

API telematics

Why data is king in construction



Abstract

Telematics is about transmitting information over lengthy distances and is used for a variety of purposes, both commercial and non-commercial. In the construction industry, the technology is used to monitor a wide range of information relating to an individual machine or an entire fleet.

This white paper will give a brief overview of how its usage has developed over recent decades in the construction sector. It will explain how telematics is helping contractors to save money and prove the environmental efficiency of their equipment – both vitally important in the current climate.

In addition, it will illustrate how data has become so integral to the construction industry that it often drives purchasing decisions for machinery. And finally, it will outline what the future could hold for this dynamic and innovative use of technology.



Telematics in construction

Telematics systems gather data (including working hours, fuel consumption, location and idling time) and visualise this on software platforms that help owners manage their resources remotely. The origins can be found in the 1960s, when the US Department of Defense developed GPS systems to track asset movements and improve communication on the battlefield.

Fast forward several decades, and the technology has transformed the face of the construction industry. It has helped to optimise efficiency, increase productivity, improve reliability and ultimately, enhance the bottom line for companies that have adopted it successfully.

One of the first OEMs to harness the power of telematics was Hitachi Construction Machinery Co., Ltd (HCM). In June 2000, it led the market by offering a satellite communications device as an option in its Zaxis-1 excavator range. It was presented to the market as an 'information excavator',

capable of remotely collecting operational information. The function was subsequently made a standard feature on the Zaxis-3 range of excavators launched in 2006 [1].

"Hitachi started collecting data from sensors installed on its equipment earlier than other manufacturers," says Yemi Onabiyi, Service Business Support Engineer at Hitachi Construction Machinery (Europe) NV (HCME). "And in terms of data generation, we are one of the leaders in the industry."

Hitachi equipment data is presented to customers on its Global e-Service platform, which HCM has been operating since 2005. Today, the information is easily accessible using a desktop computer, smartphone or mobile app using an online management tool (Owner's Site), an automated monthly email report service (ConSite) and mobile phone applications (ConSite Pocket and ConSite Shot).



Creating a standardised system

As other OEMs followed and developed their own telematics systems, contractors with mixed fleets had to access several different software platforms to view the data they needed, which was shown in varying ways. Recognising that this was time-consuming, inconvenient and inefficient, a group of manufacturers and the Association of Equipment Management Professionals [2] worked together to create the telematics data standard.

This allowed the delivery of basic telematics data – such as cumulative operating hours, miles travelled and fuel consumed, as well as current location – in a common xml document to end-user databases and was operational by October 2010.

Peter Tamming, Manager Product Support at HCME says: “This was the result of global market research. We spoke to thousands of customers worldwide to find out what kind of data, in what kind of segments, they were interested in from OEMs.”

The next step was to enable customers to view all the data from different OEMs in one management system. This is where the API, an application programming interface, comes in. It allows different applications to communicate with one another, without any user knowledge or intervention.

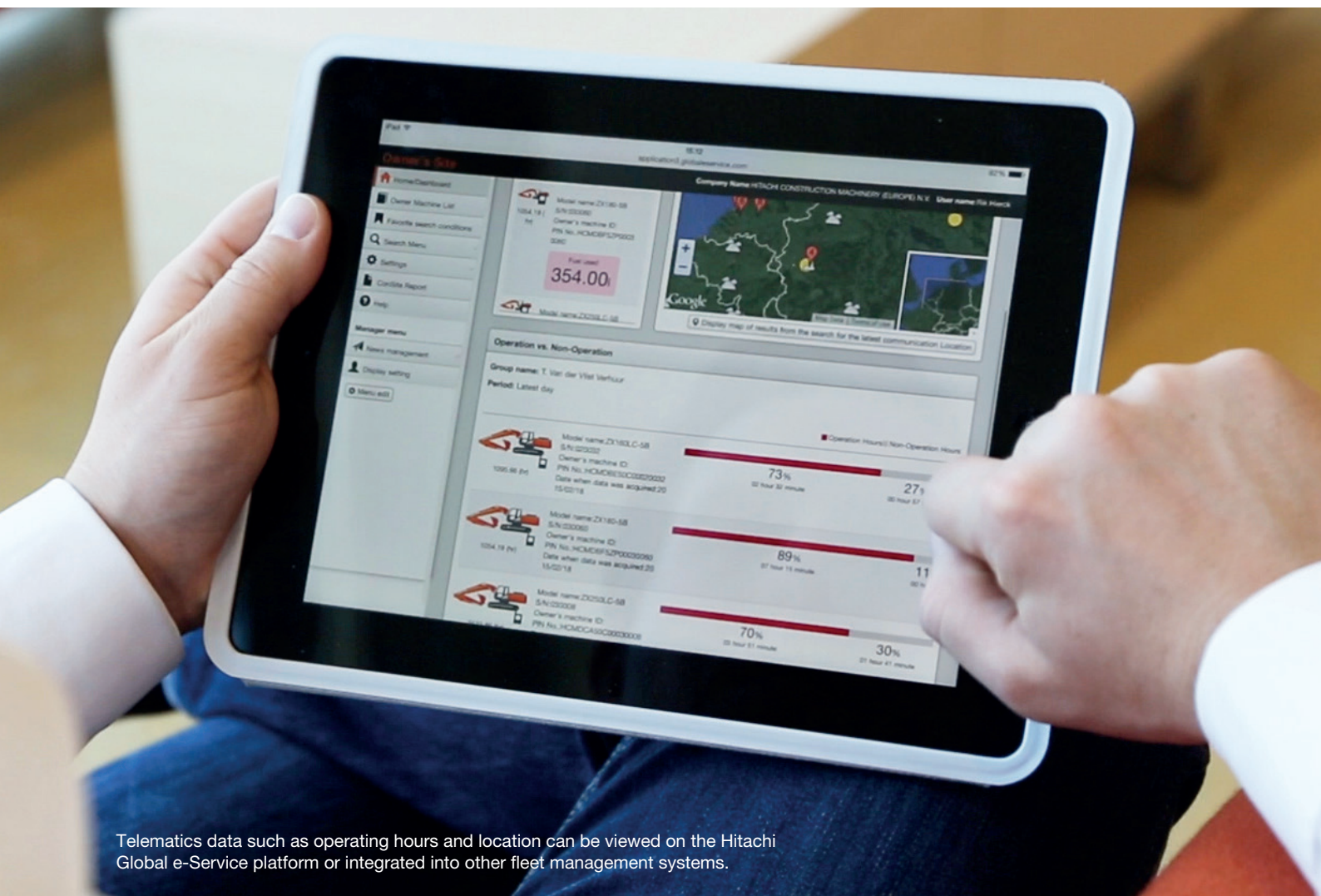
“The API is like a waiter in that it facilitates fleet management,” says Yemi. It receives a set of instructions or request from a source (an application or an engineer), takes that request to the database, fetches the required data or facilitates a set of actions, and then returns a response to the source.

