



Australian Government
**National Measurement
Institute**

Bradfield Road, West Lindfield NSW 2070

Cancellation
Certificate of Approval No 6/10B/62

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that the approval for use for trade granted in respect of the

Railweight Model WEIGHLINE Weighing-in-motion Weighing Instrument

submitted by Downer EDI Engineering Pty Ltd
 (formerly Delairco Bartrol)
 480 Victoria Road
 Gladesville NSW 2111

has been cancelled in respect of new instruments as from 1 April 2009.

Signed by a person authorised by the Chief Metrologist
to exercise his powers under Regulation 60 of the
National Measurement Regulations 1999.

A handwritten signature in black ink, appearing to be 'J. H. T.', written in a cursive style.



National Standards Commission

12 Lyonpark Road, North Ryde NSW

Certificate of Approval

No 6/10B/62

Issued under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the

Railweight Model WEIGHLINE Weighing-in-motion Weighing Instrument

submitted by Delairco Bartrol
480 Victoria Road
Gladesville NSW 2111.

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 January 2008, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked NSC No 6/10B/62 and only by persons authorised by the submitter.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the Commission and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with the Commission's Document NSC P 106.

The Commission reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

This approval shall NOT be used in conjunction with General Certificate No 6B/0.

DESCRIPTIVE ADVICE

Pattern: approved 22 December 1997

- A Railweight model WEIGHLINE weighing-in-motion weighing instrument.

Variants: approved 22 December 1997

1. With Railweight model WEIGHLINE RWT-X TR50 weighing transducers.
2. With additional and/or alternative track switches.

Technical Schedule No 6/10B/62 describes the pattern and variants 1 & 2.

Variant: approved 10 February 1999

3. With eight weighing transducers and a Railweight model MS 3000 indicator.

Technical Schedule No 6/10B/62 Variation No 1 describes variant 3.

Variant: approved 24 November 1999

4. With a Railweight model MS 3000 indicator with paperless recording.

Technical Schedule No 6/10B/62 Variation No 2 describes variant 4.

Variant: approved 17 April 2000

5. With a Railweight model MS 3000 indicator and a maximum operating speed of 80 km/h.

Technical Schedule No 6/10B/62 Variation No 3 describes variant 5.

Variant: approved 12 May 2003

6. With a Railweight model BN033 lightning protection board.

Technical Schedule No 6/10B/62 Variation No 4 describes variant 6.

FILING ADVICE

Certificate of Approval No 6/10B/62 dated 7 July 2000 is superseded by this Certificate, and may be destroyed. The documentation for this approval now comprises:

- Certificate of Approval No 6/10B/62 dated 12 June 2003
- Technical Schedule No 6/10B/62 dated 6 March 1998 (incl. Test Procedure)
- Technical Schedule No 6/10B/62 Variation No 1 dated 7 June 1999
- Technical Schedule No 6/10B/62 Variation No 2 dated 20 January 2000
- Technical Schedule No 6/10B/62 Variation No 3 dated 7 July 2000
- Technical Schedule No 6/10B/62 Variation No 4 dated 12 June 2003
- Notification of Change No 1 dated 8 April 2003
- Figures 1 to 6 dated 6 March 1998
- Figures 7 to 9 dated 7 June 1999

Signed by a person authorised under Regulation 60 of the National Measurement Regulations 1999 to exercise the powers and functions of the Commission under this Regulation.

A handwritten signature in black ink, appearing to be 'J. H. B.', is written on a light-colored rectangular background.

TECHNICAL SCHEDULE No 6/10B/62

Pattern: Railweight Model WEIGHLINE Weighing-in-motion Weighing Instrument.

Submittor: Delairco Bartrol
112-118 Talavera Road
North Ryde NSW 2113.

1. Description of Pattern

A Railweight model WEIGHLINE weighing instrument for the determination of the mass of each wagon and hence the total mass of a train, when weighed in motion.

1.1 Specifications

Instruments are approved with specifications as set out below:

Accuracy class	
Train weighing	0.5
Wagon weighing	2
Maximum capacity	36 t (18 t per rail)
Minimum capacity	1.25 t
Scale interval	100 kg
Maximum wagon weight	120 t
Minimum wagon weight	15 t
Maximum operating speed	6 km/h
Minimum operating speed	3 km/h

1.2 The System

The system includes four Railweight model WEIGHLINE RWT-X TR60 weighing transducers and a Railweight model 8200 indicator.

