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AI and the civil engineer: reimagining roles in infrastructure delivery

A similar productivity boom.

1919 TO 1929

+46%

output per man-hour

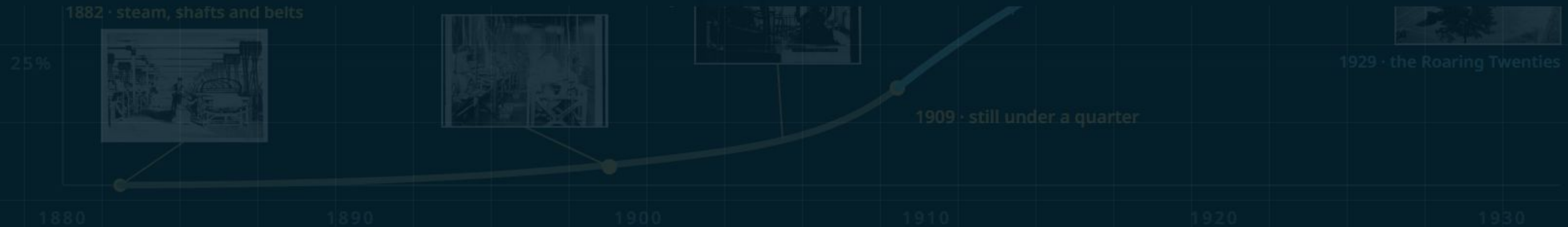
59 → 51

hours in the working week

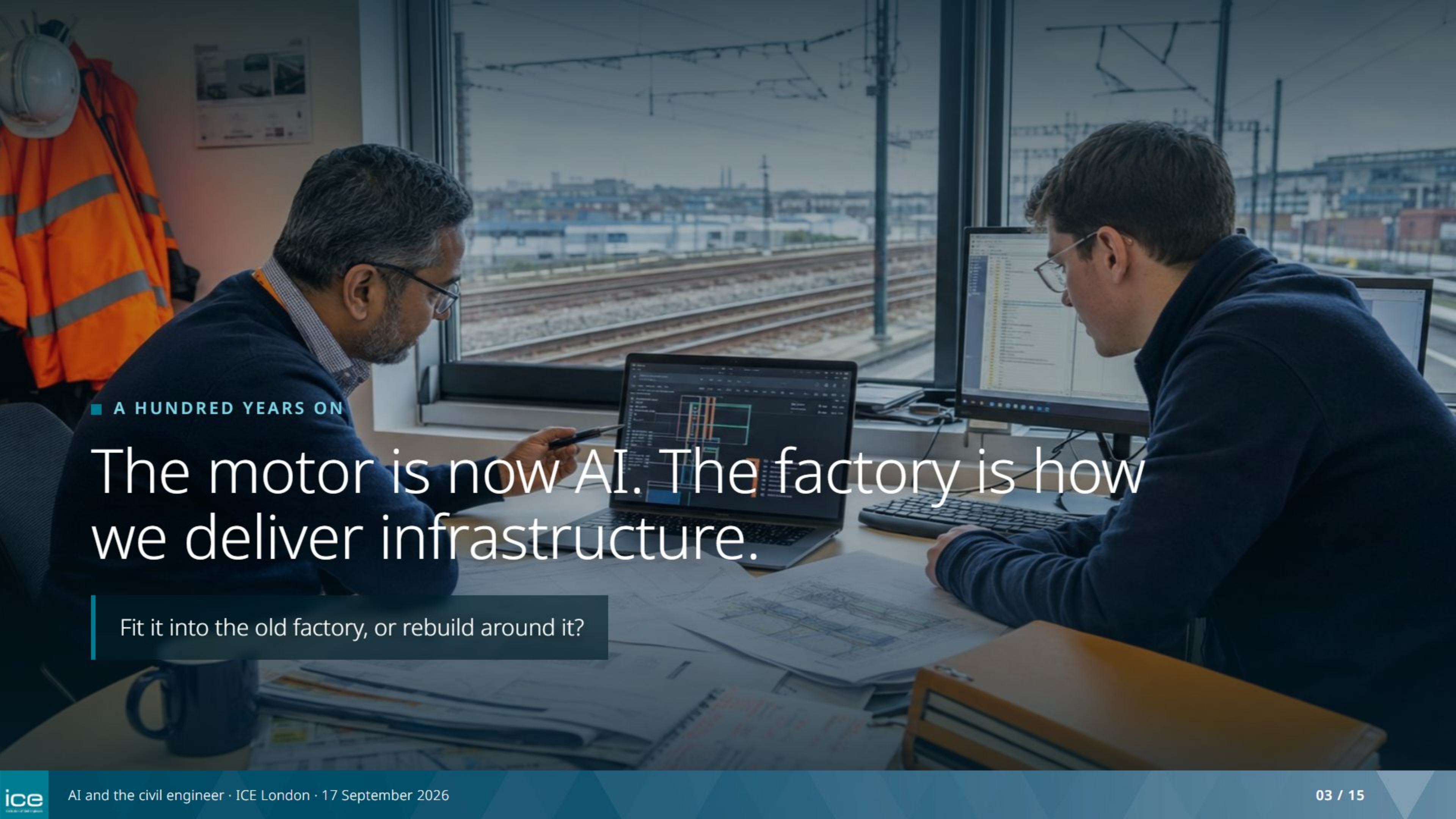
×5.5

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.

A photograph of two men in an office setting, likely a railway control room or engineering office. They are seated