

# Post Incident Inspection following an axle journal bearing failure on Iarnród Éireann Locomotive 233,

18 October 2011



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## Executive Summary

On Tuesday 18th October Iarnród Éireann (IÉ) locomotive No.233 (working in 'pushing' mode at the rear of the 16:10 Belfast to Dublin *Enterprise* service) triggered the Hot Axle Box Detector (HABD) at 28¾mp, Drogheda, which indicated that a journal bearing on the rear axle of locomotive No.233 was running hot.

The HABD alarm alerted staff at Central Traffic Control (CTC) and the signaller contacted the train driver by radio, requesting that he stop his train and carry out an inspection. The driver undertook a visual inspection and reported back to CTC, stating that there was no fault found (NFF). CTC then advised the train driver to continue to Connolly Station, Dublin, as normal.

The Chief Mechanical Engineer's (CME) department was also alerted to the HABD alarm and requested that CME staff, based in Connolly, check the axle on arrival of the train. During this inspection it was noted that the bearing had overheated and partially collapsed.

The Railway Safety Commission (RSC) was notified of the occurrence by Iarnród Éireann (IÉ) at 11:49 on Thursday 20<sup>th</sup> October. Following this notification the RSC commenced its own initial inquiries and as a result of which it was decided to undertake a Post Incident Inspection under Section 50, subsection 7, of the Railway Safety Act 2005, as amended, ("the Act").

Post incident, the RSC reviewed the salient standards relating to safety critical communications and the training and competency of both train drivers and CTC signallers.

In addition, the standards pertinent to the inspection and maintenance of 201 Class locomotive bogies and, more specifically their wheel-sets, were requested from IÉ. These were reviewed in detail in conjunction with records of the maintenance activities undertaken by CME personnel in Inchicore Works.

Having completed the document and records review phase the RSC conducted a number of interviews with various IÉ personnel. Based on the information recorded in these interviews and the records (evidence) collected the RSC have identified one (1) minor non-compliance (miNC) indicating a sporadic lapse in the implementation of the IÉ's Safety Management System (SMS). This non-compliance relates to:

- Failing to implement section 5.1.3.1 of CME-SMS-004: training and competence of CME craft persons

Thus IÉ are required to advise the RSC by a prescribed date of the actions that they will take to address the miNC and the timescale within which it shall be completed. This notification from IÉ will be in the form of an Improvement Plan in accordance with Section 76 of the Act. The RSC will review this Improvement Plan and, subject to it being acceptable, will monitor its execution.

In addition to the miNC, six (6) 'Action Required' items have been identified for IÉ to address and the RSC has assigned planned completion dates (PCD) to each of these, as follows:

<b>ID Number</b>	<b>Area for Action</b>	<b>PCD</b>
01/12-P11-AR 1	Review relevant section of the Signallers General Instruction (SGI) and amend accordingly.	3 months
01/12-P11-AR 2	Review the train driver training syllabus and the mechanisms to aid the identification of over-heated axle-boxes.	3 months
01/12-P11-AR 3	Relocate the Drogheda HABD alarm indicator to the console of the appropriate Signaller at CTC.	3 months
01/12-P11-AR 4	Review the communications assessment & monitoring processes within CTC.	3 months
01/12-P11-AR 5	Formalise procedures for CME personnel when communicating with CTC.	3 months
01/12-P11-AR 6	Ensure strategic items of rolling stock recovery equipment are available at all times.	3 months

Table i: Actions required items

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## 1. Key Facts about the incident involving Locomotive 233

On Tuesday 18th October 2011 Iarnród Éireann locomotive No.233 (working in ‘pushing’ mode at the rear of the 16:10 Belfast to Dublin *Enterprise* service) triggered the Hot Axle Box Detector (HABD) at 28½mp, Drogheda, which indicated that a journal bearing on the rear axle of locomotive No.233 was running hot.

The HABD alarm alerted staff at Central Traffic Control (CTC) and the signaller contacted the train driver by radio, requesting that he stop his train and carry out an inspection. The driver undertook a visual inspection and reported back to CTC, stating that there was no fault found (NFF). CTC then advised the train driver to continue to Connolly Station, Dublin, as normal.

