with the operation of the air brake system and confirms that only one brake valve controls the train brake.

With a **full service** or 100kPa brake pipe reduction and the brake pipe isolated, the maximum allowable leakage in the brake pipe is 35 kPa per minute.

### BRAKE PIPE CONTINUITY TEST

The brake pipe continuity test must be carried out on a train to prove that the brake pipe air pressure is continuous throughout the train and the driver has control of the brakes.

#### **Locomotive hauled trains**

The **full continuity test** is the standard test. This is always conducted from the rear of the train and is required either during or after a train inspection.

A Full Brake Pipe Continuity Test is also required in certain circumstances as set out in the sections applicable to Partial Train Inspections.

Once the brake pipe has been recharged, the brake pipe pressure at the end of the train must be greater than 425kPa.

Where a train is fitted with an *end of train marker* (EOTM) which has the capacity to indicate, in the locomotive cab, the brake pipe pressure at the rear of the train, this device may be used to conduct the continuity test.

Where the brake pipe on a locomotive hauled train has been interfered with, a **modified continuity test** must be carried to ensure that the brakes apply and release on the three (3) vehicles behind the position where the brake pipe has been interfered with. If one (1) or more of the three (3) vehicles behind the position where the brake pipe was interfered with has inoperative air brakes, then the first three (3) vehicles with operative air brake beyond the point of interference shall be tested.

A **light locomotive continuity test** is required for light multiple locomotive consists to ensure that the brake pipe, main reservoir, No 3 and No 4 pipes are continuous through the consist and that all brake cylinders are functioning correctly.

#### **Multiple unit trains**

A continuity test is carried out after a train has been prepared, after amalgamation or division of trains, and if the *brake pipe continuity* has been affected.

---

### BRAKE HOLDING TEST

The brake holding test only applies to locomotive hauled trains.

The brake holding (retention) test proves that the brakes on the rear three (3) vehicles or rear three (3) control valves and any other vehicles tested, will remain applied for a long enough time period, in the event of a break-away, to allow the train crew to reach these vehicles and apply the handbrakes, in order to secure the train. The brake holding test must be conducted with the brake pipe fully exhausted.

The brake holding time is determined by the length of the train. If it is known that additional vehicles will be added to the train, an extended brake holding time must take account of the increased train length with these additional vehicles.

At all times, a valid brake holding test must apply to the last three (3) vehicles of the train for the entire journey.

The brake holding test may also be conducted on the front three (3) vehicles, in the case where there is a proposed change in the direction of travel during the journey. It is permissible to conduct a brake holding test on more than three (3) vehicles where it is known that some of the vehicles will be detached enroute.

For locomotive hauled trains with less than three (3) vehicles, all vehicles must be tested.

## BRAKE HOLDING TEST *(continued)*

If a rake of three (3) or more vehicles is attached to a freight train enroute, and an extended brake holding test was not carried out, a further brake holding test is required for the longer train length.

The minimum standard brake holding time is ten (10) minutes plus three (3) minutes for every 100 metres (or part thereof) of train length.

Length of train (including locomotives) (metres)	Minimum brake holding time (minutes)
Up to 100	13
101 to 200	16
201 to 300	19
301 to 400	22
401 to 500	25
501 to 600	28
601 to 700	31
701 to 800	34
801 to 900	37
901 to 1000	40
1001 to 1100	43
1101 to 1200	46
1201 to 1300	49
1301 to 1400	52
1401 to 1500	55
1501 to 1600	58
1601 to 1700	61
1701 to 1800	64
1801 to 1900	67
1901 to 2000	70
Over 2000	70 plus 3 minutes for every additional 100 metres

If articulated vehicles or permanently coupled vehicles are marshalled at the rear of a freight train, the brake holding test is carried out by observing that all brake cylinders controlled by the rear three (3) control valves are extended.

It should be noted that some freight wagons are fitted with bogie mounted brakes which are not easily observed from the side of the wagon. In this case it is necessary to ensure the brake blocks on the associated bogies are hard up against the wheels.

A brake holding test is not required for vehicles fitted with spring applied parking brakes, such as that fitted to Trailerrail vehicles and some track maintenance vehicles. These brakes are applied once air pressure is lost and will remain applied indefinitely due to the spring force acting on the brake cylinder piston.

Where a locomotive is unmanned and is marshalled in the last three vehicles on a train, then it must also meet the brake holding test.

Where driver only trains are employed, ten minutes shall be added to the minimum standard brake holding times.

If one of the last three (3) vehicles on the train fails the brake holding test, the defective vehicle must be removed or re-marshalled forward in the train and the new last three (3) vehicles must meet the brake holding test.

Up to three (3) additional locomotives may be added to the front of a train without the need for any additional brake holding test on the rear vehicles.

