PEP-SBF AWARDS 2023

PRO-ENTERPRISE TRANSFORMATION (PET) AWARD - GOLD

Name of Initiative

Driving the Adoption of Remote Monitoring and Diagnostics (RM&D) Solutions in Lifts

Agency

Building and Construction Authority (BCA)

Summary of Initiative

RM&D solution uses sensors and artificial intelligence (AI) to detect, diagnose, and predict lift faults (Annex A). With the ever-increasing number of lifts, in 2017, BCA envisioned that the industry's adoption of this technology could transform lift maintenance through raising the productivity of the industry, reducing the cost of compliance with regulatory requirements, and providing better jobs for Singapore residents.

Safe Trial Environment

BCA acknowledged the importance of machine learning to improve the diagnostic capabilities of RM&D solution and designed a testbed-friendly framework to assess the effectiveness of the solutions without compromising on the safety of the lifts.

Formulation of Standard for Adoption of RM&D Solution

Concurrently, JTC and BCA met regularly with RM&D solution providers and lift contractors to review the trial results on-the-go. This helped to formulate the technical requirements for the Standard and the framework for a regulatory sandbox. The close partnership with BCA and JTC gave an early boost and enabled businesses like entrant RM&D solution providers, as well as lift contractors, to refine their systems and operational processes and deliver better services and products.

Regulatory Sandbox

The success of the trials and the development of the standard for RM&D solution paved the way for the development of a regulatory Sandbox. In August 2022, BCA and MND amended legislation to implement a regulatory sandbox for lifts equipped with RM&D solutions (RM&D lifts) to be subjected to a three-monthly maintenance frequency instead of the standard monthly frequency. This makes sense for lift owners

and lift contractors to adopt RM&D solutions for their lifts and reap the benefits of a predictive maintenance regime.

To support the Sandbox, BCA published a world-first RM&D standard to provide clarity to the industry on the minimum requirements of a RM&D solution that would be accepted into the Sandbox. Since the implementation of the regulatory Sandbox, more than 10 building owners, with portfolios of more than 450 lifts, are at the various stages in testing/sandboxing their lifts and RM&D solutions.

Annex A - Remote Monitoring & Diagnostics
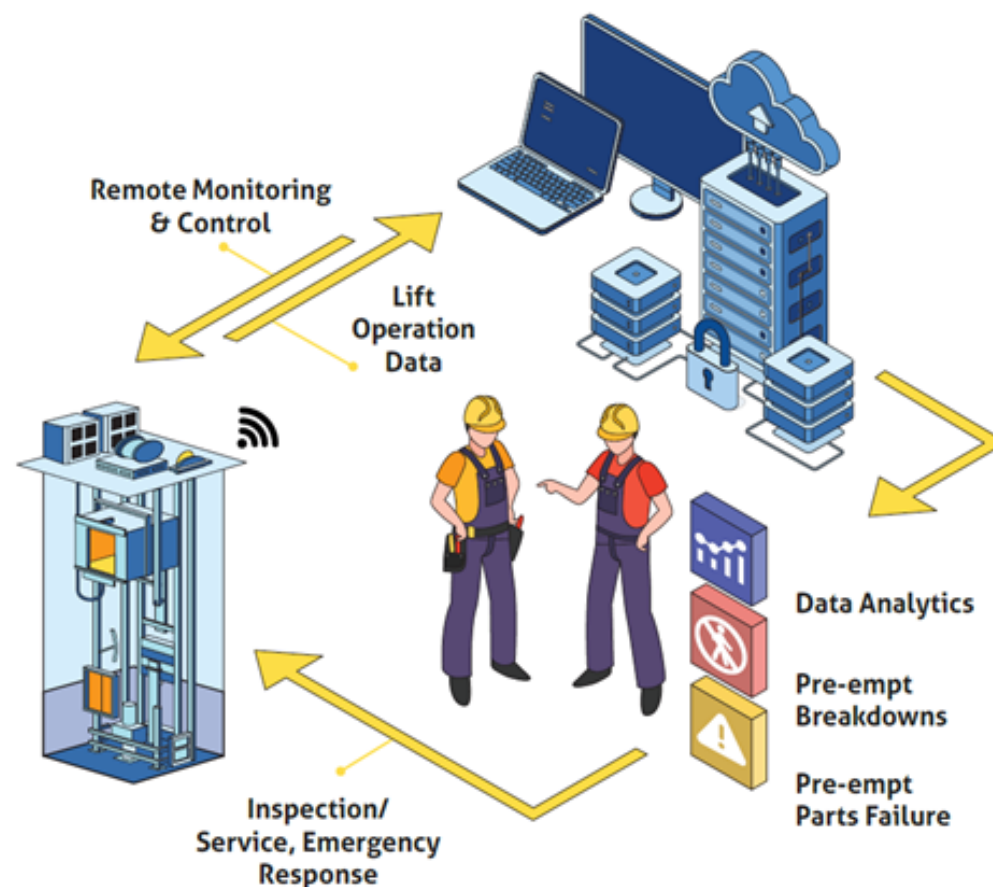
What was the impetus behind this project/initiative?

