

14th CESA YOUNG PROFESSIONALS SUSTAINABILITY IMBIZO — 2026 — 19–20 AUGUST PREMIER HOTEL MIDRAND

Beyond the Drawing Board

How AI Is Transforming the Future of Engineering

Victor Chibaya

Chairperson, SAICE Future Leaders Panel
BEng · ECSA Candidate Engineer · MEng (in progress), UCT
Developer, StoodioFlo

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Why This Room Should Care

R209.6B → R452.3B

Global AI-in-construction market, 2026 → 2031 — 16.6% annual growth (Mordor Intelligence; converted from US\$12.9B → US\$27.9B at ~R16.20/US\$1, Aug 2026)

“There simply aren’t enough engineers in the world to do all the work that needs doing.”

— Nicholas Cumins, CEO, Bentley Systems, Year in Infrastructure 2025

The real risk isn’t AI replacing you. It’s refusing to learn it — or trusting it blindly.

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Who's Talking

Victor Chibaya

- BEng · ECSA Candidate Engineer
- MEng candidate, University of Cape Town
- Chairperson, SAICE Future Leaders Panel
- Member, SAICE Structural Division
- Executive committee, IStructE Southern Africa Regional Group
- Developer, StoodioFlo

Building at the intersection of structural engineering, data and the tools our industry will run on next.

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Before Everyone Was Talking About AGI

Undergrad: teaching a model to see curved beams

- Used machine learning to derive formulae for the section rotations of curved beams — before generative AI was a household term.

Masters (UCT, in progress): concrete that tells its own story

- Building software that predicts carbonation depth in concrete, using validated predictive models that, until now, sat locked inside theses only other researchers could read.

Field context: Taffese et al. (2015), Constr. Build. Mater.; systematic review, J. Building Pathology & Rehabilitation (2025); MDPI Infrastructures (2024) on ML for curved-beam behaviour.

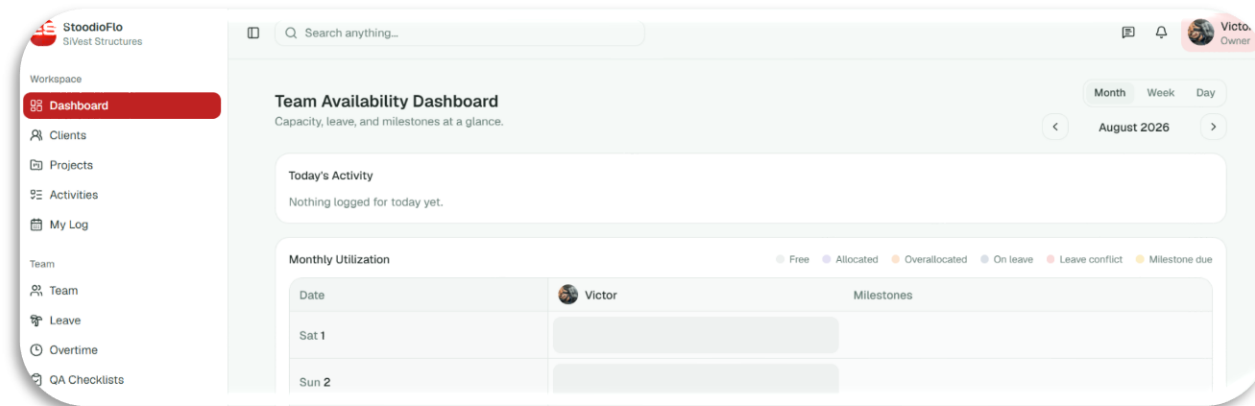
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From Research To A Tool Firms Actually Use

StoodioFlo

- A team-management tool built for consulting engineering teams.
- Tracks team resourcing and capacity in real time.
- Turns gut feel into a decision: take the new project? Hire? Push marketing harder? Cut project spend?

Proof that useful engineering software doesn't only come out of Autodesk or Bentley — it can come out of a firm like yours.



