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25 June 2019



Mr Andrew Hall
Deputy Chief Inspector of Rail Accidents
Cullen House
Berkshire Copse Rd
Aldershot
Hampshire GU11 2HP

Dear Andrew,

RAIB Report: Overturning of a tram at Sandilands junction, Croydon, 9 November 2016

I write to provide an update¹ on the action taken in respect of recommendation 11 addressed to ORR in the above report, published on 7 December 2017.

The annex to this letter provides details of the action taken regarding the recommendation. The status of recommendation 11 is **'implemented'**.

We do not propose to take any further action in respect of the recommendation, unless we become aware that any of the information provided has become inaccurate, in which case I will write to you again.

We will publish this response on the ORR website on 25 June 2019.

Yours sincerely,

Oliver Stewart

¹ In accordance with Regulation 12(2)(b) of the Railways (Accident Investigation and Reporting) Regulations 2005

Recommendation 11

The intent of this recommendation is to minimise risk due to tram driver fatigue associated with both work and out-of-work activities.

Tram Operations Limited, drawing on expertise from elsewhere in the FirstGroup organisation, should review and, where necessary, improve the management of fatigue risk affecting its tram drivers with reference to ORR's good practice guidance. As a minimum this should include a review of:

- i. the base roster with particular reference to whether it is appropriate to use a shift rotation pattern of about a week;
- ii. the management and monitoring of overtime and rest day working;
- iii. training, briefings and support for tram drivers regarding lifestyle, sleep hygiene and their individual responsibilities regarding fatigue and fitness for duty (including reporting when they feel that fatigue may affect their driving performance); and
- iv. competence requirements for managers and supervisors that have a role in the management of fatigue risk

ORR decision

1. TOL appointed independent consultants to carry out a review of their management of fatigue risk. The outcome of the review was a series of recommendations which TOL have acted upon, which as a package should ensure TOL are better able to identify work patterns and behaviour which may contribute to staff fatigue; help staff identify and reduce the risk of fatigue through their lifestyle choices; and demonstrate a corporate commitment to the management of fatigue. The revised rotor will be introduced by the end of June 2019.
2. We are encouraged that TOL have shared their learning from the review with other tram operators, some of which are undertaking their own initiatives to improve their management of fatigue.
3. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Tram Operations Ltd has:
 - taken the recommendation into consideration; and
 - Has taken action to implement it

Status: Implemented.

Previously reported to RAIB

4. On 4 December 2018 ORR reported that TOL had commissioned an independent review of its fatigue management which was carried out by Clockwork Research. The report made a number of recommendations, which TOL accepted and were implementing.

5. We accepted that the implementation of the Clockwork Research recommendations was likely to take some time, particularly as it would involve significant changes to working patterns. We asked TOL to keep us informed with progress against the Clockwork recommendations.

Update

6. TOL have provided the following Fatigue Management Timeline to demonstrate implementation of Recommendation 11:

Timeline and Status of Activities Undertaken

May 2017	<p>TOL carried out an internal safety audit of their fatigue management activities to establish sufficiency of company procedure SM0003 Fatigue Management against good practice; and level of compliance against that procedure.</p> <p>A copy of the review and corresponding documentation that supports these activities has been provided to ORR:</p> <ul style="list-style-type: none"> • Copy of the audit report and recommendations made • Updated copy of SM0003 that shows changes made to FRMS in line with good practice from rail.
	TOL regard this stage of Recommendation 11 as completed.
July 2017	<p>TOL engaged Clockwork Solutions Ltd to provide a source of professional independent support to their Fatigue Risk Management Activities. Clockwork carried out a full review and gap analysis of TOL's Fatigue Risk Management System (FRMS) and provided recommendations to improve the effectiveness of the system against recognised good practice in other high-risk industries.</p> <p>These recommendations were accepted by TOL and appropriate resource and funding was allocated to support delivery of the initiatives undertaken.</p> <p>A copy of the review and corresponding documentation that supports these activities has been provided to ORR:</p> <ul style="list-style-type: none"> • Gap analysis • Implementation plan
	TOL regard this stage of Recommendation 11 as completed
August 2017	<p>TOL reviewed it's incident data to establish whether any links existed between drivers that had been involved in safety incidents and their roster pattern – where links were established support and development plans were implemented.</p> <p>A copy of the review and corresponding documentation that supports these activities has been provided to ORR:</p> <ul style="list-style-type: none"> • Spreadsheet showing link between safety incidents and roster pattern
	TOL regard this stage of Recommendation 11 as completed

