



Revealing the layers of fatigue risk management

Our Journey

Ben Groome,

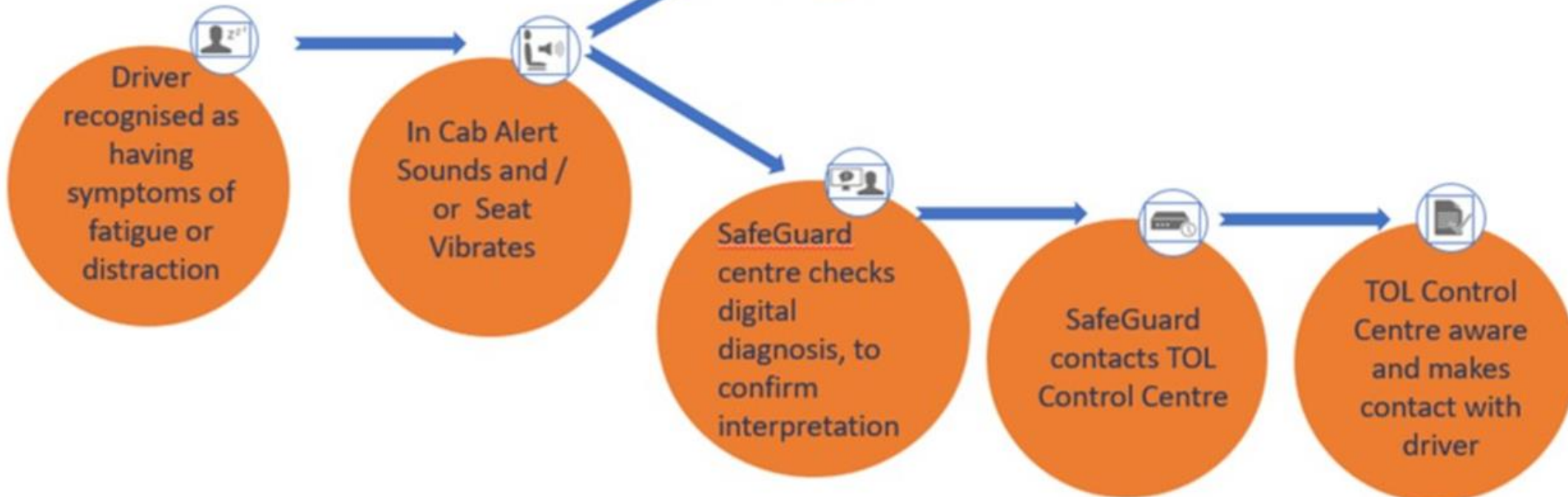
Operations Director

Tram Operations Limited

UK Light Rail Conference, 12 July 2023

Introduced a Fatigue Management System

How it works at TOL



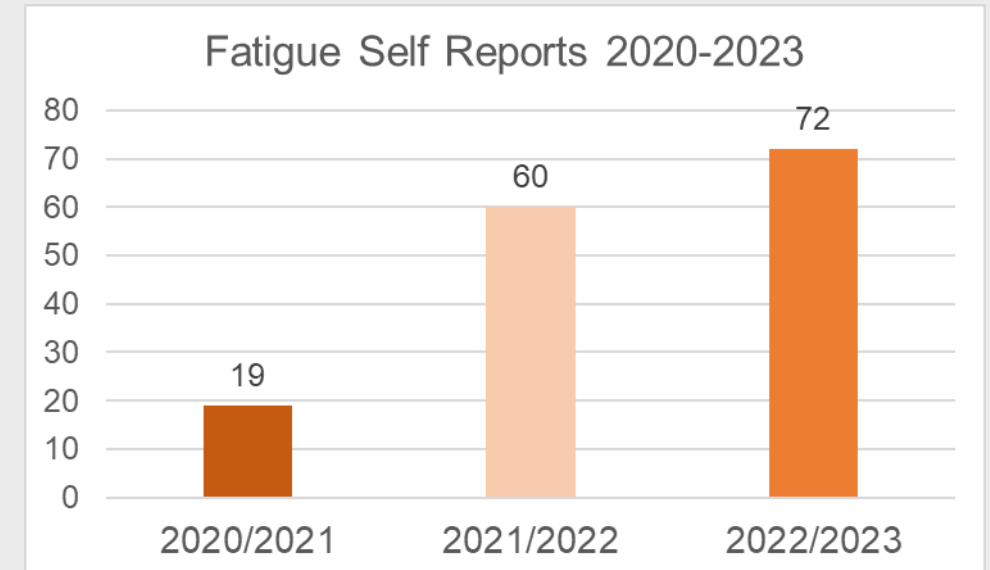
Staff Engagement and Training Throughout

