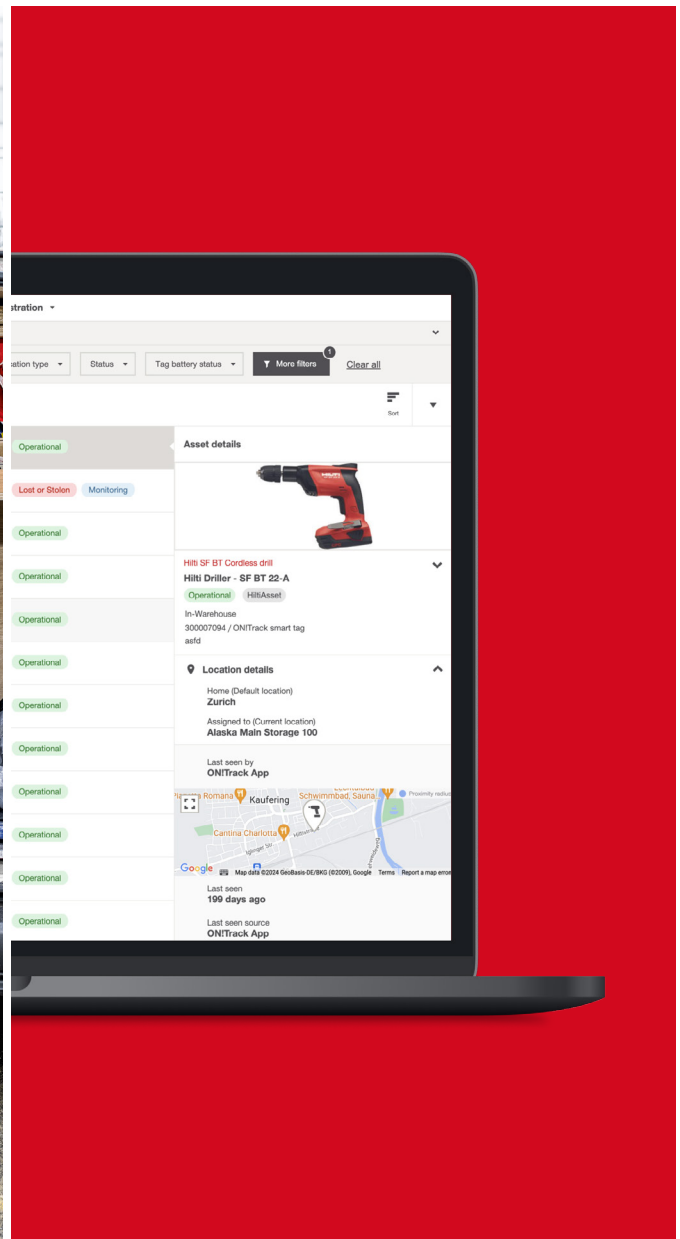# TOOLS FOR SUCCESS

How digitalization is transforming equipment and resource management

HILTI CONSTRUCTION **SOFTWARE**

Introduction

Construction is one of the largest industries globally. It plays a central role in the world economy; it creates jobs for millions of people, provides housing to almost everyone living on our planet, and builds commercial, industrial and civil infrastructures that enable economic growth. The industry, however, faces significant challenges. It has not delivered productivity over the past decades. Skilled labor is in short supply, and, cosequently, there is a strong need to do more with less.

Based on our own research, and what we regularly hear in conversations with our customers, we understand that today's biggest productivity pain points for contractors relate to business processes (see sidebar at right).

In this whitepaper, we focus on processes related to field resources and zoom in on the management of equipment. We discuss key challenges faced by contractors, we show how those challenges impact the productivity of the field personnel, and we explain how contractors can leverage software and Internet-of-Things (IoT) technology to improve their bottom-line.

