

**LTA initiatives to promote environmental sustainability and adoption of technological innovations**

<b>LTA initiatives to promote environmental sustainability</b>	
Carbon Accounting	<p>In line with the Singapore Green Plan 2030, LTA has been working to reduce carbon emissions from the construction activities of our infrastructure projects. One way is to keep track of the resources used in the construction projects through the Carbon Assets Inventory Form submitted by our contractors. The data is then analysed to identify the major sources of carbon emission, and to develop the corresponding carbon management strategies.</p> <p>Such data helps both LTA and its contractors monitor and set targets for reducing waste generation, energy and water consumption, and carbon emission from our construction projects.</p>
Use of Sustainable Materials (Green Cement)	<p>The use of concrete was identified as one of the major contributors to the overall carbon footprint of our construction projects. With more mega civil structures to be built, there is a need to review concrete usage to ensure our land transport system can be built sustainably. Ground Granulated Blast Furnace Slag (GGBS), or green cement, is a recycled by-product from steel production and can be used to partially replace conventional cement. This reduces up to half the carbon emissions due to cement production for concrete use, making it a more sustainable choice of construction material.</p> <p>LTA is planning to use green cement for the construction of permanent reinforced concrete structures in new civil projects.</p>
Reusable Drains for Earth Control Measures (ECM)	<p>Temporary concrete drains are built at construction sites to channel silty water and surface runoff during road diversions. At the end of a project, these concrete drains are then demolished and disposed of as construction waste. LTA is exploring the use of reusable drains made of steel at construction sites, which can be easily removed and reused at multiple locations. At the end of its lifespan, it can also be recycled as scrap metal, thus reducing construction waste.</p>

**LTA's adoption of technology to promote construction safety**

<p>Video Analytics (VA) to complement site supervision</p>	<p>Video analytics with closed circuit television (CCTV) cameras is used to aid and automate site supervision by flagging out interventions against predefined rules and algorithms. This is currently implemented across the construction of Cross Island Line (CRL) Phase 1, for monitoring of high-risk work areas and preventing unauthorised entry into construction sites or restricted zones.</p> <p>The use of video analytics will augment supervision efforts to allow continuous monitoring of:</p> <ul style="list-style-type: none"> <li>- Unauthorised entry of people into construction sites/ restricted zones</li> <li>- Pedestrian intrusions onto the vehicular access way</li> <li>- Tracking and tracing of workforce in high-risk areas</li> <li>- Monitoring Personal Protection Equipment (PPE) violations e.g. where PPE is not worn or not worn properly</li> </ul>
<p>Fatigue Management System for behavioural analytics</p>	<p>Monitoring the fatigue levels of heavy machinery operators help to ensure that they stay alert when high-risk works involving these machineries are carried out. This is also part of the safety management efforts to use Internet of Things (IoT) to collect data across connected devices. LTA will include the provision for fatigue management systems into contract specifications for new projects, and data collected can provide insights for behavioural management of operators. Current contractors are encouraged to adopt these systems for their works.</p>
<p>Data Analytics for Safety, Health and Environmental Management for Construction Sites</p>	<p>Data collected in LTA's Safety Information System (SIMS) are analysed to uncover patterns and provide valuable insights for safety, health and environmental management on our construction sites and to support the decision-making process.</p> <p>Moving in tandem with digital transformation, LTA is transiting our data analytics platform onto a modern business intelligence system. The new system aims to provide enhanced insights for proactive intervention measures as part of LTA's continuous efforts to create a safer, healthier and sustainable environment for our construction sites.</p>