Empowered *workforce,* Thriving *workplaces*

Leveraging WSH Technology and Grants in Construction

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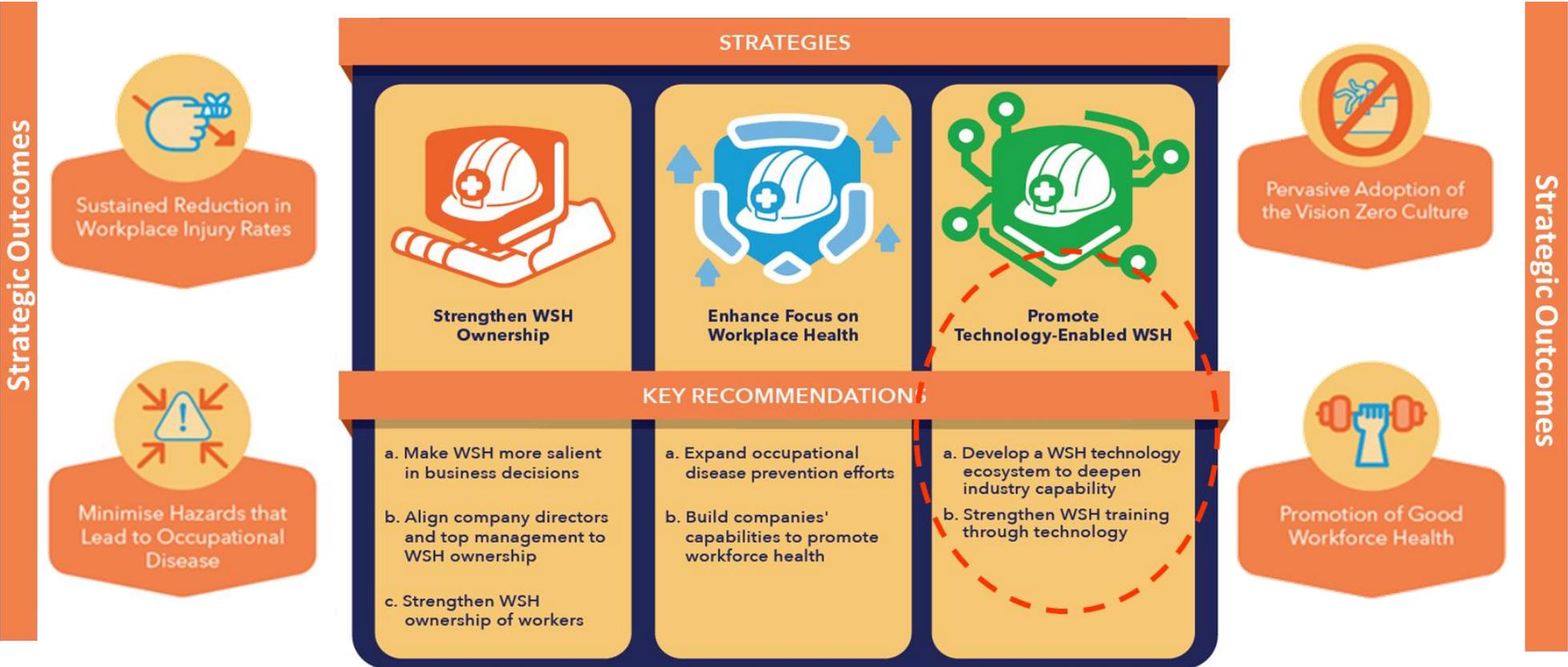
SINGAPORE

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Promote Technology-Enabled WSH is one of the key strategies to achieve WSH 2028 goals

Reduce and sustain Singapore' workforce fatality rate at less than 1 per 100,000 workers by 2028, in line with the safest countries in the world.

Workplace safety and health incidents are very costly. They can also affect business reputation and staff morale.

Incident Cost Calculator

Link

COST OF ACCIDENTS

Immediate Costs
- First-aid Treatment
- Making area safe
- Staff downtime

Accident Investigation
- Internal investigation
- Time spent with authority
- Consultant's fee

OTHER DIRECT AND INDIRECT COSTS

WORKERS
- Net loss of future earnings
- Additional cost of medical treatment and rehabilitation

COMMUNITY
- Social payouts
- Investigation/ Inspection activities
- WSH promotion activities
- Loss of human capital
- Medical subsidies

EMPLOYERS
- Staff turnover costs
- Training costs
- Loss of worker output
- Insurance premiums
- Legal costs

Recovery
- Site cleanup and repair
- Rescheduling work activities
- Machinery replacement

