

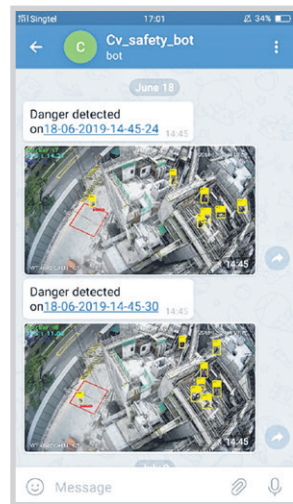
# Harnessing technology in new ways

HDB has embarked on three innovations which could potentially reap improvements in time savings, site productivity and safety. The Straits Times takes a look at them.

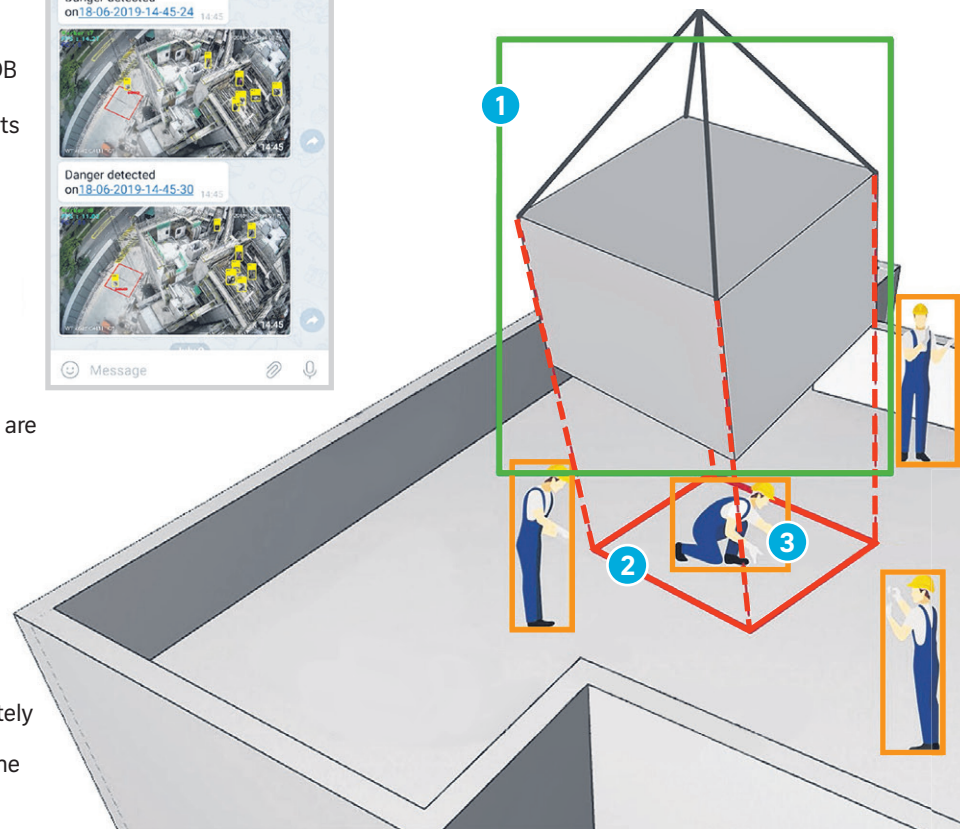
## ARTIFICIAL INTELLIGENCE (AI) SYSTEM TO REDUCE WORKSITE ACCIDENTS

### Detection and analysis of potentially hazardous situations from real-time CCTV footage

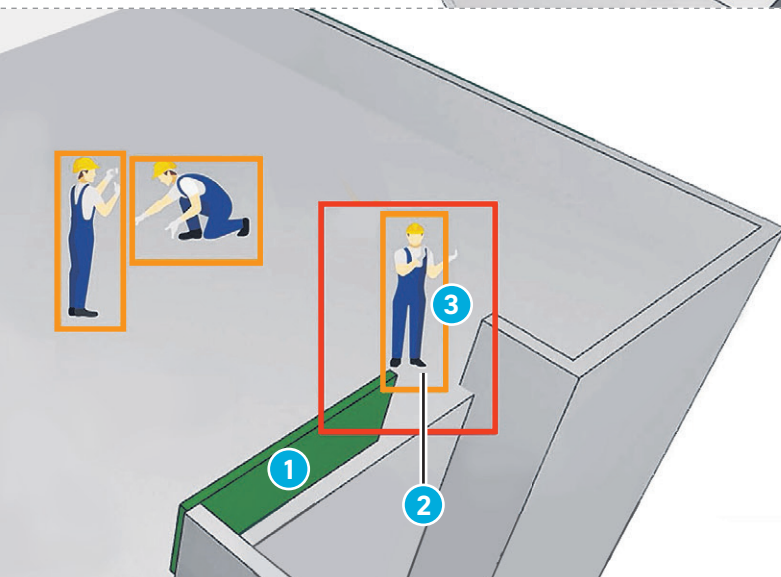
- Able to automatically identify safety lapses and detect unsafe behaviours and conditions at HDB construction sites in real time.
- When lapses are detected, alerts will be immediately sent to the site safety supervisor's mobile phone via the Telegram app (right).



- Lifted load detected
- Worker detected
- Danger zone



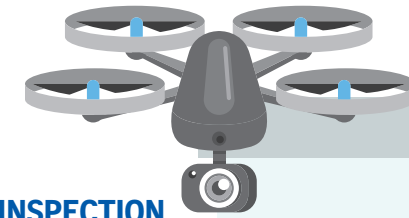
- DETECTED LIFTED LOAD**  
Load lifted by tower cranes are automatically detected.
- DANGER ZONE**  
The area directly under the lifted load (i.e. fall path) will be highlighted as a high-risk zone.
- WORKER DETECTED UNDER LOAD**  
The AI system will immediately send an alert to the supervisor and he will tell the worker to leave the area.



### High-risk situation: Fall from height

- BARRICADE AT BUILDING EDGES**  
Open sides of a building will be barricaded to prevent workers from falling over.
- BARRICADE REMOVAL DETECTED**  
Barricades at open edges are removed if work needs to be carried out in that area. Removal of barricades is automatically detected by the AI system, which identifies the area as a high-risk zone.
- WORKER AT OPEN EDGES**  
Any worker who comes within 1m of a non-barricaded building edge will be highlighted so that safety supervisors can ensure that he has observed the proper safety procedures before commencing work close to the edge.

## DRONES FOR BUILDING FACADE INSPECTION



- Future drone inspection system taps a cloud software platform to conduct a visual scan of building facades captured during inspection.
- Leveraging AI, it processes photos and identifies building defects in the cloud. It can detect and categorise the types of defects, and tag them to a visual of the building, including the exact location of the defect.
- The platform would then deliver a report to highlight the severity of the defects detected and recommend possible remedies.

## 3D CONCRETE PRINTING

The printer is capable of printing components up to 9m long, 3.5m wide and 3.8m tall. The complete cycle for HDB's first 3D printed room, including the insertion of reinforcement bars, took about six days to complete.

- 3D concrete printing material is prepared by mixing a customised cement blend with water.
- Design plans for a concrete component are uploaded into the 3D printer control panel to control the print path of the nozzle.
- Like squeezing toothpaste out of a tube, the concrete component is additively manufactured – one layer after another.