The Chief Mechanical Engineer’s (CME) department was also alerted to the HABD alarm and requested that CME staff, based in Connolly, check the axle on the arrival of the train. During this inspection it was noted that the bearing had overheated and partially collapsed.

## 2. Purpose of the Post Incident Inspection

The Railway Safety Commission (RSC) in complying with its statutory duty to regulate railway safety is concerned with any occurrence which could, in slightly different circumstances, result in a serious or catastrophic accident. It is not the role of the RSC to determine the cause of an accident or incident — that responsibility rests with the Railway Accident Investigation Unit (RAIU) — but to identify whether an occurrence resulted from a duty holder’s failure to comply with its approved Safety Management System (SMS).

Had the journal bearing on locomotive No.233 completely collapsed whilst the train was still in motion, there could have been a high speed derailment with attendant consequences. It is because of this serious potential for disaster that the RSC decided to undertake a Post Incident Inspection in accordance with section 50 (7) of the Railway Safety Act 2005, as amended.

## 3. The Incident

### 3.1. Parties Involved

- Iarnród Éireann (Irish Rail) as the principal Duty Holder is divided into two parts, i.e.,
  - Irish Rail is the Railway Undertaking (RU), i.e., the train operator and the employer of the train driver. The RU is also currently responsible for the Signallers and Regulators based in Central Traffic Control (CTC), Connolly.
  - Irish Rail is the Infrastructure Manager and is currently responsible for the maintenance of rolling stock and the trackside HABD equipment.

## 3.2. Location

The Belfast to Dublin mainline is double track comprising an UP (to Dublin Connolly) line and DOWN (to Belfast Central) line. Other key features include:

- The inter-city passenger trains on the Dublin-Belfast route are operated primarily by the *Enterprise Service*.
- The maximum line speed on this route is 90 mile/hr for passenger trains and 50 mile/hr for freight trains.
- HABDs are installed at two locations along this route, two (2) at Dundalk, 1 on the Up line and 1 on the Down line, both at the 52 milepost; and two (2) at Drogheda, 1 on the Up line and 1 on the down line, both at the 28¾ milepost.
- The HABDs at Drogheda are both Phoenix type and were commissioned in August 2007.

## 3.3. The Train

The train (Train ID: A161) involved in the incident consisted of 201 Class locomotive with seven (7) De-Dietrich carriages operated in push/pull mode. The train consist was as follows:

- 9003 DVT (First class) leading, followed 9104 (First class), 9401 (Restaurant car), 9215, 9203, 9201, 9208 (all Standard class), and Locomotive 233 in the rear.

The locomotive was equipped with an event recorder (TELOC).

## 4. The post Incident Inspection

### 4.1. Sources of evidence

Evidence gathered at site (Connolly Sidings)

- Detail of the rolling stock
- Photographs taken of the locomotive involved in the incident

Further evidence gathered / supplied / reviewed

- Copies of Component Overhaul Instructions (COIs) relating to the maintenance of 201 Class wheel-sets
- Review of CME maintenance paperwork associated with the bearing, axle and wheelset.
- IÉ Standard: CME-SMS-004 - Competency Assessments and Training V2-July 2010
- Driver training material
- Competence plan for Wheelshop 2011
- Train driver roster
- Copy of train driver and CME maintenance staff competence records
- Recordings of voice communications from CTC to Driver, Regulator and CME Personnel
- HABD information on alarm history
- Witness testing of the 3 axles on the bogie with the failed bearing
- The Risk register for the 201 Class Locomotives
- Interviews with IÉ personnel

## 4.2. Summary of evidence obtained during interview

A source of evidence was interviews with a number of personnel from various departments of Iarnród Éireann. These included personnel from both 'Operations' and 'Mechanical Engineering' functions. The specific post holders interviewed are listed below.

- The Train driver
- The Suburban Signaller
- The CME Craft Worker
- CME B&W Production Manager
- A District Traction Executive
- A Driver trainer
- Manager FTS
- Ops Performance & Control Manager
- Manager FTS Bogie & wheelsets
- CME Technical Manager
- Operations Safety Manager

The salient facts in relation to this incident are now summarised.