- Trade Union engagement
- Public Health England Research
- Trainer led classroom sessions
- Bespoke E-Learning platform
- Family fun day held

The screenshot shows the user interface of the 'Managing Fatigue at TOL' e-learning course. At the top, the 'First Tram' logo is visible, followed by a breadcrumb trail: 'Dashboard / My courses / AssessTechFatigueTOL'. The main heading is 'Managing Fatigue at TOL' with a small image of a laptop and glasses. Below this is a 'Welcome' section with a blue header. A large image of a tram (number 2543) is featured with the text 'Managing Fatigue At TOL Online Course'. The text below reads: 'Welcome to this course on managing fatigue at TOL'. Under 'Objectives of this course', it states: 'At the end of this course you should be able to:' followed by four numbered objectives: 1. Explain how fatigue risk management can benefit you. 2. Demonstrate how you would recognise the signs of fatigue in yourselves and others, and identify when you are too fatigued to operate in a safety critical role at TOL. 3. Identify how the quantity and quality of your sleep may impact your fatigue levels. 4. Demonstrate how to submit a fatigue report when you have experienced elevated fatigue levels at work. At the bottom, it notes: 'We require that you complete each of the core modules before attending your workshop session.'

Just Culture

- Help and Support drivers rather than discipline when drivers become too fatigued to work safely
- Clear Fatigue policy and procedure for reporting fatigue – **before** duty or **whilst on** duty