Intangible Costs
- Business reputation
- Staff morale

Penalties and Fines
- Contract penalties
- Fines
- Insurance premium increase

Business Costs
- Injury compensation
- Recruitment and training of new workers

COSTS

REDUCE

WSH Technologies can help to address common hazards found in construction sites

Common hazards	WSH Tech that can address
Unsafe work at height conditions	1. **Electronic Permit-to-Work (ePTW)** help supervisors ensure adequate fall protection measures are in place 2. **Video Surveillance System (VSS) with AI (or Video Analytics (VA))** provide supervisors with real-time alerts of workers near open edge 3. **Robotic or Drone solutions** automate specific work at height tasks and mitigate fall from height risks
Untidy housekeeping	1. **VA** can detect poor housekeeping to ensure materials are stored properly 2. **Smart Inspection Tool like 360° Camera** helps supervisors review site conditions and ensure that tools and materials are stored properly. 3. **Cordless Tools** remove cable trip hazards which pose slips, trips and falls risk

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Video Analytics (VA) enable real-time detection of hazards and prompt intervention to prevent accidents
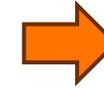
Camera sees worker under a lifted load
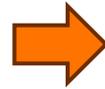
VA system alerts the supervisor

Supervisor intervenes and keep workers safe

Supervisor educates workers using relevant video footages to prevent future incidents

Over time, workers become more conscious of hazards, and this helps to nurture better situational awareness and safety culture.

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VA can detect many hazard scenarios and enhances site safety monitoring

Worker near open edge
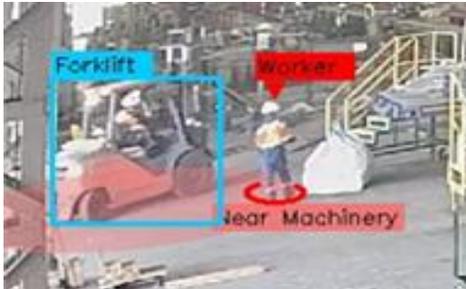

Slips, trips & falls detection

Worker under lifted load

Geofencing

PPE detection

Proximity to vehicle/machinery

Smoke & fire detection

Housekeeping

As compared to manual review of VSS footage, VA improves productivity and supervision efficiency.

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Image source: Ailytics

Case study – Video Analytics provide real time alerts for accident prevention

Eng Hup Engineering, specializes in traffic signaling systems and electrical infrastructure projects.

Business needs:
1. Enhance safety compliance monitoring
2. Reduce response time to safety incidents

VA scenarios adopted:
• Missing PPE • Worker near machinery/vehicle • Worker under lifted load • Geofencing

Workflow:
1. Safety alert sent to group chat when hazard is detected
2. Supervisors rectify and enforce compliance immediately
3. Worker asked to stop work and coached to work safe

After adopting portable cameras with video analytics:
- Safety alerts reduced by 82% over a 6-month period
- Improvement in workers' safety behaviour

Remote monitoring

Portable cameras deployed on-site

Hazard detection

Productivity Solutions Grant:
Smart Inspection and Management - Integrated and Smart Worksite Monitoring and Inspection

PSG (VA)

Source: Ailytics and Eng Hup Engineering

MOM launched SafeSite VA to encourage wider adoption of VA in the construction sector

Led by MOM, GovTech and the Public Sector Science and Technology Policy and Plans Office (S&TPPO) to trial VA at 14 sites across 7 public sector agencies

Provides a centralized dashboard for government agencies and their contractors to monitor site safety across multiple worksites simultaneously

SafeSite VA covers 5 common hazard scenarios found in construction sites:
1. Missing PPE detection
2. Geofencing
3. Worker Under Lifted Load
4. Worker Near Machinery
5. Worker Near Open Sides

Insights from the trials will be compiled into a playbook with guidelines on VA implementation and best practices to guide industry adoption of VA.

AI-enabled CCTV trial ongoing at 14 construction sites in Singapore

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Source: Straits Times

WSH management apps enable real time reporting and tracking of safety issues and processes, improving communication and compliance

Common features in WSH management apps include:

Electronic permit-to-work system (ePTW)
- Prevents falsification and backdating of permits
- Identifies conflicting work and overdue permits
- Full visibility of all ongoing high-risk activities
- Enhanced productivity by reducing paperwork

Incident and observation reporting system
- Platform to report safety incidents and observations
- Corrective and preventive actions are tracked until closure

Inspection and audit documentation
- Document inspection and audit findings
- Track action items until completion

Equipment tracking system
- Keep track of equipment on-site and perform periodic maintenance on time

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Case study - WSH management app streamlines safety processes and facilitates tracking of inspection findings and follow up rectifications

Engineering firm with extensive experience in public infrastructure projects.