### 4.2.1. Facts relating to the Train Driver

- The driver had 13 years experience driving locomotives and railcars. His route knowledge permitted him to drive between Bray and Belfast.
- His annual rules exam was in date and he had, in 2010, spent 2 days in Inchicore Training centre on the train simulator.
- The Driver was a class 'U' driver, meaning he was unrestricted under IÉ's Standard for Competence Management - Drivers (OPS-SMS-3.1). As an unrestricted driver he would be subject to a number of assessments over a two year cycle, e.g. minimum of 2 formal driving assessments per year with a District Traffic Executive (DTE).
- He commenced his turn of duty at 12:00 and worked the 13:20 *Enterprise* service to Belfast with the same train formation and without incident. At Belfast he changed ends and commenced the return passenger services at 16:10.
- While passing through the Laytown area the driver was contacted by the Suburban Signaller. The Signaller instructed the driver to stop and inspect his train and then let him know [if anything was found]. The driver did this at circa the 26  $\frac{3}{4}$  milepost and advised the Suburban Signaller that there is no sign of any heat. The Suburban Signaller asks "*is everything all right with ya, is it?*", to which the drivers replies "*everything's perfect yeah*". This would infer that the train driver found no fault. He was then told by the Suburban Signaller that he could continue his journey.
- When in the Skerries area the driver was contacted by the Regulator advising that his train would be checked upon arrival at Connolly by a member of staff from CME.
- He brought his train into platform 2 at Connolly station as normal circa 18:30, approximately 15 minutes late.

### 4.2.2. Facts relating to the CTC Signallers

- Three of the Signallers at CTC are relevant to this incident, the Northern & Sligo Signaller and two Suburban Signallers. The reason that three Signallers were involved is that the Drogheda HABD Alarm indicator is located on the Northern & Sligo Signallers console while the route from

Drogheda to Connolly is under the control of the Suburban Signaller, and there was also a change of Suburban Signaller (shift change) during the time period of the incident.

- The Suburban console is manned by two competent Signallers, one manages all voice communication while the other manages train movements. *Note: All subsequent references to Suburban Signaller refer to the communications signaller.*
- The first Suburban Signaller has worked for IÉ since 2001 and has been in CTC as a Signaller since 2004. He commenced his turn of duty at 14:00 working as the Communications Signaller on the suburban console.
- The Northern & Sligo Signaller informed the first Suburban Signaller of the HABD alarm at Drogheda.
- The Suburban Signaller contacted the train driver and advised him that he had set off the Drogheda UP line HABD alarm, and he asked him to stop and inspect his train.
- At this point there was a change of Signallers at the Suburban console.
- The second Suburban Signaller has been a CTC Signaller since 1990. He commenced his turn of duty at 17.55 (Rostered to start 18.00) working as the Communications Signaller on the suburban console.
- By that time the driver had brought his train to a stop, checked his train, and reported no fault found (NFF) to the second Suburban Signaller. The second Suburban Signaller then advised the driver that he could “*lash away*” presumably meaning proceed at line speed to Connolly.

#### **4.2.3. Facts relating to the CME Craft Worker**

- The CME Craft Worker has worked for IÉ CME since 2000 working in the fleet casualty repair facility. He had been in the wheel-shop at Inchicore since February 2011.
- His principal duties are stripping down wheel-sets and then rebuilding them, this task including the removal and fitting of axle journal bearings.
- He had been trained on the shop floor by watching others and by then undertaking the activity himself under the guidance of a more experienced member of staff. He has been assessed in:
  - Axle run out check and pump off wheels on the 23<sup>rd</sup> June 2011 and
  - 201 Class U-tube strip on the 18<sup>th</sup> October 2011 and
  - Fitting cartridge bearings on the 7<sup>th</sup> November 2011 (post incident)

#### **4.2.4. Facts relating to the monitoring of HABDs by CME Staff**

- It was advised that following the derailment of a Tara Mines freight train at Skerries on the 10th of January 2008, which was a result of the catastrophic failure of an axle journal bearing on one of the wagons leading to a burnt off journal, the CME instructed that the temperature settings that trigger HABD alarms were to be lowered from an absolute of 112 °C for a hot bearing alarm to 100 °C and from 67 °C to 50 °C and latterly again to 40 °C for an axle end to axle end differential temperature alarm.
- The Manager Fleet Technical Support (MFTS) and other key CME technical support staff actively monitor HABD readings on a daily basis and identify trends and take proactive action as required.