Revealing the layers



Rolling 13 period Yearly Summary



Period by Period Summary Dashboard



Driver Performance Dashboard



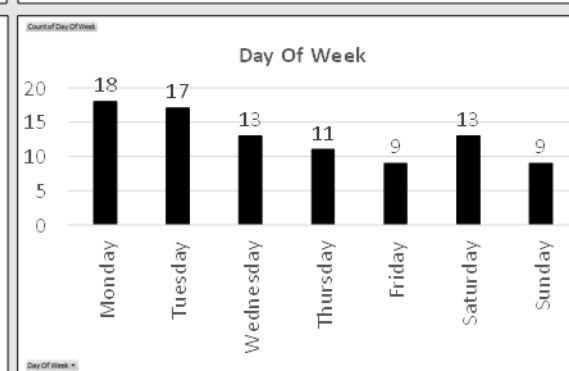
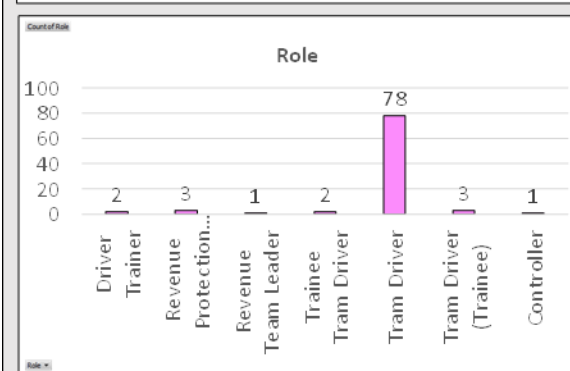
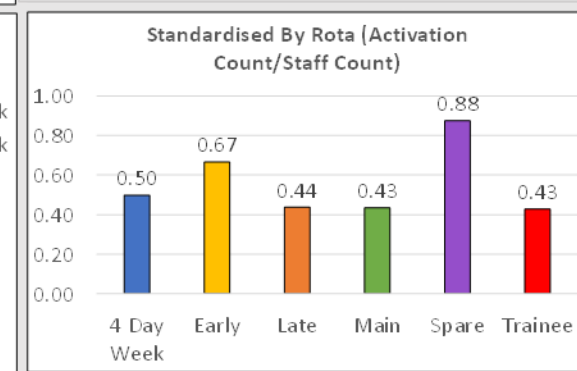
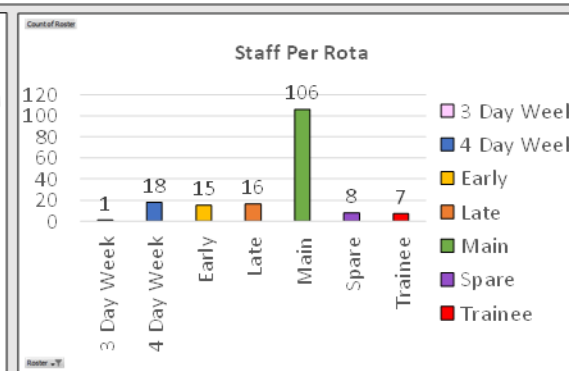
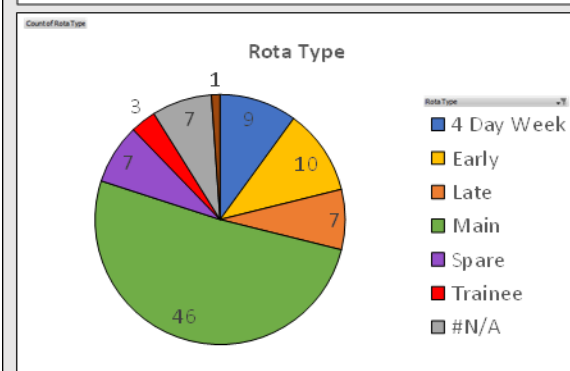
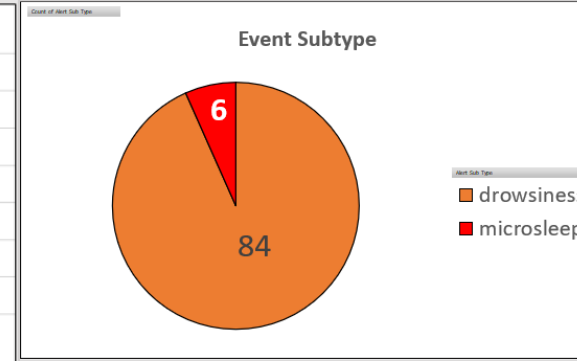
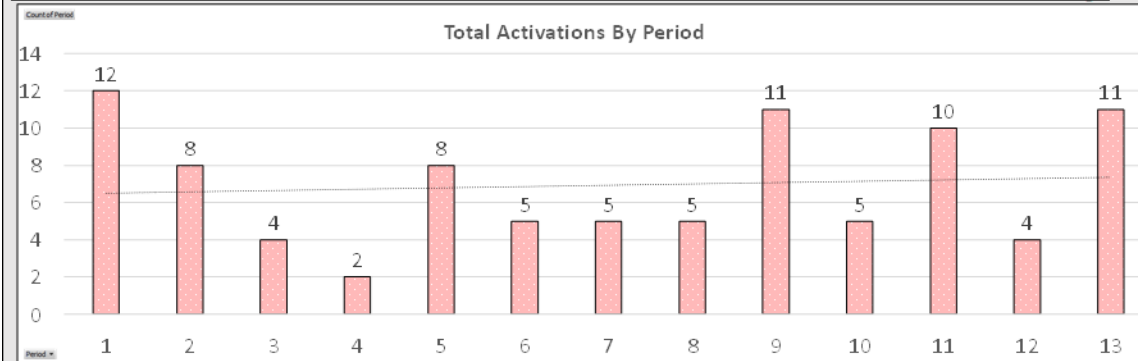
Roster Analysis