September 2017	<p>TOL reviewed the actual hours worked by staff that complete regular overtime using the HSE Fatigue Risk Index to establish variances between planned and actual fatigue levels for those staff members.</p> <p>A copy of the review and corresponding documentation that supports these activities has been provided to ORR:</p> <ul style="list-style-type: none"> • HSE FRI assessment for regular shift workers
	TOL regard this stage of Recommendation 11 as completed
October 2017	<p>Clockwork reviewed TOL staff rosters using their SAFTE FAST biometric assessment tool; this assessment showed TOL's work roster patterns to be in the effective range.</p> <p>A copy of the review and corresponding documentation that supports these activities has been provided to ORR:</p> <ul style="list-style-type: none"> • SAFTE FAST roster review
	TOL regard this stage of Recommendation 11 as completed
November 2017 – January 2018	<p>TOL ran a series of focus groups facilitated by Clockwork solutions to gather driver feedback on their experiences of factors that bring about the onset of fatigue on the Croydon Tramlink Network – it was agreed that the output of this work would be used to enhance the quality of fatigue training; groups covered by new training package include:</p> <ul style="list-style-type: none"> • Executive Managers • Line managers, staff allocations and planning teams • Drivers • Controllers <p>A copy of the workshop findings has been provided to ORR:</p> <ul style="list-style-type: none"> • Clockwork summary of workshop outputs
	TOL regard this stage of Recommendation 11 as completed
April 2018	<p>TOL begin using management fatigue data provided by Guardian System to identify individuals with greater support needs; a procedure has been written and agreed with Trade Union colleagues to ensure consistent application of support activities.</p> <p>Fatigue hotspot information has been included in TOL's Route hazard assessments and communicated to drivers during fatigue training courses and at driver safety briefs.</p> <p>A copy of the Guardian Procedure is included for information:</p> <ul style="list-style-type: none"> • SM0068 Guardian Procedure
	TOL regard this stage of Recommendation 11 as completed

July 2018	<p>TOL join National Rail Fatigue Risk Management Group – further refinement of SM0003 begins and procedure is mapped to ROGS 9 stage approach to Fatigue Risk Management.</p> <p>The latest copy of SM0003 Fatigue Risk Management is included for information:</p> <ul style="list-style-type: none"> • SM0003 Fatigue Risk Management System
	<p>TOL regard this stage of Recommendation 11 as completed</p>
November 2018	<p>Clockwork and TOL agree the proposed format for enhanced fatigue management training; the training package will support delivery of practical training module for classroom style delivery and an electronic package that can be used by staff members to refresh their awareness of fatigue risk management techniques:</p> <ul style="list-style-type: none"> • Electronic Fatigue Training Module • Classroom lead training for individuals with specific responsibilities for fatigue risk management • Open Day for families to improve awareness of the fatigue risks associated with tram driving and what level of support is needed in the home <p>An example of the training format and content being developed is included for information:</p> <ul style="list-style-type: none"> • Link to TOL training materials
	<ul style="list-style-type: none"> ✓ Course content will be finalised by Integra Aerospace (developer) in May 2019 ✓ Training for Executive Managers and others with responsibilities for managing fatigue risk will be delivered by Clockwork in June 2019 ✓ New fatigue training for staff will be delivered by TOL staff from July 2019 ✓ Open day for families will take place in August 2019
January 2019	<p>TOL are reviewing and consulting new driving rosters that take account of Guardian Data, factors raised by drivers as bringing on the onset of fatigue and recommendations made by both RAIB and Clockwork concerning extended periods of consecutive working.</p> <p>This roster change will:</p> <ul style="list-style-type: none"> • Eliminate periods of consecutive 7-day work patterns • Minimise risk associated with transitioning from early to late book on times (and vice-versa) • Specifically consider the fatigue factors identified in ORR’s Good Practice Guide on Fatigue Risk Management. <p>A copy of the new rosters and associated HSE FRI assessment will be provided to ORR when completed.</p> <ul style="list-style-type: none"> • Revised staff roster