> "
> **One of our biggest cost bases is labor, so it is important that our workforce has the tools and the equipment that they need.**
> "

Patrick Cossette
CFO, OZZ Electric, Canada

Examples of top pain points of contractors

Inefficient project management
Difficult to coordinate stakeholders and tasks. Managing progress and resolving issues is time-consuming
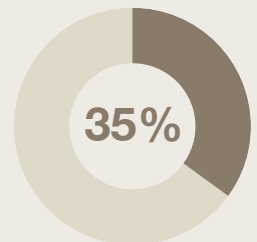
95%

Poor field-to-office communication
Information exchange still paper-based or via phone in 95% of the cases

Field resources poorly utilized*
The workforce stands idle 35% of the time. Equipment and material not at the right place at the right time; processes are paper-based

35%

15-25%

Shortage of skilled labor*
Employee attrition of 15-25% per year and growing

Data silos and lack of end-to-end integration
Data required to manage financial performance at project and enterprise level not available at required quality or reside in different silos

* In focus in this whitepaper

Why bother managing equipment?

For most contractors, it is an easy decision to proactively manage heavy equipment and vehicles, such as excavators, loaders, compactors, trucks, vans, etc. Such equipment represents major investment and can incur significant expense when being leased or rented. But what about smaller equipment and tools?

At the individual level costs may seem insignificant. However, when you look company-wide the sum is substantial. But more importantly, they have a massive impact on labor productivity and, therefore, also on the bottom-line of a construction company. For instance, a hammer drill that cannot be found when formwork should be secured could cause serious project delays for a concrete contractor. An impact driver that suddenly stops working could mean a mechanical contractor might have to postpone the pipe installation work to the next day, causing rescheduling of multiple activities.

Resolving such ad-hoc issues or organizing equipment for repair requires a lot of coordination among multiple jobsite and warehouse employees. This adds up to many hours of wasted time in a year, which becomes extra problematic given that these resources are in such short supply in construction.

> **If we are stopping because we don't have any tools it means we are losing money.**
>
> **Christopher Lloyd**
> Project Manager,
> One Source Building Services, U.S.

> **We have tools and equipment on site that we have been renting for months... that sit there not being used and which could have been sent to other sites rather than renting dual amounts of equipment.**
>
> **Douglas Skrepnek**
> President, OZZ Electric, Canada
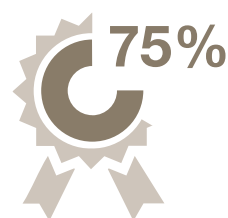
**75%** of all contractors struggle to manage certificates and inspections in a compliant way.

Managing equipment also includes important aspects of workforce safety and compliance. For example, if there is an accident with an angle grinder, and it cannot be proven that it has been inspected in a timely manner and the concerned employee has been trained to use it properly, the liability lays with the employer. Hilti research indicates that 75% of all contractors struggle to manage certificates and inspections in a compliant way.

These are just a few examples, but they highlight the fact that if construction equipment is not managed, significant loss of productivity and compromised workforce safety is almost guaranteed. The importance of managing equipment is well understood by decision makers in construction – in an international survey conducted by Hilti with more than 1000 contractors, 83% of the respondents rated equipment management as an important or very important topic.

At Hilti we share this view. In fact, our experience shows that by managing equipment professionally, contractors may reduce their annual spend on tools and equipment by up to 20%, with the key levers being reducing loss, increasing utilization, and optimizing maintenance and inspections.

But that is not all; the significant idle time at construction sites – not seldom caused by tools and equipment not being at the right place, in the right condition at the right time – may be reduced by up to 15%, corresponding

Equipment management is highly relevant
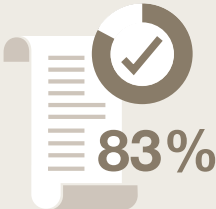
83% of the respondents rated equipment management as an important or very important topic.

20% Potential to save up to 20% in annual spend on tools and equipment
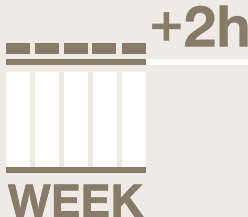
+2h **WEEK** Potential to save up to two hours per week and employee by reducing idle time

to around 2 hours per week and employee.

This adds up to substantial savings over the year. Naturally, the actual savings will vary by company depending on their unique situation and Hilti has consultants specialized in running analyses together with our clients to quantify the potential.

