



Ten Examples of Connected Technologies

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What are connected job sites?

- Construction sites and operations connected by the internet of things (IoT) to save agencies time and money, and improve safety.
- Connected job sites are delivered by **connected technologies**.



Examples of Connected Technology



The Hardware

Tools to Implement Connected Technology



- Tablets
- Smartphones
- Laptop
- Wearable technology
- Vehicles and equipment

Source: Federal Highway Administration, Office of Federal Lands Highway.



The Software

3D Modeling | Building Information Modeling



Source: Federal Highway Administration, Office of Federal Lands Highway.

- 3D Modeling-
 - the use of software to create a virtual three dimensional representation of the surface of an object.
- Building Information Modeling-
 - a process supported with tools and technology to generate functional operations and digital representations of physical facilities and infrastructure.
- Benefits:
 - Assists designers visualize spatial requirements.
 - Improves the accuracy and efficiency of infrastructure design.

Virtual, Augmented and Mixed Reality

- Virtual- simulated experience using headsets or multi-projected environments to generate realistic images and sounds.
- Augmented- interactive experience of a real-world environment enhanced by computer-generated information.
- Mixed- merging of real and virtual worlds to produce new environments and visualizations, a hybrid of reality and virtual reality.
- Benefits:
 - Ability to experiment within an safe and artificial environment.
 - Ability to bring products and concepts to life through visualization.

GPS Machine Control

- Machine control is used to accurately position machinery based on 3D design models and GPS systems
 - Begins with 3D Modeling as a base.
- Benefits:
 - Allows an operator to become more efficient and productive.
 - Increased safety by reducing the number of workers inspecting accuracy of machines.



Source: Federal Highway Administration, Office of Federal Lands Highway.

Automation of Equipment



Source: Federal Highway Administration, Office of Federal Lands Highway.

- Systems that show the operator the design difference and systems that directly control the machine hydraulics to maintain a specific position.
- Examples include driverless equipment and robotic equipment.
- Benefits:
 - Reduction in the number of hours worked by workers and equipment.
 - Increased safety by removing the workers from potential unsafe environments.

Intelligent Compaction



Source: Federal Highway Administration, Office of Federal Lands Highway.

- the compaction of road materials using vibratory rollers equipped with an integrated measurement system, an onboard computer reporting system, GPS based mapping, and feedback control.
- Benefits:
 - Improved densities during compaction.
 - Real time feedback of material stiffness values.
 - Saves money by making the process more efficient and effective.

Unmanned Aerial Vehicle UAV

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Source: Federal Highway Administration, Office of Federal Lands Highway.

- an aircraft without a human pilot on board. UAVs are a component of an unmanned aircraft system (UAS); which include a UAV, a ground-based controller, and a system of communications between the two.
- Examples of Use:
 - Crop surveys, aerial photography, search and rescue, inspection of infrastructure, delivery services, land surveying, construction industry, surveillance, security, military operations, etc.
- Benefits:
 - Ability to provide visual information at lower costs than traditional methods.
 - Provides a safer working environment by using UAV's for hazardous work.

Geofence

- a virtual perimeter dynamically generated for a real-world geographic area around a point location, or a predefined set of boundaries.
- The use of a geo-fence is called geo-fencing
- Benefits:
 - Allows enhanced security equipment.
 - Allows better tracking of people and equipment.

Electronic ticketing

- A digital ticket equivalent of a paper ticket. An electronic means of producing individual scale tickets and providing material haul summaries.
- Involves the creation, review, approval, distribution and storage of paperless construction documents.
- Benefits:
 - Allows the process to become more efficient by going “paperless”
 - Allows an inspector to monitor inventory delivery on site or remotely.

Radio Frequency Identification (RFID)

- Use of electromagnetic fields to identify and track tags attached to objects. The tags can be embedded within a material and can contain electronically stored information.
- RFID can be used to track:
 - Equipment and tool management
 - Inventory management
 - Workforce management
- Benefits:
 - Increased asset tracking and monitoring.
 - Increased productivity of employees responsible for management of assets
 - Decreased incidents of theft and loss.



Contact Information

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