

TECHNICAL REFERENCE Maintenance regime for pump and drainage system in railway tunnels and stations





TR 120:2024

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Maintenance regime for pump and drainage system in railway tunnels and stations

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Foreword

This Technical Reference (TR) was prepared by the Working Group on Maintenance Regime for the Pump and Drainage System for Railway Tunnels and Stations set up by the Technical Committee on Railway Systems under the purview of the Transportation Standards Committee.

This TR aims to promote common understanding and consistency of the maintenance regime for the pump and drainage system in railway tunnels and stations.

This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

Permission has been sought from Land Transport Authority (LTA) for the reproduction of Figure 1 into this standard.

Acknowledgement is made for the use of information from the above publications.

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NOTE

- Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "mature standards". Mature standards will not be subject to further review unless there are requests to review such standards.
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Maintenance regime for pump and drainage system in railway tunnels and stations

0 Introduction

The mass rapid transit system in Singapore is a comprehensive network of interconnected lines with multiple above ground and underground stations.

Most rail operators, including the ones in Singapore, face a short daily window to carry out maintenance on tracks and trackside equipment. This window is further limited because there is a need to implement safety measures before any maintenance staff can access the tracks after the last revenue train. Additionally, time is needed to conduct necessary preparations before the first revenue train, thereby further limiting the night maintenance window. Maximising this short daily window necessitates meticulous planning for scheduling and prioritising maintenance activities, including maintenance of the pumped drainage system.

1 Scope

This Technical Reference (TR) covers the maintenance regime and replacement for pumped drainage systems in railway tunnels and stations. It also covers the maintenance management system and processes to be adopted to ensure the pumped drainage system functions properly. This TR applies to any the working party involved partially or entirely in maintaining and replacing any pumped drainage system asset in the rapid transit system in Singapore.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

In this standard, the following verbal forms are used:

- "should" indicates a recommendation;
- "can" indicates a possibility or a capacity.

4 Design considerations

The main objective of a pumped drainage system is to effectively remove excess water or used water from a specific area or location and transport it to a designated disposal point where natural gravity drainage is not possible. A pumped drainage system consists of several key components working together: pumps for moving water, pipes for distribution, collection points such as sump pits, a control system for automation, valves for flow control, a discharge point for releasing water, and a power supply, often with backups.

The design of the sump pit serves as a protective measure for the underground facility, preventing flooding incidents and ensuring the safe operation of trains. In accordance with technical specifications, it is recommended to install a minimum of two pumps with equivalent capacities for each sump pit. Among these pumps, one should be designated as the standby pump. Either the duty or standby pump must be capable of handling the entire discharge requirements. In the event of a failure of the duty pump, the standby pump is automatically activated.