at a desk with multiple computer monitors. The man on the left is pointing at a laptop screen displaying a technical diagram. The man on the right is looking at a larger monitor. In the background, a large window offers a view of railway tracks and overhead power lines. An orange high-visibility jacket and a white hard hat are hanging on the wall to the left.

■ A HUNDRED YEARS ON

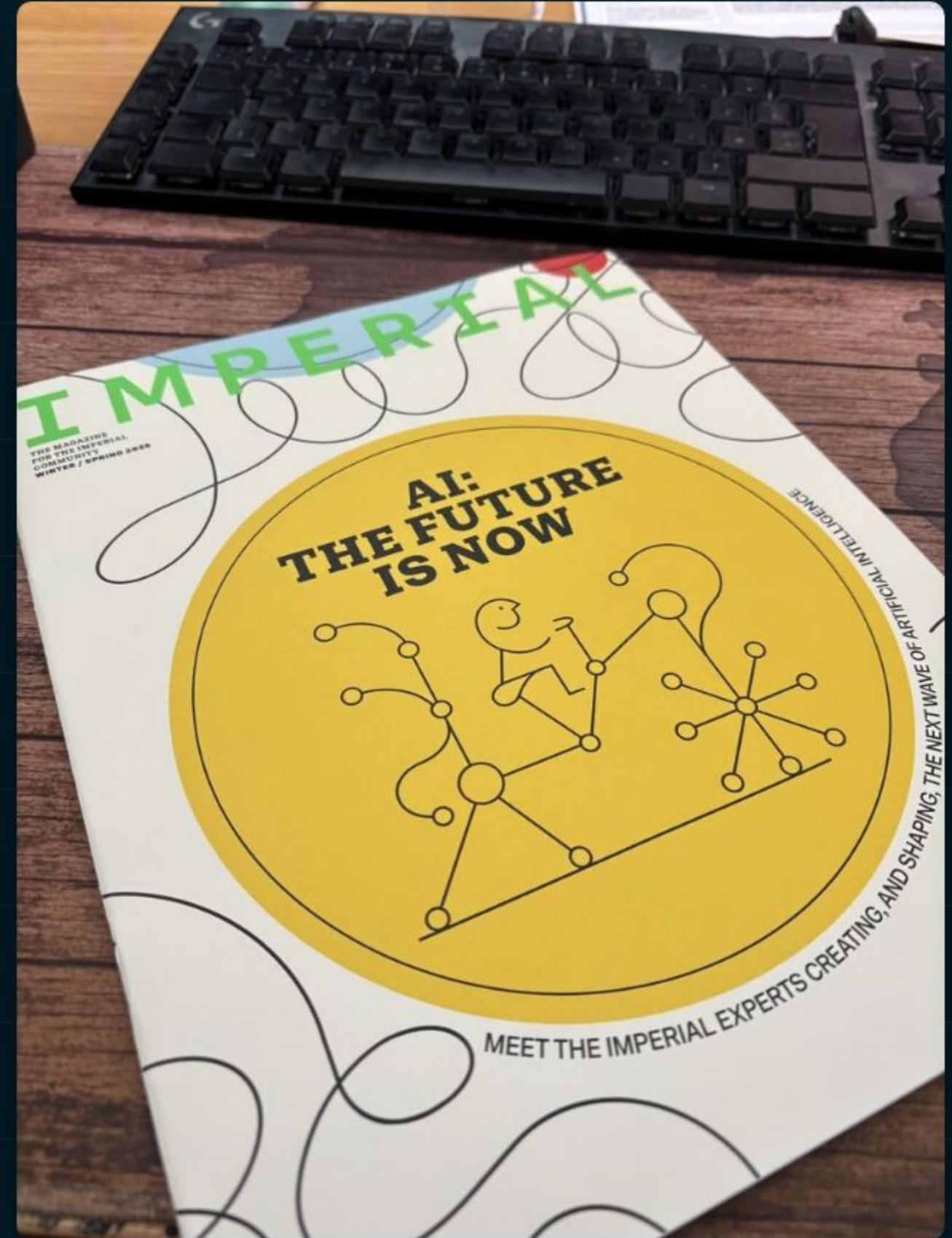
The motor is now AI. The factory is how we deliver infrastructure.

