WSH Tech for Facilities Management

WSHC Forum

25th Nov 2021

WSH Institute

Provide evidence-based, insightful and practical solutions

Safety Moment

Pic Source: https://unsplash.com

Ensuring Workplace Safety and Health @ Work

Occupational Safety And Health Division (MOM)

Workplace Safety and Health Council

REGULATOR
Legislation, Policies & Enforcement

SOLUTIONING
Provide Insights to Chart New Grounds for WSH Excellence and Innovation

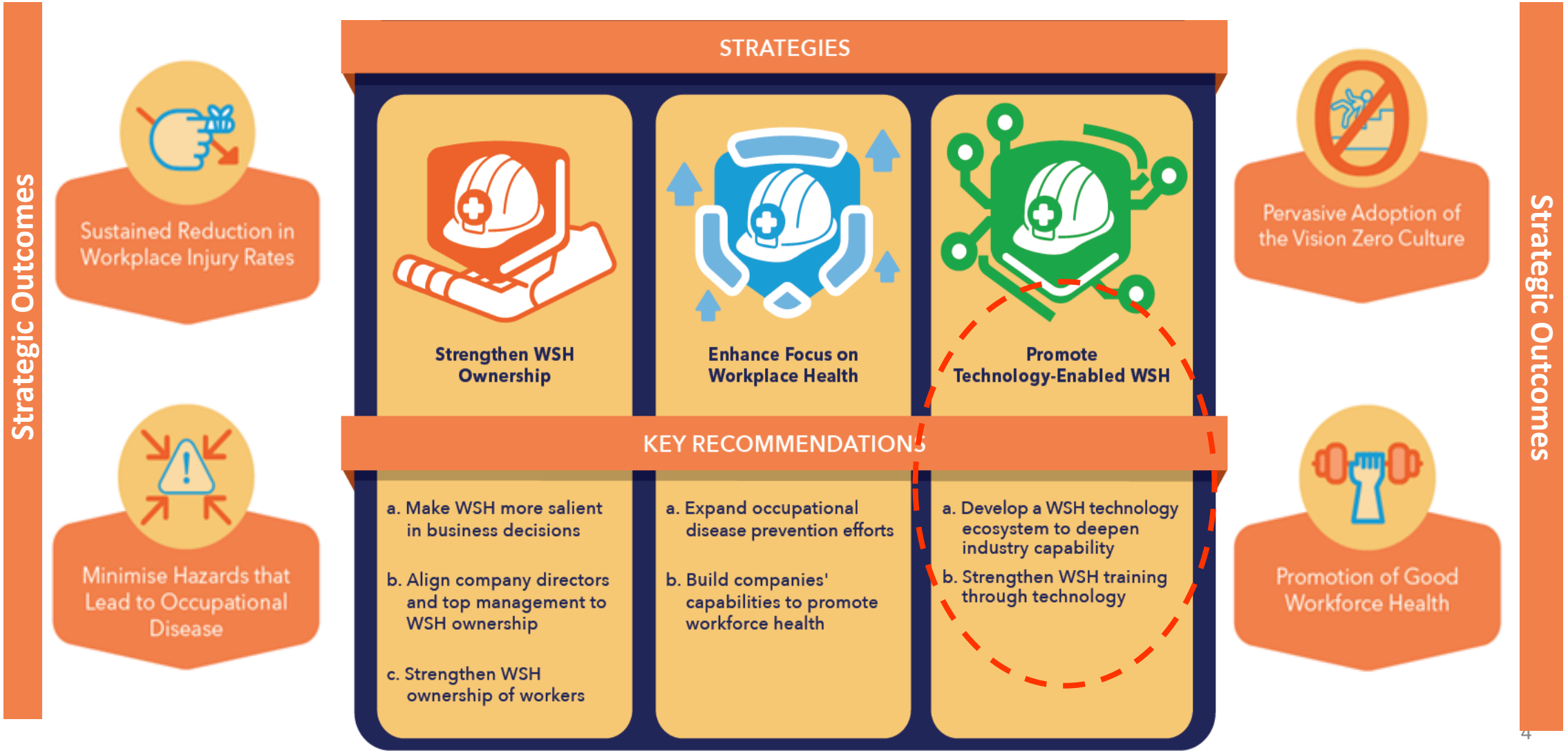
INDUSTRY PARTNER
Educate & Engage Stakeholders, Set Standards, Promote WSH