- In this particular instance a FTS operative contacted the CTC Regulator making enquires as to the train that had triggered the Drogheda HABD. It is not clear if the FTS followed up on this initial call as they had indicated they would. Additionally the MFTS contacted rang the CTC Duty Manager (presumably on their mobile phone, as there is no recorded call) as he was concerned that from reviewing the data received from the HABD fault report that the alarm was genuine. That is why he followed up with a call to Connolly Maintenance to check the train when it arrived.
- It was advised that the procedure to be adhered to following a HABD alarm if no fault was found (NFF) had been changed post incident (Locomotive 233 incident). It was explained that if no fault was found then the train would be permitted to continue its journey, but limited to 50 mile/hr, that the train would stop every 10 miles, and that the driver would be required to examine his train again.
- It was advised that the last HABD on the route to Belfast is located at Dundalk at approximately the 52 milepost. There are no HABDs north of this mileage (Belfast Central is situated 61½ miles beyond that last HABD).

#### **4.2.5. Facts relating to the management of bogies & wheel-sets**

- The MFTS Bogie & Wheelsets is the accountable line manager responsible for the production of technical documentation, e.g., standards, technical instructions, etc., relative to bogies and wheelsets for all of IÉ's fleets.
- There are circa 700 technical documents such as Component Overhaul Instructions (COI). There are two levels of COI. Level 1 is the main stages in the maintenance process whereas level 2 COI are the detailed 'how to' instructions.
- There are 2 SFTS under the MFTS B&W and they produce the documents, and also provide advice and guidance to CME Craft Workers as necessary. They do not train staff, this is the responsibility of the training school. One of the SFTS monitors the HABD activity on a daily basis in order to identify any issues of concern, spurious information, etc.
- There is a compliance-coordinator in the team who, in accordance with the CME SMS, must undertake a 100% paperwork check and 15% physical (observations) check.
- The journal bearing that failed (a Timken Class F bearing) was a recertified unit, i.e., it was not a new bearing. The overhaul was carried out by Timken UK on the 30<sup>th</sup> August 2011
- The journal bearing was assembled on to a qualified axle, No. 507 XV 09 on the 22<sup>nd</sup> September 2011, which was then fitted to bogie, No. 496 on the 29<sup>th</sup> September 2011.
- Bogie No.499 was put under locomotive 233 on the 6<sup>th</sup> October 2011. The locomotive was trialled that day for 6 miles and re-entered service on 7<sup>th</sup> October 2011 (11 days before the incident).

#### **4.2.6. Facts relating to Train drivers and CTC Signallers**

- CTC Signallers are trained in accordance with Railway Safety Standard 45 – Competence Management System : CTC Signallers (replaced in December 2011 by OPS-SMS-4.0)
- Training consists of the CTC Signaller's foundation training (typically classroom based and delivered in the training school) followed by practical workplace training.

- The Signallers involved in this incident had undertaken advanced communications training.
- The Signallers General Instructions Section 51 is the applicable guidance for CTC Signallers. These instructions were not followed as it was stated that derogation was issued by the Safety Department in relation to this. However, a record of this derogation was not available.
- The SGI contains no information on what should be done if no fault is found, however, it was advised that personnel are working on an update/revision.
- Additional instructions exist in section E of the General Appendix (*It is later advised that Section E of the General Appendix dated August 1995 was withdrawn in April 2006 and was notified in W/C 3187, dated 09/04/2006.*)
- Train Drivers are trained and their competence managed in accordance with OPS-SMS-3.0 : Driver training and OPS-SMS-3.1 : Competence Management : Drivers)
- No information on HABD is contained in any Train Drivers Manual or the Professional Drivers Manual or the Working TimeTable (WTT). However, it was stated that information is included in the train driver's initial training syllabus.