> **" Trying to manage our assets has always been a challenge. We have a lot of inventory that either goes missing, gets left behind or gets stolen. "**

Marco di Battista
Senior VP, GFL Environmental, Canada

Plans and tasks:
Reviewing, assigning, reporting, and verifying

Equipment and material:
Locating, retrieving and maintaining

Fabrication and handling

Productive work 30%

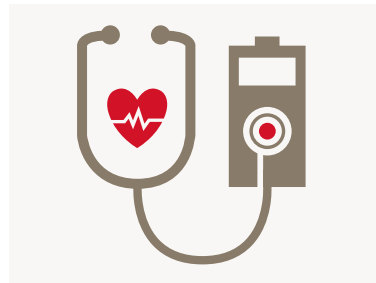# The fundamentals of managing equipment in construction

We recommend that contractors focus on three central areas:

TRACKING

Where is the equipment?

SAFETY

Is the equipment safe to use?

PROFITABILITY

What are the costs incurred by the equipment?

To properly answer these questions, there are a set of activities that contractors need to conduct. In the following section, we will explain them one by one.

Getting started

Creating a record of inventory
Establishing a central record of inventory is a fundamental first step. In this record, all items are listed along with key attributes such as ID number, visual/photo, brand, type, description, date of purchase, cost codes, etc. Every time new tools and equipment are procured, or when they are lost or scrapped, the record needs to be updated.

TRACKING

Keeping track of equipment
Most of our customers tell us that the main problem they want to solve is knowing where their equipment currently is. However, the very nature of construction makes this tricky – the equipment constantly moves between warehouses, jobsites and other storage locations such as vans or containers. Therefore, to follow the movements, contractors need to implement a process to track the equipment across all locations.

Beyond tracking the location of equipment, it is also important to track who is the responsible employee. This drives accountability and eases communication in the organization. By tracking both – location and responsible employee – our experience show that loss of equipment can be reduced by up to 50%.

In addition, you also want to track the current status of the equipment. This includes information such as if the equipment is operational or broken, as well as if it is in use or idle.

Conducting regular inventory checks
Inventory checks serve the purpose of confirming that actual inventory is in line with the record of inventory. Deviations could occur if equipment movements have not been correctly captured. If inventory checks are made more regularly, deviations are smaller and can be addressed in a timely manner, improving the chance of finding missing equipment.
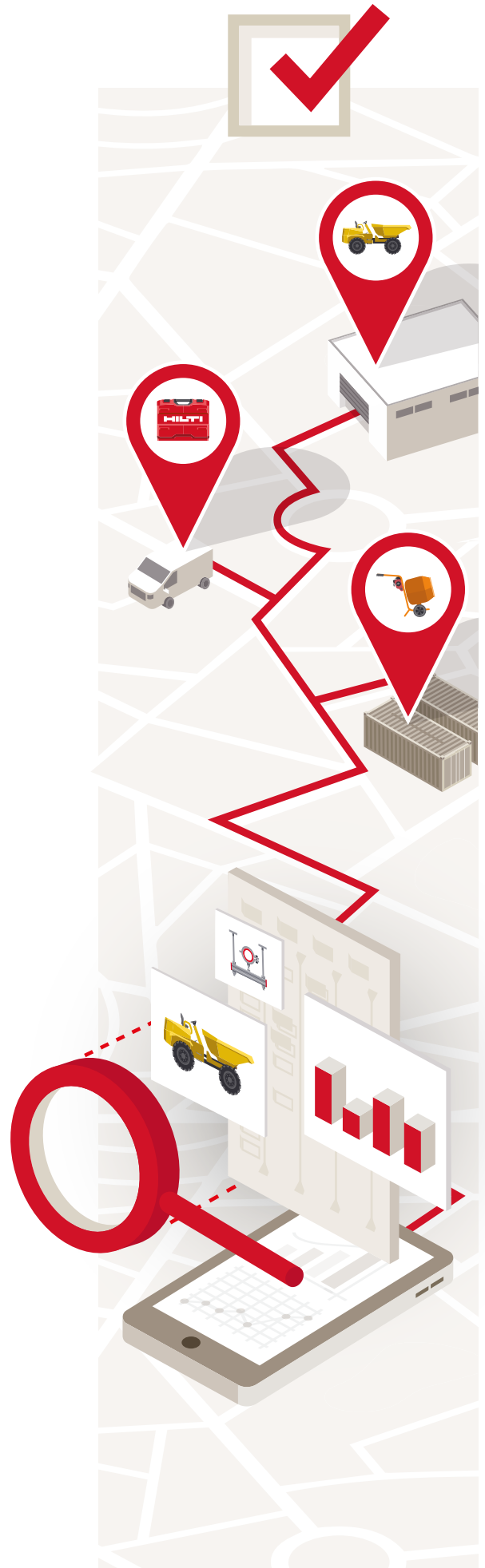
SAFETY