## CHANGING OR ATTACHING LOCOMOTIVES

When locomotives are detached, the time of detachment must be noted on the train documentation delivered to the outgoing driver, lodged with an operations employee or placed in the appropriate receptacle provided at certain locations.

**After attaching the locomotives**, the crew must check the train inspection certificate to ensure that the last three vehicles (and if appropriate, the front three vehicles) are the same as those listed on the train documentation. The train crew must ascertain from operations staff the time of detachment and confirmation that the train has not been altered since detachment:

Situation	Appropriate Action
If less than 2 hours has elapsed since the locomotives were detached in a <b>secured yard</b> . <b>OR</b>	<ul style="list-style-type: none"> <li>a brake pipe leakage test, and</li> <li>a modified continuity test must be carried out.</li> </ul>
If less than 2 hours has elapsed since the locomotives were detached in an <b>unsecured yard</b> . <b>OR</b>	<ul style="list-style-type: none"> <li>a visual inspection of each vehicle,</li> <li>a brake pipe leakage test, and</li> <li>a full continuity test must be carried out.</li> </ul>
If more than 2 hours but less than 24 hours has elapsed since the locomotives were detached in a <b>secured yard</b> . <b>OR</b>	<ul style="list-style-type: none"> <li>a visual inspection of each vehicle,</li> <li>a brake pipe leakage test, and</li> <li>a full continuity test must be carried out.</li> </ul>
If more than 24 hours has elapsed since the locomotives were detached	<ul style="list-style-type: none"> <li>a <b>full or general train inspection</b> must be carried out. <b>#</b></li> </ul>

**#** Refer to page 3, “**When is a train inspection required?**” regarding consecutive general train inspections.

When attaching locomotives to a pre-inspected train and the train consist has not changed from that indicated in the train documentation

Situation	Appropriate Action
and the time elapsed since the inspection is <b>less than 24 hours in a secured yard</b> . <b>OR</b>	<ul style="list-style-type: none"> <li>a visual inspection,</li> <li>a brake pipe leakage test, and</li> <li>a full continuity test must be carried out.</li> </ul>
and the time elapsed since the inspection is <b>less than 24 hours in an unsecured yard</b> . <b>OR</b>	<ul style="list-style-type: none"> <li>a <b>full or # general train inspection</b> must be carried out.</li> </ul>
If the time elapsed since the train was inspected is <b>24 hours or more</b>	<ul style="list-style-type: none"> <li>a <b>full or # general train inspection</b> must be carried out.</li> </ul>

**#** Refer to page 3, “**When is a train inspection required?**” regarding consecutive general train inspections.

## ATTACHING PRE-INSPECTED VEHICLES

A rake of pre-inspected vehicles may be attached anywhere within a train consist enroute at an intermediate location (except as provided by regulations for the transport of dangerous goods).

In this case, if the consist of the pre-inspected vehicles has not changed from that indicated in the train documentation **and less than 24 hours** has elapsed since the vehicles were inspected **and**:

Situation	Appropriate Action
Three (3) or less pre-inspected vehicles is attached in front of the last three (3) vehicles <b>OR</b> more than three (3) vehicles are attached in front of the last three (3) vehicles <b>AND</b> an extended brake holding test has been carried out then: <b>OR</b>	<ul style="list-style-type: none"> <li>a visual inspection of each vehicle being attached,</li> <li>a brake pipe leakage test, and</li> <li>a modified continuity test must be carried out.</li> </ul>
more than three (3) vehicles are attached in front of the last three (3) vehicles and an extended brake holding test has <b>NOT</b> been carried out, <b>OR</b>	<ul style="list-style-type: none"> <li>a visual inspection of each vehicle being attached,</li> <li>a brake pipe leakage test,</li> <li>a brake holding test, and</li> <li>a full continuity test must be carried out.</li> </ul>
if any number of vehicles are attached behind the already established last three (3) vehicles in the train, then:	

If the consist containing the attached vehicles has changed from that indicated in the documentation for the attached vehicles, or the time elapsed since the inspection of the pre-inspected vehicles is 24 hours or more, then a **full or general train inspection** must be carried out on the attached vehicles.

## ATTACHING UNINSPECTED VEHICLES

One or more rakes of uninspected vehicles may be attached anywhere within a train consist, enroute, at intermediate locations (except as provided by the regulations for the transport of dangerous goods).