1.2.1 Weighing Transducers

Four Railweight model WEIGHLINE RWT-X TR60 weighing transducers are mounted on a section of rail approximately 4 m in length with two transducers in series on each rail (Figures 1 and 2). The rails are mounted on sleepers and have a capacity of 36 tonne (18 t per rail).

Each transducer has a number of strain gauges bonded to the web of the rail.

1.2.2 Indicator

A Railweight model 8200 indicator (Figure 3) is used. In addition, the indicator may be connected to speed signals, a printer, and a remote display/control unit (which may also be connected to a printer and keyboard for entry of data such as train identification).

The Railweight 8200 indicator has the following controls:

- (a) **START WEIGH:** Sets the instrument into the mode in which a weighing can begin.
- (b) **LOCAL/REMOTE:** (optional) Sets the indicator so that it is either operated by the controls on its panel, or those on the remote display/control unit.
- (c) **TARE/GROSS:** Used to select whether the weighing to be carried out is of the empty train (TARE or T), or the full train (GROSS or G).
- (d) **DISPLAY TEST:** Performs a test of the instrument display.
- (e) **END WEIGH:** Sets the instrument to inhibit further weighing. When pressed following a weighing operation, the total train mass is printed; further operations will print duplicate weight bills.

The Railweight 8200 indicator utilises a dynamic offset facility for both low and high mass wagons in dynamic (in-motion) weighing mode only. This facility operates in a manner similar to a programmable 2 point linearisation facility.

1.3 Printer

The printer will print "CALIBRATED: YES" to indicate that the system had been set to zero before commencement of weighing. The wagon sequence number, individual bogie mass, individual wagon mass and total train mass are printed. Any weights measured outside the weighing or speed range will not result in a wagon weight being printed or displayed; instead, an error code 'E' is printed. The train weight does not include these wagons.

In addition, the statement **BOGIE WEIGHTS NOT TO BE USED FOR TRANSACTION PURPOSES** is printed. Other information may also be printed but locomotive masses will not be printed.

A sample ticket is shown in Figure 4.

1.4 Remote Control Facility

This incorporates a control to calibrate the system prior to commencement of weighing, and a control to cause the total train mass to be printed and the system to be reset, at the completion of weighing. These controls may be in the form of switches, or by an automatic control initiated by the arrival and departure of the train.

1.5 Track Switches

Railweight double-arm track switches are used (Figure 5) and these are operated by the wheel flanges of the rail vehicles. The operating sequence provides signals which prevent the locomotive mass from being printed, enable the instrument to determine the type of the wagon being weighed, detect any reversal of train movement, and monitor the speed of the wagons during weighing.

1.6 Markings

Instruments bear the following markings at each location having a weight indication or printing device:

Manufacturer's name or mark	
Importer's name or mark	
Model designation	
Serial number of the instrument	
Pattern approval mark	NSC No 6/10B/62
Accuracy class	
Train weighing	0.5
Wagon weighing	2
Maximum capacity	<i>Max</i> kg or t
Minimum capacity	<i>Min</i> kg or t
Scale interval	<i>d</i> = kg or t
Maximum wagon weight kg or t
Minimum wagon weight kg or t
Maximum operating speed	v_{\max} km/h
Minimum operating speed	v_{\min} km/h

1.7 Verification/Certification Provision

Provision is made for the application of a verification/certification mark.

1.8 Sealing Provision

Provision is made for the calibration adjustments in the indicator to be sealed by means of a seal and sealing wire through holes in the rear panel of the Railweight model 8200 indicator.

2. Description of Variants

2.1 Variant 1

With Railweight model WEIGHLINE RWT-X TR50 weighing transducers having a maximum capacity of 32 tonne (16 t per rail).

2.2 Variant 2

With additional and/or alternative track switches including Tiefenbach proximity switches (Figure 6).

