

IDENTIFICATION OF INVISIBLE HAZARDOUS SITUATIONS FROM THE RECORDED CONVERSATION BEFORE PUYUMA TRAIN ACCIDENT

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Abstract

On 21st October 2018, a Puyuma Express train derailed, killed 18 and injured 210 in Taiwan's Yilan County, where Taiwan Railways Administration investigated that one of the causes could be human error, such as communication between agents was not rigorous while dealing with the malfunction noticed during the drive. This study aim to discover invisible factors and associations behind human errors which could have caused or prevented the accident. 2 hours 41 minutes 10 seconds translated English Conversation transcript between 13 agents published as the Investigation report by the Puyuma Train Accident Investigation team was collected. We analyzed by discovering and categorizing invisible factors as hazardous situations, attention, agents, actions, and train condition. There are 5 major invisible factors that associate behind human errors. Top 2 hazardous situation categories are: "No Power" (18 times, 35 minutes 15 seconds) and "Throttle Problem" (16 times, 22minutes 17seconds).A utomaticTrainProtection(ATP)whichcontinuallychecksthespeedofatrain is compatible or not, was found to be disabled at 16:17:55 but reported only at 16:47:59. The agents seemed to be under the misapprehension that the "Air Compressor Malfunction" (reported 8 times) were not related to the "MR (Main Reservoir) Level Fluctuations" (from 15:39:12 but discussed only at 16:40:45). Most of the agents' response has repetitions of the problems to each other rather than progressing with proper technical solutions on time. Miscommunications had led to inadequate decision making without stopping the train at the previous station. Besides, our ongoing research of creating a social network will show correlation between invisible factors among the agents. These situations could have driven them to take threatening decisions unknowing the accident boundary. The results provide more findings to supplement the incident investigation on identifying invisible factors that associate behind human error in the Puyuma Train Express accident.

Keywords: Resilience Engineering, Train Accident, Hazardous Situation