



■ BILL GUO · FOUNDER, AUTOMATEX

AI, Rail and Engineering. The why, what and how.

Why it matters to your career

What actually changes in the job

How to start, this month



■ WHO IS TALKING

I started where you are sitting.

Rail

Graduate scheme to Chartered Civil Engineer. About a decade on both sides of the delivery table, most recently Engineering Manager at Jacobs leading HS2 delivery, and a former Designated Project Engineer.

AI

Founder of AutomateX, building AI systems for UK rail teams. Innovate UK funded, RISQS verified, delivering AI work with Network Rail today.

ICE

Fellow of the ICE and Vice Chair of the ICE London Regional Executive Board. Last week I hosted the same question in this building, for civil engineers of every discipline.

Not a futurist. An engineer who **changed his own workflow first.**



HS2

Jacobs



■ WHY · A STORY FROM THE LAST TIME

A similar productivity boom.

1919 TO 1929

+46%

output per man-hour

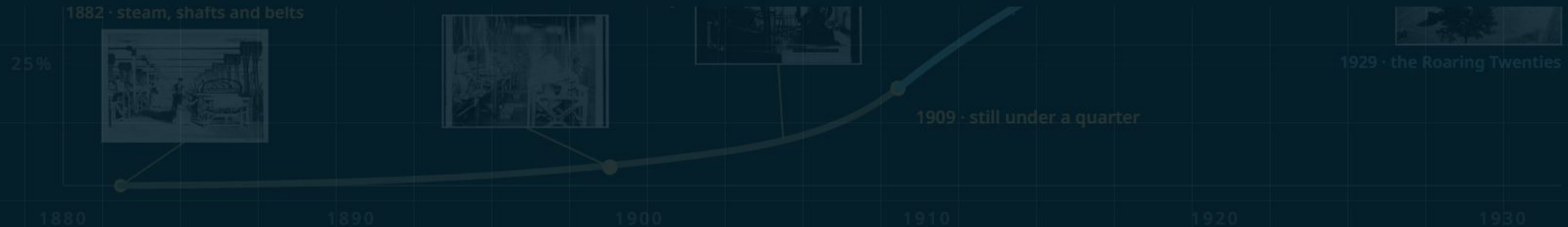
59 → 51

hours in the working week

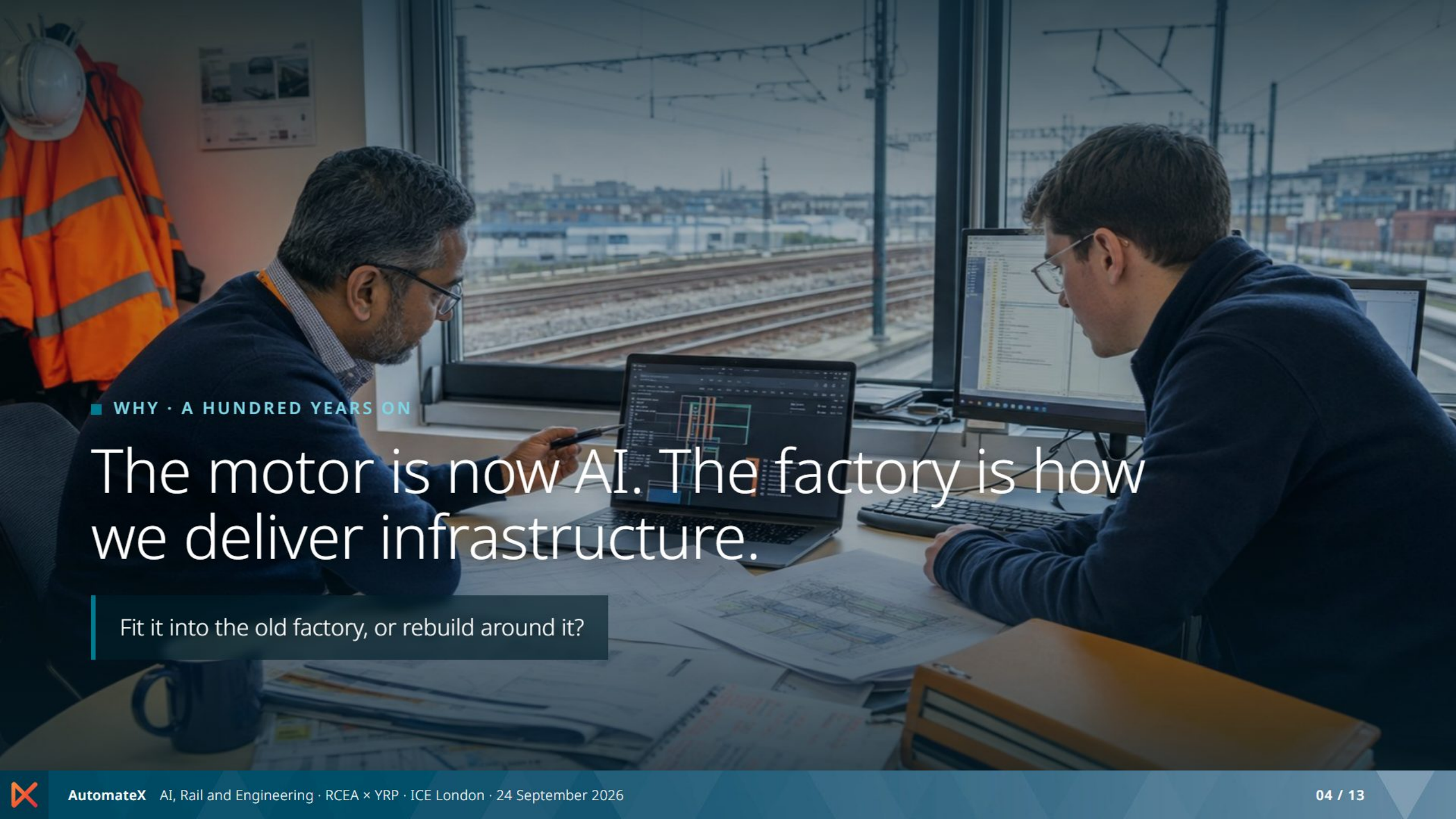
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electricians, a trade that barely existed: 50,717 in 1900, about 280,000 by 1930

