

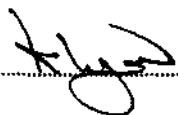
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Business Process Document

Guidance note for new and upgraded lifts

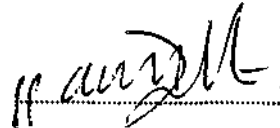
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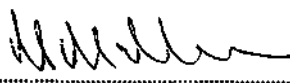
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1 Purpose

This Guidance Note offers additional information that will enable those wishing to specify new, or upgrade existing lifts, to identify and evaluate the most cost effective options and tenders.

2 Introduction

This Guidance Note strives to incorporate all relevant information from both withdrawn and current publications relevant to Network Rail and where appropriate reproduces specific clauses under appropriate headings.

The Guidance Note has been developed to avoid short-term value engineered lift equipment and achieve acceptable quality standards to protect the initial capital investment.

This Guidance Note highlights the importance of compliant tendering and detailed analysis of tender returns, supported by adequate monitoring both of the installation works and warranty periods to ensure the installations fully meet the specification.

The quality of installations is maintained by the approval process specified by the National Lifts & Escalators Contract Manager (Job Number 201.1.2/4). Consequently, completion of Schedule 1 and Schedule 2 is essential to the delivery of the installation.

3 Reference documentation

	The Lifts Regulations 1997
	Disability Discrimination Act 1995
	HSE Guidance on Stations - Part 2 Section B
	SRA Code of Practice - Train and Station Services for Disabled Passengers.
BS EN81	Safety Rules For The Construction and Installation Of Lifts
BS 7255	Safe Working on Lifts
BS 5588	Fire Precautions In The Design, Construction and Use Of Buildings
GI/RT/7014	Infrastructure Requirements at Station.
GI/RT/7015	Automatic Ticket Gates at Stations
GI/RT/7016	Interface between Station Platforms, Track & Trains.
GC/RT/5161	Station Design and Maintenance Requirements.
RT/D/P/088	Responsibility of Maintenance of Changed Assets.

4 Initial Planning

The number of lifts required will be dependant on the predicted traffic throughput of the site, floors served, location of entrance and exit points etc. and for complex sites further guidance should be sought from the National Lifts & Escalators Contract Manager.

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Where existing lift shafts exist then the maximum capacity attainable should be achieved.

Larger, or multiple, lifts may be dictated by passenger flow, the requirement to move large numbers of passengers at a single time or for the transportation of motorised wheelchairs, goods and/or self propelled trucks etc.

Where there is heavy goods traffic separate lifts must be provided for passengers and general goods use.

The use of fully glazed door panels, lift cars and lift shafts may be practical but only in specific circumstances.

Where the scheme suggests the use of glass, for observation type lifts, it is essential to consider subsequent cleaning, use by disabled persons, and the risks of children's hands being dragged into the architrave trim.

The following must be addressed and documented at an early stage: -

- i. Safe method of cleaning for both sides of all glass panels (car and shaft).
- ii. Additional maintenance budget for cleaning.
- iii. Safety of children at lift entrances including glass panels having opaque sections, or with applied manifestations.
- iv. Pressure sensitive edges on the entrance architraves.
- v. Laminated glass as per Annex J to EN81.
- vi. Use of suitable fixings and design to ensure security of panels, weatherproofing and safe method of work for replacement in compliance with CDM Regulations.
- vii. Precautions for visually impaired passengers. Including colour contrast panels, engraved strips at eye level and additional lighting.
- viii. Additional precautions where lifts may be used for goods traffic or for passengers with luggage.

When planning new lifts, replacing, modernising or modifying existing lifts, any requirements for emergency evacuation and fire-fighting lifts must be highlighted at an early stage. Advice should then be obtained from the Fire Officer.

4.1 Lifts at unmanned stations

Lifts at unmanned stations may require the facility to isolate them from a remote location, depending on local needs.

4.2 Facilities for meeting the needs of the disabled

With any new installation, or where extensive refurbishment works are planned, full consideration should be taken of providing lifts suitable for use with wheelchairs, and for the disabled generally, not only to satisfy the requirements of the Building Regulations etc. but the railway industry's duty of care to all passengers.

5 Installation selection

BS EN 81 and BS 5655, specify dimensions for lift installations including shaft, pit, machine room etc. and compliance will allow the selection of standard lift equipment increasing product availability and providing potential savings on cost and installation programmes.

Where deviations are required, due to existing building dimensions, restrictions on building loading, specific design features etc., it will be necessary to consider other non standard configurations. In all cases any deviations must provide equal standards of safety and for the protection of users and maintenance personnel.

This will provide a safe and controlled working environment for the purpose of carrying out planned, preventative maintenance.

There follows a précis of seven options with advantages and disadvantages that should be taken into account:

Traction Lifts

- Top Drive with Machine Room Above.
- Bottom Drive with Machine Room Below.
- Bottom Drive with Machine Room Below and Underslung Car.

Hydraulic Lifts

- Direct Acting With Bore Hole with adjacent machine room.
- Direct Acting With Ram(s) To The Side or Rear with adjacent machine room.
- Roped Hydraulic With The Ram(s) To The Side Or Rear with adjacent machine room.
- Pulling cylinder hydraulic with the rams to side or rear with adjacent machine room.

