

**HS1**

**PERFORMANCE**

**DATA ACCURACY**

**CODE**

**AUGUST 2009**



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**HIGH SPEED 1**  
**HS1 PERFORMANCE DATA**  
**ACCURACY CODE**

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## **Explanatory Note**

*This Explanatory note does not form part of the Code.*

*Part B of the HS1 Network Code establishes a system for monitoring train performance on HS1 and which, amongst other things, accurately records the times at which trains arrive at, depart from or pass Specified Points, and the difference between those times and the corresponding times published in the Working Timetable.*

*This Code specifies the standards of performance data accuracy required to be satisfied by the performance monitoring system established by HS1 Ltd. This Code also provides a mechanism for agreeing and notifying changes in such standards.*

### **1. DEFINITIONS**

1.1 In this Code, the following definitions apply except where the context requires a different meaning:

<b>Access Agreement</b>	has the meaning ascribed to it in Part A of the HS1 Network Code;
<b>Access Parties</b>	has the meaning ascribed to it in Part A of the HS1 Network Code and "Access Party" shall be construed accordingly;
<b>Accounting Period</b>	means each consecutive period of 28 days commencing on 00.00 hours on 1 April each year provided that the length of the first and last such Accounting Period in any year may be varied by up to 7 days on reasonable notice from HS1 Ltd;
<b>Automatic Point</b>	means a Specified Point other than a Manual Point;
<b>Berthing Offset</b>	means when a Timing is made at a location which is not itself the Specified Point, a quantity of time added to the Timing as an adjustment to convert it to the time value to be used in the corresponding Recordings;
<b>Code</b>	means this Performance Data Accuracy Code, including its Tables, as may be amended from time to time;
<b>HS1 Ltd</b>	has the meaning ascribed to it in Part A of the HS1 Network Code;
<b>HS1 Network Code</b>	means the document entitled "HS1 Network Code" and previously known as the "CTRL Track Access Conditions" as may be amended from time to time;
<b>Manual Point</b>	means a Specified Point at which timing is performed by a human agent;
<b>Margin Book</b>	means a collection of characteristics of the Specified Points relevant to a particular Access Agreement, as described in clause 5 below;

<b>Monitoring Point</b>	means a Specified Point at which Recordings are likely to have a significant effect on calculations under the relevant Access Agreement performance regime and which is described as a “monitoring point” in the Margin Book;
<b>MSF Radio Time Signal</b>	means the time according to the UTC (NPL) National Time Scale maintained by the National Physical Laboratory at Teddington, Middlesex, as disseminated from a radio signal broadcast from the Anthorn VLF transmitter in Cumbria or any successor or replacement signal notified by HS1 Ltd to all Users (other than HS1 Ltd);
<b>Performance Monitoring</b>	means the operation of the Performance Monitoring System by HS1 Ltd;
<b>Performance Monitoring System</b>	has the meaning ascribed to it in Part B of the HS1 Network Code;
<b>Recording</b>	means time data posted into the Performance Monitoring System or otherwise noted as the time at which a train arrives at, departs from or passes a Specified Point, as required by Part B of the HS1 Network Code;
<b>Recreated Data</b>	means time data which has been created through interpolation where a Timing has not occurred due to a failure of a Specified Point and/or a failure in the method of recording;
<b>Specified Point</b>	means a point at which HS1 Ltd measures and records time data during Performance Monitoring;
<b>Systems Code</b>	means the HS1 Railway Systems Code as amended from time to time;
<b>Timing</b>	means reading a clock, in each case, whether the reading is made by a human agent or by automatic means;
<b>Train Operator</b>	has the meaning ascribed to it in Part A of the HS1 Network Code;
<b>Triggering Point</b>	means a location at which a train movement is physically detected at the start of the process of making a Timing at an Automatic Point;
<b>User</b>	means any Access Party subscribing to or subject to this Code, including HS1 Ltd;
<b>User Group</b>	means a group comprising all Users;
<b>Working Timetable</b>	has the meaning ascribed to in Part A of the HS1 Network Code.

1.2 Where the context admits, words and expressions defined in, and the rules of interpretation set out in Condition 1.1 of Part A of the HS1 Network Code apply throughout this Code. Any references to the HS1 Network Code in such words, expressions and rules shall be construed as references to this Code.