A telematics API therefore brings all data together from different OEMs into one management system [3]. “The API means that no matter what system you run, you can read it on anything you want,” says Yemi.



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Yemi Onabiyi,
Service Business Support
Engineer, HCME



Telematics data such as operating hours and location can be viewed on the Hitachi Global e-Service platform or integrated into other fleet management systems.

Saving money and proving environmental efficiency

Ever-tighter profit margins and deadlines are driving the need to be more efficient and productive on construction projects. Ultimately, to be profitable, contractors need to know where their machines are, what they are doing and how they are doing it.

Therefore, the most important data for contractors is operation time (start/stop times), fuel consumption and location. This is particularly true on large-scale projects, such as the construction of the new HS2 high-speed rail line in the UK – one of the most demanding infrastructure projects in Europe.

According to Stephen Creaser, Director Product Support at Hitachi Construction Machinery UK (HCMUK), the HS2 project represents the benchmark for telematics, due to the costs and the sheer amount of machinery involved. “Leading international infrastructure groups hiring our customers’ machines to work on the project need to monitor the utilisation of those machines,” he says. “If they are paying for it, but it isn’t working how it should be, they will want to know why. It’s all about cutting costs.

“From our customers’ perspective, it is about having the most up-to-date location of the machine and operational data available for their equipment to ensure that they are always aware when the machine is being used on site, and also so they can ensure any unauthorised operation time is recorded and invoiced accordingly.”

Emissions standards are also driving the growing demand for machine data. Due to the high-profile nature of HS2, the environmental efficiency of the equipment used on site is under close scrutiny.

“This project has involved building on ancient woodlands, and politicians are watching its progress closely, so every machine has to be as environmentally friendly and efficient as possible,” says Yemi. “Using the data that OEMs provide, contractors can prove how much CO₂ their machines are creating, and how much fuel they are using.”

The data provided by telematics APIs helps contractors to tackle these challenges by providing accurate information on the condition of an individual machine or the status of an entire fleet. Every OEM now provides a telematics API, so contractors can view it either on their existing OEM-supplied platform, such as Hitachi’s Global e-Service, or on independent fleet management software.



“Telematics data is important to our customers, demand is increasing every day”

Stephen Creaser,
Director Product Support,
Hitachi Construction Machinery UK

UK perspective

In the UK, the rising importance of telematics data in the construction industry is evident. “Telematics data is important to our customers, demand is increasing every day,” says Stephen. “The biggest issue is for mixed fleets to have the information on one platform.”

“There is a new generation of owners, who are more tech-savvy than the previous generation. They know the technology has been there for years and understand how to use it to increase productivity and efficiency.”

The growing use of telematics is also beneficial in terms of building a good relationship between machine owners and their suppliers. “We can monitor their assets and proactively contact customers for servicing, as well as offer them special deals if they’re not already signed up to a service agreement,” adds Stephen.

“This not only generates revenue for us, but it takes the onus off the customers – they can focus purely on running their businesses, while we make sure their machines are serviced and maintained. We become more like a partner to them.”

He believes the role of telematics will continue to increase in the future, as owners are already requesting access to more data with greater frequency. “When Hitachi started offering machine information in 2000, there was not so much demand for live data, or updates every 15 minutes.

