



Annual YORhub Conference
12th November 2019
Construction Technology Workshop

Presenters

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Trimble**

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East Riding of Yorkshire Council**





Innovation is about

- New ways of solving problems
- Increasing safety on site
- Increasing productivity
- Saving costs
- Making efficiencies
- More accurate/ reliable data/ info



Current Good Practice
Steve Baker
East Riding of Yorkshire Council



Bring BIM into Virtual Reality
by use of cardboard VR at a cost of
a few pounds for use with a smartphone
and VR applications

Laser Scanning



East Riding of Yorkshire Council (ERYC) use Laser Scanning as an accurate and non-intrusive way to collect as-built construction data

It uses **laser** beams to quickly capture complete detail of the entire building **construction** project—much like a camera taking a 360-degree photo, but with an accurate position for every pixel



Advantages of a Laser Scanner:

- Safety- an operator can work from a distance to one side of any hazards
- Environment- battery operated so no toxic fumes
- Efficiencies- time, energy and money
- Accuracy- can capture a million data points in seconds that download to BIM
- Data backup- can be sent to cloud based storage
- Can be used with GPS for earth movements
- ERYC building surveyors use this for refurbishment surveys

Common Data Environment (CDE)



- CDE is a cloud based central repository where all construction project information is stored
- During design it acts as an interface between the client and the design team, capturing documents and data related to the design intent (including client requirements, scheme design reports) and the final design solution in the form of 3D digital models and specifications
- In the construction phase, the CDE is used by the contractor as the route for information exchange, in conjunction with information exchange points – these are set out / agreed in the Employer's Information Requirements (EiR)
- ERYC CDE is Autodesk BIM 360



BIM- 2D documentation derived directly from 3D models

- 2D Drawings
- Bills of Quantities
- Specifications



Use of drones



Drones have many uses in the construction industry including:

- Inspections
- Monitoring and recording on-site activities
- Security surveillance
- Providing visual material for clients
- Topographic and hydrographic maps
- Mapping data
- GPS for earth movement volume calculations
- Showing extent of flooding



Advantages of using drones include:

- Safety- a view from above can spot otherwise unseen dangers before they become a risk
- Safety- a drone operator can work from a distance
- Environment- battery operated so no toxic fumes
- Efficiencies- time, energy and money for monitoring sites
- Project Planning- plans change and drone images before, during and after construction show actual progress and as built images
- Data backup- can be sent to cloud based storage

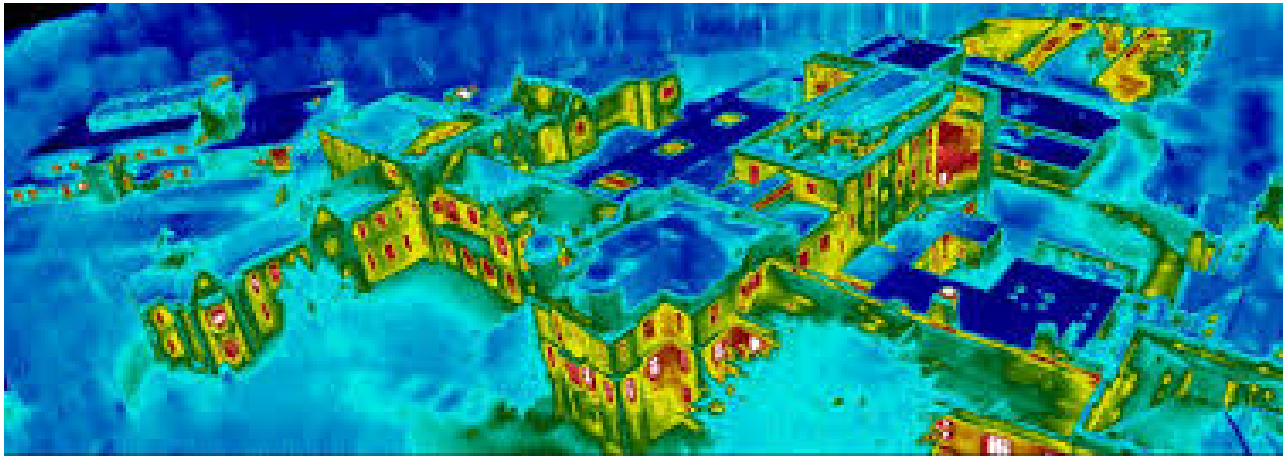


Inspections and surveys Paul Sea Wall



Inspections and surveys

The Holderness Coastline is one of Europe's fastest eroding at approx. 2m per year



Thermal Imaging for heat loss detection

Robotics- improving safety on site



Advantages :

- Safety- assisting labour force
- Safety- reduction in people doing jobs on site- according to HSE figures only farming has worse safety stats than construction
- Efficiencies- Increased capacity and performing work faster
- Profits- increased due to reduction in man hours, increased productivity and reduction in errors

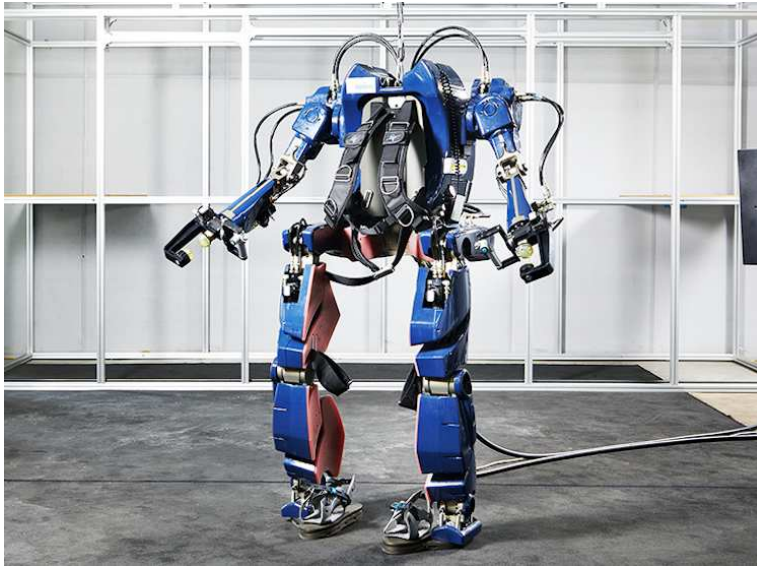


Steel fixing of rebar is traditionally labour intensive and time consuming



- Unsupported stooping when tying increases the risk of recurring back pain and injury
- Twisting with pliers requires harmful hand motion that can result in carpal tunnel syndrome
- 67% increase in man-hour productivity by TyBot for rebar work

Exoskeletons and injury prevention



Exoskeletons are metal frameworks fitted with motorized muscles to multiply the wearer's strength thus reducing risk of injury

In October 2018 Willmott Dixon commenced trials of a robotic exoskeleton vest to provide support during heavy lifting





Offsite Construction from a digital model



Factory made bathroom pod

Advantages :

- Safety- reduction in people doing jobs on site
- Efficiencies- Increased capacity, accuracy and performing work faster
- Profits- increased due to reduction in man hours, increased productivity and reduction in errors
- Uses- can be used for both new build and refurbishments
- Quality- enhanced due to factory production



Machine Control

- In civil engineering, machine control is used to accurately position earthwork machinery based on 3D design models and GPS systems for grade control





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Q&A