	<ul style="list-style-type: none"> • HSE FRI assessment
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7. Recommendations and actions from the Clockwork report are as follows :

1. Recommendation: Focus FRMS on Fatigue Principles:

Fatigue management at TOL is currently primarily focussed on compliance with Hours of Work Limitations. However, the system should acknowledge that such limitations are insufficient to manage fatigue risk, and that fatigue principles allow a more flexible, higher degree of safety.

Actions: Through Focus Groups and Roster Analysis, the specific causes of fatigue at TOL can be established. Fatigue principles ('best practice') can then be implemented in order to control elevated fatigue levels, without being overly restrictive where fatigue is not elevated.

2. Recommendation: Base FRMS on ORR's 9-stage approach:

The ORR requires controllers of safety critical work to establish effective arrangements for managing the risks arising from fatigue, and states that this process should include the 9-stages outlined in section 6 of the ORR guidance material.

Actions: Use the Gap Analysis to determine which of the 9-stages are already implemented and documented at TOL. Where stages are implemented and not documented, these should be included in the FRMS documentation. Several of the recommendations in this document will also satisfy requirements of the 9-stages, these should be documented as they are implemented.

3. Recommendation: Undertake initial data collection to identify fatigue factors:

The operational and personal factors that determine fatigue differ between different organisations. Therefore, it is important as a first stage in the FRMS process to undertake initial data collection to determine what the TOL-specific fatigue factors may be. In order to get a broad overview, it is recommended that such data collection considers objective and subjective data.

Actions: Undertake initial data collection through Roster Analysis (objective data regarding roster-related fatigue factors) and Focus Groups/a Survey (subjective data regarding whole operation fatigue factors). The fatigue data collected via these two methods will provide TOL with a good foundation on which to build the necessary processes, procedures and mitigations to control operational fatigue.

4. Recommendation: Write new Fatigue Policy

The Fatigue Policy should state TOL's commitment to managing fatigue, and outline at a high level how this will be achieved. The policy should emphasise that fatigue management is a shared responsibility: all managers and staff have a role to play in managing fatigue. The policy should also contain an explicit statement to the effect that employees have a responsibility to ensure that they are fit for duty and to manage non-work activities so that they do not cause fatigue.

Actions: Consult the ORR guidance material, and best practice from other industries, as laid out in the Gap Analysis, and develop a Fatigue Management Policy to meet the requirements of the ORR.

5. Recommendation: Demonstrate Senior Management Commitment

Senior Management at the highest levels should demonstrate their commitment to Fatigue Risk Management, in order for the process to be effective. The Accountable Manager (or equivalent) can do this through messages to employees re-enforcing the importance of managing fatigue risk, and through the allocation of resources (human and financial) to allow the Company to act when fatigue risks are identified.

Actions: The first stage is for the Accountable Manager (or equivalent) to sign the Fatigue Policy, which will also state Management's commitment to FRM, and the joint responsibility between managers and employees.

6. Recommendation: Develop Fatigue Education and Training

To enable employees and management to be best equipped to uphold their responsibilities regarding fatigue risk management, education and training should be provided to enable uniform understanding of important topics such as sleep and circadian rhythms, the impact of fatigue on performance, and the importance of obtaining sufficient good quality sleep. Management and those with direct operational control should also receive fatigue training suitable to their role, in order to equip them to best manage fatigue at TOL.