Documenting services and inspections
To ensure proper maintenance of equipment, service and inspection intervals should be defined and alerts set. Maintaining the equipment according to a predefined schedule reduces the risk of unexpected downtime, improves safety and may also be required to comply with safety-related regulations. Once completed, services and inspections should be documented to ensure that the maintenance history can be retrieved on-demand from the back-office or in the field, e.g., via a mobile app.
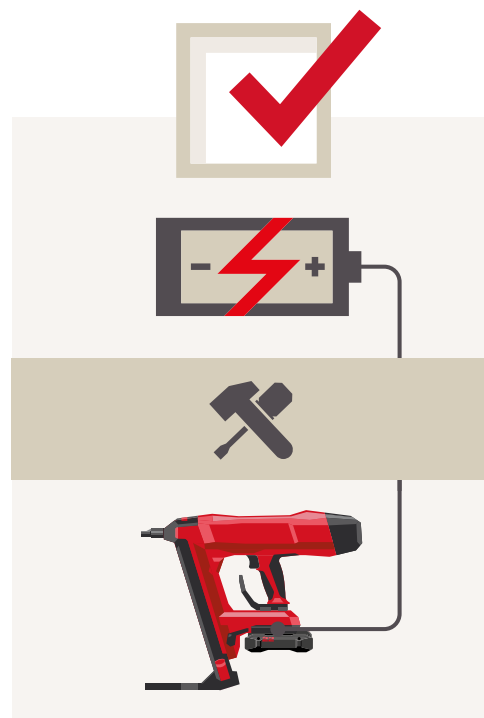
PROFITABILITY

Allocating costs of equipment to projects
Keeping track of how equipment moves across locations, like warehouses and jobsites, also enables contractors to apply a fair allocation of the costs of that equipment to the respective projects where it has been used. This is particularly relevant for those contractors running their warehouses as a profit center. We have seen many contractors do this for their most expensive assets, like cranes and excavators, but many stop at mid-value equipment like generators, breakers and measuring devices, stating that the effort is too high.

Learning from your data
When conducting the activities described above, a substantial amount of data is generated. This data can be used to improve decision making and ultimately profitability. For instance, by evaluating equipment usage data, hoarded equipment can be identified. Similarly, utilization data can also be used as input to optimize the composition of equipment fleets.
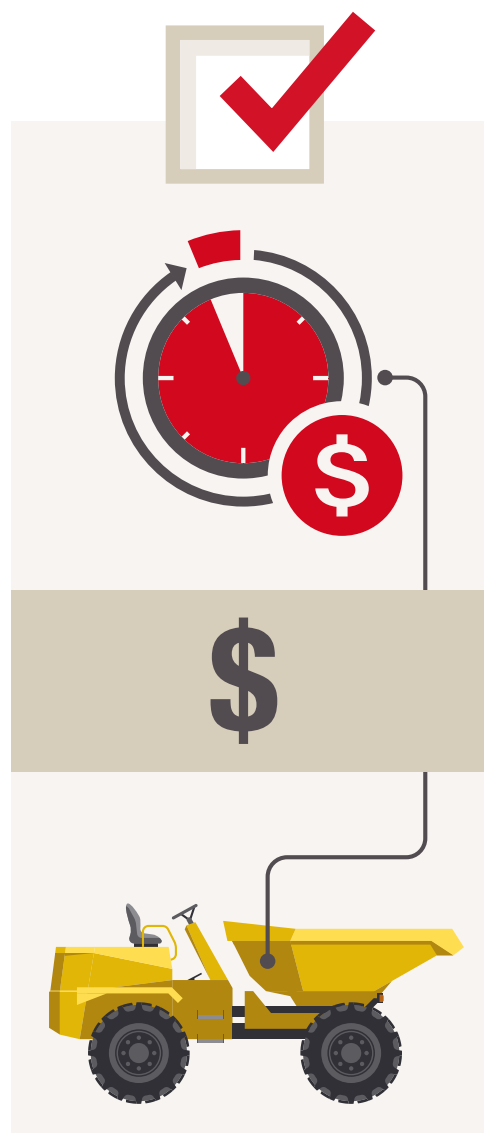
How contractors can best leverage software and technology to better manage equipment

