

AI in Construction

The Art of the Possible

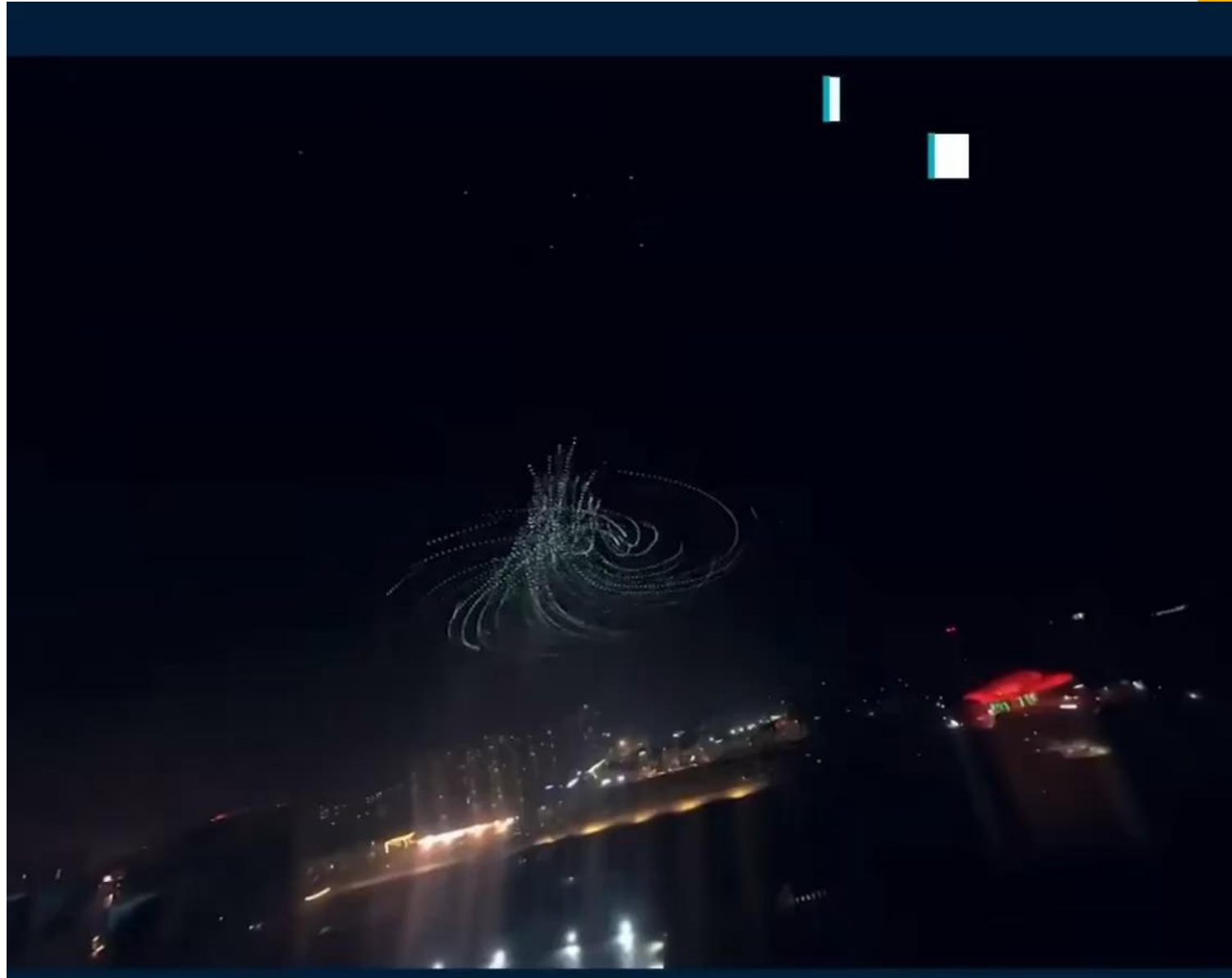
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East Riding of Yorkshire Council





AI Examples- to show what is possible

16,000 drones controlled by AI





Health & Safety

AI is used in construction to monitor safety with cameras primarily through real-time hazard detection and automated safety compliance tracking using computer vision technology.

This allows for a shift from reactive to proactive safety management by identifying potential risks and alerting personnel instantly.