Allocation

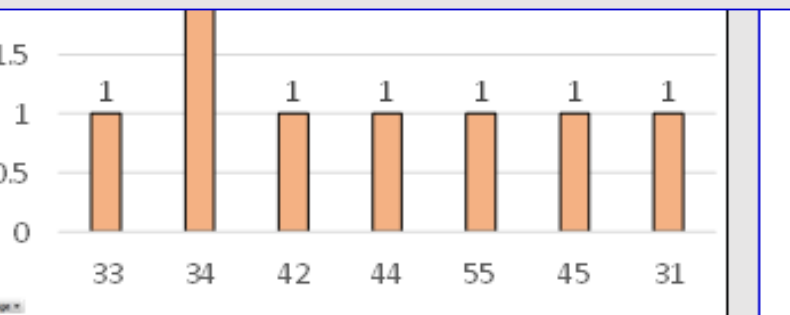
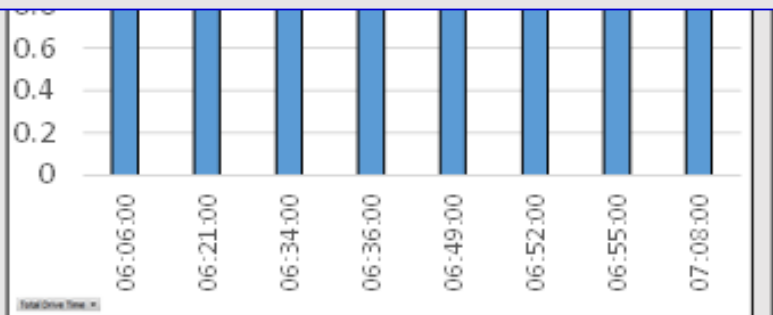
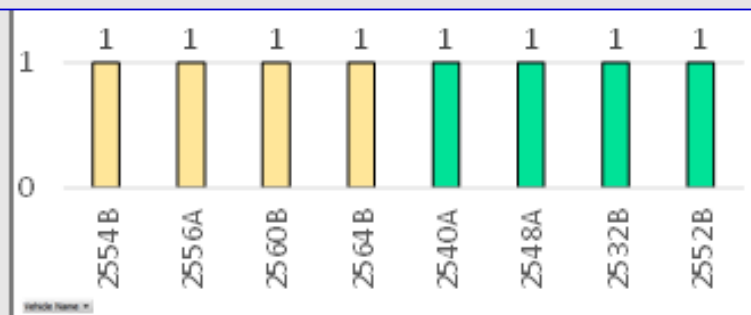
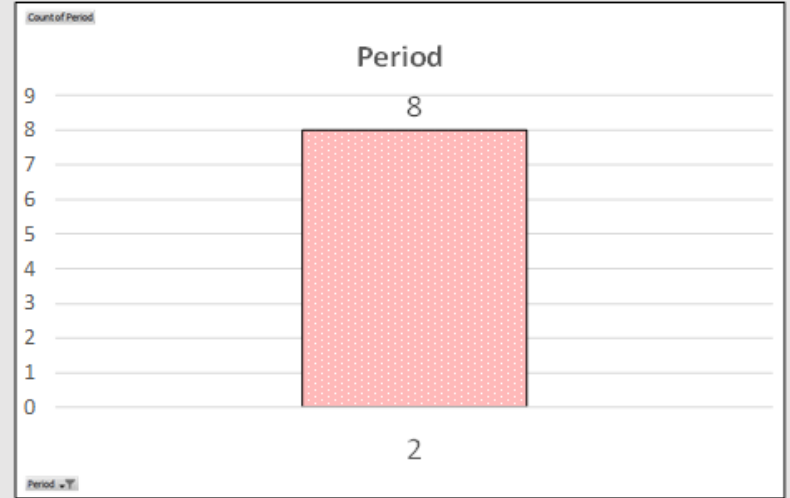