While using traditional methods (we have seen many contractors using everything from pen & paper, excel sheets, white-boards, to magnetic boards) may work, there is major effort to maintain them, ensure they are accurate and also available company-wide. As a consequence, many contractors have struggled to professionally manage their equipment, and many more simply neglected the task. Many contractors, however, understand that in today's competitive environment, managing equipment professionally is becoming a must, and those companies are leveraging software and IoT technology to make it happen.

> " We track marketing. We track sales. Why not track your tools or your production? "

Brian Dalinghaus
Owner, Dalinghaus Construction, U.S.

> " In the old way of working we had to input an awful lot of information for our tracking, and we had to filter out that information to find what we were looking for... which ended up, normally, in making a phone call to somebody on site which took up both their time and my time to find the tool. This meant we would end up buying tools or hiring tools when it just wasn't required and it ended up costing our company more than it should. "

Mark Clancy
Plant Manager, Clancy, Ireland

From Hilti's experience, there are three levels of maturity, each building on the other.

Digitize   **Automate**   **Optimize**
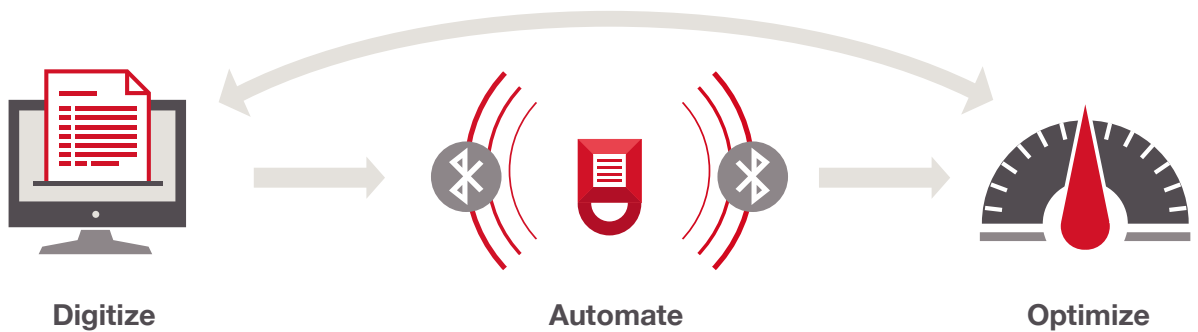
Level 1
DIGITIZE

The first step is to use software specifically designed for managing equipment in construction. Such software solutions, like Hilti ON!Track, make it easy to create a record of inventory by offering functionalities such as data import and templates and they offer a clear structure to capture the relevant attributes for all equipment, independent of type or brand.

Many contractors have thousands of pieces of equipment – using a software solution make it easy to find, filter and sort equipment. Software solutions for equipment management also typically offer intuitive workflows to assign equipment to locations and individuals, to manage services and inspections from scheduling to documentation, and to conduct inventory checks.

Leading solutions offer both a web and mobile interface, with targeted functionality for different "personas" such as the warehouse manager, the jobsite manager, the health & safety manager and as well as the construction workers. Modern solutions are cloud-based, which

ensures that data can be updated and shared in real-time to anyone with access to the software. Further, access rights typically allow contractors to manage access to data and functionality at a granular level.

Solutions designed for construction also include "hardware," such as robust barcodes to allow easy and reliable identification of the equipment using a smartphone. While digitizing equipment management processes through a software significantly improves transparency within the organization, and thereby drives productivity, it does not eliminate the need for process discipline since key activities require human intervention. For example, someone needs to make a digital transfer of equipment from one location to the next. This is where we have seen a lot of contractors struggle and that is why more and more companies go beyond level 1 and leverage innovative technology that allows for a higher degree of automation.

