



Building and Construction Authority

Guidelines

**Approval Process for Reduced Maintenance
Frequency for Lifts installed with Remote
Monitoring and Diagnostics Solution**

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1. Introduction

- 1.1 In Singapore, lift owners must engage fixed installation service contractors registered with BCA to carry out monthly maintenance¹ for lifts in accordance with the maintenance requirements² found in Part 2 of the Fourth Schedule of the Building Control (Fixed Installations) Regulations 2025 (the “**BC (FI) Regulations**”).
- 1.2 To encourage and facilitate the adoption of Remote Monitoring & Diagnostics (“**RM&D**”) technologies for lifts, an interested lift owner (the “**Applicant**”) can now apply to the Commissioner of Building Control (the “**Commissioner**”) (via BCA) for approval for their lifts³ implemented with a particular RM&D solution⁴ to be subject to a longer maintenance interval of 3 months.
- 1.3 This guide aims to provide lift owners, lift companies and technology firms as well as other stakeholders in the lift maintenance industry more information pertaining to the application process and conditions of approval.

2. Approval Process

- 2.1 The approval process would be in 2 Stages.

Stage 1: Pre-Approval Trials

- 2.2 The applicant would first have to apply for their RM&D solution to undergo pre-approval trials.
- 2.3 The aim of the pre-approval process is for the applicant to demonstrate to the Commissioner that their RM&D solution meets the requirements specified in BCA’s Code of Practice⁵ for Design and Performance of Remote Monitoring & Diagnostics Solution for Lifts (hereinafter referred to as “**COP**”).
- 2.4 To demonstrate that the RM&D solution meets the requirements in the COP, the lifts installed with the RM&D solution must undergo a trial period of minimum 6 months.
- 2.5 At the end of 6 months, BCA would carry out an evaluation of the performance of the lifts equipped with the RM&D particular solution before deciding whether the applicant can be eligible for the 2nd Stage. During the trials, these lifts will still be required to be maintained every month by a fixed installation service contractor.

¹ The requirements for periodic maintenance of lifts can be found under Regulation 39 of the Building Control (Fixed Installations) Regulations 2025.

² Fixed installation Service Contractors must meet a set of 23 Maintenance Outcomes stipulated in the Regulations that covers the critical areas of maintenance.

³ Other than a home lift, vertical platform or a stairlift

⁴ “Remote monitoring and diagnostics solution” or “RM&D solution” means a system that (a) continuously collects data from an operating lift, (b) analyses the data to detect, diagnose and predict issues in the lift’s operation; and (c) recommends action for the lift’s maintenance.

⁵ The COP can be found in BCA’s website: <https://www1.bca.gov.sg/regulatory-info/lifts-escalators/remote-monitoring-diagnostics-for-lifts-in-singapore>

2nd Stage – Application Process

- 2.6 If the Applicant evaluates that the particular RM&D solution satisfies the requirements in Regulation 40 of the BC (FI) Regulations, the Applicant may submit an application under Regulation 40 for the lifts that had undergone the pre-approval trial process in Stage 1 to be subject to a longer maintenance interval of up to 3 months. To this end, the Applicant must complete the application using the requisite form, and prepare the necessary documents and forms to be submitted to the Commissioner.

3. Stage 1: Pre-Approval Trials

- 3.1 This section provides more information on the process of the Stage 1 pre-approval trials.
- 3.2 Applicants who are interested to conduct pre-approval trials in Stage 1 should write to BCA for a consultation with the required information (listed in Annex A) on the details of their RM&D solution.
- 3.3 If the Applicant's RM&D solution is assessed to be suitable after the consultations with BCA, the Applicant can proceed to conduct the pre-approval trials.
- 3.4 During the 6-month pre-approval trials, the Applicant should:
- (i) collect evidence and data, contained in documents, that demonstrate that the RM&D solution is able to meet the monitoring outcomes requirements in Table 1 listed under section 3.7.2 of the COP. The monitoring outcomes describe the lift systems that are required to be monitored and the expectations on the outcome of the monitoring;
 - (ii) collect and submit information to the Commissioner on the RM&D performance indicators⁶, maintenance findings⁷ and servicing reports monthly; and
 - (iii) facilitate audits by the Commissioner for the lifts deployed under the trial during the pre-approval trial period. The fixed installation service contractors engaged to maintain the lifts under the trial must facilitate and assist the Commissioner in any audit inspections that may be required by the Commissioner. The Commissioner will provide advance written notice of such audit inspections.