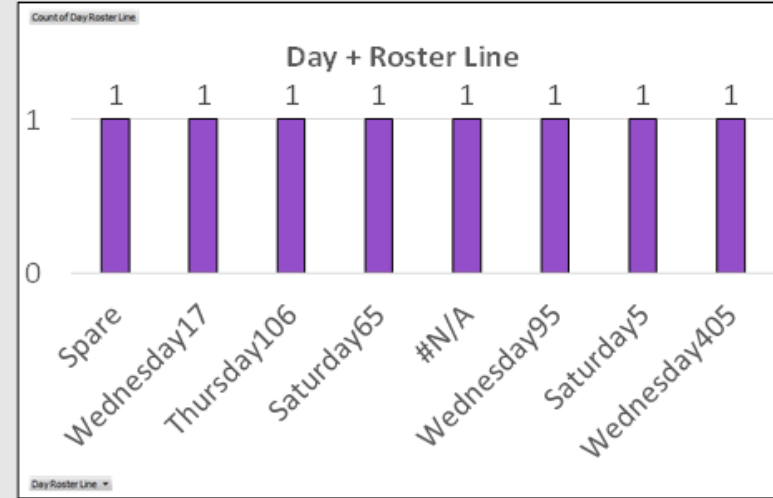
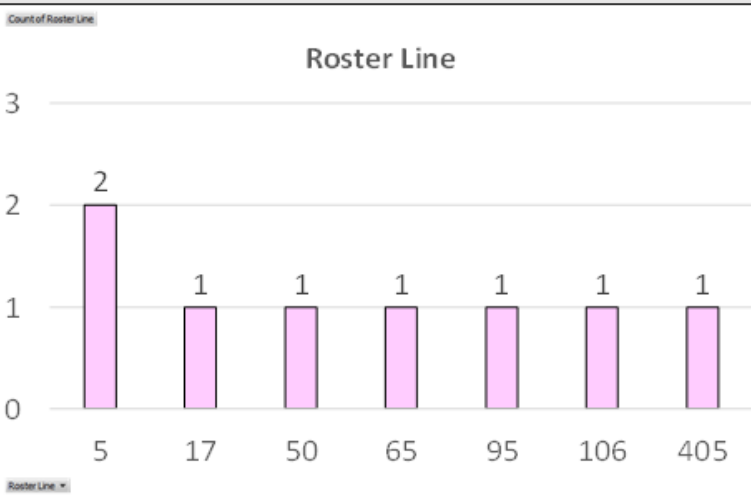
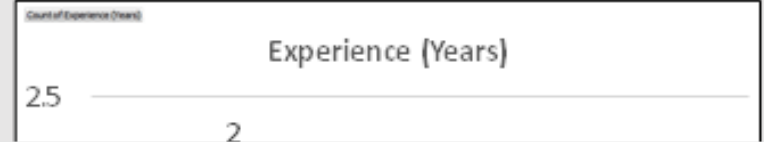
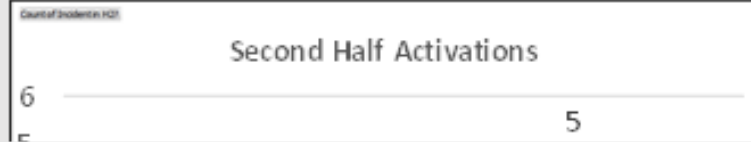
Year Summary Dashboard