## 5. Analysis, findings & outcomes

Based upon the above facts, evidence and analysis a number of findings are now presented. From the findings identified as part of this inspection a number of inspection outcomes have been decided. These outcomes are in accordance with the RSC's guidance on supervision and enforcement, RSC-G-023-B, but for convenience they are explained below. Where possible, they are made specific, measurable, achievable, realistic and timely (SMART). The supervision activity outcomes are classified as follows;

**Major Non Compliance (MaNC):** an area of non-compliance with an IÉ internal, an applicable external standard, or legislation that is evidence of a system failure.

**Minor Non Compliance (miNC):** an area of non compliance with IÉ internal standard, an applicable external standard, or legislation that is evidence of a sporadic lapse in implementation of a system or deviation from a system.

**Action Required (AR):** an area where potential exists for a non compliance to occur unless remedial actions or improvements are made, or an isolated error that requires correction.

**Scope for improvement (SFI):** an area highlighted where, in the opinion of the Inspector, system or business improvement can be achieved by the company. Typically this is phrased as a recommendation, the merits and implementation of which should be decided by organisation in question.

The format in which outcomes are made are shown thus;

<b>01/12-PII-CA 1 - "unique supervision activity number for the year"/"year"- "supervision activity"- "counter with prefix MaNC, miNC, AR or Sfi"</b>
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Title (High level descriptor of identified issue)
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Detail as required
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<b>PCD:</b> (Planned completion date only specified for an 'Action Required' item)
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Table 1: Recommendation Format

### 5.1. Finding & Outcomes

#### 5.1.1. Documentation

Section 51 of the Signallers General Instructions (SGI) pertains to Hot Axle Box Detectors (HABD). A small number of issues were identified with this section and these are now presented.

Section 51.1 requires that the Signaller marks the recorder graph specific information.

**Finding 1:** The use of recorder graphs is no longer undertaken and marking the recorder graph is no longer necessary.

Section 51.2 requires that the Signaller examines the recorder graph to ascertain the location of the suspect vehicle.

**Finding 2:** The use of recorder graphs is no longer undertaken.

Section 51.3 requires that the Signaller tells the train driver the specific location of the defect

**Finding 3:** *the Signaller has until recently only been advising the Train Driver to ‘Stop & Examine your train’*

Given the above findings (1-3) in relation documentation the following AR item is made.

**01/12-PII-AR 1:** Review relevant section of the Signallers General Instruction (SGI) and amend accordingly

The HoES should review and rewrite section 51 of the SGI to ensure it reflects current operational practices. The new instruction should then be briefed to all necessary personnel including CME staff involved in the monitoring of HADB alarm information.

**PCD:** 3 months from final issue of report.

### 5.1.2. Training and Competence

Training and competence of personnel involved in safety critical work is a key activity of any duty holder.

- **CME Staff**

In the case of this incident the CME Craft Worker is the key safety critical worker responsible for the fitting of bearings to axles. From the evidence it is clear that the Craft Worker had not been assessed in the activity of fitting bearings to axles.

Section 5.1.3 of CME-SMS-004 states;

*Any new recruit and/or any relocation of either craft persons or supervisors between identifiably different types of CME Locations as described in CME Safety Management Standard CME-SMS-001 - “Safety Management System” will require a Safety Critical Competency assessment before such a person can take up their duties. In these cases the following approach will be followed:*

Section 5.1.3.1 of CME-SMS-004 states;

*Every new recruit and/or any relocated craft person will be identified as “Not Yet Competent” and will work under the direct supervision and guidance of an identified competent member of staff for a period of eight weeks; after which the person’s Safety Critical Competency will be assessed.*

Section 5.4.5.1 of CME-SMS-004 states;

*All employees with existing rolling stock Maintenance knowledge are assumed to be competent and will systematically be assessed against this Standard within the period 2 January 2009 to December 2012.*

**Finding 4:** The Craft worker had, in February 2011, moved between identifiably different types of CME Locations, i.e., from the fleet casualty repair facility to the wheel-shop; and had undertaken a safety critical activity, fitting bearings to axles, without being formally assessed.