“However, larger companies in particular, now want to know what they are paying for from rental companies, in terms of fuel usage and idling time. They don’t want to know the next day, because it’s already too late, they have already paid for it. It also works well for smaller companies and rental firms – they can prove how much a machine has worked in one day, which is important as there is so much competition for hire rates.”



The use of telematics helps to strengthen the relationship between machine owners and their suppliers.

Data drives the purchasing decision

Such is the importance of telematics and the information it provides, Stephen believes it has now become crucial to the purchasing decision. Customers are less interested in the brand of equipment and more concerned with the software fitted to it and the level of data available.

“It’s no longer only about who has the best machine when it comes to the purchase decision, but also about which manufacturer has remote access to the most important operational data, and how quickly the customer can access that data,” says Stephen. One large rental customer of HCMUK involves its Plant and Logistics Data Analysts in the purchasing decisions: “The Mobile Plant Manager recommends the machines, but the Digital Plant Manager asks who provides the information and how quickly.

“It’s therefore important to have an edge over the competition in this respect. For the UK market, I am sure that Hitachi should put as much effort into telematics as it does into the development of its next generation of excavators and wheel loaders.”

Not all HCMUK customers, however, believe that data is more important than the equipment itself. Although Land & Water Managing Director Richard Maclean recognises that telematics is crucial to his business, which specialises in

maintaining and managing the UK’s coastal, canal and river networks, he also appreciates the residual value and product support of the machines.

“I sell used machines around the world, so it’s good to have a brand like Hitachi that is renowned globally,” he says. Three quarters of the Land & Water fleet is Hitachi – the majority of machines are long-reach models to carry out dredging and vegetation management, as well as deep excavation and work on railway embankments.

According to Richard, the company is increasingly using Hitachi’s Global e-Service remote monitoring system to check the application of the machine, operation times and fuel consumption.



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Richard Maclean,
Managing Director,
Land & Water



Image courtesy of Land & Water.

Due to the nature of its work on waterways, and its national framework with the Environment Agency, the ability to prove the environmental impact of its equipment is particularly important. “Customers ask about our carbon footprint and we can demonstrate our CO₂ emissions,” he explains. “It helps to show that our equipment is greener.”

Idle times are also important to Land & Water and the company uses the telematics data to show customers how much diesel is being wasted. “We help our customers reduce this, as less fuel burnt reduces costs. Also, if a machine has less hours, it’s worth more when you sell it on.”

Another advantage of using Global e-Service is the transparency it brings. This has a beneficial impact on Land & Water’s relationships with its Hitachi dealer, as well as with its own customers. “It removes any ambiguity,” explains Richard. “If we had a warranty claim with the dealer for example, and there was a fault on the machine, we can check if a warning light has been on and has been ignored, or if it has come out of the blue – there’s transparency on both sides.”

Its customers hire the Hitachi excavators to work a certain number of hours per day and also pay for the amount of fuel used. “If they go over that, we can check and charge more, so it brings transparency with our customers, too.”

Looking to the future, Richard is keen for Hitachi to provide a greater level of data, real-time information, and increase the remote monitoring capabilities of its equipment. The Land & Water fleet uses biodegradable oil, so it’s important for the company to monitor the use of attachments to avoid contamination.

“If a customer hires one of our machines and changes attachments, it would be useful if we could switch on the auxiliary hydraulics to set it up remotely by adjusting the flows and pressures for that individual attachment,” says Richard.

“Another USP for Hitachi would be if we could view the cameras on the excavator remotely, so we can see what it is seeing in real time. It’s not available yet with OEMs, so we use a third-party system, which is costly and less effective than an OEM system would be.”



Image courtesy of Land & Water.

Conclusion

Since emerging in the 1960s, the use of telematics systems has proved invaluable to industries such as construction. The data they provide enables contractors to make significant savings on fuel consumption, to plan their work more efficiently, and to schedule preventative maintenance effectively to ensure high levels of availability and a higher residual value. It also helps to monitor the environmental performance of their machines, which is increasingly vital for tenders on government projects.

The industry is also benefitting from the wider use of telematics, as it accelerates towards digitalisation. In addition to autonomous machines, modular construction and building information modelling (BIM), telematics can make a valuable contribution to the industry's efforts to achieve net zero carbon status.

Machine connectivity has also opened up new possibilities for construction equipment manufacturers to engage with customers on an ongoing basis, providing a service as well as a product [4]. In addition, it has proved to be a decisive factor in the purchasing decision and an important element for manufacturers to focus on. "A growing number of

customers would buy a machine purely because of the level of data they can get access to," says Yemi Onabiyi, Service Business Support Engineer at Hitachi Construction Machinery (Europe) NV (HCME).

As telematics in the sector becomes more comprehensive to meet the growing demand from owners, machines are becoming smarter and software platforms are able to share significant amounts of detailed information and analysis at greater frequencies – in some cases, every 15 minutes.

The infrastructure and associated technology on which telematics solutions rely, via satellite and mobile networks, is also developing, enabling connectivity on a greater scale. The future could see the use of wearable devices that monitor how many hours an operator has worked and how fatigued they are [4]. The need for more useful, actionable data, presented in an accessible way, and at higher frequency, will only continue.

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