TEST PROCEDURE

Only dynamic weighing tests should be carried out in accordance with the following:

1. Maximum Permissible Errors

The maximum permissible errors for weighing-in-motion shall be:

Wagon Weighing (Accuracy class 2)

The maximum permissible error for dynamic weighing of a coupled wagon during initial verification/certification shall be:

- (a) $\pm 1\%$ of the wagon weight, rounded to the nearest scale interval;
 - (b) $\pm 1\%$, rounded to the nearest scale interval, of the weight of a single wagon equal to 35% of the maximum wagon weight as inscribed on the descriptive markings; or
 - (c) \pm one scale interval,
- whichever is the greatest.

Errors of not more than 10% of the weighing results, taken from one or more passes of the test train, may exceed $\pm 1\%$ but shall not exceed $\pm 2\%$ of the wagon weight.

Train Weighing (Accuracy class 0.5)

The maximum permissible error for dynamic weighing of a train of coupled wagons during initial verification/certification shall be:

- (a) $\pm 0.25\%$ of the total train weight, rounded to the nearest scale interval;
- (b) $\pm 0.25\%$, rounded to the nearest scale interval, of the weight of a single wagon equal to 35% of the maximum wagon weight as inscribed on the descriptive markings, times the number of wagons in the train but not exceeding 10 wagons; or
- (c) \pm one scale interval for each wagon in the train, but not exceeding 10 scale intervals,

whichever is the greatest.

In-service Errors

The maximum permissible errors applicable in-service are twice the values for initial verification/certification, namely:

- (a) wagon weighing $\pm 2\%$ of the wagon weight; and
- (b) train weighing $\pm 0.5\%$ of the total train weight.

2. Dynamic Test Procedure

The dynamic test procedure and the number of test wagons in the test train are detailed below.

Test Train

The types and number of wagons shall be in accordance with the normal operation of the instrument provided that the number does not exceed 60.

The test train shall be made up of test wagons and normal operational wagons. The wagons shall be loaded to represent the loads weighed by the weighing instrument. If the loads vary, then wagons full, partially filled, and empty shall be used as applicable.

Number of Test Wagons

Each test train shall have not less than five and not normally more than 15 test wagons in accordance with the table below.

Total number of wagons in test train (n)	Minimum number of test wagons
$n \leq 10$	n
$10 < n \leq 30$	10
$30 < n$	15

If the number of test wagons is less than the total number of wagons in a test train, the test wagons shall be distributed evenly throughout the train.

3. Performance Requirements

The test train shall be weighed repeatedly to yield not less than 60 wagon weights or their equivalent in total train weight. Every weight indication and printout shall comply with the maximum permissible errors.

If applicable, repeat the tests for other speeds, other directions of travel, or other entry or exit tracks to or from the weighing instrument.

4. Other Tests

Carry out tests to check the correct operation of the instrument (including printed record) for:

- over or under speed;
- over weight;
- roll back; and
- calculations (net weight, totals).

TECHNICAL SCHEDULE No 6/10B/62

VARIATION No 1

Pattern: Railweight Model WEIGHLINE Weighing-in-motion Weighing Instrument.

Submitter: Delairco Bartrol
112-118 Talavera Road
North Ryde NSW 2113.

1. Description of Variant 3

With eight weighing transducers and a Railweight model MS 3000 indicator.

1.1 Specifications

Instruments are approved with specifications as for the pattern, except as set out below:

Scale interval	50 kg
Maximum operating speed	40 km/h
Minimum operating speed	10 km/h

1.2 The System

1.2.1 Weighing Transducers

Eight Railweight model WEIGHLINE RWT-X TR50 or RWT-X TR60 weighing transducers are used.

1.2.2 Indicator

A Railweight model MS 3000 indicator (Figure 7) is used.

The indicator comprises:

- (i) an analog signal conditioning unit;
- (ii) a wheel sensor interface unit;
- (iii) a weight processor; and
- (iv) a keyboard and display.

Various settings are available to correct for the dynamic effects of the train and these are:

Percentage bias	This bias is a percentage of the uncorrected wagon weight, is constant for the entire train, is applied to each wagon, and is added to or subtracted from the uncorrected wagon weight;
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Speed banded bias This bias is the same as a percentage bias, however it is applied over a range of speeds. This bias is mainly used where the instrument is used over a large range of speeds; and

Position bias This bias is applied to the first 10 wagons and is applied as a percentage bias which is at a maximum for the first wagon decreasing to a minimum for the 10th wagon.

