

True tyre transparency

Kal Tire's new TTT system offers a new level of transparency between the TPMS provider, tyre service provider and the mining customer



Kal Tire Mining Tire Group is re-launching TTT, its True Tire Technology system that it says will considerably improve how mine sites monitor tyre temperature and pressure in order to increase safety, tyre life, fuel efficiency and mine productivity. But a big part of it is deepening the dialogue on TPMS data with customers and making it more meaningful. Paul Moore spoke to Mike Batka, VP Technology, Products and Services; and Kris Green, Global Technical Support & Services Manager

One of the things that Kal Tire wanted to do is to go from TTT being just a TPMS monitoring system to its becoming more of a true site and fleet management system. Kris Green told *IM*: “The software on the older TTT system largely allowed just monitoring of the tyres, so we set about developing new software to allow us to really have a true reporting package to allow us to really manage the tyres onsite and manage the fleet, including giving recommendations to the mine for how they can better manage the fleet. We started with the base station software, Base Station 2.0. We did a total ground up redesign, including the user interface and the SQL server in the background, so we had to redo that database. One of the things that we used to do with the old system was that the first point of reference was a sensor. When it came to tracking a tyre with

regard to the lifecycle of the tyre, we didn't have the functionality to do it, so we redesigned the database to put the tyre serial number as the first point of reference. This then allows us later on to run reports and analyse that tyre from the first day that it was installed to when it was scrapped or removed for recycling or retreading. Now our tyre management teams have this pressure and temperature info to help complement the service history information throughout the life of the tyre.”

Mike Batka adds: “The foundation for the design of the new TTT dashboard was tyre fleet management transparency – both transparency for the client and transparency for Kal Tire and for our teams. The key for us with the new TTT is for us to have something to base dialogue on with the client. The closer we are to the client maintenance operations on site, the more

successful the system will be and giving them this level of visibility they can see the value but also understand the challenges.”

The old set up was very much designed around monitoring a vehicle and not the system as a whole; so one of the key points that Kal Tire first came to was that it needed a way to be able to monitor the whole system; and they came up with the idea of system health. That gives the transparency of how many vehicles and their tyres are being actually monitored at any one time. Green comments: “We know we have a fleet size of X but how many of those vehicles are in maintenance and how many might have equipment that no longer works or has been tampered with. In the old system it was hard to tell at a glance what the state of the overall system was. So the dashboard now has three dials: the top one is the number of vehicles, the second one is wheel positions and the third one is repeaters, in this case specific to the 900 Mhz system.” So with a glance at a real case from Canada seen by *IM*, it was possible to say that there were 13 vehicles of which 11 were being monitored and were working. So that was an 85% availability; of 76 wheel positions that could be being monitored it was at 51 or 67%. This site typically runs at 90% but in this case it was early morning and following the morning production meeting there would be a full tyre change at which time the figure went back up to 90% of the tyres monitored. There were two trucks in this case not being monitored but if

looking into the fleet monitoring section, it was easy to see that they were in maintenance.