P3 2022 to P2 2023 Guardian Summary



Period Summary Dashboard

Period 2 Summary (2023/24)



Driver Performance Dashboard

2022/2023 Guardian Summary

Event ID:	2.5	Period	Total	2.5	Cumulative Working Day
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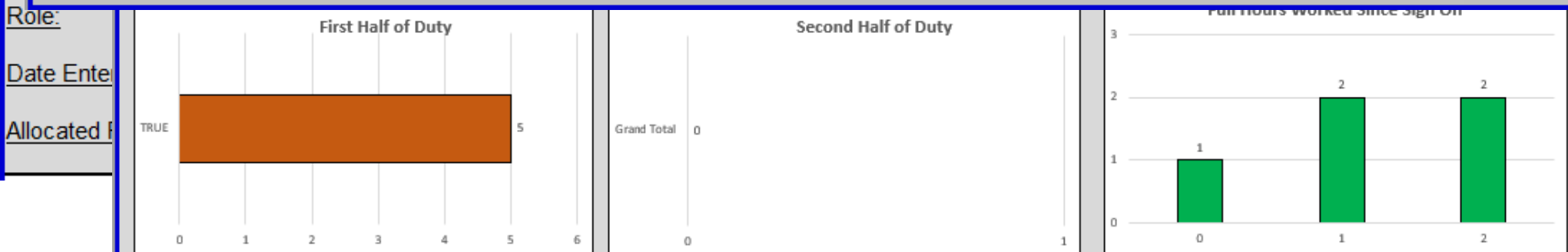
2022/2023 Guardian Event Data

Event ID	Date/Time	Time Until Break	Time Until Sign O	WRD?	Reason
2205362449	19/05/2022 15:29	02:08	06:02	No	Looking down to open doors
2210455792	22/05/2022 21:15	01:29	06:45	No	Dry Eyes
2338056055	03/08/2022 13:31	00:20	05:58	No	Driver had left tram prior to being reported
2385689482	11/09/2022 15:42	02:32	06:13	No	Driver Aware of Activation Due to Dry Eyes
2398491288	30/03/2023 06:17	03:59	07:56	Yes	Driver Stated They Were Looking at Fault Display Screen

2022/2023 Fatigue Reporting Data

Date	Association	When Event Experienced	Commute (Mins)	Alert Level	Cause
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Roster Analysis - Period of Data 29 May 2022 to 27 May 2023

Early Roster																Guardian	Fatigue Rpt										
Tuesday				Wednesday				Thursday				Friday				Saturday				10	0						
Rest	Duty	Gu Act	Fat Rpt	Rest	Duty	Gu Act	Fat Rpt	Rest	Duty	Gu Act	Fat Rpt	Rest	Duty	Gu Act	Fat Rpt	Rest	Duty	Gu Act	Fat Rpt								
3	Fully Rested	106	0	0	4	16:02	sby01	0	0	5	15:21	101	0	0	6	16:14	105	0	0	7	17:28	209	0	0	0	0	
10	REST	0	0	0	11	2d 15h 39m	121	0	0	12	15:48	123	0	0	13	15:39	122	1	0	14	REST	0	0	1	0		
17	15:53	sby02	0	0	18	REST	0	0	19	1d 15h 21m	109	0	0	20	16:42	108	0	0	21	17:19	213	0	0	0	0		
24	REST	0	0	25	1d 15h 51m	128	0	0	26	15:39	126	0	0	27	15:26	121	0	0	28	REST	0	0	0	0			
31	15:28	102	0	0	32	16:50	101	0	0	33	REST	0	0	34	1d 17h 22m	120	1	0	35	TBA	0	0	1	0			
38	121	0	0	39	REST	0	0	40	REST	0	0	41	REST	0	0	42	3d 14h 54m	210	0	0	43	1d 15h 21m	201	0	0	1	0
45	15:55	sby01	0	0	46	15:28	102	1	0	47	16:59	sby01	0	0	48	REST	0	0	49	REST	0	0	2	0			
52	111	2	0	53	15:36	107	0	0	54	17:33	TRAINING	0	0	55	REST	0	0	56	TBA	0	0	1	0				
59	4d 15h 4m	116	1	0	60	15:42	114	0	0	61	15:50	sby02	0	0	62	15:54	117	0	0	63	TBA	0	0	1	0		
66	REST	0	0	67	REST	0	0	68	3d 15h 3m	120	1	0	69	16:22	127	0	0	70	TBA	1	0	2	0				
73	15:56	112	0	0	74	REST	0	0	75	1d 16h 17m	116	0	0	76	16:44	125	0	0	77	16:48	218	0	0	0	0		
80	REST	0	0	81	1d 14h 34m	112	0	0	82	15:47	108	0	0	83	17:02	111	0	0	84	REST	0	0	0	0			
87	TBA	0	0	88	sby02	0	0	89	REST	0	0	90	1d 14h 45m	sby01	0	0	91	16:06	207	0	0	92	REST	0	0	0	0
94	REST	0	0	95	REST	0	0	96	REST	0	0	97	3d 14h 48m	sby02	0	0	98	15:19	206	1	0	99	REST	0	0	1	0
101	15:21	109	0	0	102	16:45	110	1	0	103	16:03	107	0	0	104	REST	0	0	105	1d 18h 45m	224	0	0	1	0		
108	119	0	0	109	15:36	111	0	0	110	16:00	113	0	0	111	REST	0	0	112	REST	0	0	0	0				
		3	0			2	0			1	0			2	0			2	0			0	0				