The above bias settings are described in detail in section 5 'Commissioning and Testing' of the Railweight publication *Weighline In-motion Weighing System manual*, version WWP3.

A computer can be connected to the indicator and the data on the printout plus additional data (e.g. individual wheel weights) can be downloaded and displayed on a report.

(*) Additional data which is not on the printout is not verifiable and therefore shall NOT be used for trade purposes.

1.2.3 Printer

The printout displays the wagon sequence number, wagon weight, speed and total train weight. A status column is also used to display a description of the wagon. If a train rollback or overspeeding is detected then "E" is printed in the wagon weight column for the wagon weight where the rollback or overspeeding was detected then for every wagon thereafter for that train. Additionally, "!!! This train has rolled back !!!" or "!!! Not valid for transaction purposes !!!", is also printed.

Sample tickets are shown in Figures 8 and 9.

1.2.4 Markings

Instruments bear the markings as per the pattern with the following amendments:

Scale interval	$d = \dots$ kg or t
Maximum wagon weight (18 t X Number of wheels on wagon)	$\dots\dots\dots$ kg or t
Minimum wagon weight (1.25 t X Number of wheels on wagon)	$\dots\dots\dots$ kg or t
Maximum operating speed	$v_{\max} \dots\dots$ km/h
Minimum operating speed	$v_{\min} \dots\dots$ km/h

1.2.5 Sealing Provision

Provision is made for the calibration adjustments in the indicator to be sealed by means of a seal and sealing wire through holes in the rear panel of the Railweight model MS 3000 indicator.

TECHNICAL SCHEDULE No 6/10B/62

VARIATION No 2

Pattern: Railweight Model WEIGHLINE Weighing-in-motion Weighing Instrument.

Submittor: Delairco Bartrol
112-118 Talavera Road
North Ryde NSW 2113.

1. Description of Variant 4

With a Railweight model MS 3000 indicator as described in Variant 3 but with a paperless recording system.

A printout of a transaction report may be obtained by entering the transaction serial number and the date in the 'print diagnostics' menu of the instrument. Access to this menu may be restricted by the use of a password.

TECHNICAL SCHEDULE No 6/10B/62
VARIATION No 3

Pattern: Railweight Model WEIGHLINE Weighing-in-motion Weighing Instrument.

Submittor: Delairco Bartrol
112-118 Talavera Road
North Ryde NSW 2113.

1. Description of Variant 5

With a model MS-3000 indicator (variants 3 or 4) approved for use up to a maximum speed of 80 km/h. In-situ performance of the instrument, particularly at high speeds and with non-uniform wagon loadings (i.e. light wagons interspersed with heavy wagons) will depend on site conditions and train configuration. It may therefore be necessary following in-situ testing (and in the light of results obtained) to restrict the range of operation in ways such as:

- Limiting the maximum or minimum wagon weights.
- Limiting the allowable speed range(s).
- A combination of both the above.

Such restrictions shall be marked on the nameplate of the instrument and where operation occurs outside the acceptable range(s), weight values should not be shown and an error message should appear (similar to the current overspeed arrangement).

1.1 Specifications

Instruments may have differing specifications as described above, but shall be within the limits shown below:

	With RWT-X TR60 transducer	With RWT-X TR50 transducer
Accuracy class		
Train weighing	0.5, 1 or 2	0.5, 1 or 2
Wagon weighing	2	2
Maximum capacity	18 t per wheel	16 t per wheel
Minimum capacity	1.25 t per wheel	1.25 t per wheel
Scale interval	50 kg or 100 kg	50 kg or 100 kg
Maximum wagon weight	No. of wheels x 18 t (or less)	No. of wheels x 16 t (or less)
Minimum wagon weight	No. of wheels x 1.25 t (or more)	No. of wheels x 1.25 t (or more)
Maximum operating speed	80 km/h or less	80 km/h or less
Minimum operating speed	0.5 km/h or more	0.5 km/h or more

1.2 Markings

Instruments bear the following markings at each location having a weight indication or printing device (the values given are provided as an example only):