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

■ WHY WE ARE HERE

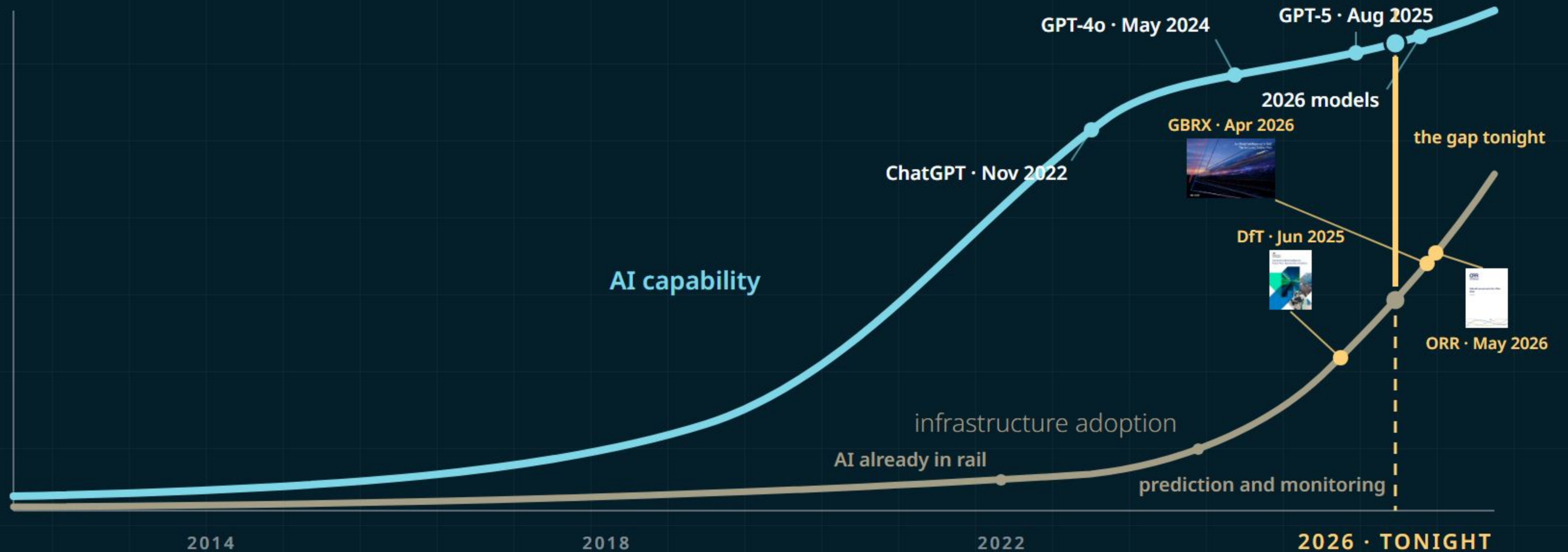
Why does 2026 feel different?