WSHI's Role

- Uncover red flags, root causes and emerging WSH issues through data
- Develop industry assessment tools
- Improve WSH through technology

WSH 2028 Strategies

Promote Technology-Enabled WSH is one of the 3 strategies to achieve WSH 2028 goals



WSH Technology as an Enabler

The WSH Tech team in WSH Institute aims to translate WSH challenges into technology plans to:

- Reduce accident risks caused by human error/judgement (or unsafe behaviour / lack of situational awareness)
- Minimise jobs that are dull, dangerous or repetitive (including hazardous work environment)
- Assess physical and cognitive fitness to catch potential problems before accidents occur (health affecting work safety)

We also promote effective market-ready solutions for sector wide adoption, and grow the WSH technology ecosystem in Singapore.

A coordinated approach to integrate WSH into the tech ecosystem

- For **market-ready solutions**, we are working with sector leads to incorporate WSH requirements or solutions into the sectoral Industry Digital Plans

- For **solutions in prototype stage**, we are supporting pilot testing via sector leads' innovation platform

- Where **no visible solutions are available or low TRL**, we will leverage on Research Institutes and Institutes of higher learning to conduct research & development, which may require a longer lead time.

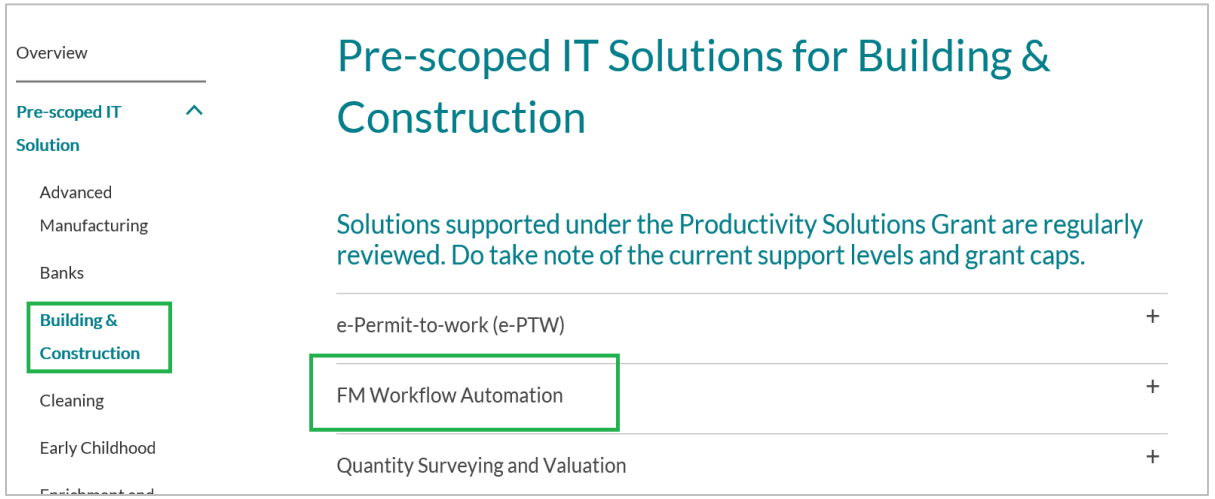
You can find WSH tech in the Construction and FM IDP with grant support for market-ready tech

