RAIU: Safety Advice Notice

SAN 001: Suitability of Fixed Buffer Stops

PART 1 – Occurrence Description	
Time & Date	15:06hrs 06/07/19
Organisation	IÉ (IM-CCE & RU-CME)
Occurrence Type	Collision with a fixed buffer stop
Location	Laois Train Care Depot – Pit Road 8
Rolling Stock Type	Inter City Rail 22000, InterCity Railcar set 22216 (ICR 16). Consist 22216 leading, 22816, 22416 & 22316.
Infrastructure Asset Type	Fixed Buffer Stop
Accident Description	While undergoing maintenance intervention on Pit Road 8, LTCD, ICR 16 was moved approximately 8.25 meters under its own power before colliding with a fixed buffer stop. The train rode up on, and moved, the buffer before coming to a stop. There was a CME Craft worker in cab 22216 at the time of the accident. No other persons were in the vicinity of the train at the time of the accident. The train was in a normal state with no bypasses or isolations activated or circuit breakers tripped. The fixed buffer stop was significantly damaged.
Previous Similar Occurrences	Collision of an ICR with a buffer stop at Laois Train Care Depot, 17th July 2018 (RAIU Report 2019-R002, issued 25th June 2019).

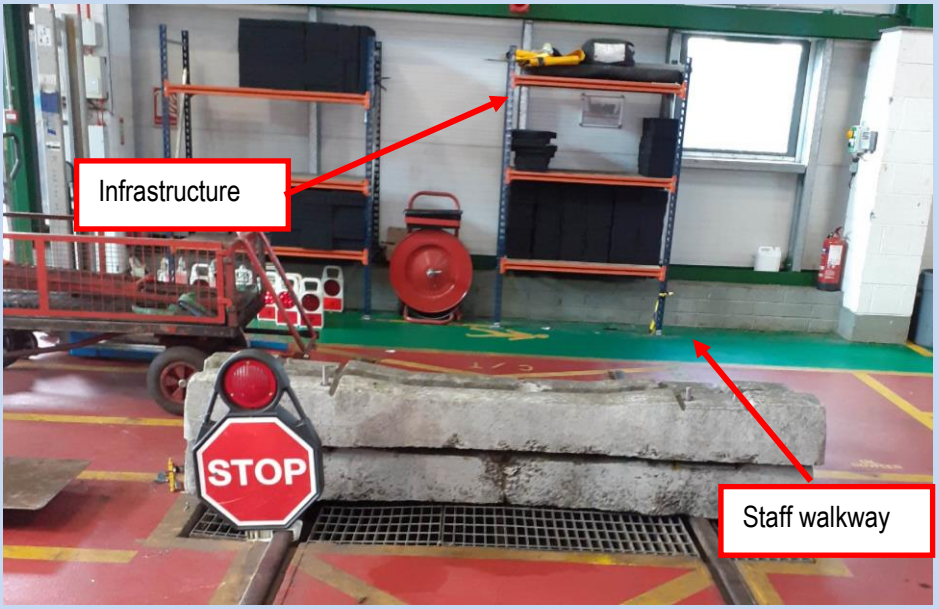
PART 2 – Supporting Documentation

Supporting Documentation - Photographs

Photograph 1 – Image of buffer stop after accident:

Photograph 2 – Location of buffer stop involved in the accident, now with concrete block

Note: The measurements from the face of the buffer to the inside staff walkway and to the infrastructure wall are 2600 mm and 3900 mm, respectively.



Photograph 3 – Example of fixed buffer stop insitu:

Supporting References – Standards & Procedures & IÉ responses to queries	**Technical Information Sheet MW55 (14th August 1991)** According to IÉ, the buffer involved in the accident was installed to MW55. MW55 was reviewed by the RAIU & MW55 only appear to reference to Friction Buffer Stops; there is no specific mention on fixed buffer stops. Some requirements to note from MW55 are as follows: • It is not good practice to site new buildings directly behind buffer stop. In a few locations it may be necessary to consider the need to provide additional protection behind the buffer run-out by way of sand heap or concrete block where existing buildings might be vulnerable. **Risk Register Depot (21st August 2007)** While the hazard of "movement of rail vehicles" is identified in the risk register and the accident scenario "Collision with infrastructure" is further identified; IÉ have not identified the potential collision of rail vehicles with staff; and the risk control plan does not reference buffer stops in any accident scenario. In addition, IÉ CCE have confirmed that "there was no risk assessment conducted for the installation of the buffer stops within the workshop at LTCD". **CCE-TMS-386, Requirements for Buffer Stops** As part of the review undertaken by the RAIU, the RAIU requested information on the current standards related to buffer stops (i.e. what replaced MW55, which was in place at the time of installation). 1.2.2 states that "While this standard applies to all new buffer stops designed, purchased and commissioned after the operative date of this standard, the spirit of this standard also applies to all pre-existing buffer stops on our network". IÉ-IM "intended by this statement to demonstrate that while it is accepted that there is a large number of historic buffer stops installed on the system, the maintenance and inspection regime that is applied to all new buffer stops, would also be applied to these existing historic buffer stops. In addition when there is a material change to the use of the line, on which the buffer is located, or when new or additional rolling stock is introduced, the suitability of the buffer stop would be re-viewed. As and when necessary a new buffer stop would be installed". CCE-TMS-386 defines Fixed Buffer Stops as a "A fixed assembly provided at the end of a line to stop rail vehicles. It provides no energy absorption". Paragraph 4.1.5.1 & 4.1.5.2 state that: "A fixed or static buffer stop is not an energy-absorbing device. It is used for track demarcation to show where a track ends and to stop stock accidentally rolling off the end of the rails. A fixed buffer stop cannot be calculated to provide any protection for a specific train weight or speed, due to its lack of energy-absorbing capacity. In the event of a serious