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5.1 Traction lifts

5.1.1 Top drive with machine room above

This configuration locates the machine directly above the lift shaft and provides for simplicity of installation. The layout requires a lift machine room having dimensions generally as BS EN 81 and BS 5655, and allows for selection of standard lift equipment and provides a safe working environment.

The simple 'up and over' path for the main suspension ropes to the car and counterweight, either with or without a diverter sheave, provides for minimum loading on the building structure and for maximum rope life.

The configuration is cost effective both on installation, energy consumption, and lifetime maintenance costs.

5.1.2 Bottom drive with machine room below

This configuration locates the machine room either directly below, or adjacent to, the lift shaft and the main suspension ropes run for the full height of the lift shaft over top diverter wheels to the car and counterweight.

The configuration is required where the height for a conventional machine room is not possible but will still require a top wheel enclosure having 1500mm minimum headroom and with separate access.

The installation and maintenance costs are higher than those for a conventional machine room above.

The loading on the building is approximately twice that for a conventional machine room above installation and in addition the machine will impose an up-thrust loading to the building floor.

5.1.3 Bottom drive with machine room below and underslung car

This provides for a configuration as 5.1.2 but with the ropes passing under the car via diverter wheels. The requirement for a top wheelhouse is minimised and allows for a further reduction in the headroom requirements at the top of the building.

The installation and maintenance costs are higher than a standard machine below configuration primarily due to the greatly increased length of the main suspension ropes and the reduced life resulting from the reverse bends imposed on the ropes.

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The machine room would be located directly below, or adjacent to, the lift shaft at the lowest level served.

The installation and maintenance costs are higher than those for a conventional machine room above.

The loading on the building structure will be increased as 5.1.2.

5.2 Hydraulic lifts

5.2.1 Direct acting with bore hole with adjacent machine room

With this configuration the hydraulic ram is connected directly below the lift car and a borehole is provided to house the ram cylinder.

The installation is ideally suited for heavy loads and for short travel installations. For modernisations the configuration maximises shaft availability increasing the lift car dimensions and for new lifts minimises the lift shaft dimensions.

With the exception of a lifting beam to the head of the shaft there is no requirement for top of shaft equipment and under normal operating conditions the installation does not impose vertical loads on the building structure above the pit level.

The maximum travel is normally limited to 20m and future inspections of buried cylinders may prove expensive. In addition the initial forming of a borehole at sufficient depth may prove difficult, expensive or impractical.

For an efficient system the machine/pump room should be located at the lowest level served and adjacent to the lift shaft. However in many existing buildings this may prove impractical and the hydraulic pump unit and controller can be housed up to 10m away from the lift shaft.

5.2.2 Direct acting with ram(s) to the side or rear with adjacent machine room

This installation connects the hydraulic ram directly to the sides or rear of the lift car and with a multi stage ram could negate the requirement for a borehole. For additional travel a borehole of reduced depth will be required.

With the hydraulic ram being located to the side of the lift, the lift car dimensions are reduced and the cantilever support to the lift car imposes additional loading to the shaft walls. Twin rams to opposite sides of the lift car reduce the loads applied to the lift shaft.

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5.2.3 Roped hydraulic with ram(s) to the side or rear with adjacent machine room

This installation provides for a ram mounted in the side or rear of the lift shaft, connected to the lift car by suspension ropes. The lift car travels at twice the speed of the ram and therefore a corresponding increase in contract speed is achievable.

A safety gear is required due to the use of suspension ropes and this will necessitate an overspeed governor being located at the head of the shaft, thus necessitating separate access to this area.

As with 5.2.2 the twin ram configuration reduces loads applied to the shaft.

The configuration provides for reduced initial installation costs but increased running and maintenance costs.

5.2.4 Pulling cylinder hydraulic with machine room

Pulling cylinder hydraulic lifts allow for reduced sizes of cylinder and storage tank and suit applications where a standard size of machine / pump room is impractical.

The pulling cylinder configuration is supported on a fabricated steel frame and minimises loads imposed on adjacent structures.

The rope suspended lift car requires an overspeed governor to the top of the shaft and sliding wedge safety gear.

This configuration is typically limited to a maximum contract load of 16 person or 1200 kg.

Pulling cylinder hydraulics are to use variable frequency drive and have energy accumulation equipment to minimise start and run currents.

5.2.5 Energy accumulation equipment – hydraulic lifts

Energy accumulation equipment stores the energy of a down travelling hydraulic lift in gas/diaphragm accumulators and uses the energy to assist with the up journeys.

This stored energy provides a reduction in the current demand for an up travelling lift and thereby provides a lifetime saving in energy consumption.

This aspect must be considered when specifying new lifts for existing stations, particularly where there may be a limitation on available electrical mains supply.

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5.3 Electrical supplies (general)

As a general rule the declared starting current for a conventional electronic valve hydraulic lift will be up to 3 times that of a similar conventional traction lift.

Variable frequency ac traction drive can provide up to 33% energy saving over a single or two speed lift and 40 to 50% over a variable voltage ac lift.

Variable frequency hydraulic pump motor control can provide 33% energy saving over a conventional electronic valve with star delta pump motor starting.

Variable frequency hydraulic pump motor control with energy accumulation equipment can provide up to 50% energy saving over a conventional electronic valve with star delta starting and significantly reduce the starting currents.

Electrical supply diversity cannot be applied to multiple lift installations.

5.4 Selection of Lift Equipment