Level 2
AUTOMATE

The purpose of automation is to drastically reduce the need for human process discipline. This not only saves time and drives productivity, it also improves data quality as data collection then moves from sporadic to frequent or even realtime. In the last few years, there has been a rapid evolution of technology suitable to help automate key processes of equipment management.

Hardware plays a key role and automation requires a shift from "passive" hardware (e.g. barcodes or RFID) to active hardware, where Bluetooth Low Energy (BLE) has established itself as the most suitable technology for both medium-sized and smaller equipment. While typical BLE tags (also known as beacons) have a battery lifetime of approximately 2 years, robust BLE tags engineered for construction can have a lifetime of more than double that. Attached to the equipment, they send out a signal every few seconds and can share a variety of information including identification, location and movement. The signal needs to be received by a so-called gateway, which then relays it and ensures connectivity to the cloud.

There are many types of gateways and here are a few examples:

Smartphone as a gateway:
One of the main advantages with BLE is its compatibility with all standard smartphones. On a jobsite, the smartphone can quickly give you a list of all pieces of equipment within a 30 meter radius.

Stationary gateways: A stationary gateway is a device that can be mounted in a warehouse, container or on the jobsite which continuously scans for BLE signals. This allows for automatic and real-time inventory management, without any need for a smartphone. Two or three gateways are typically sufficient to ensure full coverage for a normal-sized warehouse, making it an economically attractive solution.

Van gateways:
Placed inside the service van or other vehicles, modern van gateways can both track the location of the van itself, as well as the equipment within the van. For van-based companies such as electrical and mechanical contractors, this provides a very powerful solution for creating 24/7 transparency of the inventory within a van. On top, it can also trigger automated transfers whenever equipment moves in or out of the van, driving significant increases in efficiency.

Telematics devices: While telematics devices have been around for decades collecting data and ensuring connectivity for heavy equipment, the latest generation of such devices have BLE capabilities, which means they can also function as a gateway that scans for Bluetooth signals in its surrounding area. That creates a very compelling use case since such a device can be used to track both the heavy equipment to which it is attached, as well as the BLE-tagged equipment surrounding it. This provides a scalable way to create jobsite connectivity especially for general contractors or concrete contractors who regularly use heavy equipment.

> **Van gateways give us a lot more confidence in knowing that our tools and what we've got are 100% safe. It's great for us to have the confidence that if something goes out of the building, we know it's going to be coming back.**
>
> **Andrew Alls**
> General Manager, Onsite Special Maintenance, UK

Level 3
OPTIMIZE

We call level 3 "optimize" because here it is all about leveraging data and analytics to create actionable insights and improve decision making. A key step is to include automation (level 2) in the core workflows to ensure frequent data collection. Additionally, sensors become important to collect relevant data about the equipment. Depending on the equipment, relevant data could include runtime, health indicators, applications modes, etc.

The good news is sensor data can be gathered from new and old equipment alike via two different methods:

- **Built-in sensors (smart equipment):** Heavy equipment manufacturers paved the way for rich data capture and sharing by ensuring this information is core to the machinery they offer. It became clear that this information was valuable for contractors and other equipment manufacturers soon followed suit. For instance, Hilti's Nuron cordless platform also captures and uploads data seamlessly and securely to help ensure tools are where they should be, that they are being used to their full potential and that batteries are healthy.
- **External sensing (add-on/retrofit sensors):** For equipment without built-in sensors and for non-powered equipment, devices like BLE tags can be securely attached at any time to also gather useful information. Tags can share a variety of data including location, movement, vibration, runtime and usage logs, just to name a few. To maximize battery life and minimize size, tags are typically datapoint and use-case specific rather than "one size fits all."

In the end, however, contractors don't want to have to sift through the data to make sense of it, a point well-learned from the early days of telematics in heavy equipment. Ideally this data is turned into information and knowledge after being enriched by business context so that informed actions and decisions can be directly taken. For instance, you can better plan equipment assignment and purchasing based on historic need on previous jobsites or know when best to take advantage of services like Hilti Tools on Demand if you find equipment is only needed for short periods of time.