## **2. AIMS**

2.1 The aims of the Code are:-

2.1.1 to define the standards of measurements and Recording required for the Performance Monitoring System;

2.1.2 to provide a mechanism for the further development of standards of measurement and Recording required for the Performance Monitoring System; and

2.1.3 to provide a process for managing the changes consequent on alterations in measurement and Recording.

## **3. EFFECTS OF THE CODE**

3.1 This Code has no effect on:-

3.1.1 any safety-related obligations of any person; or

3.1.2 any rights or obligations of any Access Party relating to data which are incorrect in a sense not contemplated in this Code or to have regard to other data where alternative evidence as to actual train performance is available.

3.2 Nothing in the Code entitles:

3.2.1 any Access Party to abridge any process required under any Access Agreement to implement any change;

3.2.2 any person to abridge any process required under the Systems Code; or

3.2.3 HS1 Ltd to make any charge for any train movement to the extent that it has not in fact occurred.

3.3 In connection with any Access Agreement, a Recording at a Specified Point which is based on a Timing (as opposed to Recreated Data) is accurate if:

3.3.1 it is made in a Accounting Period during which HS1 Ltd achieves at that Specified Point the standards set out in this Code and the relevant Margin Book; and

3.3.2 in the case of an Automatic Point:

(A) the automatic equipment is either the same kind as was used at the Automatic Point on 14 November 2007 or is automatic equipment having a shorter response time (that is, a shorter delay between the first moment of the physical detection of a train movement and the making of the corresponding Timing, before the application of any Berthing Offset); and

- (B) a Berthing Offset (of the magnitude set out in the Margin Book in respect of that Specified Point) is added to each Timing to convert it to the corresponding Recording.
- 3.4 If HS1 Ltd omits or becomes aware that it is likely to omit to make a Timing of an event for a Recording, HS1 Ltd shall notify each affected Train Operator as soon as it reasonably can. In respect of any day on which HS1 Ltd gives such notice:-
- 3.4.1 each affected Train Operator shall as soon as reasonably practicable supply to HS1 Ltd in good faith all information available to that Train Operator which is relevant to that Timing omitted on that day. HS1 Ltd shall use all appropriate information provided by the Train Operator in creating a Recording related to the omitted Timing. HS1 Ltd may disregard information provided by the Train Operator if and to the extent that it is reasonable to do so owing to manifest error, or failure of the Train Operator to act in good faith or demonstrable bias; and
- 3.4.2 if, having made use of appropriate information supplied by Train Operators, HS1 Ltd still has omitted Recordings then HS1 Ltd may use an appropriate procedure to interpolate or otherwise create Timings and related Recordings.
- 3.5 Recordings created under clause 3.4.1 or 3.4.2 above shall be agreed by HS1 Ltd and the affected Train Operator. If and to the extent that the affected Train Operator reasonably considers that: (i) HS1 Ltd has not created a Recording in accordance with clause 3.4.1 and/or 3.4.2, or (ii) any of the matters described in clause 3.9 below apply, and in either case the parties are unable to agree the Recording within 14 days of HS1 Ltd first notifying the affected Train Operator for the Recording, then (subject to the provisions of the relevant Access Agreement) the affected Train Operator may refer the matters in dispute to be determined in accordance with clause 9 below. If an affected Train Operator has not referred any disputed matter within 21 days of HS1 Ltd first notifying the affected Train Operator of the Recording, the parties shall be deemed to have agreed the relevant Recording. Recordings agreed with the affected Train Operator (or which are determined in accordance with clause 9 below) are accurate.
- 3.6 HS1 Ltd shall publish a procedure for interpolating or otherwise creating Recordings referred to in clause 3.4.2 to the User Group. The procedure shall include the basis for selecting the missed Timings to be subject to interpolation or creation, and the basis for selecting the data to be used to create Recordings.
- 3.7 Recordings omitted in good faith which have not been created are nonetheless accurate provided that HS1 Ltd achieves the data completeness standard set out in the train operator's Margin Book for the Specified Point in the relevant Accounting Period or on that day or otherwise applying under Table A to this Code, as the case may be.
- 3.8 Recordings at any Specified Point which are accurate in accordance with clauses 3.3, 3.4, 3.7 and 3.10 and where HS1 Ltd has observed the obligation of good faith as described in clause 10 below and except in the case of manifest error, constitute a sufficient discharge of all obligations on HS1 Ltd under the Access Agreement with respect to them, and none of those Recordings may be challenged.
- 3.9 If Recordings at a Specified Point are not accurate in accordance with clauses 3.3, 3.4, 3.7, or 3.10 above or are manifestly in error or if HS1 Ltd has not observed the

obligation of good faith in relation to those Recordings, then those Recordings may be challenged and the relevant parties may exercise any rights and remedies available to them under any contract or at law or otherwise.