Imperial, the magazine for the Imperial community, issue 59, Winter/Spring 2026. On my desk this week.



■ THE CONTEXT

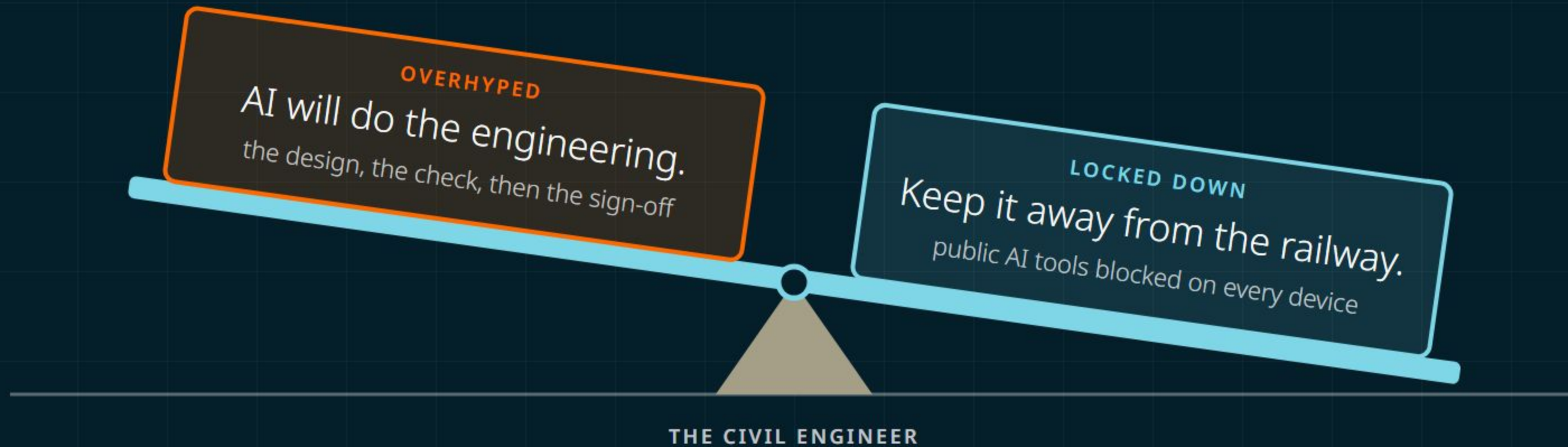
AI capability rose fast and is still rising. Adoption lagged, and is closing the gap.



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

■ THE VIEWS ABOUT AI

The views about AI are polarised.



Tonight is not about an answer. It is about choosing the question worth asking.

TONIGHT'S QUESTION

How is **our role**
in infrastructure delivery
being reshaped in the era of AI?

■ THE PROFESSIONAL BOUNDARY

The Code keeps the accountability with you. It could also ask what you have handed over.

AI CAN SUPPORT

Searching, comparison, drafting, calculation and pattern detection.