Copilot produced the next two slides based on this description

Copilot Slide





CONSTRUCTION SITE SAFETY ESSENTIALS

Personal Protective Equipment

PPE like hard hats, high-visibility vests, gloves, boots, and eye protection are vital for accident prevention.

Site Access and Housekeeping

Clear walkways, visible signage, and secure scaffolding reduce trip and fall hazards on site.

AI-based Hazard Detection






AI cameras and sensors detect trip hazards, falling objects and unsafe behaviors for real-time alerts.

Equipment Inspection and Emergency Preparedness

Daily machinery checks, lockout/tagout procedures, and accessible emergency gear ensure safe operations.

ChatGPT Slide based on same details

AI in Construction Safety Monitoring

-  AI-powered cameras enhance site safety.
-  Uses computer vision for real-time monitoring.
-  Detects hazards and tracks safety compliance automatically.
-  Sends instant alerts to personnel when risks appear.
-  Enables a proactive approach — preventing accidents before they happen.

Impact

- “From reactive responses to proactive prevention — AI is reshaping construction safety.”

YORcivil example from Local Government Association Digital Construction Group AI Survey on Best Practice

Jackson Civil Engineering's Highways division are working with Galliford Try's Innovation team who is developing AI software that will systematically collect and analyse data from CCTV footage on people's behaviours and from that ensure the most suitable traffic management system is rolled out. This include the movement of pedestrians around their sites in order to improve their safety and provide better customer service.



Image by Copilot



Plant Maintenance

AI can also be used for plant maintenance for example caterpillar has sensors built into its machinery that gather data on temperature, vibration and sound.

This allows unusual vibrations, temperature and sound to be analysed by AI to predict in advance when parts might fail or require maintenance so preventative action can be taken.

Is this something we should use more in the civic estate?

Copilot produced the next slide based on the above details



Predictive Maintenance



Temperature



Vibration



Sound



Sensors collect data for AI to analyze and predict failures



The LGA AI user case bank, has been compiled to inform and empower local councils in their exploration of artificial intelligence (AI) solutions

[Artificial intelligence case study bank | Local Government Association](#)





Barnsley Council: Pioneering Use of Microsoft Copilot



Time savings



Improved meeting efficiency



Procurement gains



Document summarisation



Optimized finance operations



Reduced administrative workload

70% of staff using regularly

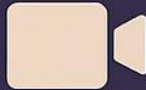


AI in Transport – Lancashire County Council Case Study



Real-Time Traffic Prediction

Aimsun's Real Time Model uses historical traffic data and pattern recognition to forecast future conditions. By integrating live data, it detects anomalies and triggers timely traffic management responses.



Junction Usage Analysis

VivaCity sensors apply computer vision and machine learning to identify vehicles, cyclists, and pedestrians. This data feeds into traffic models to optimize junction performance and safety.



Congestion Hotspot Identification

Alchera's Pinch Point Analysis Tool combines predictive analytics with real-time data to locate network bottlenecks. These insights help engineers plan more efficient bus routes and reduce delays.

AI enables smarter, data-driven decisions in transport planning, improving safety, efficiency, and public service delivery.



What is AI

- Simulation of human intelligence in machines
- Performs tasks like learning, reasoning, and decision-making

Common types:

- Machine Learning – learns from data (e.g, Autodesk tools)
- Deep Learning – advanced pattern recognition
- Generative AI – creates content (e.g. Copilot, ChatGPT)
- Chatbots – conversational interfaces



AI is a branch of computer science focused on creating machines or software that can perform tasks that normally require human intelligence.



Some AI Easy Wins (Real-World Examples Included)

Meeting Minutes

Win:
Automate documentation
from meetings



Estimating & Tender Review

Speed up and improve accuracy
of cost estimates



Gantt Charts for Programming

Exmpel



Document Preparation & Review

Review contracts, specs,
and RFIs for risks and cdrplian



GanttChart.ai

Learning & Upskilling

On-demand AI training
tailored to construction roles



Devil's Advocate

Use AI to challenge
assumptions and uncover risks



Civils.ai





Robotics with AI

- Monitor progress on site
- Carry out laser scanning to show construction progress
- Scan for heat spots on plant
- Provide remote access for difficult to reach places
- Capture data including images and videos
- Quality control inspections
- Data can be integrated into digital twins and BIM systems
- Site security





Generally AI humanoid robots such as this one are still under development





YORhub BAM example from Local Government Association Digital Construction Group AI Survey on Best Practice

- AI enabled progress tracking using buildots
- Currently piloted on 3 projects
- Case studies to be produced at the end of the pilots
- Improved and transparent progress tracking
- Transparency on package productivity and progress to reduce risk and improve collaborative planning. Additional resource to capture data and manage dashboard.









