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Procedural Performance: Possible Costs of Time Pressure, Shift Change, and Task Complexity

S. Camille Peres^{1,2}, Ranjana K. Mehta^{2,1}, Wimberly S. Hoyle¹, Ashley Shortz¹

¹ *Environmental and Occupational Health Department,*

² *Industrial and Systems Engineering Department,*

Texas A&M University, College Station, TX

Emails: peres@tamu.edu, rmehta@tamu.edu

Abstract

Procedural tasks, which typically involve performing a sequence of steps in a regular and consistent manner, are an inherent part of almost all high-risk industrial settings. Further, it is not uncommon for a need to arrive when these tasks need to be performed at an accelerated rate to meet a deadline or accommodate a mechanical state in the facility. Additionally, because these industries operate on 24-hour cycles, the workers performing these procedural tasks work shift work—often working 12-hour shifts and varying between day and night shifts. Extensive research has shown that changing between day and night (or vice versa) work shifts causes fatigue and can result in decrease performance. Finally, given the nature of these complex socio-technical systems, some of the procedural tasks are more complex than others. These three variables—time pressure, shift change, and task complexity—could of course individually have impacts on workers' performance with procedures as well as have combined impacts on performance. However, there is little objective research investigating workers' performance on procedural tasks in this domain.

It is conceivable that workers maybe able to sustain task performance for a period of time with a combination of these three variables with increased effort and focus. However, this task performance likely comes at a cost. For instance, Metha and her colleagues found that when stressed, participants were able to maintain a certain performance but it required a higher physiological load, which, if sustained can lead to fatigue.

This presentation will share the results of participants who completed 24 different procedural tasks (procedures) representing the 3 variables mentioned above. They completed 12 during a day shift and 12 during a night shift. For each of the 12 day/night shift, half required the participant to complete the procedure under time pressure and the other half were self-paced, and the procedures varied in their levels of complexity.

Participants' performance on the procedures at a step level (2-perfect, 1-some problems, 0-fail) were scored and their physiological responses (Heart Rate, Heart Rate Variability) were recorded.