Manufacturer's name or mark
Importer's name or mark
Model designation
Serial number of the instrument
Pattern approval mark	NSC No 6/10B/62
Accuracy class	
Train weighing	0.5
Wagon weighing	2
Maximum capacity	Max (wheel) 18 t
Minimum capacity	Min (wheel) 1.25 t
Scale interval	d = 50 kg
Maximum wagon weight	No. of wheels x 16 t
Minimum wagon weight	No. of wheels x 1.25 t
Maximum operating speed	$v_{\max} = 80$ km/h
Minimum operating speed	$v_{\min} = 0.5$ km/h

The markings shall reflect details for which the particular installation has been verified. The maximum and minimum wagon weights and maximum and minimum operating speeds may vary from those shown in the specifications (clause 1.1) but shall be within the limits specified there. For example, the maximum wagon weight will be related to the heaviest reference wagon used; the Commission should be consulted for guidelines regarding this.

Note 1: It is acceptable for more complex sets of markings to be provided. This may be necessary where (for example) it was necessary following in-situ testing to restrict operation to one speed range for wagon weighing and another speed range for train weighing. Such arrangements shall be clearly set out in the markings provided.

Note 2: Where an installation is only to be used with wagons of a particular configuration (e.g. all with 8 wheels), the maximum and minimum wagon weight values may be expressed as a value rather than the formula shown in the example.

TECHNICAL SCHEDULE No 6/10B/62

VARIATION No 4

Pattern: Railweight Model WEIGHLINE Weighing-in-motion Weighing Instrument

Submittor: Delairco Bartrol
480 Victoria Road
Gladesville NSW 2111

1. Description of Variant 6

With a Railweight model BN033 lightning protection board mounted in a junction box near the weighbridge for protection of the load cells or transducers. The board comprises eight individual circuits, each consisting of semi-conductor and gas discharge transient suppression devices and current limiting resistors. Each load cell or transducer is individually protected.



National Standards Commission

12 Lyonpark Road, North Ryde NSW

Notification of Change

Certificate of Approval No 6/10B/62

Change No 1

The following changes are made to the approval documentation for the
Railweight Model WEIGHLINE Weighing-in-motion Weighing Instrument

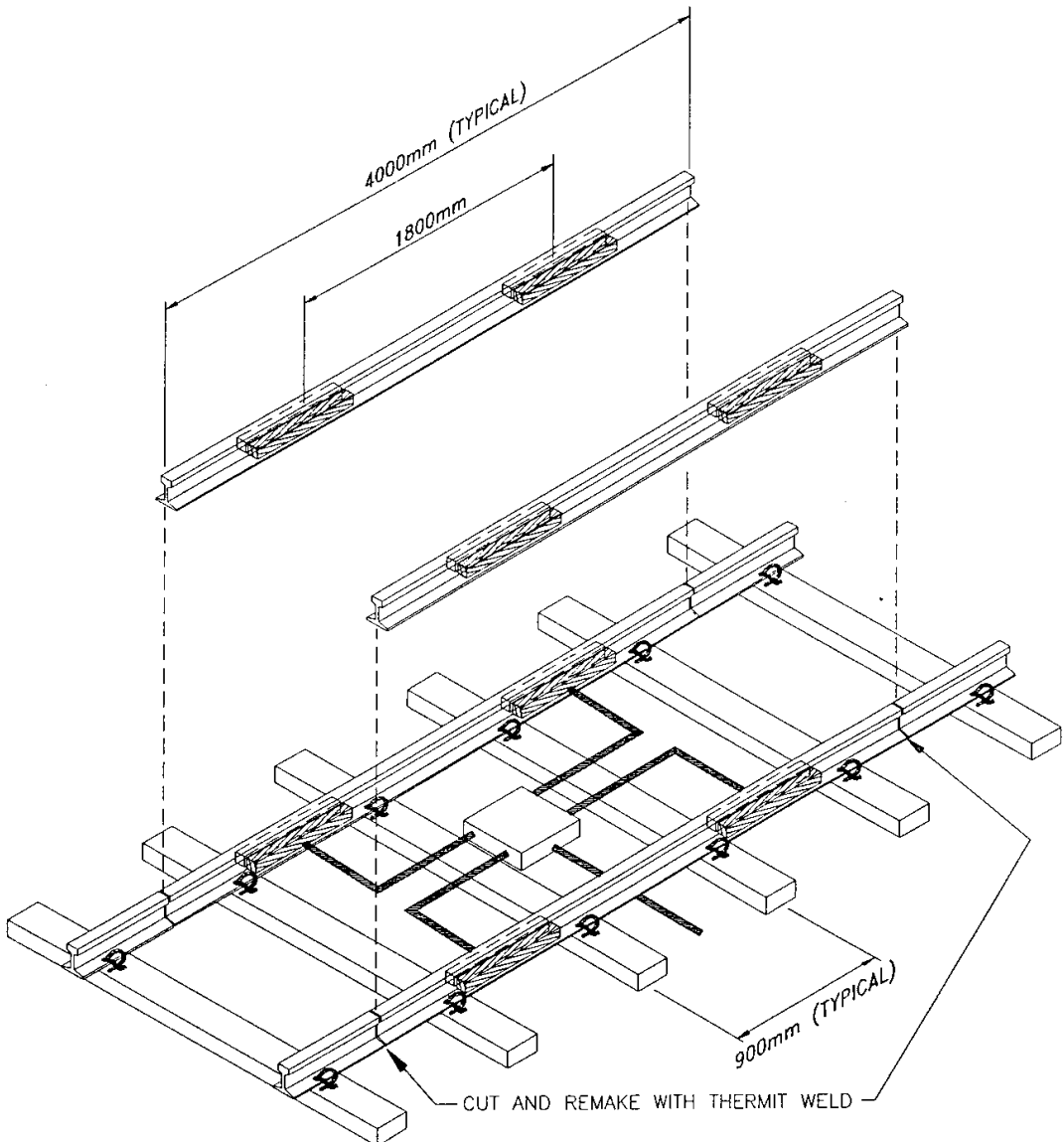
submitted by Delairco Bartrol
now of 480 Victoria Road
Gladesville NSW 2111.