In this case when the vehicles are attached, the uninspected vehicles must be given a **general mechanical inspection** and if:

Situation	Appropriate Action
three (3) or less vehicles are attached in front of the last three (3) vehicles then: <b>OR</b>	<ul style="list-style-type: none"> <li>a brake pipe leakage test, and</li> <li>a modified continuity test must be carried out.</li> </ul>
more than three (3) vehicles are attached in front of the last three (3) vehicles and an extended brake holding test has been carried out then: <b>OR</b>	<ul style="list-style-type: none"> <li>a brake pipe leakage test, and</li> <li>a modified continuity test must be carried out.</li> </ul>
If more than 3 vehicles are attached in front of the last three vehicles and an extended brake holding test has <b>NOT</b> been carried out then: <b>OR</b>	
If any number of vehicles are attached to the train in rear of the last three vehicles or within the last three vehicles then	<ul style="list-style-type: none"> <li>a brake pipe leakage test,</li> <li>a brake holding test, and</li> <li>a full continuity test must be carried out.</li> </ul>

ATTACHING OR DETACHING ASSISTING LOCOMOTIVES	Situation	Appropriate Action
	When attaching assisting locomotives to the front of the train then <b>OR</b>	<ul style="list-style-type: none"> <li>• a brake pipe leakage test, and</li> <li>• a modified continuity test must be carried out</li> </ul>
	When detaching assisting locomotives from the train <b>OR</b>	<ul style="list-style-type: none"> <li>• restore the brake pipe pressure, and</li> <li>• apply and release the brakes at least twice to overcome any overcharge.</li> <li>• No further inspection is required.</li> </ul>
	When attaching assisting (bank) locomotives to the rear of the train and the brake pipe is connected then: <b>OR</b>	<ul style="list-style-type: none"> <li>• a brake pipe leakage test, and</li> <li>• a full continuity test must be carried out.</li> </ul>
	When attaching or detaching assisting (bank) locomotives at the rear of the train and there is no connection to the brake pipe	<ul style="list-style-type: none"> <li>• No further inspection is required.</li> </ul>

### LOCOMOTIVE RUN AROUND MOVEMENTS

When locomotives are involved in a *run around* movement, reattached and a brake holding test has been previously carried out on the three (3) vehicles which then become the last three (3) vehicles on the train, a modified continuity test must be carried out.

If the brake holding test has not previously been carried out on the three (3) vehicles which then become the last three (3) vehicles on the train, a brake holding test and a modified continuity test must be carried out.

### DETACHING VEHICLES

Vehicles may be detached from anywhere within a freight train consist enroute at intermediate locations provided that the altered train does not contravene the requirements for the transport of dangerous goods.

The vehicles that become the last three (3) vehicles of the train consist must have had a brake holding test.

However, if any of the last three (3) vehicles are detached, and additional vehicles have not had a brake holding test, then a holding test must be carried out on the vehicles which are now the last vehicles on the train. A full continuity test is then conducted in place of the modified continuity test.

Situation	Appropriate Action
After detaching vehicles from a locomotive hauled freight train then: <b>OR</b>	<ul style="list-style-type: none"> <li>• a brake pipe leakage test, and</li> <li>• a modified continuity test must be carried out.</li> </ul>
After detaching vehicles from a locomotive hauled passenger train then:	<ul style="list-style-type: none"> <li>• a brake pipe leakage test, and</li> <li>• a full continuity test must be carried out.</li> </ul>

### PROGRAMMED PREVENTATIVE MAINTENANCE

Programmed preventative maintenance (PPM) is regular vehicle or train maintenance based on a fixed time or distance travelled cycle, approved by the ONRSR, to ensure that the vehicle will remain fit for purpose for at least the duration of the PPM cycle.

To claim a PPM status for any vehicle type, or group of vehicles, an operator must demonstrate that there are written maintenance procedures and a maintenance history recording and tracking system in place. This is to ensure that the nominated vehicles receive their due maintenance within the scheduled maintenance cycle.

Vehicles that are scheduled for PPM are permitted to operate with consecutive general train inspections.

Approval to extend the nominated PPM maintenance periods, including full train inspection periods, for particular train operations may be given by ONRSR, based on the submission of satisfactory evidence to support the variation.

When a PPM vehicle/train exceeds the PPM period, the train may complete its loading cycle and must return to its maintenance location to retain its PPM status. It is, however, permissible for a vehicle/train which is outside PPM to continue operation as a non-PPM vehicle/train with the appropriate inspections.

Where vehicles are added to a PPM train, they must be of the same or better maintenance standard or the train must operate as a non-PPM train until the PPM standard is restored.

### ***Unit train operation***

Unit train operation is a PPM operation, where vehicles within the train consist remain unchanged during the PPM period. It is permissible to replace vehicles in the unit with pre-inspected spare vehicles if required.

Unit trains do not require general train inspections within the full train inspection period.

After unloading, but before reloading, unit trains must be inspected to ensure that the train has no defects which may affect the safe operation of the train and that the doors of all vehicles are closed and secured.

Where applicable, immediately after loading and unloading, the train must be inspected to ensure that manual empty/load valves and grade control valves are set correctly.

**Attaching non-unit vehicles to a unit train.** It is permissible to attach non-unit vehicles to a unit train. The non-unit vehicles must have a full or general train inspection. These vehicles must be marshalled at the front or rear of an empty unit train or on the rear of a loaded unit train.