Can alarm devices improve worker safety?

Mineral safety measures in urban ad-hoc work zones contribute to roadside accidents.

Stationary active alarm devices difficult for workers to hear or see in work zone environments. Workers tend to ignore these alarms.

Do wearable alarm devices trigger reactions?

Wearable devices (e.g., smart watches, haptic vests) can ensure workers notice safety alarms. But how workers react to different alarm characteristics (sound/vibration, duration, frequency) are still not well understood.

Integrated virtual reality and micro traffic simulation platform

Testing alarm devices in real construction sites or physical roadway testbeds is not safe or effective for testing a wide variety of vehicle related accident scenarios. The platform utilizes sensors to measure different forms of worker reactions (watch face response, gaze direction, etc.) to alarms of random characteristics (sound/vibration, duration, frequency).

Data collection on worker reactions

Collected data from thirty-three (n=33) participants using the platform to evaluate worker reactions to alarms. Currently analyzing the captured data on worker behavior for developing a reinforcement learning-based model to calibrate alarm characteristics for achieving faster physical reactions from workers.

Expected Contributions and References

An improved alarm control system that optimizes alarm characteristics to evoke faster physical reactions from workers during a workday.

References: