

Analyzing Safety Incidents using the Fatigue Risk Index Calculator as an Indicator of Fatigue within a UK Rail Franchise

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Abstract : The feeling of fatigue at work could potentially have devastating consequences. The aim of this study was to investigate whether the well-established objective indicator of fatigue - the Fatigue Risk Index (FRI) calculator used by the rail industry is an effective indicator to the number of safety incidents, in which fatigue could have been a contributing factor. The study received ethics approval from Cardiff University's Ethics Committee (EC.16.06.14.4547). A total of 901 safety incidents were recorded from a single British rail franchise between 1st June 2010 - 31st December 2016, into the Safety Management Information System (SMIS). The safety incident types identified that fatigue could have been a contributing factor were: Signal Passed at Danger (SPAD), Train Protection & Warning System (TPWS) activation, Automatic Warning System (AWS) slow to cancel, failed to call, and station overrun. From the 901 recorded safety incidents, the scheduling system CrewPlan was used to extract the Fatigue Index (FI) score and Risk Index (RI) score of all train drivers on the day of the safety incident. Only the working rosters of 64.2% (N = 578) (550 men and 28 female) ranging in age from 24 - 65 years old (M = 47.13, SD = 7.30) were accessible for analyses. Analysis from all 578 train drivers who were involved in safety incidents revealed that 99.8% (N = 577) of Fatigue Index (FI) scores fell within or below the identified guideline threshold of 45 as well as 97.9% (N = 566) of Risk Index (RI) scores falling below the 1.6 threshold range. Their scores represent good practice within the rail industry. These findings seem to indicate that the current objective indicator, i.e. the FRI calculator used in this study by the British rail franchise was not an effective predictor of train driver's FI scores and RI scores, as safety incidents in which fatigue could have been a contributing factor represented only 0.2% of FI scores and 2.1% of RI scores. Further research is needed to determine whether there are other contributing factors that could provide a better indication as to why there is such a significantly large proportion of train drivers who are involved in safety incidents, in which fatigue could have been a contributing factor have such low FI and RI scores.

Keywords : fatigue risk index calculator, objective indicator of fatigue, rail industry, safety incident

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