Given the above finding (4) in relation training and competence the following minor non-compliance is stated.

**01/12-PII-miNC 1:** Non-compliance with section 5.1.3.1 of CME-SMS-004

The CME Craft Worker undertook safety critical work without being passed as competent to undertake the specific activity.

It is unknown at this stage whether or not the above non-compliance is linked to the immediate cause or contributory to the axle failure. This will be established by the RAIU. However, it indicates a sporadic lapse in the implementation of the SMS and therefore remains valid.

- **Operations Staff**

The train (Train ID: A161) departed Belfast as normal and travelled past the HABD at Dundalk without incident. As it travelled past the HABD at Drogheda is set off the alarm. CTC contacted the driver and requested that he stop and inspect his train.

**Finding 5:** A train driver may on occasion be required to undertake a potentially safety critical inspection yet they do not have a Safety Responsibility Statement (SRS).<sup>1</sup>

Given the above finding (5) the following scope for improvement item is suggested.

**01/12-P11-Sf1 1: Review need for SRS's for safety critical workers**

The issue of SRS to train drivers and other safety critical workers represents an opportunity for improvement for IÉ.

The train driver having being contacted by the appropriate CTC Signaller commenced an inspection of his train to check for an overheating bearing/axlebox.

**Finding 6:** HABD alarms are an infrequent event and therefore train drivers are not overly familiar with what is expected of them, nor are they equipped to check their train for hot axle-boxes. The train driver completed the inspection of his train and found no fault yet circa 25 miles later at Connolly station it was evident the axle bearing had partially collapsed.

Given the above finding (6) the following AR is made.

**01/12-P11-AR 2: Review the train driver training syllabus and the mechanisms to aid the identification of over-heated axle-boxes**

- a) IÉ should ensure that HABD and the associated tasks required of train drivers are adequately covered in training and periodic refresher training.
- b) IE should review the mechanisms available to aid the train driver identify an axlebox which has overheated with a view to implementing across all operational fleets.

**PCD:** 3 months from final issue of report.

### 5.1.3. Assets & equipment

The railway is a complex system comprising numerous subsystems that must interact together to enable efficient train operations.

- **CTC Signallers Consoles**

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<sup>1</sup> During the course of this post incident inspection it was also noted that the Acting Duty Supervisor at Connolly who would be expected to check trains at Connolly and essentially pass a train as fit for service does not have an SRS. During the course of a earlier audit this issue was identified (see audit outcome 04/11-A-AR 6). It is acknowledged that the CME is currently undertaking a review to confirm that all relevant staff have been issued with and briefed with an SRS. This will be complete by April 2012.

CTC as a department is responsible for the regulation and train control function and the Signaller plays a key role in this activity.

**Finding 7:** The Drogheda HABD alarm indicator is located on the Northern Sligo Signaller's console yet this track location is the responsibility of the Suburban Signaller.

Given the above finding (8) the following AR is made.

**01/12-P11-AR 3:** Relocate the Drogheda HABD alarm indicator to the console of the appropriate Signaller at CTC

The CE-SET should arrange for the Drogheda HABD alarm indicator to be relocated to the console of the most appropriate Signaller.

**PCD:** 3 months from final issue of report.

- **The HABD network and strategy**

IE's HABD network and strategy was discussed with key personnel as part of the interview process. IE has a number of HABD units installed, typically every 30 miles, around its network and has in recent years increased the number of installations.

**Finding 8:** There are two HABD sites on the Dublin to Belfast line located at Drogheda and Dundalk. The Dundalk HABD site is located approximately at the 52 milepost, meaning a train travelling to Belfast will go unchecked from the 52 milepost to Belfast Central a distance of 61½ miles.

**01/12-P11-Sfl 2:** Review the HABD Network and overall HABD strategy

A review of the adequacy of the HABD network and the overall HABD strategy and of available technologies to detect the presence of axle box and wheel bearing abnormalities, e.g., acoustic detection represents an opportunity for improvement for IE.