And some skills carried straight across the era. The people who could lay out the work.



US Census of Manufactures 1929; Paul David, *The Dynamo and the Computer*, 1990; Warren Devine, *From Shafts to Wires*, 1983. Pictures: Baines 1835 engraving and Governor Square c.1929 via Wikimedia Commons; Library of Congress.



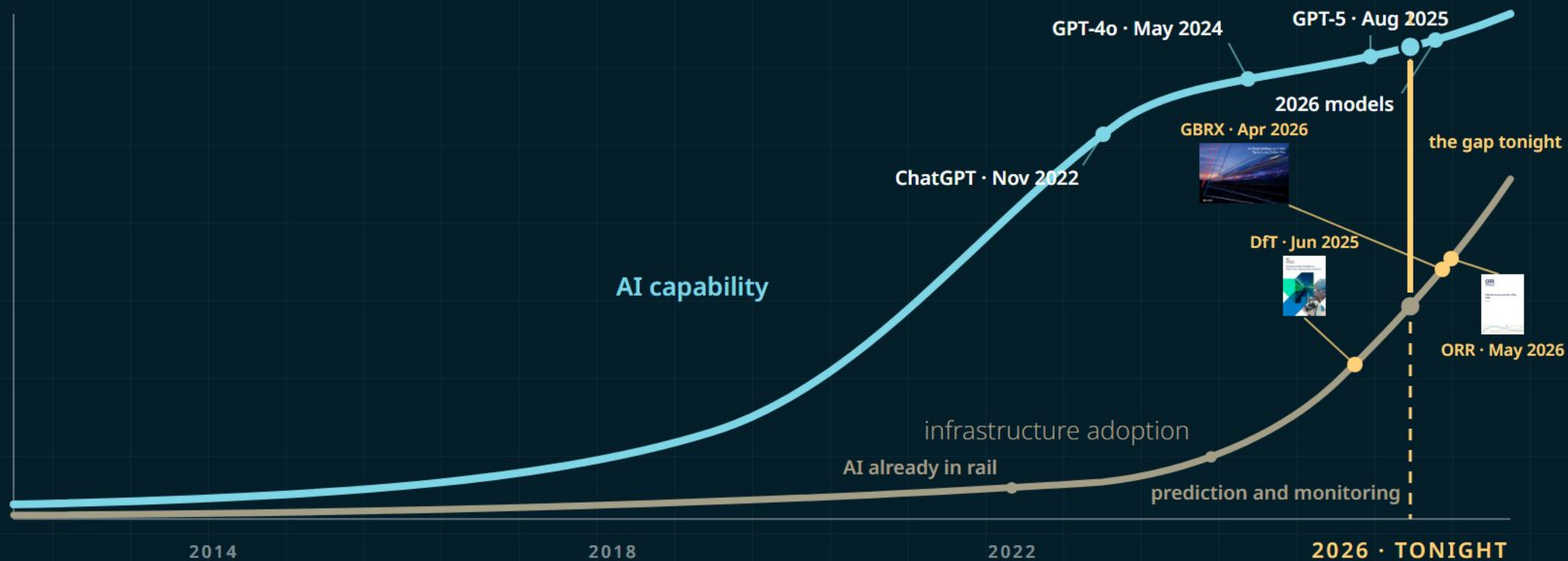
■ WHY · A HUNDRED YEARS ON

The motor is now AI. The factory is how we deliver infrastructure.