- 3.10 Recordings are presumed to be accurate unless:-
  - 3.10.1 they are shown not to be; or
  - 3.10.2 in respect of Recordings at a particular Specified Point or a group or class of Specified Points, an annual review of standards achieved in the Performance Monitoring System undertaken in accordance with clause 7 below causes HS1 Ltd to be concerned as to the accuracy (in accordance with its meaning in the Code) of Recording there.

#### **4. CHARACTERISTICS OF SPECIFIED POINTS AND OTHER STANDARDS**

- 4.1 The characteristics of a Specified Point include:-
  - 4.1.1 its location;
  - 4.1.2 the category applicable to the Specified Point for the purposes of Table A to this Code;
  - 4.1.3 the technology employed to make Recordings at the Specified Point; and
  - 4.1.4 Berthing Offsets.
- 4.2 Table A to this Code sets out the data completeness standard which applies under this Code. Part A of Table A sets out the completeness standard which applies in respect of any Specified Points which are subject to a common mode failure. Part B of Table A sets out the standard which applies otherwise than in respect of Common Mode Failures.
- 4.3 Table B to this Code sets out the timing standard that applies under this Code. The category of timing standard for a Specified Point is determined by the technology usually employed for making Recordings there. Table B sets out the Recording technologies, allocates each to a category, and states the standard of timing that HS1 Ltd is required to meet in that category.
- 4.4 The timing standard will be:-
  - 4.4.1 for each category of manual Recording and those allocated to the orange category in accordance with clause 4.5 below or otherwise, the standard set out in Table B to this Code for orange, and
  - 4.4.2 for each category of automatic Recording and those allocated to the blue category in accordance with clause 4.5 below or otherwise, the standard set out in Table B to this Code for blue.
- 4.5 If a new Recording technology not included in Table B is adopted, HS1 Ltd shall either:-
  - 4.5.1 seek and obtain amendment to this Code to establish a new category for it; or



- 4.5.2 allocate it to the blue category.
- 4.6 Table A and Table B to this Code shall be interpreted, and the standards shall be applied, with the use of appropriate statistical techniques commensurate with practicality and reasonableness.
- 4.7 The units for measurement of Berthing Offsets are as follows:-  
Berthing Offsets stated in integer seconds
- 4.8 The units of measurement in which Timing data are held in the Performance Monitoring System and other systems are as follows:  
Timing data held in integer minutes
- 4.9 Where a Berthing Offset applies to a Specified Point, Recording at that Specified Point shall be made by summing Timings and the relevant Berthing Offsets in the units in which they are recorded from time to time.
- 4.10 HS1 Ltd shall on request supply to any person a statement of the characteristics of any Specified Point, or of changes to those characteristics, within a reasonable time and on payment of its reasonable charges.

## **5. MARGIN BOOKS**

- 5.1 For each Access Agreement, HS1 Ltd shall compile a Margin Book setting out the characteristics of each relevant Specified Point for the purpose of that Access Agreement as at the date of the Access Agreement together with any adjustments specific to that Access Agreement. For each Specified Point, HS1 Ltd shall state in the Margin Book whether it is a Monitoring Point for the purposes of Table A to this Code and what category of data completeness standards applies.
- 5.2 HS1 Ltd and the Train Operator shall seek to agree the Margin Book and any changes made to it from time to time. If and to the extent that the Train Operator considers that the Margin Book does not satisfy any of the matters described in clauses 5.2.1 to 5.2.4 below and the parties are unable to agree any changes to the Margin Book within 28 days from the date of the Train Operator being supplied with a copy of the first Margin Book under clause 5.1 above or a revised Margin Book under clause 5.4 below then the Train Operator may refer the matters in dispute for determination in accordance with clause 9 below. If the Train Operator does not refer any matter in dispute within 35 days from the date of the Train Operator being supplied with a copy of the first Margin Book under clause 5.1 above or a revised Margin Book under clause 5.4 below the parties shall be deemed to have agreed the Margin Book. Agreement by the parties of the Margin Book specifically signifies that the relevant Access Parties are content that:-
- 5.2.1 the Margin Book covers all the Specified Points appropriate to the Access Agreement;
- 5.2.2 the Specified Points are correctly described as being, or as not being, Monitoring Points;
- 5.2.3 the data completeness categories to which the Specified Points are allocated are appropriate having regard to the circumstances at that time; and

5.2.4 the Margin Book contains no gross or obvious mistakes.