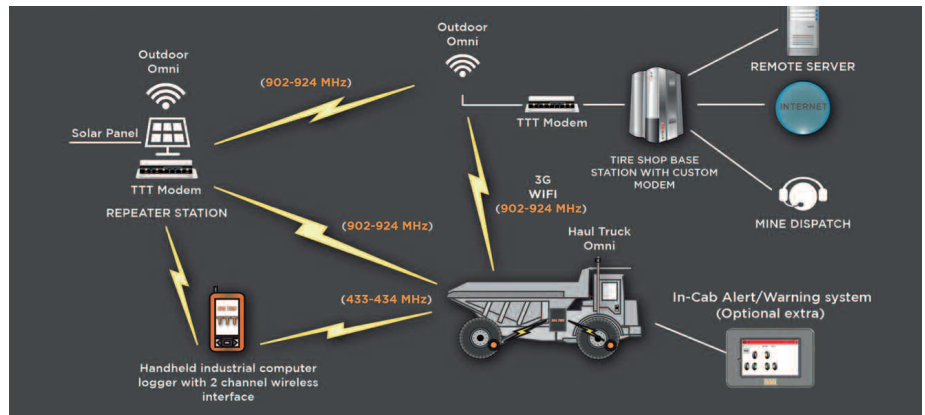
Achieving 90% plus monitoring

The goal is to try to have 100% of the trucks with the TTT system installed; and 90% of wheel positions monitored at all times. The challenge on a working minesite is actually getting the opportunity to install the sensors on the tyres. These trucks are running up to an average of 21 hours a day even with shift changes and day to day maintenance. This means there are limited opportunities for the truck to be stood down and for Kal Tire to take a tyre off and put a sensor in, so it is a continual challenge. But the major benefit of transparency with the new TTT with regard to the site manager and the client is that they can better plan because all the real time system health info is available to them.

In reality, to get to 100% of sensors fitted, with constant tyre change outs it would be nigh impossible, which is why Kal Tire set 90% and above as being its target. The actual sensors do not add to the change out time as the patches are already installed on the tyre when it is delivered new to the site, so the tyres are ready to go in the spares pile with the patch on and the sensor just screws into it.

Green adds: "When we select a vehicle on the system to go into maintenance/service, it then asks for reasons why – it is mechanical maintenance, is it tyre maintenance or is it just parked? We didn't want it to get to a point where we say to the customer that we haven't monitored trucks for a particular period as they were in maintenance; and the customer may disagree – with new TTT it is very clear to everyone that the trucks were out of the fleet for a period of time and why and where all trucks are at any one time. At the moment, all the data on the dashboard is from the TTT sensors. Typically the information goes to the mine, whether from TTT or VHMS or Modular/Wenco type or other systems – all of this goes to dispatch. Of course, some of this data could also be useful for us, such as the actual tonnage being hauled on each truck, which would give us an idea of how hard the truck and therefore its tyres are working. But that is not part of this TTT phase, it is something we will look at more in the future."

Looking again at the Fleet Monitor dashboard, the user can see the list of all the trucks that are running at that particular site. When the user selects an individual vehicle, over on the right hand side the user can see the detailed information for that truck. Each of the wheel positions with the pressure, temperature, cold inflation, tyre serial number, and the sensor itself. This adds to the top screen info such as the vehicle type/model and if the truck in



service or out of service. Selecting an individual tyre, it gives a 12 hour graphical history of what the pressure and temperature have been on that tyre. The next box to the left is an alerts trends box, showing any alerts on the particular minesite relating to P&T. "Here we can see 99% of the fleet is in the optimum range of tyre P&T alarm settings that we set. So 99% of the trucks are running fine and don't need any assistance from Kal Tire. The 1% is low, it is underneath the target line. Looking then at the alerts monitor, the 1% shows up as one wheel position that is running on low pressure. This acts essentially as a job sheet for the site manager to print off each day and pass to one of the tyre fitters to go and inspect the truck or trucks and bring them back to within the target limits. So it is a way of very quickly managing the fleets and acting on alerts."

A new maturity in TPMS

Mike Batka commented: "Typically, other systems that we have seen involve downloading P&T data into Excel, so in addition to transparency we have tried to bring in a one click system into the design, so just by clicking on the icon at the top, you can immediately get to the Alerts Monitor and print it off as necessary for the site manager and know the job list for that day. The client can also see it and understand exactly what needs to be done and we can keep the fleet running as close to 100% optimum as possible."

Touching on the point about one click, this was one of the things that Kal Tire highlighted when it assessed the old software. "We looked at what are the most common tasks when you are using the system. Changing sensors, changing tyres, how many steps does it take to carry out that task. We found that there was a lot of clicking and one screen to another which could sometimes be too labour intensive to administrate on a busy site. So the one click option means that this is much more efficient. All the tyres running are in the database so you can select whichever tyre you want to look at and inflate or change in one click. Again, with

Kal Tire TTT network overview

the sensors, it is clear with one click what needs changing. At the minute all of this data is maintained in a base station but in the future we will also have it available on a handheld tablet that will put it directly in the hands of the tyre service team."