1. In Certificate of Approval No 6/10B/62 dated 7 July 2000, the Condition of Approval referring to the review of the approval should be amended to read:
"This approval becomes subject to review on 1 January 2008, and then every 5 years thereafter."
2. In Certificate of Approval No 6/10B/62 dated 7 July 2000 and in the Technical Schedules for this approval dated 6 March 1998, 7 June 1999, 20 January 2000 and 7 July 2000, the address of the submitter should be amended to read:

480 Victoria Road
Gladesville NSW 2111.

Signed by a person authorised under Regulation 60 of the National Measurement Regulations 1999 to exercise the powers and functions of the Commission under this Regulation.

FIGURE 6/10B/62 - 1



Railweight Model WEIGHLINE RWT-X Transducer Installation

FIGURE 6/10B/62 - 2



Railweight Model WEIGHLINE RWT-X Transducer

FIGURE 6/10B/62 - 3

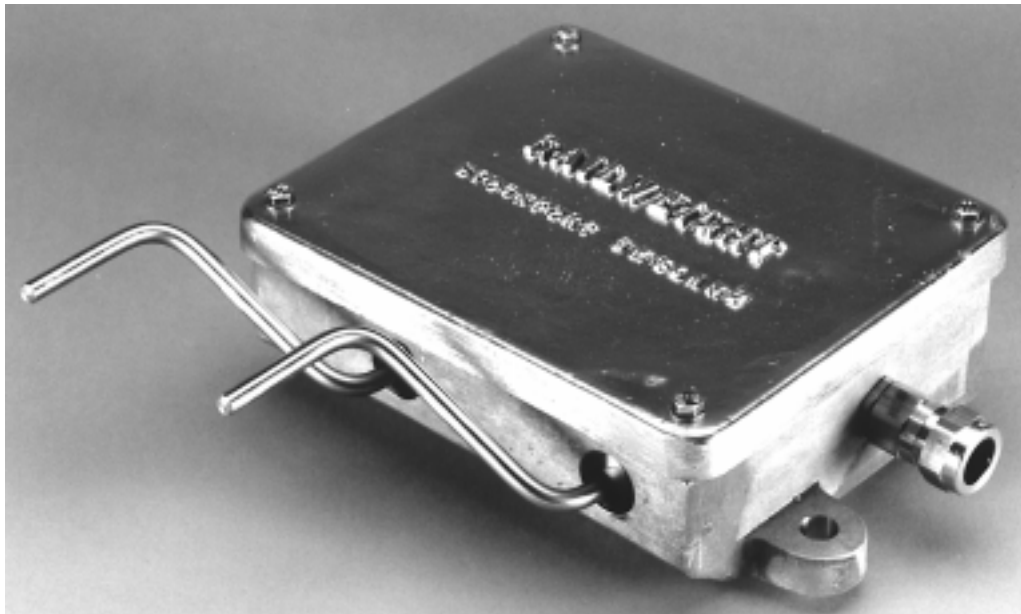


Railweight Model 8200 Indicator

FIGURE 6/10B/62 - 4

TRAIN IDENT.		HEXHAM					
STATUS	DATE	TIME		CALIBRATED			
GROSS	22-12-97	13:36		YES			
SEQ.	WAGON ID.	FIRST.	SECOND.	GROSS.	TARE.	NETT.	LOAD
001		15,80	15,80	031,60			
002		15,80	15,80	031,60			
003		15,80	15,80	031,60			
004		15,00	00,00E				E
005		00,00E	00,00E				E
TRAIN TOTAL TONNES ** INVALID **				94,80			
BOGIE WEIGHTS NOT TO BE USED FOR TRANSACTION PURPOSES.							
N N N N							

FIGURE 6/10B/62 - 5



Railweight Double-Arm Track Switch

FIGURE 6/10B/62 - 6



Tiefenbach Proximity Track Switch

FIGURE 6/10B/62 - 7



Railweight Model MS 3000 Indicator

FIGURE 6/10B/62 - 8

Printed: Date: 29/04/1999 Time: 11:21:05

----- Start of Train -----

RAC Chullora ATIS
Flemington
New South Wales

Train arrival date: 29/04/1999