⁶ For further details on the Performance Indicators, please refer to the COP.

⁷ Data templates would be provided to the Applicant. The Applicant would have to fill in the necessary data fields and submit them to BCA monthly.

4. Stage 2: Application Process

- 4.1 This section provides more information on the Stage 2 Application Process.
- 4.2 The application must be made by the owner of the lifts installed with the RM&D solution ("**RM&D Lifts**"). To apply, the Applicant would need to download and fill up the requisite application, supporting forms and relevant documents, and submit them to the Commissioner. The application must set out the list of RM&D Lifts and be endorsed by the fixed installation service contractor engaged to maintain the RM&D Lifts as well as the intended RM&D solution provider. The list of forms is listed below and can be found on BCA's website at <https://www1.bca.gov.sg/regulatory-info/lifts-escalators/remote-monitoring-diagnostics-for-lifts-in-singapore>:
- (i) Application to Maintain Lifts using RM&D solutions at reduced maintenance frequency.
 - (ii) Form A: Details of Lifts
 - (iii) Form B: Details of Performance Indicators Values
 - (iv) Form C: RM&D Maintenance Findings
 - (v) Form D: Checklist for monitoring outcomes for BCA's Code of Practice for Design and Performance of Remote Monitoring & Diagnostics Solutions for Lifts
- 4.3 In evaluating the application, the CBC must be satisfied of all the following:
- (i) that the RM&D solution can collect data on all or most of the maintenance requirements referred to under regulation 39 of the BC (FI) Regulations
 - (ii) the RM&D solution can predict issues⁸ in the operation of the RM&D Lifts;
 - (iii) the lift owner, fixed installation service contractor and RM&D solution provider agree to comply with any condition imposed by the Commissioner for the approval;
 - (iv) given the use of the RM&D solution, the appropriate frequency to carry out maintenance works for the RM&D Lifts; and
 - (v) public safety
- 4.4 Upon written approval of the application by the Commissioner, the fixed installation service contractor may then carry out maintenance works at the

⁸ To demonstrate this, the Applicant must ensure that performance indicator values submitted in Form B meet the requirements in Annex B.

approved frequency for the RM&D Lifts, subject to the conditions of approval as may be imposed by the Commissioner.

4.5 In approving the application, the Commissioner may impose conditions of approval which may include one or more of the following:

- (i) the Applicant shall continue to use the RM&D solution throughout the period of approval;
- (ii) the Applicant shall notify BCA in writing if the lift owner, fixed installation service contractor or RM&D solution provider intends to terminate the use of the RM&D solution or wish to revert back to the monthly maintenance regime for the RM&D Lifts, and obtain the Commissioner's approval before such termination or reversion;
- (iii) the Applicant continues to ensure that the approved RM&D Lifts meet the performance benchmarks in **Annex B** at all times;
- (iv) the Application immediately notifies the Commissioner in writing as soon as the Applicant becomes aware of any defects or issues in the RM&D solution that could cause severe unintended consequences affecting public safety;
- (v) the Applicant shall submit data on all maintenance findings, servicing reports and performance indicator results for the RM&D Lifts to BCA on a monthly basis;
- (vi) the Applicant shall ensure that the fixed installation service contractor engaged to maintain the RM&D lifts carries out actions recommended by the RM&D solution provider, within the timelines suggested by the RM&D solution provider; and/or
- (vii) the Applicant shall facilitate audits by BCA for the RM&D Lifts by ensuring that the fixed installation service contractor engaged to maintain the RM&D Lifts facilitates and assists BCA in any audit inspections that may be required by BCA with advance written notice of such audit inspections.