The TTT Console

The TTT Console is another aspect to the new system. As stated the main TTT database for site is on a base station that is maintained on a desktop PC in an office. The console is an online portal that replicates what the user sees on the base station TTT dashboard. The graphic user interface looks slightly different, but it has the same feel and components, with system health at the top, then Fleet Monitor and the individual truck monitoring section with sensor IDs, tyre serial numbers etc. "This can be accessed via any device with an internet connection and has the same one click edit throughout. The aim is to give more access to the tyre engineer so that when he changes the tyre, he doesn't have to fill in pieces of paper to be sent back to the office to update the system, he can edit the system in real time. Currently tyre teams still have to fill in a tyre change sheet, stating which tyres have come off, which tyres have gone on, plus a box for the TTT sensor where they would write the new sensor ID. With TTT console this can all be updated on screen. Beyond this we also have the vision of being able to incorporate RFID tagging to allow all this to be done automatically through scanning."

So the main users of the base station dashboard via TTT console are the Kal Tire engineers onsite, who have full administrative capability and permission to put tyres on and take them off due to the transparency again of access to the system. But TTT is also very valuable for the bigger picture to client staff such as site and operations managers, to allow them to see the status of all the tyres in the fleet.

"To support TTT console we have also introduced ruggedised wifi-enabled tablets for



TTT installation elements on customer mining truck

our on-site teams, to allow them to make best use of access to the system remotely. Ultimately all the other tyre management info contained on another database, such as information on wheels, planned tyre rotations, site tyre inventories and orders etc, could also be hosted on TTT and accessible via TTT console. We see TTT very much as a foundation platform which will assist clients with the integration of data from multiple sources and again help it become more of a true management system as opposed to purely a monitoring set up. Already our alerts are also pushed directly through to the dispatch system the mine is using, such as Modular or Wenco, allowing them to instantly decide whether to reroute the truck based on the tyre data, or slow it down, or give it a lesser tonnage load etc.”

True transparency

There is a lot of info out there on value opportunities using TPMS to reduce tyre wear, reduce tyre damage costs, reduce fuel burn, increase productivity etc. But one of the key areas of value with TPMS is in the dialogue between the tyre service provider and the mine; whether that is production or maintenance or dispatch. That dialogue and the transparency that the TTT system allows, is effectively a much enhanced decision making tool and helps the client see much more clearly the value that the TPMS data brings in terms of ability to react to alerts. “Ultimately, we hope to be able to reflect this value in dollar terms or other metrics so the value of the system can be better defined. We believe that if the client can see the system working and used to the full potential that it is designed to be used, then they will better see the

value in having the 90% plus of fleet tyres being monitored versus a lower proportion that is only broadly representative of the whole fleet.”

Batka adds: “Of course a lot of mines are still testing and experimenting with different TPMS sensors and approaches. But over the past five or six years, we have seen a lot of promises made by some TPMS sensor providers that have not really delivered, largely due to them only providing a sensor without the means to ensure transparency and reach a situation where almost all the tyres are being monitored and therefore meaningful results and alerts that can be acted on. There have been issues with the sensors themselves and a lack of visibility of system health, a lack of reporting, a lack of support in the field and the inability of the customer to see if the system is actually working as it should. The new TTT system does allow full visibility and does bring true value in all these areas. So it is in a sense the first TPMS system on the market that actually lives up to its potential.”

New TTT to market

Kal Tire was in the market early with TTT, but were the first to look in this amount of detail beyond the sensor and what the system actually needs to deliver in value terms and where are the areas that TPMS systems have been letting clients down. “So yes, there a lot of mines still trialling different TPMS options and quite a few that have spent quite a bit of money without getting the true value of the data and now wondering what the value of TPMS is. By going back to basics, Kal Tire has been able to use the latest technology. Our system incorporates Android technology and is Wi-Fi compatible or can use GPRS (3G) or a basic RF network.”

Green comments: “We went to all the customers and listened to their concerns about what was missing with current TPMS solutions.