Copilot generated slide on Buildots

What is Buildots?

Buildots uses AI and 360° cameras to automatically capture and analyze site data, providing real-time insights into construction progress.

Benefits

-  **Accurate Performance Measurement:** Tracks actual progress vs. planned schedules with high precision.
-  **Delay Reduction:** Early results suggest potential delay reductions of up to 50%.
-  **Enhanced Transparency:** Improves visibility into package productivity and site activities.
-  **Collaborative Planning:** Supports better coordination between teams through shared dashboards.



YORconsult Mason Clark example from Local Government Association Digital Construction Group AI Survey on Best Practice

The Challenge

- Non-standard engineering calculations require **extensive manual research**.
- Designers must sift through **academic journals, international standards, and technical papers** to find relevant formulas and references.

AI-Powered Solution

- AI system summarizes complex research papers.
- Extracts key information and references automatically.
- Uses **embedded AI in Excel** to generate formulas and automate repetitive calculations.



Impact

- **~60% reduction** in research time before design begins.
- Enables **innovative design approaches** with faster, more informed decision-making.

Why It Matters

“AI transforms preparatory design work — freeing up time for creativity and innovation.”



Risk Assessments with Autodesk Construction IQ

What is Construction IQ?

Autodesk Construction IQ is an AI-powered tool within the Autodesk Construction Cloud that helps project teams proactively manage risk across safety, quality, design, and project controls.


Why It Matters


- ✓ **Proactive Risk Management:** Prevent incidents before they happen.
- ✓ **Improved Efficiency:** Frees up staff from manual data analysis.
- ✓ **Enhanced Collaboration:** Shared dashboards improve transparency across teams.
- ✓ **Smarter Decisions:** Data-driven insights support faster, more informed actions.








How It Works


 **AI & Machine Learning:** Analyzes thousands of daily project data points—issues, RFIs, checklists, and observations—to identify patterns and predict risks.

 **Daily Risk Assessments:** Automatically prioritizes high-risk projects, subcontractors, and issues needing immediate attention.

 **Safety Risk Factors:** Detects unsafe behaviors, overdue inspections, and hazards like falls or water risks.

 **Design Risk Factors:** Flags critical design issues before they become costly RFIs or change orders.

 **Quality Risk Factors:** Highlights non-conformance trends and quality checklist gaps.

 **Project Controls:** Tracks schedule and cost risks to support better decision-making.



AUTODESK CONSTRUCTION IQ

Key Benefits

- Proactive Risk Management and Improved Decision Making
- Increased Efficiency: Automating the data analysis frees up staff time from manual processes to focus on high-priority issues and remedy dangers on site.
- Ultimately, Construction IQ acts as an intelligent assistant, augmenting human expertise with data-driven predictions to improve safety, quality, and project outcomes.

AI Automation of plant



- **Key Applications**
- **Autonomous Machinery**
Excavators, graders, and loaders operate with minimal human input using AI
- **Lidar & GPS Integration**
Combines laser-based mapping and satellite positioning for precise navigation and grading.
- **Sensor Fusion**
Real-time data from cameras, vibration sensors, and proximity detectors ensures safe and accurate operation.



AI Automation of plant

Benefits

- ✓ Increased productivity
- ✓ Reduced labour costs
- ✓ Enhanced safety in hazardous environments

Future Outlook

AI-driven plant automation is reshaping construction—delivering precision, efficiency, and safety.”

AI Health Warnings



Accuracy & Bias

AI outputs depend on the data it's trained on. Biased or incomplete data can lead to incorrect or unfair decisions.



Data Privacy

AI systems often process sensitive information. Ensure compliance with GDPR and local data protection laws.



Over-Reliance

AI is a tool, not a replacement for human judgment. Always validate critical outputs before acting.



Intellectual Property

Generated content may reuse patterns from training data. Check for copyright and licensing issues before publishing.



Security Risks

AI models can be exploited (e.g., prompt injection attacks). Use trusted platforms and follow cybersecurity best practices.




