Better Grading Through Technology: Enhancing Motor Grader Performance and Efficiency with Machine Control and Telematics

Advances in machine intelligence, as much as anything related to brute strength and iron, have evolved the ways that graders are used and how people operate them.

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As seen in Utility Contractor.

Motor graders remain among the most difficult to train new operators on and, as with many trades, finding skilled operators in the construction industry remains a challenge. At the same time, the industry is getting more competitive, and having capable operators along with the ability to compete in terms of productivity and quality is as important as ever.

While all machines continue to evolve in terms of controls, cab space, etc., the most important advancements in grader design and performance – those that have the greatest impact on the bottom line – are data related. The iron is still important, but how *intelligent* is that iron? In this article we'll take a look at the ways that machine control technology and telematics help significantly improve motor grader performance.

A Matter of Inches: Machine Control Improves Grader Operation

Summary benefits: reduced rework, reduced maintenance and wear/tear, greater productivity, greater accuracy, improved planning, simplified training, and reduced cost and effort associated with re-staking jobsites.

One of the most comprehensive actions a company can take to improve motor grader performance is to implement machine control technology. Machine control continues to evolve and offers new ways for contractors to operate more efficiently. Looking comprehensively at a job site, it helps contractors plan for the right materials and the right equipment to do the job, but it also offers very specific benefits to motor graders.

One benefit is the ability to reduce rework. Machine control technology allows graders to reach final grade faster and more accurately. This helps save time, reduce costs associated with rework, and allows contractors to move forward rather than moving backwards.

Equipment experiences more wear and tear the more often it is used (especially if you think about the ground-engaging moldboard and components of a grader), while also piling up more hours on the engine and the machine's filters and fluids. Machine control will generally allow a task to be completed in fewer passes with a grader, helping to minimize each of these factors while completing the same amount of work.

Being able to work more efficiently also allows contractors to more intelligently sequence and plan their equipment. If the contractor knows that a grader will get the grade to where it needs to be after a specific number of passes, they can better plan for the compactor to be there and ready to go as soon as the final pass is completed.

Motor graders remain among the more difficult machines to find and train qualified operators on. Machine control technology helps significantly shorten the learning curve and allows less-experienced operators to achieve grade characteristics similar to those with more field experience.

One of the greatest advantages of machine control in the grading process – and a quick way to lower costs on a job – is the elimination of re-staking costs. With machine control, data points don't change and the plan remains constant within the system, unless the plan changes – at which point a new plan is uploaded rather than staking the whole site again. Similarly, this continuity of data can help numerous contractors all working on the same site. By sharing and working from a single model of the jobsite, all of the disciplines work from the same plans, and it helps eliminate ambiguities or concerns over changing plans or contractors possibly working off of outdated specs.

Telematics Makes Grader Maintenance/Management More Intuitive

Summary benefits: improved maintenance, easier to monitor machine use rates and performance, easier to monitor how an operator uses that machine (reduced idling/increased productivity).

Telematics makes it easier to maintain graders because real-time data is captured and presented in a way that helps save time and resources. Gone are the days of hand-written notes and phone calls from the field – data such as engine hours, fluid levels and operating temperatures are immediately available to fleet managers. Users can also schedule automatic maintenance alerts to keep machines serviced on a more accurate and consistent basis. By the same token, users can have automatic alerts sent to the maintenance team if specific machine health parameters are operating outside of acceptable limits.

With up-to-the-second and more accurate information easily compiled into a report, fleet managers can more readily determine the optimal time to perform maintenance – important in grading applications where other upstream and downstream operations are dependent on a grader's work. Telematics also allows equipment dealers to be more proactively engaged in the upkeep of a grader. And because the dealer's service department can see the same data that the maintenance team sees, it can possibly help identify problems before they happen.

Telematics also gives contractors the ability to better track equipment hours on a day-to-day basis, which helps in two ways: actual billing and estimating. The actual data pulled from the system gives the contractor an exact measurement of hours that a grader worked on a specific job, allowing for accurate billing. Similarly, a contractor can look back at equipment hours for a comparable job as they bid on new jobs, helping them remain competitive with accurate estimates.

One often-overlooked capability is the monitoring of idling times. Engine idling indicates an inefficient use of the grader, as well as wasted fuel and higher depreciation associated with excessive engine use. Less idling is also better for the environment. By reviewing utilization reports via telematics, fleet managers can diagnose systematic problems that are also robbing the business of productivity. For example, excessive idling could point to operator inactivity. If observed, it can be turned into an opportunity to coach that operator on best practices and efficient operation of the machine.

Telematics also offers a number of benefits related to equipment security and monitoring unauthorized use, but these issues are not as prevalent with motor graders.

Easier Path to Adoption

All new technology has an intimidation factor – especially when there is a cost involved. Manufacturers recognize this and are making it easier for contractors to implement these technologies. The systems are also easily scalable – if a contractor would like to start out with a 1D system to determine if it's beneficial, it's relatively easy to then upgrade to a 2D or 3D system. Contractors should identify the manufacturers that provide this flexibility so that they're not stuck with a system that cannot be expanded.

In terms of telematics, many manufacturers are offering graders "telematics-ready", meaning that the machine comes equipped with the components to make the system work – all the contractor needs to do is add a subscription. Some manufacturers take it a step further and even include the subscription as standard – making it a no-risk investment, and opening the door for contractors to explore new ways of optimizing grader performance.

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