For example, our original TTT was a 900 Mhz system based on our own network that we would put in, as that was the most flexible and could be used on anything from a remote mine with no existing network upwards. But some customers already had 2.4 Ghz wifi enabled on their site and so wanted to use that. Likewise a big mining contractor might be using their fleet on multiple sites so want the ability not to be tied to one particular site’s network. So the new TTT can work on 2.4 Ghz wifi, or on a 3G cellular network, or on 900 Mhz as it did originally. So beyond transparency, TTT now offers greater flexibility than any other TPMS system. And third, we addressed a real lack of support in the TPMS industry from some other systems. We have TTT dedicated people in all the major mining regions giving 24/7 support to all TTT customers and can respond immediately to any issues they may have.”

Each minesite has its own unique challenges that have to be addressed as well as the training element and the installation. “We have TTT-trained people there specifically to go the mine for a new installation and spend time with the staff – both Kal Tire and mine staff – to make sure they are comfortable with operating the systems. The mines have different service arrangements – normally TTT would be managed by a Kal Tire team but some mines for various reasons may have their own tyre maintenance crew rather than ours, but we will still provide a Kal Tire engineer to provide a site management perspective. Equally it would be possible for a mine to buy TTT from us independent of service and only have remote support.”

The new TTT offering will be offered to all of current Kal Tire mining customers, as well as potentially other new mining operations not currently working with Kal Tire due to the system’s unique selling points that are not dependent on Kal Tire also providing the service at the mine, though the group believes that clients would get the maximum value that way. Batka adds: “We have not rushed it to market until it is ready and have been careful to develop the right pricing packages, brief all our sales reps, as well as having the right brochures and training info in place. While we think that all major mines will move towards TPMS, for now we are working with a group of our major Kal Tire mining customers before rolling it out globally. These include major coal and copper operations. We have had some very good feedback already from those key clients in terms of the practical value that TTT brings to their operations. Being able to express and quantify the value of TTT in monetary terms to a minesite is something we are working on and believe is necessary in a mature TPMS market that is much more than just the sensors and data in isolation.”

About a year ago Kal Tire also launched a Mining Tire Group intranet called My MTG, which took about 10 months to design and build. This assists the group internally with group level communication where for example any Kal Tire staff member around the world can access all the latest brochures and material relating to the new TTT in one place, without the need for email

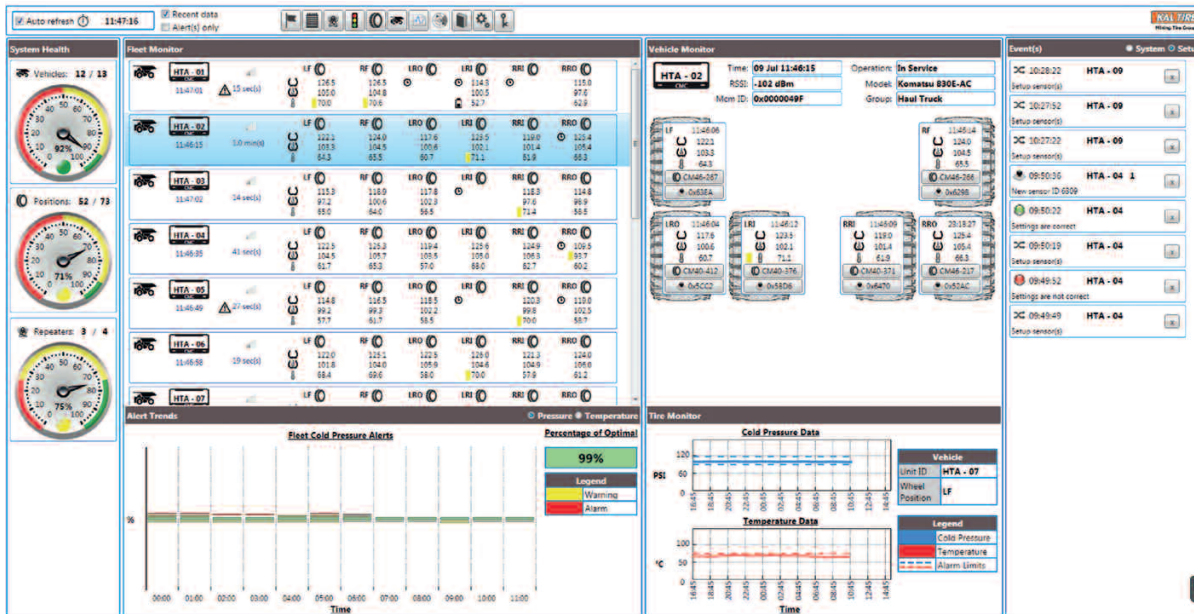
and phone requests. All the material is currently available in English, Portuguese and Spanish but will also be there in a number of other languages in due course.