4DW Roster																Guardian	Fatigue Rpt									
Tuesday				Wednesday				Thursday				Friday				Saturday				9	1					
Rest	Duty	Gu Act	Fat Rpt	Rest	Duty	Gu Act	Fat Rpt	Rest	Duty	Gu Act	Fat Rpt	Rest	Duty	Gu Act	Fat Rpt	Rest	Duty	Gu Act	Fat Rpt							
3	REST L	0	0	4	Fully Rested	174	0	0	5	TBA	0	0	6	179	0	0	7	16:09	279	0	0	0	0			
10	REST	0	0	11	REST	0	0	12	REST E	0	0	13	3d 5h 33m	112	0	1	14	REST	0	0	0	1				
17	3d 21h 31m	144	0	0	18	16:07	145	0	0	19	REST E	0	0	20	1d 10h 16m	116	0	0	21	16:07	214	2	0	2	0	
24	16:13	101	0	0	25	16:08	104	1	0	26	18:27	TRAINING	0	0	27	REST	0	0	28	REST	0	0	1	0		
31	4d 23h 21m	157	0	0	32	16:02	159	1	0	33	15:37	158	0	0	34	REST L	0	0	35	1d 19h 32m	273	0	0	1	0	
38	REST	0	0	39	REST E	0	0	40	2d 7h 59m	133	0	0	41	14:57	123	0	0	42	REST	0	0	0	0			
45	REST	0	0	46	REST	0	0	47	REST L	0	0	48	4d 1h 24m	160	0	0	49	16:30	260	1	0	1	0			
52	15:53	175	1	0	53	TBA	0	0	54	sby05	0	0	55	REST	0	0	56	REST	0	0	57	REST	0	0	1	0
59	REST E	0	0	60	5d 6h 4m	116	0	0	61	15:57	117	1	0	62	16:42	119	0	0	63	TBA	1	0	2	0		
66	REST	0	0	67	REST M	0	0	68	2d 18h 41m	139	0	0	69	16:19	140	0	0	70	REST	0	0	0	0			
73	3d 21h 35m	sby05	0	0	74	14:30	158	0	0	75	REST	0	0	76	1d 8h 56m	133	0	0	77	TBA	0	0	0	0		
80	1d 12h 2m	103	1	0	81	16:58	109	0	0	82	REST	0	0	83	REST	0	0	84	REST	0	0	1	0			
87	5d 18h 5m	126	0	0	88	TBA	0	0	89	REST	0	0	90	REST L	0	0	91	2d 43m	266	0	0	0	0			
94	REST	0	0	95	REST E	0	0	96	2d 6h 40m	111	0	0	97	16:02	114	0	0	98	REST	0	0	0	0			
101	16:46	105	0	0	102	REST	0	0	103	REST L	0	0	104	3d 3h 4m	167	0	0	105	15:18	sby15	0	0	0	0		
108	15:37	180	0	0	109	TBA	0	0	110	169	0	0	111	REST	0	0	112	REST	0	0	113	REST	0	0	0	0
115	REST M	0	0	116	5d 10h 1m	140	0	0	117	14:45	138	0	0	118	REST E	0	0	119	1d 15h 2m	219	0	0	0	0		
122	REST	0	0	123	REST	0	0	124	REST M	0	0	125	3d 23h	159	0	0	126	16:08	257	0	0	0	0			
129	2d 16h 6m	166	0	0	130	15:42	165	0	0	131	REST E	0	0	132	1d 8h 58m	136	0	0	133	15:42	221	0	0	0	0	
136	TBA	0	0	137	130	0	0	138	15:28	125	0	0	139	REST	0	0	140	REST	0	0	0	0				
		2	0			2	0			1	0			0	1			4	0			0	0			

