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Dispatching fatigue

Richard Roberts, 30 June 2011



A NEW partnership between the world's leading mine fleet management technology supplier and a British developer of an "unobtrusive" driver fatigue monitoring device looks set to bear fruit over the coming months.

Part of Modular Mining Systems' bid to broaden its product offering, and heightened focus on mine safety, the DISPATCH FatigueAlert module for fatigue risk management (FRM) is being rolled out at a mine in South Africa along with other elements of the company's FRM portfolio. Through the alliance struck with Fatigue Management International earlier this year, and that group's close work with the Loughborough Sleep Research Centre at Loughborough University in Leicestershire, England, Modular is confident of adding an important new dimension to its mine fleet asset management offering and a significant point of difference in the emerging fatigue management technology market.

"The more we learn about fatigue and how it can be managed, the more we realise that we've only just scratched the surface in terms of synergies between our products," USA-based Modular's Lucas van Latum, manager of the company's alliances business development unit, told *HighGrade* this week.

"Since the alliance between Modular and FMI was formalised we have integrated FMI's ASTID technology into our DISPATCH FatigueAlert module for fatigue risk management [and] we have aligned and packaged FMI services with our own in order to offer our customers a complete solution encompassing training, implementation and change management and consulting services. Although ASTID is an enabling technology, successful fatigue risk management requires a holistic approach and technology alone simply is not enough. For this reason we have also been developing internal training for our own people, and have started rolling this out to our regional offices."

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van Latum maintains a steering monitor – the Advisory System for Tired Drivers, or ASTID, uses algorithms developed by Loughborough Sleep Research Centre to isolate specific data signatures that can be related to operator fatigue, regardless of driving conditions – is not just the best fit for Modular's suite of monitor-based, real-time measurement and reporting tools, which have evolved over the past 30 years.

"Steering dynamics are only part of the measurements required to predict fatigue risk," he said. "To say operator steering performance indicates fatigue is only partially true.

"Steering dynamics are an indicator of driving conditions and driver state; what the route looks like and how the driver is performing on that route ... [and] by monitoring steering there is no direct physical driver monitoring through cameras or wearables and this makes ASTID unobtrusive and very transparent to the operators. Most of the other technologies available are triggered when the driver is already showing signs of extreme fatigue such as head nodding and eye closure from micro sleeps.

"Certainly the predictive nature of, and continuous risk assignment by ASTID allows us to not only manage fatigue risk in real-time, but more importantly to do so pro-actively. Instead of receiving a warning that a particular operator is falling asleep, FatigueAlert will ultimately be able to also minimise the risk of this happening."

According to van Latum, Modular's technical infrastructure at mines for real-time operations management allows the FMI technology to be used effectively. "This includes, for example, reliably maintaining individual operator fatigue scores even as they switch between multiple equipment," he said.

In the area of services, Modular's expertise in change management complemented FMI's training and consulting services, which would help miners increase the chances of success with fatigue risk management initiatives.

"The LSRC has done much research on the effectiveness of various approaches in reducing sleepiness [and] the results of this research are directly applicable to the mining industry," van Latum said.

"There is very strong correlation between over-the-road driving and mining equipment operation from a driver physiology point of view. This is to say that a driver in a haul truck and a driver in a car have been shown to experience fatigue at similar times when factors such as the time of day, previous sleep quality, driving conditions and steering quality degradation are evaluated. It does not matter what the operator is driving, the body reacts in roughly the same way no matter what size the vehicle being operated is.

"LSRC has developed models for predicting baseline shift-by-shift fatigue risk due to roster design. Small changes to a roster schedule can have large beneficial effects.

"We have just initiated a new project to research the possibility of automated fatigue risk minimisation. This might be the first step towards a generalised approach to optimisation for safety.

"Since the factors contributing to this risk are known, and to some extent can be measured and controlled, they can be plugged in to our DISPATCH assignment and optimisation algorithms. Safety has the potential

to become the third leg of the optimisation triangle; production, cost and safety are all important goals that must be balanced. Modular will help our customers do this in real-time."

van Latum said the first "full-scale deployment" of FatigueAlert was underway in South Africa but there were trials in progress or recently completed at more than 10 other mine sites around the world "with favourable results".

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