*Post Audit Note:* Northern Ireland Railway (NIR) have recently installed and commissioned an acoustic bearing fault detector and provided there is a process for the sharing of safety information this finding is no longer true. However, in the interest of continuous improvement it remains a valid scope for improvement.

**Finding 9:** The HABD unit currently installed around the network does not identify the Train (train ID) only the number of axles that make up the train. Technology exists such as passive tagging whereby a train can send information to a trackside receiver thus identifying the train by its ID or other such means.

**01/12-P11-Sfl 3:** Establish a CME-SET Working Group

The ACEO (Eng) should consider establishing a CME-SET Working Group (WG) similar to the Wheel-Rail Interface WG. This WG could discuss common CME-SET faults/issues and potentially identify and implement solutions or make improvements to existing monitoring equipment, e.g., HABD with 'Passive tagging' capability.

#### 5.1.4. Internal Communication

In high reliability organisations safety critical communications is recognised as a key risk area and one which requires constant monitoring.

IE Railway Safety Standard 45, which is being phased out and replaced by standard OPS-SMS-4.0 (Selection, training, monitoring and assessment of CTC Signallers) and standard OPS-SMS- 8.1 (Safety Critical Communications) establishes structured regimes for monitoring the communications of CTC personnel (*Note the latter standard covers all persons making a safety critical communication not just CTC Signallers*). The Signallers involved in this incident had also undertaken advanced communications training. However, the RSC, having reviewed the audio recordings relating to this incident, are of the opinion that the quality of some communications used by CTC personnel was not suitable for a safety critical environment. Similarly, some internal CTC communication failed to identify the train by its ID and in none of the calls did the Signaller request the other party to repeat the instruction.

**Finding 10:** The quality of Safety Critical Communication by some CTC personnel does not meet the standard expected of those individuals responsible for conducting safety critical communications. The Train ID was not conveyed in a number of calls, and inappropriate terms, e.g., ‘*lash away*’ have been used.

**01/12-P11-AR 4:** Review the communications assessment & monitoring processes within CTC.  
IE’s safety department should undertake an independent review of the communication assessment and monitoring processes within CTC. This review should assess the general standard of safety critical communication within CTC and identify any actions required to ensure high individual performance is maintained.  
**PCD:** 3 months.

**Finding 11:** Two members of CME Technical Support, independently of each other, contacted CTC regarding the HABD alarm. One of these calls was made directly to the CTC Duty Manager (Regulator) and was not recorded; the other was simply to determine the fleet (type of rolling stock involved).

The CME have ‘on-call rosters’ for fleet specific FTS staff to be available out of hours to provide advice and guidance to CTC, drivers and others as required. In addition, an ‘on-call procedure’ for use by CTC staff would appear to be in place. [Procedure submitted to the RSC attached to the Drogheda On-call roster]. Studying the ‘on-call procedure’, it appears not to have been followed in this instance as CTC did not contact the FTS but rather it was other way around. Similarly, nowhere in the procedure does it state that the MFTS should contact CTC on an unrecorded line. While the intentions of the CME technical team are well intended they lack robustness in terms of passing potentially safety critical advice. Given the above, the following ‘Action Required’ item is raised.

**01/12-P11-AR 5:** Review the existing on-call procedure to ensure it captures what CME personnel should do when communicating with CTC.  
The CME in conjunction with the HoES should review and amend as necessary the current on-call procedure to ensure it accurately reflects what actually happens following an occurrence. It should be an auditable process ensuring safety critical information is formally recorded.  
**PCD:** 3 months.

### 5.1.5. Emergency Preparedness

From time to time operational incidents will occur that require remedial plans to be instigated. Similarly, in a high reliability industry, such as the rail industry, emergency preparedness must be considered.

**Finding 12:** The bogie carriage unit (skate) was not available for the recovery of the locomotive. This introduced new risks, i.e., the 113 tonne locomotive had to be lifted by crane onto a low loader and moved to Inchicore by road as opposed to simply jacking the locomotive to insert a recovery skate.