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The Race Has Already Started

Autodesk: generative AI foundation models in Forma & Fusion; R3.2B bet on spatial-intelligence startup World Labs; R58.3B MaintainX acquisition (2026)

Bentley Systems: Bentley Copilot, OpenSite+ generative design, an Infrastructure AI co-innovation initiative with engineering firms

Trimble: SketchUp Diffusion and AI-assisted project controls

Nemetschek: an AI assistant now built into Archicad and Allplan

– AEC AI startups raised R10.0B in H1 2026 alone — nearly double all of 2025 (Memoori)

These are the tools you already use. If they're racing to embed AI, sitting it out isn't neutral.



Six Things AI Already Does Well

Model generation — first-pass structural framing, site layouts and BIM geometry generated straight from your constraints

Analysis summaries — turns pages of FE and load-case output into a plain-language summary, flagging the outliers for you

Data extraction & manipulation — pulls numbers out of PDFs, scanned drawings and old spreadsheets, then cleans and reformats them in seconds

Reporting — drafts a first-pass technical or compliance report straight from your calculation package

Drafting — auto-annotates drawings, drafts specification clauses and first-pass client correspondence

Automation — batch-runs the repetitive design iterations and checks that used to eat a graduate's whole week

None of this replaces your stamp. All of it changes what your working week actually looks like.



The Gap AI Actually Fills

“The greatest challenge to delivering better, more resilient infrastructure is engineering capacity.”

— Nicholas Cumins, CEO, Bentley Systems

- A 2025 survey of infrastructure professionals (Bentley, with Pinsent Masons, Mott MacDonald & Turner & Townsend) found roughly half are already piloting or using AI.
- At a large firm, hundreds of graduates absorb the modelling, drafting and checking load.
- AI lets a small team carry the same volume of that work — freeing you for the judgement calls only a registered engineer can make.

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What This Means For You, Right Now

- Your value shifts from doing the calculation to judging the calculation.
- GitHub Copilot cut developer task time by 56% (Peng et al., 2023); AI-assisted writing cut time 40% and lifted quality (Noy & Zhang, 2023).
- Support-desk workers saw a 14% productivity gain on average — the least experienced gained the most, 34–35% (Brynjolfsson et al., 2023).

Engineers who learn to direct AI well, early, may gain the most of anyone in this room.

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Using AI Safely: What Good Practice Looks Like

- Treat AI output like a capable but unregistered graduate's work: read it, check it, don't sign it blind.
- Verify against code and first principles before it touches a drawing or a design.
- Know what you're allowed to paste into a chatbot — client and project data is still covered by POPIA once you've typed it in.
- Use AI for speed on the grunt work: search, first drafts, first-pass calcs — not for the judgement call.
- Document what the AI touched, so there's an audit trail behind every decision.

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When Nobody Checked: A Cautionary, Local Tale

- April 2026: South Africa's Draft National AI Policy was published for public comment.
- Weeks later it was withdrawn — after officials confirmed the reference list contained fake, AI-hallucinated citations.
- Four officials were suspended pending investigation. (Daily Maverick, TimesLIVE, BusinessTech, Apr–May 2026)
- This was a national government department — more resources than most consulting firms. Hallucination still got through.

ECSA is blunt: registered persons “must discharge their duties... with due care, skill and diligence.” The AI doesn't sign the drawing. You do.



A High-Level Roadmap For Your Team

- 1. Learn** — build AI literacy before you build AI tools.
- 2. Pilot** — start with augmentation & analysis, on low-risk, reviewable tasks.
- 3. Verify** — every output gets checked against code, first principles, or a senior engineer.
- 4. Govern** — a simple internal policy: what data goes in, who signs off, what gets logged.
- 5. Scale** — automate only where it removes toil without adding risk, then expand.

Adapted from Trimble's "Evolve" framework and Bentley's phased AI rollout, 2025–2026

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- The firms that win the next decade won't be the biggest. They'll be the ones that learned fastest and checked hardest.
- Start small: pick one task this month you can verify every time.
- Get involved: SAICE Future Leaders Panel, your division committee, IStructE SA — this conversation needs young engineers in the room.

Build, don't just consume: the next StudioFlow is sitting in someone's frustration with a spreadsheet. It might be yours.

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Thank You

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