Business needs:
Digitalise safety operations and integrate with existing processes to improve safety and productivity

WSH management app features:
- e-PTW
- Safety inspection checklist and workflow
- Incident management system
- Toolbox meeting with attendance verification
- Equipment tracking system

After adopting WSH management app:
- Greater PTW compliance (e.g. no missing info, identifies conflicting work areas, expired equipment)
- Inspection findings are closely tracked until resolution
- Improved site monitoring and time savings for PTW applications
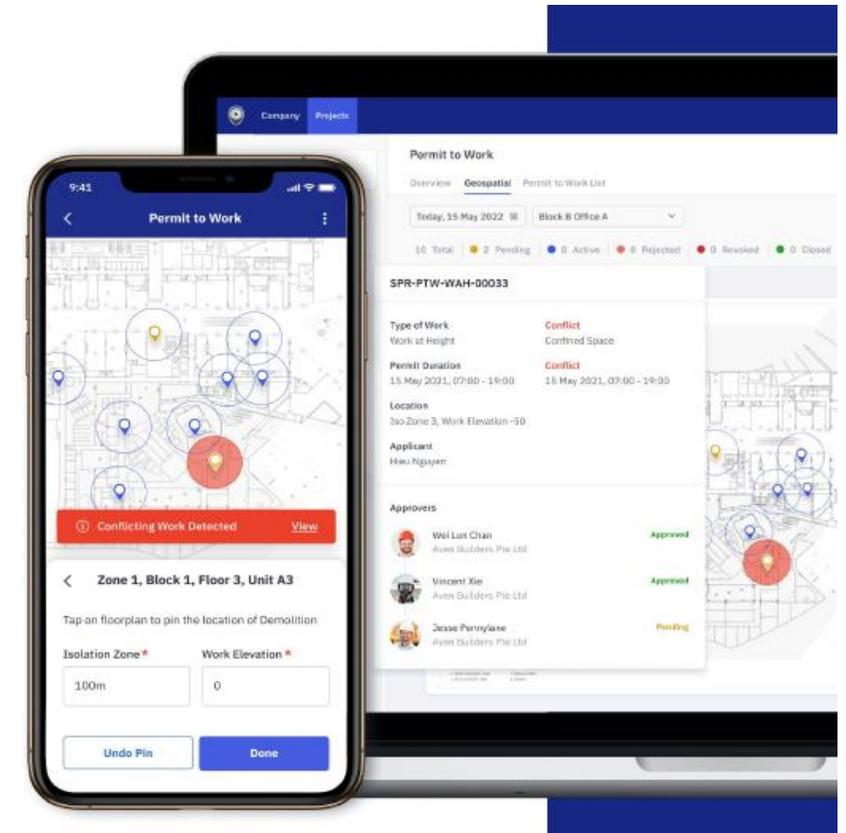
Productivity Solutions Grant:
Smart Inspection and Management - e-PTW

PSG (ePTW)

Source: Hubble

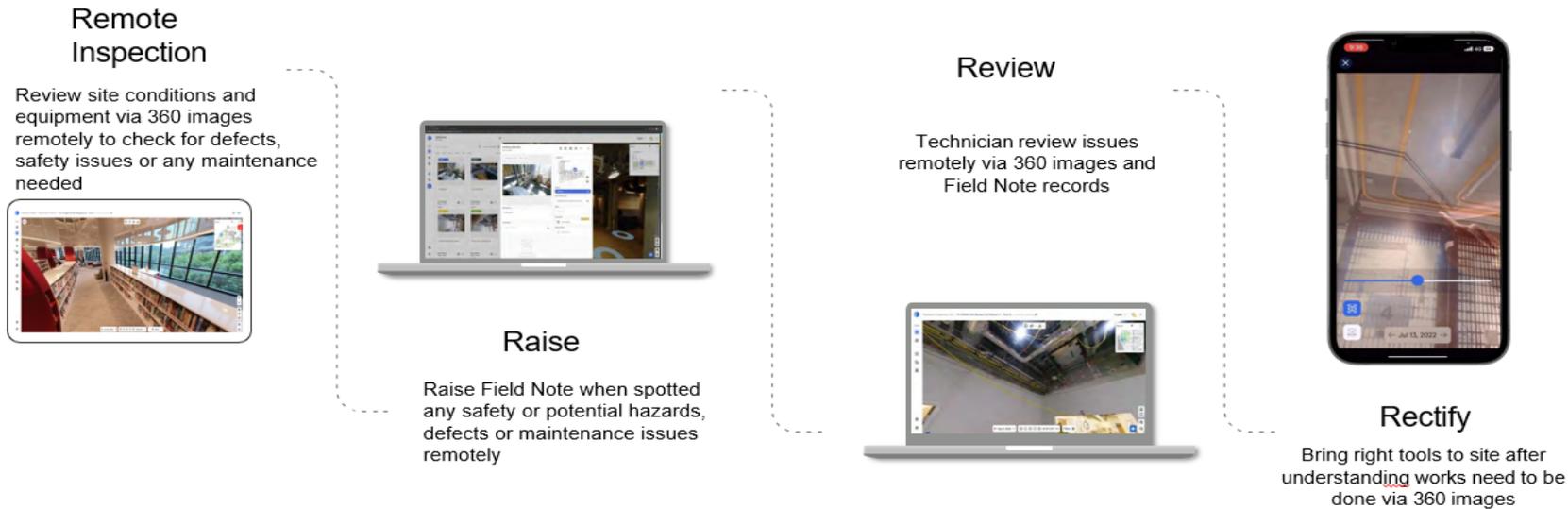# Smart inspection using 360° cameras capture building defects, spot hazards and track construction progress efficiently