In 2017, BCA conceptualised a regulatory framework to shift the lift industry towards predictive maintenance using RM&D as an enabler. To encourage adoption of RM&D technology, there needed to be clarity in the standard for compliance and less costly legislative requirements.

Trial Environment
BCA acknowledged the importance of machine learning to improve diagnostic capabilities of RM&D solution and designed a testbed-friendly framework to assess the effectiveness of the solutions in a safe manner. For example, BCA adopted a calibrated approach on its enforcement towards lift safety by allowing for delayed rectification of low-to-medium safety risk issues but require lifts with high-risk safety issues to be stopped for immediate rectification. The trials were successful, validating that lifts fitted with RM&D could meet safety and performance objectives required by BCA and JTC.

Formulation of Standard for Adoption of RM&D Solution

Concurrently, JTC and BCA met regularly with the RM&D solution providers and lift contractors to review the trial results on-the-go. This help to formulate the technical requirements for the standard and framework for a regulatory sandbox. The close partnership with BCA and JTC gave an early boost and enabled businesses like entrant RM&D solution providers, as well as lift contractors, to refine their systems and operational processes and deliver better services and products.

Regulatory Sandbox

The success of the trials and the development of the standard for RM&D solution paved the way for the development of a regulatory Sandbox – maintenance frequency of the lifts could be stretched beyond its current state of monthly intervals in a controlled regulatory environment.

In August 2022, (i) BCA and MND amended legislation to implement a regulatory sandbox for lifts equipped with RM&D solutions (RM&D lifts), and (ii) BCA published an RM&D standard to provide clarity to the industry on the minimum requirements of a RM&D solution that would be accepted into the Sandbox. Under the Sandbox, RM&D lifts are subject to a lower maintenance frequency of 3 months instead of 1 month. This enables lift owners and lift contractors to reap the benefits of a predictive maintenance regime by providing flexibility to optimise their manpower and resources in carrying out the required maintenance visits.

What challenges did you/your team encounter, how did you/your team overcome them?

In 2017, when RM&D technology was still nascent, BCA conceptualised a regulatory framework to shift the lift industry towards predictive maintenance using RM&D as an enabler. This would help raise the capabilities and productivity of the industry.

However, the challenge was that there were no countries that had introduced regulations related to RM&D for the team to benchmark against, and no international standards on RM&D for reference. The team did not have usable data on lift safety regarding RM&D lifts deployed in other countries as well.

The team, through industry consultations then conceptualised a regulatory sandbox that could provide a safe trial environment to assess the effectiveness of the solutions without compromising on safety. To build up the data on the performance and safety of the lifts, JTC provided their lifts to conduct the trials on 3 different RM&D solutions. A standard on the design and performance on the use of RM&D technology was also developed through the data from the trials.

Another challenge was risk management. Lifts are required to be maintained regularly so that they can function safely and reliably. They are also heavily used by the public. The key risks for implementing the regulatory sandbox on a longer maintenance frequency were public safety and reliability.

To manage the risks, BCA worked closely with MND to identify risks and scope the safeguards for the Sandbox. This was based on data from the JTC trials and in consultation with the industry and overseas lift experts. The legislation was also drafted to provide BCA with the flexibility to expeditiously address safety risks that may subsequently arise during the Sandbox.