> **" The Hilti Runtime Tag solution is a real gamechanger.
> The power of the generated data enables us to rethink our fleet management processes and to deliver unprecedented services to our customers. "**
>
> **Joel Särkkä**
> Chief Information Officer, Renta Group, Finland

> **" I am proud of the contribution Hilti has made to improve equipment management for thousands of contractors worldwide.
> We are committed to continue this journey and we will invest in innovation and technology, such as AI and IoT, to further increase the value for our customers. "**
>
> **Michael Neidow**
> Executive Vice President, Hilti Business Unit Construction Software, Liechtenstein

Conclusion

Many contractors understand that by proactively managing their equipment, there is significant potential to improve productivity. Depending on a contractor's outset situation, Hilti's experience indicates that annual spend on tools and equipment may be reduced by up to 20% and up to two hours per worker and week may be saved in reduced idle time. However, the very nature of construction with equipment spread over multiple locations makes it a difficult task to capture this productivity potential.

To overcome this challenge, leveraging software and IoT technology becomes key. While a few years ago most solutions did not go beyond digitalization, today's leading solutions can automate key process steps based on technology that is both reliable and affordable. This is a real breakthrough because it takes away the need for human process discipline and at the same time drives productivity and data quality. Looking ahead, the next level of equipment management with data-driven and AI-enabled use cases, holds the promise of helping construction companies further optimize decision making.

Despite all the excitement about the technology, it is still humans that make it work. Deploying software and IoT technology in construction typically involves change management, which is difficult for any company. Our advice to contractors is to select a partner that not only provides leading technology, but also a helping hand on the adoption journey.
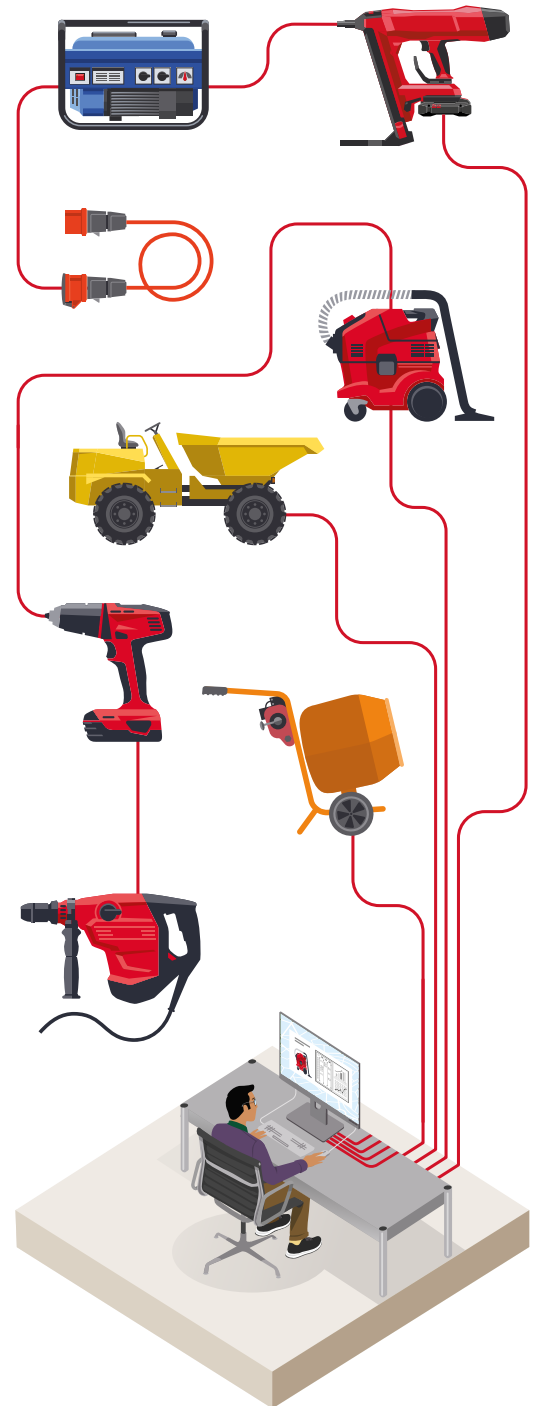
Hilti.Group

Contact us

If you want to learn more about how Hilti can help you manage your construction equipment and material, please visit our webpage or contact us.