Ethical Use

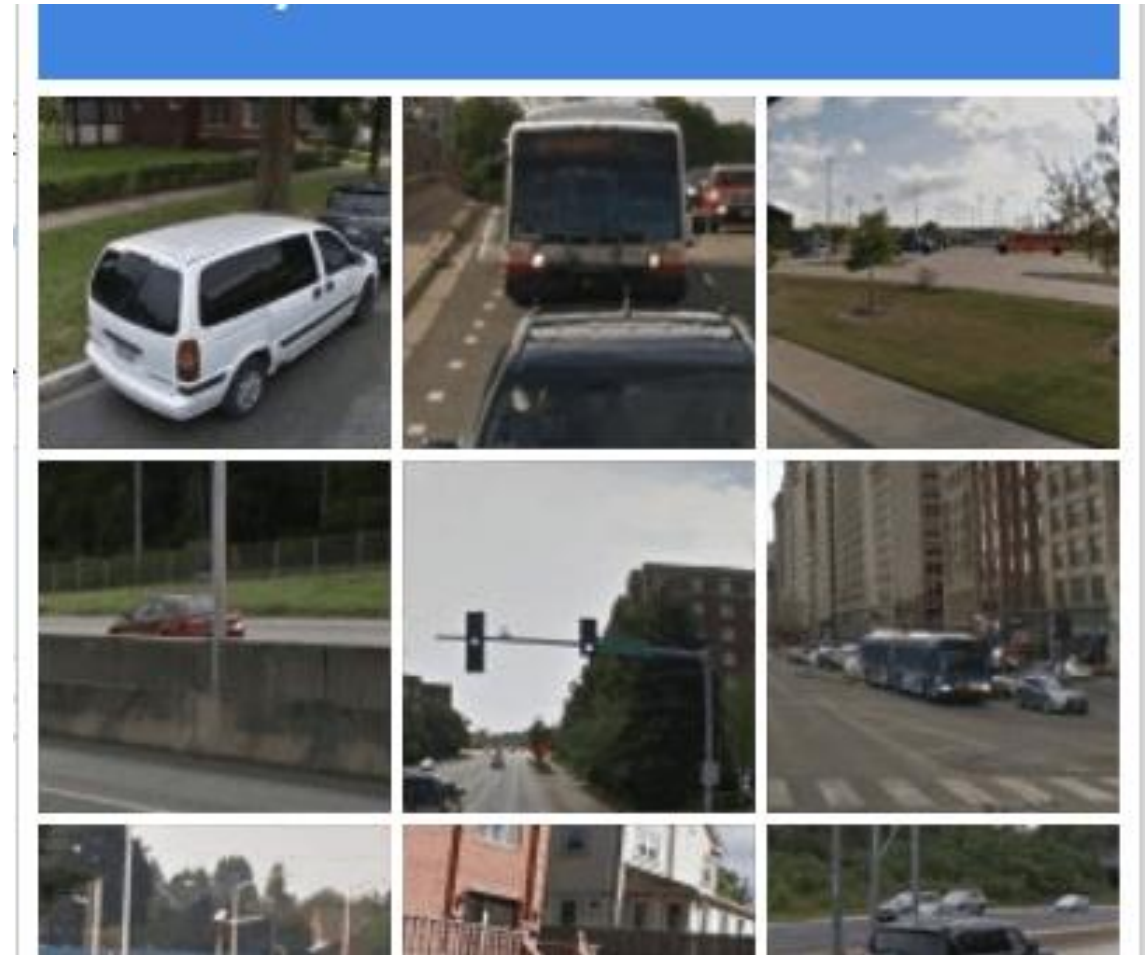
Avoid misuse in surveillance or profiling. Transparency and accountability are essential.

Beware AI sameness



ChatGPT tricked into beating CAPTCHA checks

-  **What's New?**
Recent advancements in AI allow large language models like ChatGPT to solve CAPTCHA challenges—tasks originally designed to distinguish humans from bots.





Local Government Association Digital Construction Group AI Survey on Best Practice

We are interested in current AI best practice and guidance notes in the construction industry by both public and private sector to allow us to develop LGA case studies to show the pros and cons of AI

If you have experience of AI, both good or bad, please complete the questions via the link below.

[Local Government Association Digital Construction Group AI Survey on Best Practice](#)



Any Questions