Train arrival time: 11:19:55
Direction : IN
Serial No. : 48

Seq.	Weight (t)	Speed (km/h)	Status
1	* 64.950	NW* 10.0	6 Axle Veh.
2	* 65.000	NW* 10.1	6 Axle Veh.
3	43.200	10.0	4 Axle Wagon
4	43.200	10.0	4 Axle Wagon
5	43.200	10.0	4 Axle Wagon
6	43.250	10.0	4 Axle Wagon
7	43.250	10.0	4 Axle Wagon
8	43.250	10.0	4 Axle Wagon
9	43.200	10.0	4 Axle Wagon
10	43.250	10.0	4 Axle Wagon
11	43.250	10.0	4 Axle Wagon
12	43.200	10.0	4 Axle Wagon
TOTALS		432.250	

Train max speed: 10.1 km/h Train departure date: 29/04/1999
Train min speed: 9.9 km/h Train departure time: 11:21:05

----- End of Train -----

* Vehicles which are detected as being non-weighed vehicles (e.g. vehicles 1 and 2 above are locomotives) are marked on the ticket with the error message "NW*" meaning 'not weighed'; their weights are not included in the total.

FIGURE 6/10B/62 - 9

Printed: Date: 29/04/1999 Time: 11:39:27

----- Start of Train -----

RAC Chullora ATIS
Flemington
New South Wales

Train arrival date: 29/04/1999
Train arrival time: 11:38:20
Direction : IN
Serial No. : 50

Seq.	Weight (t)	Speed (km/h)	Status
1	E	19.9	6 Axle Veh. OverSpeed
2	E	20.3	6 Axle Veh. OverSpeed
3	E	19.9	4 Axle Wagon OverSpeed
4	E	19.9	4 Axle Wagon OverSpeed
5	E	19.9	4 Axle Wagon OverSpeed
6	E	19.9	4 Axle Wagon OverSpeed
7	E	19.9	4 Axle Wagon OverSpeed
8	E	19.9	4 Axle Wagon OverSpeed
9	E	19.9	4 Axle Wagon OverSpeed
10	E	19.9	4 Axle Wagon OverSpeed
11	E	19.9	4 Axle Wagon OverSpeed
12	E	19.9	4 Axle Wagon OverSpeed

=====

TOTALS INVALID!! E

=====

E !!! Not valid for transaction purposes !!!

Train max speed: 20.4 km/h Train departure date: 29/04/1999
Train min speed: 19.9 km/h Train departure time: 11:38:54

----- End of Train -----