Notwithstanding the agreement by the Access Parties of the Margin Book, either party may at any time notify the other of an error in the Margin Book or of any Specified Point becoming or ceasing to be a Monitoring Point or any different data completeness category becoming applicable (in each case, due to a change in circumstances since the Margin Book was last agreed). If the other party agrees that there is an error or that the categorisation of any Specified Point should change (or it is determined by dispute resolution that there is an error or there should be such a change) then, HS1 Ltd shall correct the Margin Book and the correction takes effect from the time at which the error or requirement for change was first notified.

5.3 The category of data completeness standard to which each Specified Point in a Margin Book shall be allocated is determined as follows:-

5.3.1 for an Automatic Point that is a Contractual Monitoring Point the category is Super Gold, as defined in Table A to this Code;

5.3.2 for an Automatic Point that is a Delay Recording Point the category is Gold, as defined in Table A to this Code; and

5.3.3 for all other Specified Points, the category is Silver, as defined in Table A to this Code.

5.4 If the characteristics of the Specified Point change, HS1 Ltd shall update each Margin Book and provide revisions or supplements to the relevant Access Party. Before making any change to the characteristics of a Specified Point, HS1 Ltd shall notify each affected Train Operator.

5.5 HS1 Ltd and an Access Party may agree that they will adjust any set of characteristics in the Margin Book relating to that Access Party, either indefinitely or for a period of their choosing.

5.6 If any Train Operator requests HS1 Ltd to alter the magnitude of a Berthing Offset, HS1 Ltd shall give fair consideration to the request. If the Berthing Offset is at the time of such request applied universally (as described in clause 4.7 below), HS1 Ltd shall have regard to the willingness of other affected Train Operators to agree to the same alteration. HS1 Ltd may decline a request made under this Section 5.6 if any other affected Train Operator does not agree to the proposed alteration.

## **6. CHANGES TO CHARACTERISTICS OF SPECIFIED POINTS**

6.1 Any change to a lower category of timing standard applicable to a Specified Point is a material change to the operation of HS1 for the purposes of Part G of the HS1 Network Code.

6.2 Each party acknowledges that a change in the characteristics of a Specified Point may have a financial effect, that is to say, may give rise to a difference (all other things being equal) in sums payable by one party to another under an Access Agreement, when taken either by itself or as part of a series of changes.

6.3 If a change to characteristics of a Specified Point comprises:-

- 6.3.1 a change of category in Table A or Table B to this Code;
- 6.3.2 a change in the requirements of a standard;
- 6.3.3 a change in the magnitude of Berthing Offset; or
- 6.3.4 a change within any part of the Performance Monitoring System of the units in which time Recordings are held to smaller units,

and there is a financial effect as described in clause 6.2 above then an affected Access Party may require the other Access Party to its Access Agreement to negotiate with a view to compensating the affected Access Party for any adverse financial effect. Either party may notify the other that it wishes a negotiation to take place, and may do so at any time, provided that

- (A) any financial effects that have occurred before the start of the Accounting Period in which the notification is given;
- (B) any loss of revenue; and
- (C) any indirect or consequential losses, costs, expenses and/or liabilities suffered or incurred by the affected Access Party,

shall not be taken into account in determining any amount of compensation. If the parties do not reach agreement within 28 days after notification on the need to compensate the affected Access Party for any adverse financial effect or the amount of such compensation, then either party may refer the matters in dispute for determination in accordance with clause 9 below.

- 6.4 If a change is not as described in clause 6.3 above then neither Access Party has a right under this Code to require compensation for any adverse financial effects arising from such change.
- 6.5 Where the parties reach agreement on the manner in which an affected Access Party will be compensated for any adverse financial effect of a change, or a decision is reached through dispute resolution, it shall be final and binding on the parties and no further claims for compensation shall be able to be made by the affected Access Party receiving such compensation in respect of such change.
- 6.6 If the agreement or decision described in clause 6.5 above requires or is equivalent to an amendment to an Access Agreement, it shall take effect only in accordance with the process for amending the relevant Access Agreements.
- 6.7 The parties to an Access Agreement shall use reasonable endeavours to limit the number of negotiations for compensation arising from changes in Recording technology to not more than 2 in any one year; provided that there may be more if changes to Recording technology occur more frequently or other circumstances require it. Users shall use all reasonable endeavours to identify likely financial effects during consultation on the annual proposals for improving standards.

