

Fleet - Case for Continued Safe Operation (CCSO)



Complete all grey fields on the form. Attach photographs and updates as required to the appropriate sheets.

Title	Longitude Crack		
Vehicle Type	96TS	CCSO Number	394
		Issue	1
		Status	Active

Prepared By	William Marshall
	(Fleet Competent Person)

Reviewed By	Steve Whysall
	(Principals Engineer)

Reviewed By	
	(Additional Principals Engineer if required)

Reviewed By	Lee
	(Fleet Manager)

Accepted By	Helen Carrington
	Head of Rolling Stock

8.10.19

Issue Number	Date	Comments
1	18.10.2019	First Issue

Distribute: the names above, Materials Management, ESM, FEM, FCP, FM, LMAE, HoRS, Senior Electrical and/or Senior Mechanical Engineer, RS Engineering Manager, Maintenance Planning Manager

Used in conjunction with PR0155
Valid on day of printing: 18/10/2019

Fleet - Case for Continued Safe Operation (CCSO)



Title	Longitudinal Crack	Status	Active
		CCSO Number	394
		Issue	1

Incident Information	
Date	17/10/19
Time	14:00
Location	Stratford Market Depot

Defect Description
 During Exam large cracks were found on the longitudes on both sides of D end on car 96609.

Vehicle No.	96609
Vehicle Type	96TS
Affects other fleets?	Yes 95TS & 92TS
Vehicle Environment	Maintenance

Immediate Cause
 The stresses caused by buff and draw loads experienced by the longitudes have caused fatigue cracks to form.

Actions Taken At The Time
 The fleet is being inspected against 'Longitude Inspection Record', as per email William Marshall 17/10/2019 19:47. This has four categories of crack; any unit with a category 1 crack is stopped. Any unit not inspected by Start of Traffic on 18.10.2019 is not being offered for passenger service.

Operating Restrictions (if any state how Operations informed)
 None

Lee Milledge

Principles Engineer's Statement
 The cracks initiate in the region of the last fixing on the inner longitude or at the inner radii. The coupler bracket is stiff in comparison to the longitude and has a sharp stiffness transition resulting in a high stress at these locations. The 7th car location between the UNDM and another trailer car results in the location with the highest buff and draw loading. The most significant cracks have been located at this location, however smaller cracks have been identified at other car locations.
 The initial visual once round is being carried out to identify assemblies that are at risk of failure in the short term, to ensure that no high risk vehicles remain in service. All trains have been checked before entering service. It will be necessary to complete NDT testing of all cracked longitudes and then all remaining longitudes to ensure the full extent of all cracks is known and any of concern removed from service.
 A further review of the run criteria will be made on completion of the NDT assessment. A short term repair procedure will be trialed and proven by FEA and in-service strain gauging to allow time for a long term repair to be developed.
 With these mitigations in place the risk of catastrophic failure of the coupler arrangement is reduced to a tolerable level to allow continued safe operation of the fleet.

Asset Risk Register Information (Principles Engineer to complete)																					
Top Event	Derailment		Failure Mode Fatigue cracks have initiated in the longitude Failure Effect Continuation of the cracks would lead to detachment of the coupler assembly.																		
Base Event	Miscellaneous large object falls from Train																				
Zone	16	Underframe																			
Defective Component	Longitudinal																				
<table border="1"> <tr> <th colspan="3">Safety Risk (Unmitigated)</th> </tr> <tr> <td>Consequence</td> <td>Frequency</td> <td>Risk Level</td> </tr> <tr> <td>4</td> <td>4</td> <td>16</td> </tr> </table>		Safety Risk (Unmitigated)			Consequence	Frequency	Risk Level	4	4	16	First Issue	<table border="1"> <tr> <th colspan="3">Safety Risk (Mitigated)</th> </tr> <tr> <td>Consequence</td> <td>Frequency</td> <td>Risk Level</td> </tr> <tr> <td>4</td> <td>2</td> <td>8</td> </tr> </table>	Safety Risk (Mitigated)			Consequence	Frequency	Risk Level	4	2	8
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ACTIONS						
Action Number	Action	Action Holder	Completion Date	Status	Safety Mitigation	Closure Evidence
1	Carry out a visual once round on the fleet in accordance with 'Longitude Inspection Record'. Any unit not inspected by SoT on 18.10.2019 shall not be offered for passenger service.	Fleet - Fleet Manager	23.10.2019	Open	Yes	Email from FSM with summary result sheet
2	Carry out NDT of all CAT 2, 3 and 4 cracks.	Fleet - Fleet Manager	25.10.2019	Open	Yes	NDT records
3	Carry out NDT of all positions on the fleet not covered by action 2.	Fleet - Fleet Manager	25.11.2019	Open	Yes	NDT records
4	Produce a report to describe the failure mode.	LU OPS - Mechanical Engineering	18.10.2019	Open	No	Signed report
5	Define an NDT regime to be incorporated into the maintenance regime based on refined definitions of crack category.	LU OPS - Mechanical Engineering	17.01.2020	Open	Yes	Issued CRS
6	95TS Fleet to carry out a visual once round against 'Underframe Crack Check Above Drawgear' on 25% of the fleet.	Fleet - Fleet Manager	18.10.2019	Closed	Yes	List of closed Service Orders
7	Review 92TS design and determine next steps.	LU OPS - Mechanical Engineering	24.01.2020	Open	No	Email from Principles Engineer