

Machine guidance is not just for big operators, large machines, and long-term jobs...

Royal Randwick Racecourse— Specialist Rob McMahon Called In On Re-build of Track

Small machines and modest jobs can also benefit from automatic control systems. It's not just for the big players, on massive jobs.

Rob McMahon of Gisborne in Victoria is a perfect example. His company, McMahons, is a specialist in high precision earthworks on sports fields, stadiums, and racetracks. Amongst other venues, he's surfaced the Colonial Stadium in Melbourne and worked on the Olympic Games facilities and Moonee Valley racecourse.

Right now, Rob is flat out on the reconstruction of the main track at Sydney's Randwick racecourse. The main earthmoving contractor is Kingstons. Rob is there to get the surfaces spot on.

Re-Designed with Complex Slopes

The AJC has had the entire track re-designed. It's quite a big project. Whereas they were previously flat, the bends are now sloped inwards at five degrees, like a velodrome. The straights slope inwards towards the centre of the course at two and a half degrees, to facilitate drainage.

You can expect to hear fewer reports, "the going is heavy today at Randwick..."

Kingstons have excavated a new sub-base to the required design. As our pictures show, an extensive drainage system is being constructed.

Rob is following along with a 100mm layer of 7mm washed blue metal, providing a drainage course. Kingstons are hot on his heels trucking in a sandy loam mix that will become 300mm of 'growing medium'. On top of that, the turf will be laid.



The tolerance Rob is required to achieve on these complex sloping contours is zero to ten millimetres.

Using "Mini-Scraper"

McMahons are using two light tractors with broad-profile tyres, each towing a small bucket (roughly two cubic metres) ahead of a roller. It's a sort of micro-scraper arrangement that they largely put together themselves. The bucket has hydraulically controlled vertical travel of about 200mm, with cross-tilt if needed.

In what he considers an improvement on his earlier techniques, Rob has hired a Spectra BladePro 3D system to automatically control the blade of the bucket.

As usual with these systems, the design of the job is loaded into an on-board computer on the tractor, and each machine is tracked automatically by a robotic total station (RTS) set up beside the track.

The RTS tells the machine where it is, and the computer refers to the design and tells the hydraulics whether to raise or lower the blade at that particular point.

This is small potatoes compared with the Dalby job we reported on, last issue. Stockport's project involved eighteen kilometres of new highway, and four graders (see our website, www.kerville.com/gps).

But the point is, regardless of the scale of operations, this equipment is doing the job quickly and efficiently—productivity is what it's all about.

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**Specialist at surfacing sports venues,
Rob McMahon of Gisborne, Victoria.**



McMahons Using ATS Machine Control at Randwick Racecourse

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'One Step Higher Up the Ladder in Sophistication'

Previously, Rob McMahon used an ingenious technique he'd developed himself. A laser control system for height was combined with a GPS receiver to supply the horizontal X and Y coordinates.

"This new set-up works better," says Rob. "If it had been available at the time of our earlier jobs, we'd have used it. In sophistication, it is one step higher up the ladder."

Rob McMahon says that there are two reasons he chose BladePro 3D over the alternative systems he checked out.

"In my game, I often need to use two or more rigs, working directly alongside each other," he says.

"For instance, I'm expecting to go back soon to put a new surface on Colonial Stadium and the very limited time they allow for the job will probably mean using three machines. When more than one RTS is at work, frequently the control beams overlap. I need equipment that doesn't get confused as to which tractor it's working with, and other systems I saw can't do that."

"Also, some other products don't provide a display on the tractor itself that our operators can keep glancing at, to confirm that their work is going correctly. We feel more comfortable if we can do that."

Confidence in New Technology Grows Quickly

People appear to quickly gain confidence in this new technology—both contractors and operators.

Rod Binedell from Ultimate Positioning's Melbourne office and Allan Archbold from Brisbane were on hand for instruction and advice. Soon after I arrived at lunchtime a few teething problems were sorted out, and in the short course of an afternoon Rob had about six hundred metres of the drainage layer finished.

The procedure was that both tractors ran around constantly in



Rob's light tractors towing 'mini-scrappers' work in overlapping circles to create an accurate surface.

overlapping circles, working the material from the high side to the low side, filling low spots in the process.

Everything was firing smoothly. By knock-off time Rob's operators were being delayed by the drainage contractor ahead of them, and were ready to start on the top layer that Kingstons had bulked out behind them.

Productivity Improvement in Survey Work

The advantages of using this equipment are not simply limited to machine control.

The robotic total station is, after all, a surveying instrument. It is in fact a revved-up EDM, capable of operating at the higher speeds required to control a machine. But used in its survey mode, it makes mincemeat of grade checking.

The Randwick job highlighted a prime example of modern technology versus The Dark Age.

For practically the entire time we were there watching Rob McMahon's machines busily

creating the surface, a couple of surveyors were working on the finished section, laboriously marking out a grid with a conventional chain, and doing pick-ups.

Rob was literally creating the surface quicker than they could check his work.

The better option was, of course, to stop one tractor for twenty minutes,

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A Robotic Total Station (RTS) tracks each machine, transmitting its position: on-board computer then adjusts blade of bucket for that precise location.



Randwick Racecourse Project

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lock the station on to the portable rover, and take a hundred shots at random over the completed work.

Within minutes, a printout would be available to confirm that the section was within tolerance.

This disparity in taking up current technology is surely going to be the cause of some problems and disputes in the future.

If, for instance, a huge storm had been brewing late in the afternoon, McMahons would have been increasingly anxious about having their work passed, so that they could get some topsoil cover laid.

Is it reasonable that they risk loss, when insurance would have protected them, just because the contracting surveyor was enjoying running up his hourly charge?

Postscript

I called Rob McMahon just before we went to press, to enquire how things were progressing.

"Very well indeed," he said. "By the way, did you know that we've got SiteVision on the job since you were down here?"

It appears that the taste for technology feeds on itself.

As we mentioned in the main story, the lead contractor was following McMahon along, laying 300mm of topsoil on top of his completed drainage course of blue metal.

As work progressed, it became clear that the spreading was being done with low accuracy (to put it politely!). Rob found himself involved in a great deal of unnecessary work, getting close to the design level.

So he reached agreement with Kingstons to spread the topsoil himself, and brought his own dozer up from Victoria.



Ultimate Positioning agreed to a short-term rental of the GPS system based on Rob paying the fitting costs.

He now expects to be off this job several weeks earlier than planned. So you could safely conclude that Rob McMahon is also a convert to the use of GPS for roughing in.

—Peter Kerville

TOP: McMahon's 'mini-scraper' bucket of about 2 cubic metres.
ABOVE: Operators can check their work in progress, using displays mounted on each tractor.
Below: Part of the big Randwick re-design involved comprehensive drainage under the running track.

