

National Precast Concrete Association Australia

# Next-level quality in precast production

In precast, every millimetre counts. Sunset Sleepers has moved beyond the limits of manual checks, bringing new precision to quality control.

National Precast member Sunset Sleepers is piloting an artificial intelligence (AI) inspection system in partnership with Swinburne University of Technology and supported by grant funding from the Australian Government through the SmartCrete Cooperative Research Centre. The project has the potential to redefine how the precast sector approaches quality assurance.

Like many precast businesses, Sunset Sleepers once relied on manual inspection of every unit, and while thorough, the process was both time-consuming and vulnerable to human error. As demand for high-quality sleepers grew, the company recognised that its inspection regime needed a digital overhaul.

The answer lay in the Industrial Internet of Things (IIoT) and machine learning. The new system autonomously scans each sleeper as it comes off the line, detecting cracks, chips or inconsistencies in real time. Instead of subjective human judgment, the AI model applies the same standard to every product, every time.

"Automating inspection doesn't just save time; it creates a feedback loop that helps improve production at its source," explains Miguel Donnenfeld, director at Sunset Sleepers. "Every defect becomes a data point we can learn from."

### Data-driven improvement

Unlike traditional quality checks, the system doesn't stop at red-flagging faulty units. It also logs defect data continuously, giving operators insight into recurring issues and enabling proactive fixes.

That information feeds back into process optimisation, helping reduce waste, address root causes and strengthen compliance with Australian and International Organization for Standardization (ISO) standards.

The four-week pilot is evaluating accuracy, speed, robustness and scalability. Early results are promising: the AI system is proving faster than manual inspection, while also providing better information about where defects originate.

"We're leveraging state-of-the-art AI methods to develop a fit-for-purpose automated machine vision and defect detection technology that supports precision, efficiency and continuous improvement in precast manufacturing," says Dr Felip Marti, project lead and chief investigator on the Swinburne – Sunset Sleepers collaboration.

### Industry implications

If successful, the project could provide a roadmap for broader adoption of AI-enabled quality control across the precast sector. For an industry facing skills shortages and rising cost pressures, the ability to automate inspections while simultaneously gathering intelligence for improvement is a game-changer.

It marks a shift from quality control as a back-end task to quality intelligence as an integral part of manufacturing.

### A glimpse of the future factory

This collaboration between industry and academia shows what's possible when precast embraces manufacturing technologies. AI-powered inspection expands the operational toolkit, offering efficiency, consistency and insight that were previously out of reach.

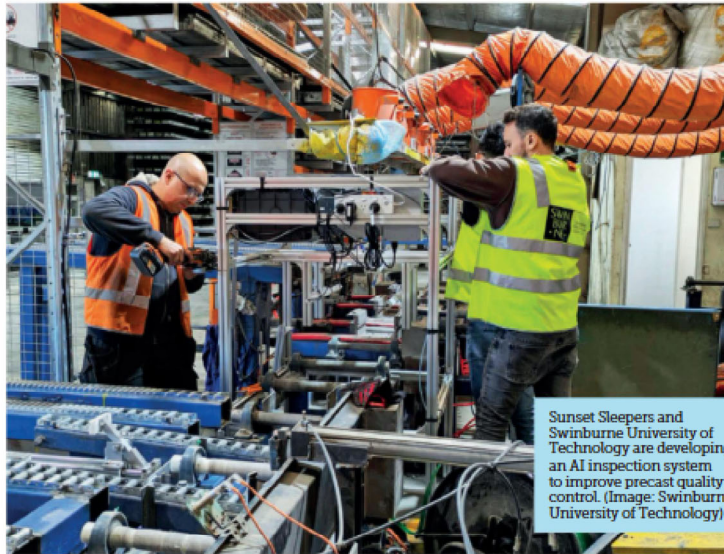


The system autonomously scans each sleeper as it leaves the production line. (Image: Swinburne University of Technology)

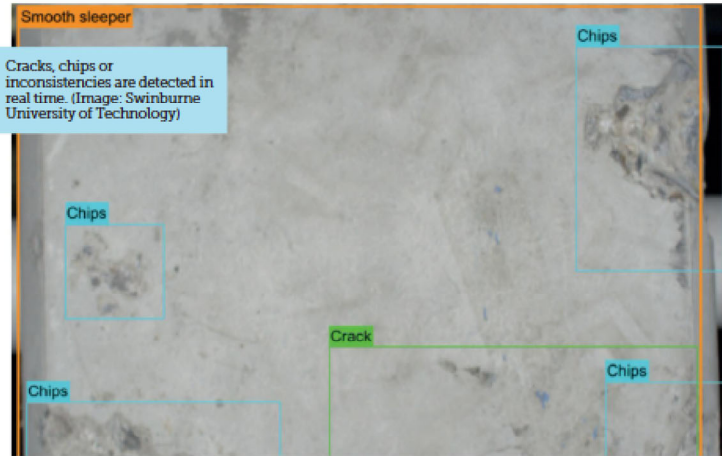
For Sunset Sleepers, the payoff is stronger products, smarter processes and a competitive edge built on innovation. For the wider industry, it is proof that AI is not a distant prospect but a practical tool already reshaping how precast gets made. ■■



By Cadell Taye, CEO of National Precast. (Image: National Precast)



Sunset Sleepers and Swinburne University of Technology are developing an AI inspection system to improve precast quality control. (Image: Swinburne University of Technology)



Smooth sleeper  
Cracks, chips or inconsistencies are detected in real time. (Image: Swinburne University of Technology)

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