Remote Inspection & Maintenance

Remote Inspection
Review site conditions and equipment via 360 images remotely to check for defects, safety issues or any maintenance needed

Raise
Raise Field Note when spotted any safety or potential hazards, defects or maintenance issues remotely

Review
Technician review issues remotely via 360 images and Field Note records

Rectify
Bring right tools to site after understanding works need to be done via 360 images

Benefits:
- Spots hazards, building defects/faults and monitor work progress
- Reduces the number of walks needed for inspection
- Reduces disputes between planned and actual construction
- Streamlines inspection workflow and facilitates swift communication to action parties

Graphics from OpenSpace

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Cordless tools can eliminate potential slips, trips and falls (STF) hazards, reduce risks of hand injuries and dust inhalation

Advantage over conventional corded tools:

- Eliminates wires that can pose STF risks
- More flexibility in movement
- Reduces risk of electrocution as tool is not plugged in directly
- Eliminates risks associated with cable laying

Safety features (may not apply to all cordless tools):

- Vibration reduction feature
- Stops tool from spinning uncontrollably when drill bits are jammed which reduces kickback to operator
- Localised dust removal systems as attachments (e.g. vacuum cleaners)
- Deadman's switch: tool stops when operator is not holding on to the tool

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Graphics from Hilti

Drones and robotic solutions minimise worker exposure to working at height

Tethered Drones

Indoor painting/wall finishing robots

Façade cleaning and painting robot

Benefits

- Tethered drones can reduce work at height risks for building façade inspection, cleaning and water tightness tests
- Drones and robots are generally more efficient in completing mundane tasks
- Workers can also be upskilled as drone or robot operators

Graphics from Spinoff Robotics, Atlas Robotech, ELID

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Business grants such as the Productivity Solutions Grant (PSG) and NTUC Company Training Committee (CTC) Grant provide funding support for industry adoption of WSH tech solutions

Productivity Solutions Grant

Kick-start your adoption of technology with pre-qualified, tried and tested IT solutions to increase productivity.

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NTUC Company Training Committee (CTC) Grant

Home > NTUC Company Training Committee (CTC) Grant

You have plans to transform your business and upskill your workers.
We can partner you to make it a reality.

Apply Now NTUC CTC Grant

Examples of WSH Tech solutions supported by PSG:
• Electronic permit to work
• Video analytics
• Vehicular safety technologies

Productivity Solutions Grant (PSG) supports SMEs in the adoption of IT solutions or equipment that improve productivity. Receive up to 50% funding support for eligible costs.

From 1 Aug 2024, projects that enhance WSH are recognised as enhancements to business capabilities, fulfilling the enterprise transformation criteria of the CTC Grant.

Company Training Committee (CTC) Grant supports entities that have formed CTC to implement transformation plans that would lead to better worker and business outcomes. Receive funding support of up to 70% of qualifying cost for each project.

WSHI also partners industry to explore and trial innovative tech solutions

Smart Safety Harness

Tethered Drones

Cooling vests

Exoskeletons

Health Monitoring Kiosk

Keen to implement tech solutions to address WSH challenges?

Get in touch with us today at
contact@wshi.gov.sg

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Images from REMOC, KTV Working Drone, EMCOOLS, Armastec, 36Zero

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Thank you