Allocation

Main										Minus (-)	Plus (+)		
Period 13 Week 1										02:00	02:00		
Day		Previous Duty	Previous Duty Start		TBA Duty Assigned	TBA Duty Start		Following Duty	Following Duty Start		Earliest Start Time	Latest Start Time	Acceptable Duty?
37	6Monday	SBY22	08:45		140	8:51		141	8:55		6:45	10:45	Yes
189	27Saturday	175	16:56		267	15:10		350	16:57		14:56	18:56	Yes
221	32Wednesday	122	5:42		110	4:37		118	5:12		3:42	7:42	Yes
275	40Monday	320	08:59		131	6:19		SBY03	7:15		6:59	10:59	No
460	66Thursday	149	11:44		152	12:48		153	12:55		9:44	13:44	Yes
493	71Tuesday	143	10:15		146	11:10		153	12:55		8:15	12:15	Yes
555	80Monday	314	06:49		119	5:24		120	5:27		4:49	8:49	Yes
744	107Monday	330	09:57		145	10:40		142	10:00		7:57	11:57	Yes
Period 13 Week 2										02:00	02:00		
Day		Previous Duty	Previous Duty Start		TBA Duty Assigned	TBA Duty Start		Following Duty	Following Duty Start		Earliest Start Time	Latest Start Time	Acceptable Duty?
46	7Wednesday	SBY04	11:00		147	11:11		145	10:40		9:00	13:00	Yes
124	18Thursday	138	7:40		137	7:30		SBY03	7:15		5:40	9:40	Yes
246	36Sunday	272	17:03		356	17:26		165	14:10		15:03	19:03	Yes
261	38Monday	336	11:27		148	11:20		146	11:10		9:27	13:27	Yes
342	49Friday	181	17:21		180	17:16		283	18:11		15:21	19:21	Yes
373	54Monday	331	10:27		145	10:40		142	10:00		8:27	12:27	Yes
501	72Wednesday	148	11:20		145	10:40		142	10:00		9:20	13:20	Yes
611	88Monday	352	17:11		185	17:50		179	17:10		15:11	19:11	Yes
Period 13 Week 3										02:00	02:00		
Day		Previous Duty	Previous Duty Start		TBA Duty Assigned	TBA Duty Start		Following Duty	Following Duty Start		Earliest Start Time	Latest Start Time	Acceptable Duty?
53	8Wednesday	146	11:10		149	11:44		149	11:44		9:10	13:10	Yes
138	20Thursday	158	13:30		185	17:50		179	17:10		11:30	15:30	No
189	27Saturday	175	16:56		277	17:25		350	16:57		14:56	18:56	Yes
213	31Tuesday	176	17:03		166	14:18		169	14:36		15:03	19:03	No
348	50Thursday	137	7:30		134	6:48		129	6:09		5:30	9:30	Yes
483	69Saturday	141	8:55		245	10:44		326	09:29		6:55	10:55	Yes
611	88Monday	321	08:59		133	6:34		129	6:09		6:59	10:59	No
748	107Friday	132	6:33		149	11:44		254	13:01		4:33	8:33	No

Next Steps

- Further develop the Driver dashboard and insights to better understand driver behaviour
- Using Guardian data to further develop
 - The pre-cursors (yawning and distractions) and understand what part they play in driver behaviour before a Fatigue activation and/or a safety related incident
 - Monitor overspeed alerts - proactive management and identifying trends
 - New Gen 3
- Using fatigue self reporting and Guardian activations to help identify any potential 'problematic' duties
- Review rules around allocation of duties considering prior days of rest and time of duty allocated upon return with our new rostering system

Thank you – any
questions?



First  Tram Operations