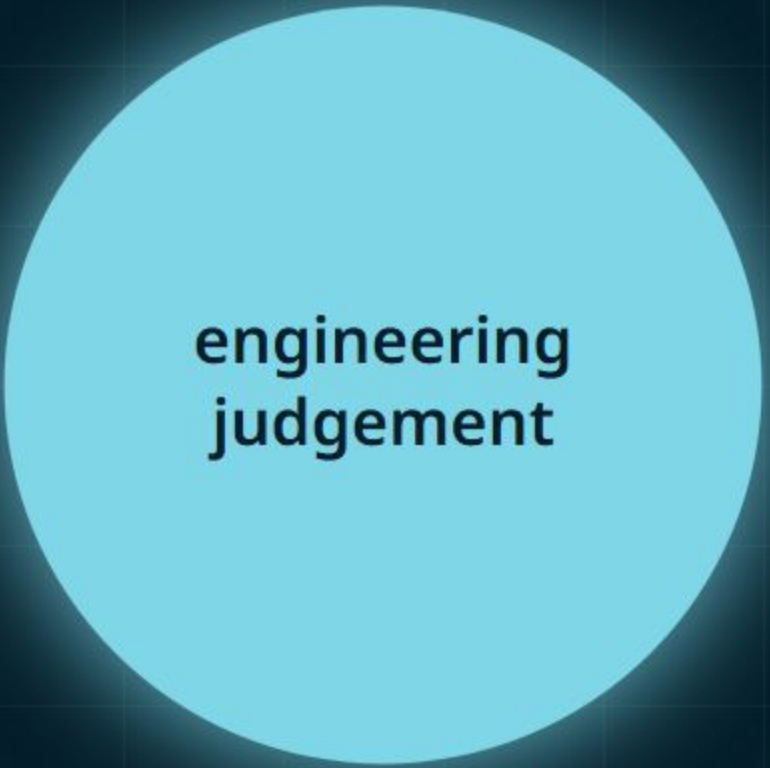
ENGINEERS RETAIN

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**.

One step further: can you show which parts of your day-to-day work you have identified as safe to hand to AI, and where the boundary sits?

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**

■ THE HOW

So how do we become AI-enabled?

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

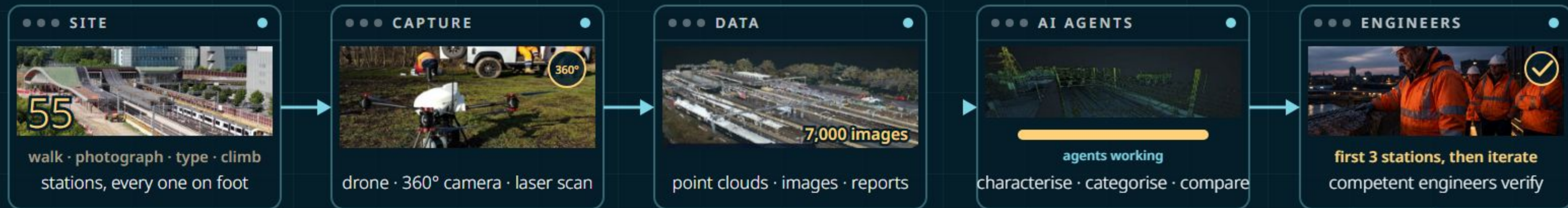
Fit the model to the task small models for small tasks, and verify every output

Know the boundary hand over the thinking, never the understanding

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

■ ONE EXAMPLE, LAST YEAR

55 stations to survey.



300 condition reports
same template, defects newly found

intelligence
for the next control period

6 months → 2 months
the time-consuming part, same engineers



■ BEFORE I INTRODUCE THE SPEAKERS

Two centuries of shaping the world.