5. Roles and Responsibilities

5.1 Lift owners, fixed installation service contractors and RM&D solution providers are reminded of their respective roles and responsibilities in deploying the RM&D solution for the RM&D lifts under a longer maintenance frequency.

Lift Owners

5.2 In the event that the lift owner finds that any of the RM&D lifts are unsafe through information from the RM&D solution or otherwise, the lift owner should put the lift(s) out of operation immediately, alert the fixed installation service contractor and/or RM&D solution provider. Observations, before and after rectifications, should be recorded and logged in the RM&D data submission templates provided by BCA.

- 5.3 The approval granted by the Commissioner provides flexibility for an extended, condition-based maintenance regime. Notwithstanding any approval granted by the Commissioner, the lift owner should take advice from the fixed installation service contractor to impose a more frequent maintenance regime, should the need arise, on any of the RM&D Lift(s).

Fixed Installation Service Contractor

- 5.4 The fixed installation service contractor would need to increase monitoring and is expected to respond expediently and accordingly if the fixed installation service contractor is informed, through the RM&D Solution, the RM&D Solution Provider or otherwise, that the RM&D Lifts require intervention.
- 5.5 Observations and rectification actions during intervention trips should be recorded and logged. In an event the fixed installation service contractor finds the anomalies or recommendations raised by the RM&D solution does not warrant interventions, justifications are to be clearly provided.
- 5.6 The fixed installation service contractor should advise the lift owner as well as the RM&D solution provider on a suitable maintenance frequency/plan if the maintenance arrangements cannot meet the necessary maintenance requirements for the RM&D Lifts to operate in a safe manner.

RM&D Solution Provider

- 5.7 The RM&D Solution Provider must take the necessary precautions to prevent unauthorized control and access to the RM&D Lifts remotely. There should be consideration in the system design to minimally log, trace, and interrupt hijacking and hacking attempts.
- 5.8 The RM&D solution provider has the responsibility to safeguard the RM&D Lifts' data, regardless of storage means. The RM&D Lifts' data must be identifiable and extracted in a readable format, and be able to be provided to BCA and lift owner upon request (in addition to the monthly data submissions to BCA, if applicable).
- 5.9 The RM&D Solution Provider should at all times work with the fixed installation service contractor and/or lift owner to continuously improve the diagnostic capabilities, raising diagnostic and predictive accuracies through means of on-site validation for feedback to the RM&D Solution.