Actions: Develop a syllabus for fatigue training (both initial and a shorter recurrent training programme) for employees and management. Determine the best method to undertake this training – classroom, computer-based, short briefings, etc.

7. Recommendation: Establish a Fatigue Safety Action Group

Establish a Fatigue Safety Action Group (or equivalent) to take forward the Fatigue Risk Management System. The group should consist of Company and Union representatives and meet on a regular (e.g. monthly) basis to review the progress of the development of the Fatigue Risk Management System, as well as having oversight of all data collected since the previous meeting and owning the fatigue hazard log. The FSAG should undertake risk assessments and make recommendations to the Board regarding the management of fatigue to mitigate identified fatigue hazards.

Actions: Consult guidance from the ORR and other industries (for example ICAO FRMS documentation) regarding membership of the FSAG, their roles and responsibilities. Identify an individual to lead the group, and arrange the first meeting.

8. Recommendation: Establish a Fatigue Reporting System

A Fatigue Reporting System is a key element of a functioning FRMS. The system enables employees to inform the company of instances of elevated fatigue, and concerns regarding fatigue (experienced or anticipated). One of the most important features of the Fatigue Reporting System from a risk mitigation perspective is that it

allows employees to self-identify as being too fatigued to carry out their duties safely and remove themselves from duty. All employees in this position should then submit a fatigue report (examples of which can be seen in the ORR Guidance, and Guidance for other industries) informing the Company of the reasons for their elevated fatigue levels. This allows reactive fatigue management and provides data on factors resulting in elevated fatigue risks.

Actions: A Fatigue Reporting System seems simple, however, it must be implemented correctly in order to be functional. The first action is for the Safety Department to develop the procedure for fatigue reporting, how reports will be responded to, how the data will be collected, and what actions will be implemented depending on the risk level of the report. The fatigue report form should then be designed, considering TOL's specific contributors to fatigue (information on these will be gained from the Focus Groups and Roster Analysis). Only once the procedure and form are both appropriate should the Fatigue Reporting System be made available to employees.

9. Recommendation: Identify and analyse Safety Performance Indicators on Fatigue

Fatigue-related Safety Performance Indicators (SPIs) that are relevant to the operation should be identified. Data relating to these SPIs should then be collected and reported at each FSAG meeting. A summary of the key findings, and actions recommended, can then be presented to the Board as a part of the usual briefing cycle.

Actions: Use the results of the proposed Focus Groups/Survey and Roster Analysis to develop an initial series of SPIs. Once Fatigue Reporting is functioning, appropriate SPIs should be developed for Reporting. SPIs should be regularly reviewed for their usefulness by the FSAG, with new SPIs being developed to inform on identified hazards.

10. Recommendation: Develop a Fatigue Safety Assurance Process

A functional Fatigue Safety Assurance Process will enable TOL to know that the FRMS is functioning as anticipated, that identified hazards are being managed, and that the FRMS is continually improving. The key areas of Fatigue Safety Assurance are similar to those in SMS, i.e. Performance Monitoring; Managing Changes that may impact on the FRMS; and Audit and Review.

Actions: As much as possible, the FRMS Assurance Process should follow existing Safety Assurance Processes within TOL, to ensure consistency of approach. The current and existing processes and procedures should be assessed to ensure that they are appropriate, and referenced within the FRMS documentation.

Previously reported to RAIB

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- ii. the management and monitoring of overtime and rest day working;
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- iv. competence requirements for managers and supervisors that have a role in the management of fatigue risk

ORR decision

1. TOL commissioned an independent review of its fatigue management which was carried out by Clockwork Research. The report made a number of recommendations, which TOL have accepted and are now implementing.
2. We accept that implementation of the Clockwork Research recommendations is likely to take some time, particularly as it will involve significant changes to working patterns. We have asked TOL to keep us informed with progress against the Clockwork recommendations.
3. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, TOL has:
 - has the recommendation into consideration; and
 - is taking action to implement it.

Status: Implementation on-going. ORR will advise RAIB when further information is available regarding actions being taken to address this recommendation.