## **7. REVIEW OF STANDARDS IN THE PERFORMANCE MONITORING SYSTEM**

- 7.1 HS1 Ltd shall at least once in each year review the standards of measurement and Recording achieved in the Performance Monitoring System. HS1 Ltd shall aim to carry out the review at about the same time each year. In formulating its proposals HS1 Ltd shall give adequate consideration to the materiality of data to each individual affected Access Party.
- 7.2 Following the review, HS1 Ltd shall publish to the Train Operators a report of its review and its proposal for improving standards in the following year. In formulating its proposals, HS1 Ltd shall give adequate consideration to the materiality of data inaccuracy to each of the Access Parties.
- 7.3 The report shall include an assessment of the standards in measurement and Recording achieved across HS1 over the previous year. This may be done by reference to a suitable sample of the Specified Points.
- 7.4 As soon as reasonably practicable after publishing the report, HS1 Ltd shall consult on the proposal for improving standards with Users and take account of reasonable modifications (including additional proposals) suggested by them. HS1 Ltd should convene and provide accommodation for a meeting of the User Group for this purpose unless at least ninety percent of Users are content to consult in another way. Each User shall bear its own costs of attending the meeting.
- 7.5 HS1 Ltd shall make efforts to improve standards in accordance with the proposal (or the proposal as modified following suggestions by Users).
- 7.6 Any User may request HS1 Ltd to convene a meeting of all Users to discuss any relevant topic. If the request is reasonable, HS1 Ltd shall convene a meeting at a reasonable time and place; but HS1 Ltd is not obliged to fund it. Each User shall bear its own costs of attending the meeting.

## **8. CHANGES TO THIS CODE**

- 8.1 This Code may be amended in the same manner as the HS1 Network Code and Part C of the HS1 Network Code shall apply to amendments to this Code mutatis mutandis.

## **9. DISPUTE RESOLUTION**

- 9.1 The Dispute Resolution Procedure shall apply to this Code.

## **10. GOOD FAITH**

- 10.1 The obligation of good faith set out in Condition 1.5 of Part A of the HS1 Network Code applies in respect of this Code.
- 10.2 Amongst other things, good faith requires all Users:-
- 10.2.1 to strive to achieve zero bias in Recordings;
  - 10.2.2 to be fair and honest when interpolating or otherwise creating Recordings (after a failure to make a Timing);

- 10.2.3 not to conceal any Timing actually made, or unfairly and deliberately to omit to make any Timing or Recording.
- 10.3 All Users shall request, and HS1 Ltd shall make, changes to characteristics of Specified Points in good faith. All such changes shall be fair and equitable and not discriminate unduly between participants in the railway industry.

## **11. DEMONSTRABLE ACTUAL LONG TERM BIAS**

- 11.1 If any User shows a reasonable likelihood that actual long-term bias in relation to that User's performance regime under any of its Access Agreements is more adverse to the User than 0.3 % of the annual access charges (excluding any performance related payments) under its Access Agreement in that year, then HS1 Ltd shall on request by that User commission and pay for a study by a suitably qualified and experienced expert (the identity of whom shall be agreed with the User or in the absence of agreement appointed by the Secretary of State) of the demonstrable actual long-term bias, the results of which shall be made available simultaneously to HS1 Ltd and the User. If the study demonstrates actual charge long-term bias which is greater than 0.3% of the User's annual access charges (excluding any performance related payments) under its Access Agreement for the relevant year then HS1 Ltd shall give the User a credit against access charges which is equal to the excess of the actual long-term bias in access of 0.3% of that annual access charge (excluding any performance related payments).
- 11.2 Any credit to be made by HS1 Ltd under clause 11.1 above shall be given from the start of the Accounting Period in which the User requests the study and continue to be given up to:-
- 11.2.1 the date from which HS1 Ltd and the User agree that the credit no longer applies ; or
- 11.2.2 the relevant date of a further study (whether requested by the User or by HS1 Ltd) conducted in accordance with clause 11.1 that demonstrates that no credit is due or that HS1 Ltd shall give a different credit. If the further study demonstrates that HS1 Ltd shall provide a different credit, the different credit shall be given from the relevant date in place of the previous credit. "Relevant date" has the meaning given to it in clause 11.3 or 11.4 (whichever is appropriate).
- 11.3 A User may request, and HS1 Ltd shall commission and pay for, a further study by a suitably qualified and experienced expert (agreed with the User) to be conducted in accordance with clause 11.1 if the User shows a reasonable likelihood that the actual long-term bias has increased beyond that determined in the immediate preceding study. The "relevant date" of a further study of this kind is the date on which the User requests it.
- 11.4 HS1 Ltd may commission a further study at any time. The "relevant date" of a further study of this kind is the date on which HS1 Ltd request that User to agree the expert to perform the further study. HS1 Ltd shall commission the study promptly after the User agrees the identity of the expert or after the identity of the expert is determined by the Secretary of State.