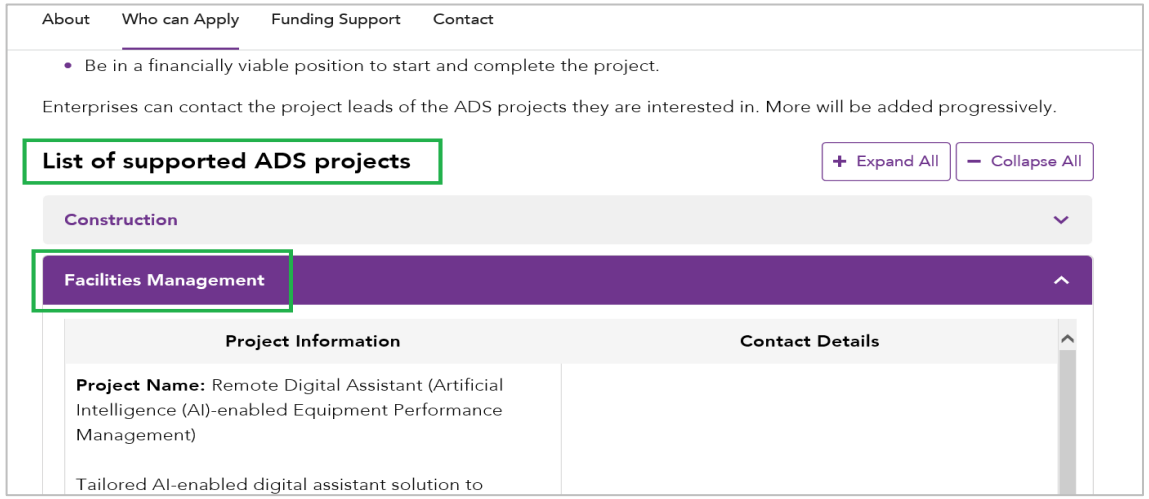
Solution Category	Description
Integrated and Smart Worksite Monitoring and Inspection 	Provide real-time digital monitoring and insights to project health in a connected digital environment Monitor on-site activities through sensors and video analytics to provide alerts to potential safety and health risks including those posed by vehicles/machines, fatigue, noise, dust, heat and working at height
Digital Wearables for Workers' Health and Safety 	Track critical Health and safety information such as human fatigue and stress, heat stress and ergonomic risks so as to alert affected parties accordingly to avoid safety incidents

You can find WSH tech in the Construction and FM IDP with grant support for market-ready tech

Solution Category	Description
Robotics for Autonomous Construction and Facilities Management 	Undertake strenuous and repetitive works such as brick stacking, painting and cleaning
Fleet Safety Management 	Collect data automatically and provide insights on driving patterns and external environment through sensors and video recordings
e-Permit-to-work (e-PTW) 	Submit, track and monitor PTW applications for high risk activities digitally via a centralized system

Find the list of pre-approved solutions in the GoBusiness Gov Assist portal and IMDA website





https://govassist.gobusiness.gov.sg/productivity-solutions-grant/itsolution/buildingconstruction/

https://www.imda.gov.sg/advanceddigitalsolutions#Facilities-Management

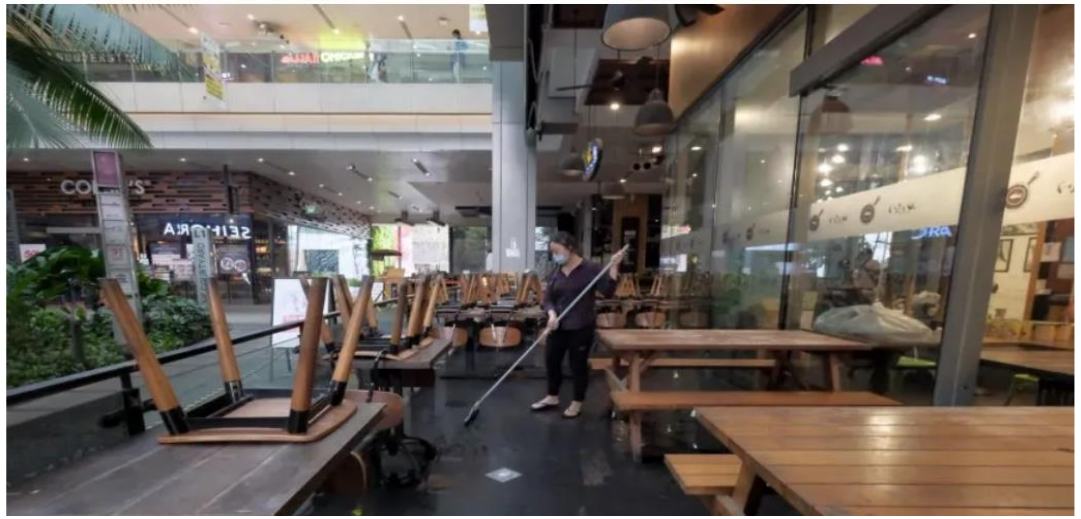
Calling for good solutions

Solution providers with good WSH technology proposals can email contact@wshi.gov.sg with a write-up of how the solution can improve WSH.