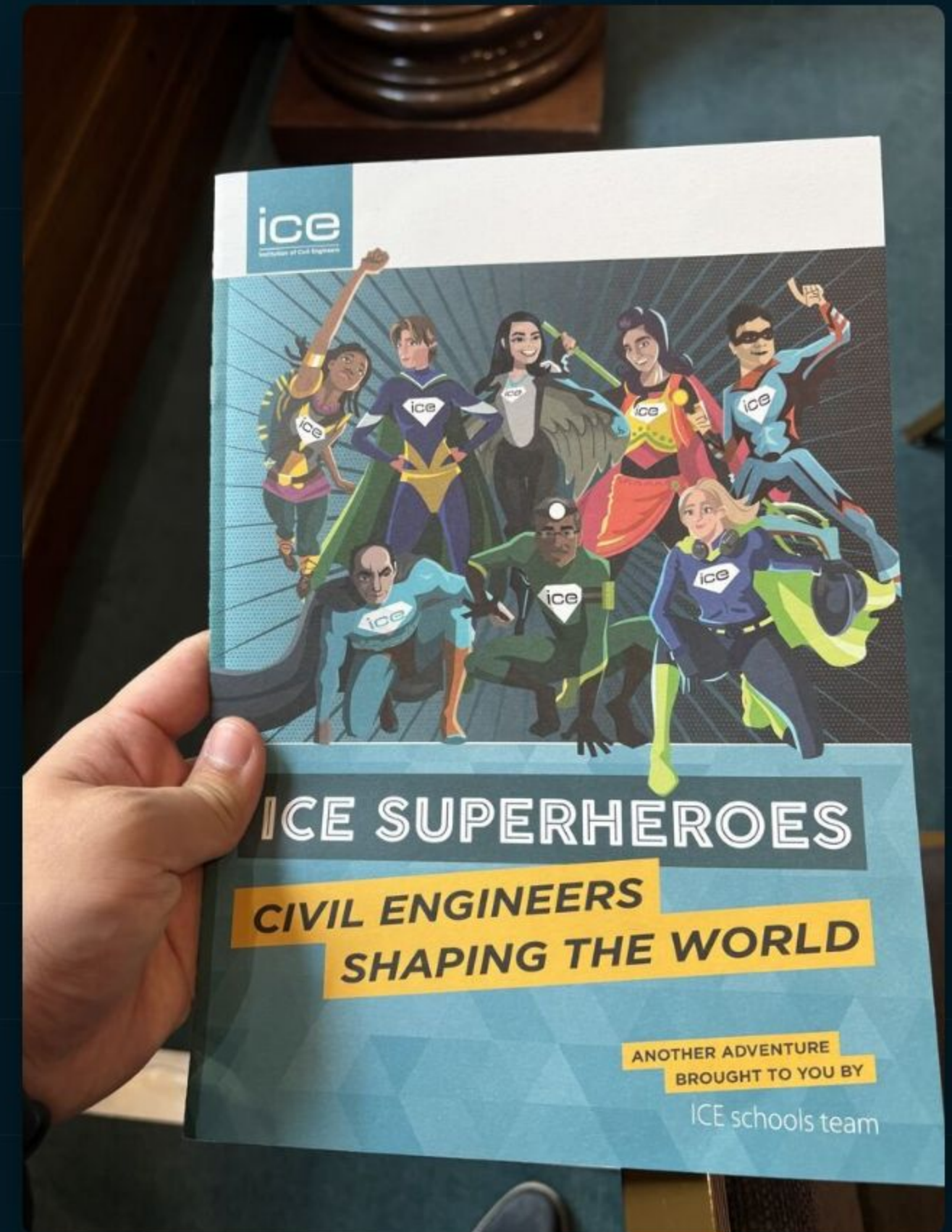
We lasted because we evolved with our tools, and kept delivering the value society needs.



A gift to take home

Tonight's slides, and the evergreen skills a civil engineer should keep developing. How to ride this wave, with AI as the golden key to the vault of our value.

automatex.uk/ice.html



■ SPEAKER ONE

The Systems Thinking Perspective: Designing Organisations for the Age of AI

Dr Neda Naghshbandi

Technical Director, AtkinsRéalis • GBRX AI Advisory Council

Specialises in AI transformation, systems innovation and the adoption of emerging technologies across transport and infrastructure. PhD in Complex Adaptive Systems and agent-based modelling from UCL.



■ SPEAKER TWO

Design. Build. Operate. Renew. AI Changes Everything.

Anthony Dewar

EurIng BEng CEng FICE FRSA

Head of Estate and Architectural Design · Company Technical Authority for Buildings, Network Rail

Technical and safety leadership for one of Britain's largest and most diverse building portfolios. A recognised voice on the future of railway stations, buildings and the built environment.



■ SPEAKER THREE

How AI is shaping Arup's Global Rail Skills Strategy

Lucy Gardner

CEng FICE

Associate Director, Global Rail Skills Network Leader, Arup

A Fellow of the ICE and the Rail Engineering Institution, with 20 years in rail leading multidisciplinary design teams in the UK and Australia. The technical home for Arup's core rail systems disciplines.