11.5 HS1 Ltd shall publish a methodology for determining demonstrable actual long-term bias in relation to the performance regime applying to Access Agreements expressed as a percentage of the annual access charges (excluding performance related payments) which are payable under that Access Agreement. All Users shall within 3 months of publication notify HS1 Ltd of any objections to it. HS1 Ltd shall take account of all proper objections and revise the methodology accordingly or state its reasons for not doing so. HS1 Ltd shall publish to the User Group the revisions or its reasons or (where and to the extent that revisions are made in part) both. The methodology or revised methodology as published shall then apply, unless a User disputes it within 1 month of such publication under clause 9 in which case the methodology shall apply as determined by the process of dispute resolution. The methodology shall be used for all studies under this clause 11.

**TABLE A**

**DATA COMPLETENESS STANDARD**

In this Table:

“**Common Mode Failure**” means a failure that affects both train performance and Recording (such as signalling failure);

“**Other Failure**” means a failure that affects Recording but not train performance (such as failure of a Recording device); and

“**Completeness**” is the ratio of the number of Timings actually made to the number that would have been made if there had been no omissions.

Planned downtime agreed between affected parties is not treated as a failure, and the Timings not made on that account are not treated as omissions.

**Part A – Common Mode Failures**

On any day during which a Common Mode Failure occurs or persists, data for each failed individual Monitoring Point is identified in Margin Book, shall be created to the following level of Completeness: 98%.

Data need not be created under this Part A for other Specified Points subject to a Common Mode Failure.

**Part B – Other Failures**

For all other days in an Accounting Period taken together (that is, excluding in respect of any Specified Point which is a Monitoring Point in a relevant Access Agreement, days on which that Specified Point is subject to a Common-Mode Failure):

Category	Completeness at each Specified Point (%)	For the average of all Specified Points of a category in a Margin Book, the number of days in which Completeness is less than 50% is not to exceeded
SUPER GOLD	98	1 Day
GOLD	97	1 Day
SILVER	95	1 Day

**TABLE B:**

**TIMING STANDARD**

Category	Technology	Standard at each Specified Point over an Accounting Period		Average of all Specified Points of a category in a single Margin Book over an Accounting period
		Bias equal to or less than	Scatter	Bias equal to or less than
Blue	Improved SMART ATR/IECC	± 1 sec	100% within ± 1 sec of zero error	± 1 sec
Orange	Tick Sheets Manual TRUST Entry	± 10 secs	90% within ± 60 secs of zero error	± 10 secs



Table B is subject to the following:-

**Relationship to MSF Radio Time Signal Time**

“-” Indicates an understatement of lateness. For example, if a clock at Specified Point runs 3 seconds slow in comparison to the MSF Radio Time Signal time, a train arriving at that Specified Point at 12.00 and 3 seconds by MSF Radio Time Signal time will be timed at 12.00 and nil seconds. Accordingly for the purposes of Table B, that Timing is regarded as having an error of minus 3 seconds.

**Bias**

The bias at Specified Point is the sum of all the errors, divided by the number of timings. The average bias at several Specified Points is the sum of the individual errors divided by the sum of the number of timings.

**Blue Category**

The error is the difference between the Timing and the MSF Radio Time Signal time at the moment when the Timing is made for use in the Recording.

**Orange Category**

The error is the difference between the Recording and the MSF Radio Time Signal time of the corresponding event.

For Orange Specified Points, the bias at each Specified Point and the average bias of all Specified Points of a category in a single Margin Book shall be the underlying long-term biases and not biases over a single Accounting Period.

For Orange Specified Points, in relation to trains stopping at Specified Point the event the subject of the Timing is the train coming to a stand at that Specified Point.

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