Slips Trips and Fall (STF) is the leading cause for major and minor injuries in Facilities Management

THE STRAITS TIMES SINGAPORE

Rise in workplace injuries from slips, trips and falls a concern and needs to be addressed: Zaqy Mohamad



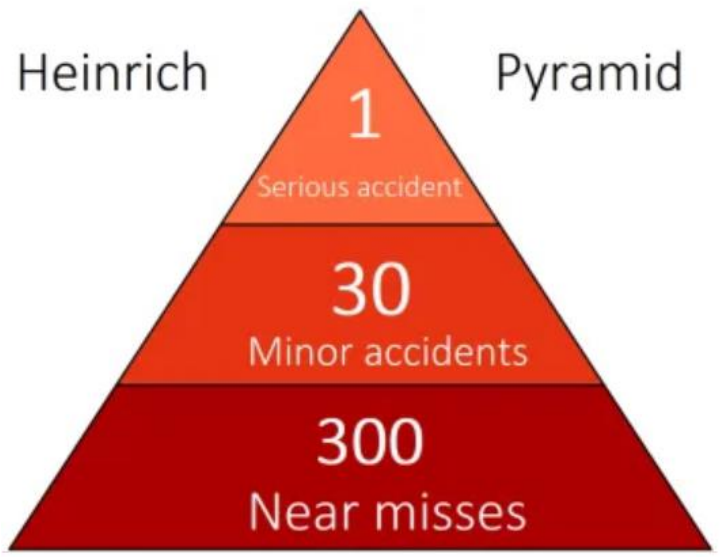
Source: Straits Times
https://www.straitstimes.com/singapore/rise-in-workplace-injuries-from-slips-trips-and-falls-a-concern-and-needs-to-be-addressed

THE STRAITS TIMES SINGAPORE

Over 1,800 workplace injuries from slips, trips and falls in first half of the year

Source: Straits Times
https://www.straitstimes.com/singapore/manpower/over-1800-workplace-injuries-from-slips-trips-and-falls-in-first-half-of-the-year

STF prevention solution using wearables and vision AI

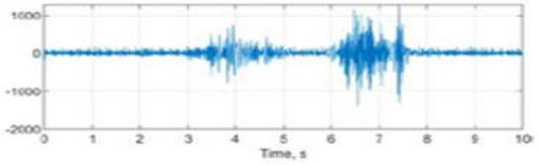


From detecting hard falls

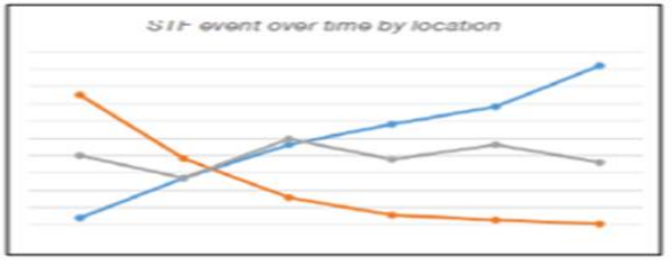
To detecting STF **near misses**

Example : Vulcan's WorkSafe uses wearables and vision AI to capture STF near misses

Multi-Sensor: Wearable and video sensor ingestion



Detect: STF event and STF hazard objects using accelerometer data & video footage



Monitor: Logging, monitoring of STF count over time

Alert: Send notification to facility manager based on preset rules

Source: Vulcan AI Pte Ltd

Use case for STF prevention solution

Source: CNA

Benefits of using an STF prevention tech solution

Benefits of having an STF prevention at facilities management settings include:

- ✓ Heightened safety awareness among workers
- ✓ Ability to render prompt assistance
- ✓ Audit trail for action taken
- ✓ Automated generation and digital storage of STF reports
- ✓ Productivity loss prevention – An injured worker cannot work, and his/her injury can be life altering, affecting quality of life.

Examples of Vendors with STF prevention Solutions

- ***Worksafe**** by Vulcan AI (local tech company)

- **Boost Plus** by GoX Labs (local distributor: **EIL Global**)

*Applicant is applying for funding support under the Pilot Project scheme

Mitigating Work at Height risks associated with building façade inspection using drones

Heady days: Use of drones to detect defects on HDB blocks takes flight

The small-scale, one-week pilot at the end of July saw the Housing and Development Board's drone operator inspect four public housing blocks in Jurong East.