Fit it into the old factory, or rebuild around it?

■ WHY · WHERE RAIL IS IN 2026

AI capability rose fast and is still rising. Adoption lagged, and is closing the gap.



Selected milestones; spacing is schematic. Sources in the notes.

■ WHY · THE CAREER QUESTION

AI in rail is moving from pilot to practice. Nobody is 10 years ahead of you.

THE PROFESSION HAS NOTICED

The ICE Code of Professional Conduct was updated in April 2026. Competence with the tools you use, AI included, is now part of what you sign up to.

MOST TEAMS ARE STILL DECIDING WHAT TO DO

Pilots everywhere, practice in pockets. **The people who work out the practice will set it for everyone else.**

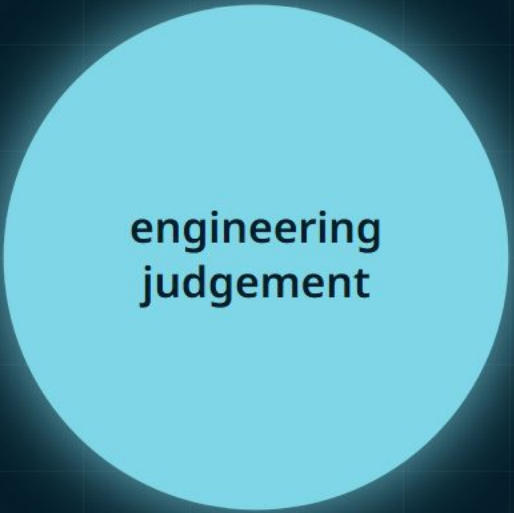
YOU HAVE THE LEAST INVESTED IN THE OLD WAY

The habits your seniors spent 20 years building are the hardest thing to change. You have not built them yet.

The best-placed people in the room are the ones **still learning the job.**



Peel the layers and the core is engineering judgement.



engineering
judgement

- ~~formatting and re-typing~~
- ~~finding the last version~~
- ~~re-entering the same context~~
- ~~chasing comments and approvals~~
- ~~first drafts of things written a hundred times~~
- **engineering judgement, and the signature**

■ WHAT · THE SHAPE OF THE CHANGE

What actually changes in the job.

AI-assisted

AI supports the decision

the engineer owns the judgement

AI surfaces context, precedent and risk

the engineer decides and signs

acceptance · sign-off · the design choice

AI-enabled

human and AI, in turn

the engineer frames the task

prepares the inputs and context

AI drafts and analyses

the engineer verifies and issues

condition reports · review responses · option studies

AI-replaced

routine, rule-based, checkable

the document arrives

AI extracts and re-types

AI checks it against the template

filed; the engineer spot-checks

formatting · re-typing · finding the last version

Build with increasing proficiency prompting → context engineering → harness engineering → loops