Seven system options

TTT is now available through quite a simple pricing structure for customers, meaning that there is a one off price covering a three year period of TTT use, including all the physical components such as the base station and sensors, as well as all the servicing and licensing fees that go into the upkeep of that particular system.

Talking again about hardware, in addition to the ruggedised tablet, Kal Tire offers an in cab alert system display. Green states: "This is fundamentally the same hardware that we have had all along with regard to sensors and patches but now with an in cab alert system showing the six wheel positions. This is optional and the same functionality can be achieved with a less visual alert system in the cabinet behind the operator. Other sites want the operator to have the visual access to the alert system."

To reflect the fact that the mining market includes everything from small mines running only a few trucks to very advanced and complex mines running numerous networks and on board systems, TTT is also available in different levels. The most basic is just an in-cab system alone, without a base station and where seeing real time tyre data is not the top priority. The P&T data is accessible just by clicking on the tyre position. When there is an alert there will be an audible alarm that the driver can acknowledge it and take action, and the more detailed data can then be later downloaded via Bluetooth. "It is all about both ourselves and the client being part of the decision making process on site with a



The Kal Tire TTT Base Station dashboard

new level of engagement beyond Kal Tire being purely just a tyre service provider and the free flow of TPMS data and information. And of course it means Kal Tire is also taken to task in terms of us proving that 90% plus of tyres are being consistently monitored. But the more value we offer, the more TTT becomes part of a more strategic alliance relationship with customers, even across multiple minesites. What better way to create new business for us but to prove TTT value at one site then roll it out at others" says Batka.

They may be happy just to have the data through a manual download to a laptop such as via Bluetooth. The system is designed as such so that if the customer then wants to switch to a wifi or 3G option, then they can do this as the hardware is already built in but not yet activated but Kal Tire can activate it and make the wider functionality available to them if they wish. This allows small mines to invest in an entry level system but migrate to a full system easily once they start seeing the value in it without having the pull out old hardware and install new equipment. Green states: "This means we can also reach a much larger pool of customers that can benefit from TTT – in the UK market for example, there are hundreds of quarry operators with small truck fleets that can still benefit from the functionality. Beyond the most basic system we actually have six other possible TTT offerings to customers. The differences in the products mainly concern connectivity such as whether they are running it off 3G, wifi or 900 Mhz."

TTT and reporting

Finally on reporting, within the TTT Console there are several tabs running along the top. In addition to the dashboard and system health, there is a selection of formatted reports

available to the customer that all speak to how the system is performing but represent the data in different ways. This includes operational reports and what Kal Tire calls value added reports. Each of the different TTT reports can be generated individually or the system can produce what Kal Tire calls a consolidated report. The aim is to provide a monthly in depth TTT report so that the mine manager and/or Kal Tire site manager can pick a date range and generate a PDF in a preconfigured format. This supplements the tyre management meeting the Kal Tire team would be having monthly with the customer anyway. The customer could also generate a daily or weekly report or an annual report as they wished; even a report on a life of a particular tyre. Batka states: "We have found that is important to be consistent in the format and way in which a report is presented; as well as to be consistent in the algorithms used so that the numbers are generated in the way every time. We wanted to standardise the reports being delivered to customers to avoid different interpretations and confusion from the same data; and make them as concise as possible. This consistency of reporting will also allow owners with mines on different continents to easily compare TPMS data globally. We can actually produce 21 different formats of report, which was based on listening to customers. We also held a workshop from which we used feedback. Finally, the new TTT system has a GPS module built in, which will allow us to relate where a truck has been and actually relate any depressurisations for example with particular areas of the haul road, that could then be inspected." IM