Kevin Kwang

10 Aug 2018 06:32AM
(Updated: 08 Aug 2021 11:31AM)

Source: Channel News Asia

https://www.channelnewsasia.com/business/heady-days-use-drones-detect-defects-hdb-blocks-takes-flight-802556

THE STRAITS TIMES SINGAPORE

Building owners urged to use drones for facade inspections as new BCA guidelines rolled out

Source: Straits Time

https://www.straitstimes.com/singapore/housing/building-owners-urged-to-use-drones-for-facade-inspections-as-new-bca-guidelines

Mitigating Work at Height risks associated with building façade inspection using drones

Benefits of using drones for building façade inspection:
✓ Easier and safer to inspect difficult-to-access areas for buildings with complex design
✓ Less time taken to do inspection
✓ Lower cost of inspection
✓ Reduced reliance on manpower

Examples of Vendors with building façade inspection using drones solution

- H3 Dynamics
- Avetics Global
- Operva.ai

Technical Reference TR 78: 2020 'Building facade inspection using unmanned aircraft systems (UAS)'

- provides non-exhaustive specifications for the use of UAS to conduct inspection of existing building facades
- covers phases starting from preparation, stakeholder approvals, execution and up to post-flight data processing and report generation

Electronic Permit to Work improves safety through audit trail

For high risk (WAH) activities in FM, e-PTW is a well established digital technology with many service providers in the market. It is featured as one of the solutions in the Construction and Facilities Management IDP, with funding support available.

Benefits of E-PTW include:

- Improved safety through audit trail – ensures qualified person approve the PTW
- Protection against falsification of PTW – cannot backdate
- Full visibility of which high risk activities are ongoing and which PTWs have closed
- Dashboard to help safety supervisors identify conflicting works and overdue permits
- Enhanced productivity – reduces paper work and waiting time; assigns to other staff easily to cover staff absences

Source: Novade

Listed on PSG and ADS:

HUBBLE

Novade

InSight QSE

intelli SOLUTION

On-road solutions for vehicular safety

Advanced Driver Assistance System (ADAS)	Driver Status Monitoring Systems (DSMS)	Blind Spot Detection	Driver Behaviour Monitoring
• Forward Collision Warning • Lane Departure Warning • Headway Monitoring Warning • Traffic Sign Recognition	Alerts driver of abnormal driving status such as: - Fatigue - Distraction - Smoking - Cell phone usage	Assists driver to avoid collision by detecting vehicles and pedestrians in blind spots when changing lanes or turning.	Helps the organization manage poor driving behavior such as: • Speeding • Harsh Acceleration • Harsh Cornering • Excessive Braking

Listed on PSG

Logistics: Fleet Safety management

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Detecting heat stress and providing early intervention

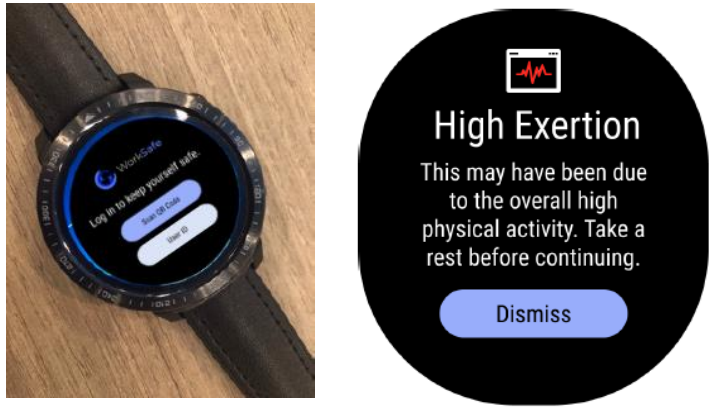
With climate change, for outdoor environments in FM, such as landscaping and conservancy works, **heat stress** may be a growing concern.

The use of **Wet Bulb Globe Temperature (WBGT)** meters for localised environmental monitoring can provide an indication on the risk of heat stress while **health monitoring devices** can detect fatigue and stress levels for workers.

- WBGT provides more accurate measurement of environmental heat on site
- Measure WBGT at locations where work is carried out (large worksites may require more than 1 point of monitoring)
- Trigger additional heat stress management measures when WBGT exceeds threshold

Detecting heat stress and providing early intervention

Wearables with health / environmental monitoring features can assess a worker's fatigue levels and/or unsafe environmental conditions and remind the workers to take breaks and prevent heat stress injuries.