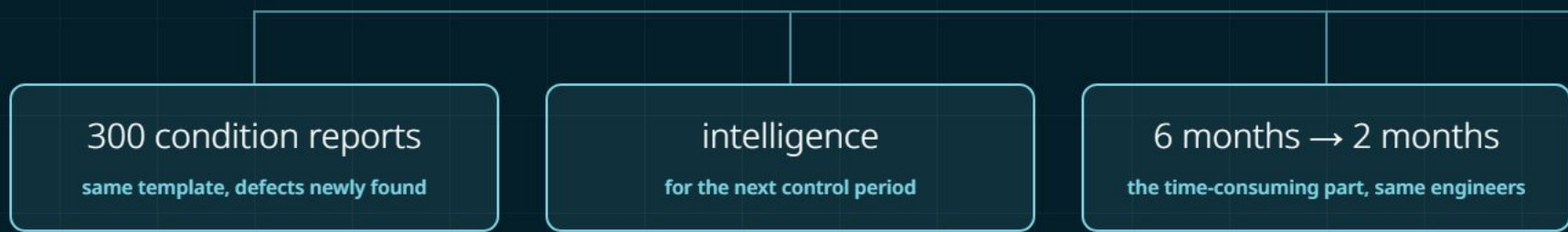
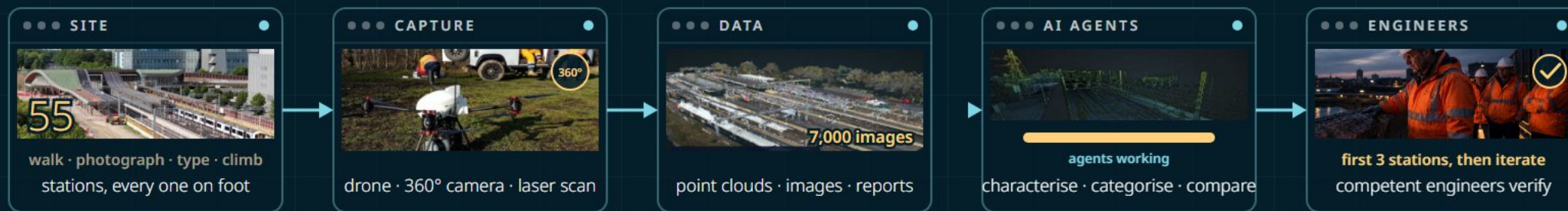
Fit the model to the task small models for small tasks, and verify every output

Know the boundary hand over the thinking, never the understanding

Our value is the vault. AI is the golden key.

■ WHAT · ONE EXAMPLE, LAST YEAR

55 stations to survey.



ICE East of England
Merit Awards 2025 · Winner

■ HOW · FIND THE RIGHT WORKFLOW FIRST

Score the workflow before you automate it.

The mistake is not bad tools. It is automating the wrong thing first. **2 questions sort every workflow you own.**

CAN IT BE AUTOMATED?

Is the process written down, are the rules dense, are the inputs structured? A form with a standard behind it scores high. A judgement call in a site meeting scores low.

SHOULD IT BE?

Volume, pain, leverage. Something you do 40 times a year that blocks others is worth automating.

Something annoying you do twice a year is not.

Start where both say yes. High on both axes, and leave the rest alone. Some work should stay exactly as it is. The map matters more than the model.



■ HOW · START WITHOUT ASKING FOR A PROGRAMME

You do not need a transformation programme. You need 1 workflow.

01 · PICK ONE WORKFLOW WITH WRITTEN RULES

Something you did this month that follows a standard, a template or a checklist. A form, a register, a comment sheet, a take-off. **Small enough to finish. Real enough to matter.**

02 · PROVE IT BESIDE THE OLD WAY

Do the work both ways on a real job. Check every output yourself. Then show your lead the difference in **coverage and iterations**, not the hours.

03 · COMPOUND: WRITE DOWN WHAT WORKED

The prompts, the checks, the failure cases. The 2nd workflow is faster than the 1st, and that record becomes **your value to any team you ever join.**

Start smaller **than feels impressive.**



■ HOW · THE PART THAT DOES NOT CHANGE

Use it like an engineer.

AI CAN SUPPORT

Searching, comparison, drafting, calculation and pattern detection.

ENGINEERS RETAIN

Verification, judgement, disclosure and responsibility for the decision.

ICE Code of Professional Conduct, April 2026: understand the limitations and risks of the technologies you use, disclose their use where relevant, keep that use justified and proportionate, and **retain responsibility for professional decisions.**

Check the output like a subcontractor's design. Confident and wrong look identical on screen. The signature stays yours, and the Code applies to work done with a tool exactly as it applies to work done without one.

■ NEXT STEP

Pick 1 workflow this month, and score it.

Not a strategy. Not a licence request. One workflow, 2 questions, a real job.

- 1 **Tonight.** Walk back through the last month and ask, honestly: to what extent could AI be leveraged here? Most people find 3 candidates before the train home.
- 2 **This month.** Can it, should it. Run the winner beside the old way on a real job, verify everything, and show your lead the coverage, not the hours.
- 3 **Then.** Tell me what you found. What worked, what fell over, what surprised you. Rooms like this one are how the industry learns.



A gift to take home

Tonight's slides and the first step, laid out: one workflow and two questions, a 30-day plan, the checks to run on every output, and where to start.

automatex.uk/rcea.html · scan now, read on the train

Bill Guo FICE CEng MEng · Founder, AutomateX · bill.guo@automatex.uk · automatex.uk