impact, damage can occur to the rails, rolling stock or buffer stop"; and, "Fixed buffer stops are more suited to depots and sidings where passenger safety is not a factor in protecting the train or infrastructure".

Tables 1 & 2 in CCE-TMS-386 set out the track requirements for friction and fixed buffer stops, respectively. While 12 m (buffer face to end of run-out rail) is required for friction buffer stops; 1 m (buffer face to end of the rail behind the buffer stop) is required for fixed buffer stops.

Under 4.5, Design Requirements for Buffer Stops and their Locations", 4.5.1 states that each buffer stop installation is designed for its particular location. Every location must be individually reviewed", this is done through the completion of a Design Form, included in Appendix C of the standard. In terms of the design of the fixed buffer stop "A fixed buffer stop is not an energy-absorbing device. It is used primarily for track demarcation to show where a track ends and to stop stock accidentally rolling off the end of the rails. In the event of a serious impact, injury and/or damage can occur to any or all of the following – staff, the rails, rolling stock or buffer stop".

IÉ-IM responses

IÉ have stated that other controls are used in the absence of friction buffer stops, namely "speed limits, driver skill training and local knowledge would be used as methodologies to prevent the train striking the buffer stop".

IÉ-IM also stated that "A low energy "bumping or humping" strike into a fixed buffer during a shunting movement **would probably** be absorbed by the buffer stop but repeated incidences like this would over time result in damage to both the fixed stop block and the rolling stock".

In relation to ongoing works by IÉ-IM , IÉ-IM have stated that "As part of our overall asset management strategy and our focus on implementation of decision support tools to help us in the management of all our assets, we recently introduced and are in the process of rolling out a risk evaluation tool for all buffers on the network".

PART 3 – RAIU Conclusion	
RAIU Conclusion	The RAIU note that the fixed buffer stop was installed when no standard was in place, specifically for fixed buffer stops and as a result no risk assessments identified the hazards associated with the installation of fixed buffer stops in depots. Although, a new standard is now in place, the RAIU are not confident that the current design form is an adequate tool in the selection of appropriate buffer stops (it is noted that new risk evaluation tools are currently being drafted in relation to buffer stops). IÉ have stated that other controls are used in the absence of friction buffer stops, namely "speed limits, driver skill training and local knowledge would be used as methodologies to prevent the train striking the buffer stop"; however, these were not effective on the day of the incident as there was a collision with the fixed buffer stop. IÉ-IM also stated that "A low energy "bumping or humping" strike into a fixed buffer during a shunting movement **would probably** be absorbed by the buffer stop but repeated incidences like this would over time result in damage to both the fixed stop block and the rolling stock". The RAIU do not consider a "would probably" outcome acceptable. The RAIU conclude that a fixed buffer stop is not suitable at the location where the accident occurred in LTCD, as it does not adequately protect the staff (at its current distance of 2600 mm from walkway) and does not adequately protect the shed infrastructure (at its current distance of 3900 mm from the structure).

PART 4 – Safety Advice Notice (SAN)	
SAN Date	02/10/19
SAN Title	Suitability of Fixed Buffer Stops
SAN Number	SAN 001
Issued to	IÉ-IM & and CRR
Implementer	IÉ-IM
System/Equipment	Buffer Stops
Safety Issue Description	The fixed buffer is not suitable in depot locations which are close to staff walkways and structures.
Circumstances	ICR 16 moved unintentionally at slow speed, striking and damaging a friction buffer stop.
Consequences	The safety consequence as a result of the unintentional movement of a rail vehicle at speed would be injuries to staff and potential structural damage.
Reason for Issue	To prevent the possibility of injury to staff and damage to structures.
Safety Recommendations	**SAN001-01: IÉ-IM should review the selection of fixed buffer stops at locations at LTCD for their suitability and efficacy in protecting staff and infrastructure.** **SAN01-02: IÉ-IM should conduct review of their current specification for fixed buffer stops and their associated design forms to ensure they are fit-for-purpose; and fixed buffer stops are only selected where appropriate. Based on this review, IÉ-IM should commence a programme of inspections for fixed buffer stop at all locations on the IÉ network to ensure their suitability and effectiveness at protecting passenger, staff, track and infrastructure.**
PART 3 – SAN Sign-Off	
Chief Investigator Signature	D. Murton
Date	02/10/19