Source: **WorkSafe** from Vulcan AI

Source: **Modjoul** from Fortiss

Monitor indoor air quality for hygiene and wellness

Monitoring devices that measure indoor air quality parameters such as levels of **CO2, carbon monoxide, dust and volatile organic compounds** which may post significant health risks if present in excessive amounts. The BCA-NEA-MOH Joint Guidance Note on Improving Ventilation also highlighted the use of CO2 levels as proxy for ventilation of occupied areas

Building and Construction Authority | National Environment Agency | MINISTRY OF HEALTH SINGAPORE

Revised on 26 September 2021

UPDATED GUIDANCE NOTE ON IMPROVING VENTILATION AND INDOOR AIR QUALITY IN BUILDINGS AMID THE COVID-19 SITUATION

1. Introduction

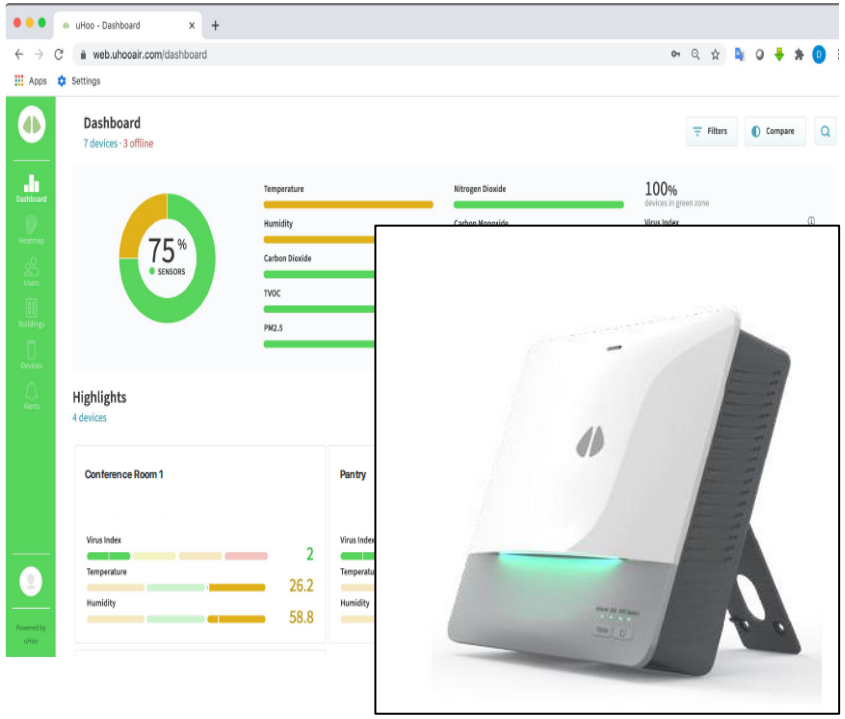
1.1. COVID-19 is mainly transmitted by close contact and respiratory droplets which are released when an infected person coughs, sneezes, talks, or sings. It can also be spread through virus aerosols in the air under certain settings, such as enclosed environments which are poorly ventilated. Hence, it is critical to mitigate this risk by improving ventilation and air quality in indoor environments.

1.2. This Guidance Note provides building owners and facilities managers with updated recommended measures to enhance ventilation and air quality in indoor spaces, through the proper operations and maintenance of air-conditioning and mechanical ventilation (ACMV)[1] systems. It is aimed at reducing disease transmission amid the current COVID-19 situation and resurgence of community cases. Earlier versions of this document were issued on 25 May 2021 and 29 May 2020.

1.3. This Guidance Note applies to non-residential premises where air-conditioning is used intermittently or continuously, as well as to naturally ventilated premises, with the exception of specialised premises[2] such as certain factory production areas, hospitals, polyclinics, and laboratories. Advice from subject matter experts and specialists should be sought for specialised premises.

1.4. Occupants of residential homes may improve home ventilation by opening doors and windows, especially when hosting non-household guests. Fans can be used to promote air circulation when needed.

1.5. The recommended measures in this Guidance Note should be accompanied by other key measures to reduce disease transmission, such as requiring



Source: uHoo

A local company, uHoo, has gone global with their indoor air quality monitoring product which can also assess COVID-19 risk in real-time.

Their business solution dashboard gives an overview of air quality across locations and spaces to help organizations identify locations that require immediate action.

You can feedback to us on WSH issue(s) you face and share solution(s) that you have tried or are exploring

We want to hear from you

We look forward to your feedback on the WSH issues(s) you face and the solution(s) that you have tried or are exploring:

Go.gov.sg/fm-tech-feedback