**01/12-P11-AR 6:** Ensure strategic items of rolling stock recovery equipment are available at all times. IÉ CME should establish procedures to ensure that suitable recovery equipment is always available for use, i.e., there is ownership of that responsibility. Additionally, IÉ should undertake a risk assessment of the various means of recovering failed rolling stock.

**PCD:** 3 months from issue of final report.



## 6. Summary of findings & outcomes

This post incident inspection has identified 12 findings resulting in 10 inspection outcomes. They include;

- 1 minor non-compliance,
- 6 'Acton Required' items and
- 3 'Scope for Improvement' areas.

The tables below summarise the inspection outcomes.

Number	Area
01/12-PII-miNC 1	Non-compliance with section 5.1.3.1 of CME-SMS-004 which deals with the training and competence of CME craft persons.

*Table 2: Non-compliance summary*

Number	Area	PCD
01/12-PII-AR 1	Review relevant section of the Signallers General Instruction (SGI) and amend accordingly.	3 months
01/12-PII-AR 2	Review the train driver training syllabus and the mechanisms to aid the identification of over-heated axle-boxes.	3 months
01/12-PII-AR 3	Relocate the Drogheda HABD alarm indicator to the console of the appropriate Signaller at CTC.	3 months
01/12-PII-AR 4	Review the communications assessment & monitoring processes within CTC.	3 months
01/12-PII-AR 5	Review the existing on-call procedure to ensure it captures what CME personnel should do when communicating with CTC.	3 months
01/12-PII-AR 6	Ensure strategic items of rolling stock recovery equipment are available at all times.	3 months
01/12-PII-Sfl 1	Review need for SRS's for safety critical workers	NA
01/12-PII-Sfl 2	Review the HABD Network and overall HABD strategy	NA
01/12-PII-Sfl 3	Establish a CME-SET Working Group	NA

*Table 3: Inspection outcome summary*

## 7. Relevant actions already taken or in progress

On the 8<sup>th</sup> March 2012 IÉ advised of the following;

- In terms of HABD locations, IÉ have advised that Northern Ireland Railway (NIR) have an installed and recently commissioned an acoustic bearing fault detector at the 111 mile post. Technical Staff from the CME department have met with their counterparts from NIR and IÉ envisage some form of process whereby information pertinent to IÉ rolling stock from the acoustic bearing fault detector will be supplied.
- Section 51 of the Signallers General Instructions has been rewritten and issued to all relevant IÉ staff as a supplement to Weekly Circular WC 3497, week ending 18.03.12.
- In terms of the minor non-compliance with section 5.1.3.1 of CME-SMS-004, the craft worker was trained and accessed to fit 201 bearings on the 07<sup>th</sup> November 2011 (After the incident).
- Improvements have been made to the wheelset overhaul documents to record the push on force of bearings similar to that used on wheel pans to ensure fitment is correct.
  - *RSC additional Comment* - Achievement of the correct push-on force gives some confirmation that the bearing has seated, but it is not an absolute indicator. The RSC requested an Improvement Plan, reference RSC-L-76/005 that covered this issue and IÉ in its submitted Improvement Plan advised of additional measures that have been incorporated in the applicable COI(s), including the 'feeler gauge check' to confirm that a bearing is fully seated.
- IÉ's own detailed investigation into the bearing failure is underway with the OEM Timken and an independent expert. This will feed into the RAIU investigation report

## 8. Next Steps

In accordance with section 76 of the Railway Safety Act, to ensure deficiencies in the process for controlling risks in relation to competency assessment, IÉ shall submit an Improvement Plan (Plan) to the RSC by a prescribed date. This plan should clearly define how it intends to rectify the SMS deficiencies (non-compliance) identified and provide a timescale for doing so. The RSC will review this submission and subject to it being satisfactory will track its implementation.

Similarly, IÉ should detail the actions taken /proposed to address the 'Action Required' items. Furthermore IÉ should confirm its acceptance of the proposed planned completion dates for all 'Action Required' items.

As is stated in section 5, a 'Scope for improvement (SFI)' item is an area highlighted where, in the opinion of the Inspector, system or business improvement can be achieved by the company. Typically they are phrased as recommendations, the merits and implementation of which should be decided by inspected organisation.