6. Flowchart on the Approval Process

6.1 The processes from consultation to obtaining of approval are as shown in Figure 1.

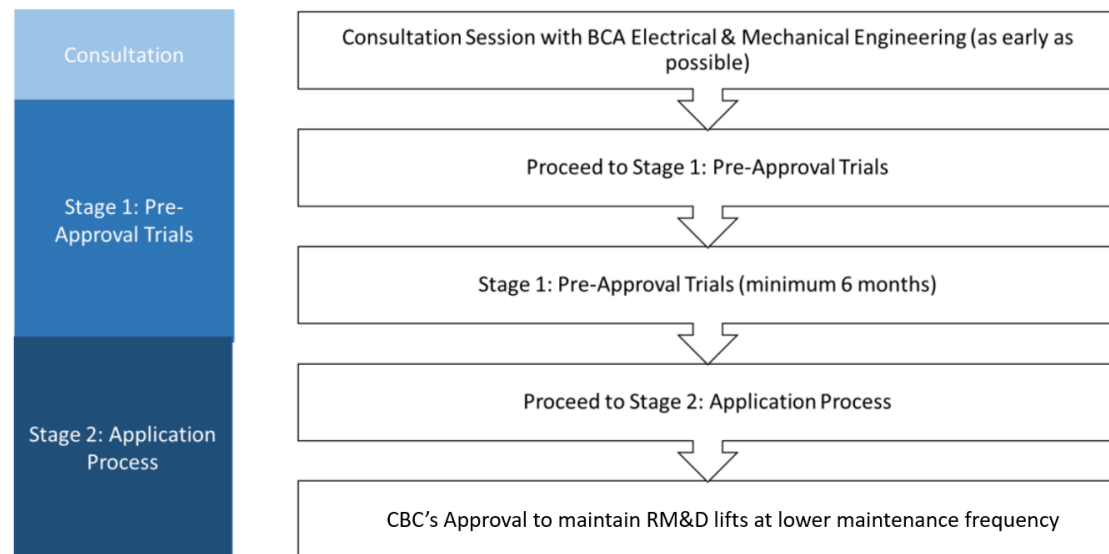


Figure 1: Flowchart on Approval Process

6.2 Interested applicants may request for a consultation session or send their enquiries through <https://www.bca.gov.sg/feedbackform>.

Annex A

1. Number of lifts to be used for the pre-approval trials
2. Name of the RM&D solution
3. Brief Description of the RM&D solution (including system architecture)
4. Checklist for monitoring outcome
5. Additional documentations and/or supporting information to demonstrate that the RM&D system meets the COP.

| Lift system and their sub-system | Monitoring Outcomes | Does the RM&D system meet the monitoring outcomes? Yes/No |
|--|---|--|
| 1. Traction Machine | To be able to monitor and analyse the performance of the lift and identify potential issues with the traction machine; and provide recommendation on possible rectification works and indicate when they are required. | |
| 2. Brakes | To be able to monitor and analyse the performance of the lift and identify potential issues with the brakes; and provide recommendation on possible rectification works and indicate when they are required. | |
| 3. Suspension Means | To be able to monitor and analyse the performance of the lift and identify potential issues with the suspension means; and provide recommendations on possible rectification works and indicate when they are required. | |
| 4. Guide system (i.e. guide rail and guide shoes or rollers) | To be able to monitor and analyse the performance of the lift and identify potential issues with the guide system; and provide recommendations on the possible rectifications for the guide system and indicate when they are required. | |
| 5. Car and Landing Doors (including door protective devices) | To be able to monitor and analyse the performance of lift and identify potential issues with the car and/or landing doors system; and provide recommendations on possible rectification works and indicate when they are required. | |
| 6. Levelling Devices | To be able to monitor and analyse the performance of the lift and identify potential occurrences and instances of mis-leveling; and provide recommendations on possible rectification works and indicate when they are required. | |
| 7. Fault Diagnosis including the following components: a) Overspeed Governor b) Safety Gear c) Controller and Inverter Drive d) Buffer e) Compensation System | To be able to monitor and analyse the performance of the lift and indicate if one or more of the following fault(s) is/are possible cause(s) for the stoppage of the lift: <ul style="list-style-type: none"> • Overspeed Governor Activation • Safety Gear Activation • Controller and Inverter Drive Failure • Buffer Activation • Compensation System Activation • Ascending Car Overspeed Protection Activation • Unintended Car Movement Protection Activation • Fire Emergency • Power Failure | |

Annex B

The performance indicators and benchmarks aim to provide a reference where the effectiveness of the RM&D technology can be assessed through the performance of the lifts on 3 key areas: a) safety, b) productivity, c) reliability as well as the diagnostics accuracy of the RM&D Solution.

Table 1: Performance Indicators and Benchmark

| Performance Indicators | Performance Benchmark |
|---|--|
| 1. Safety – 23 Maintenance Outcomes | <ul style="list-style-type: none">• < <u>2</u> consecutive months of similar high-risk findings• < <u>4</u> consecutive months of low/med risk findings |
| 2. Productivity – First Time Fix Rate (FTFR) | >70% for 6 months |
| 3. Productivity – Mean Time to Repair (MTTR) | >10% improvement |
| 4. Reliability – Technical Failure Per Equipment (TFPE) | <0.2 (per month) |
| 5. Reliability – Uptime | >99% |
| 6. Reliability – RM&D Device Availability | >95% |
| 7. Diagnostics Accuracy | >85% |