BRITISH STANDARD

BS 5655-11: 2005

Lifts and service lifts —

Part 11: Code of practice for the undertaking of modifications to existing electric lifts

ICS 91.140.90

Confirmed January 2012

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI Documents Document Sharing Hub British Standards

Full document details: BS 5655-11:2005

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee MHE/4, Lifts, hoists and escalators, upon which the following bodies were represented:

AMICUS — AEEU
British Broadcasting Corporation
British Retail Consortium
Chartered Institute of Environmental Health Officers
Chartered Institution of Building Services
Consumer Policy Committee of BSI
Department of Trade and Industry — Standards Policy Unit
Engineer Surveyors Section of the Manufacturing, Science and Finance Union
Health and Safety Executive
Institution of Electrical Engineers
Institution of Incorporated Engineers
Institution of Mechanical Engineers
Lift and Escalator Industries Association
Lloyds Register of Shipping
London Underground Ltd.
Office of the Deputy Prime Minister — Building Division
Post Office
Safety Assessment Federation Ltd.
Society of Operations Engineers
Co-opted members

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 December 2005

© BSI 30 December 2005

First published as BS 2655-8 March 1971
First published as BS 5655-11 August 1989
Second edition December 2005

The following BSI references relate to the work on this British Standard:
Committee reference MHE/4
Draft for comment 05/30128010 DC

ISBN 0 580 47468 2

Amendments issued since publication

Amd. No.	Date	Comments

Documents
Document Sharing Hub

Full document details: BS 5655-11:2005

Contents

		Page
Committees responsible		Inside front cover
Foreword		ii
Introduction		1
1	Scope	3
2	Normative references	3
3	Terms and definitions	4
4	General	4
4.1	Upgrading the safety of existing lifts	4
4.2	Risk assessment	4
4.3	Upgrading of existing CE marked lifts	5
4.4	Tests and records of important modifications	5
5	Modification to existing lifts	6
5.1	Change of rated speed	6
5.2	Change of rated load	6
5.3	Change of travel	7
5.4	Change of mass of empty car or suspended mass	8
5.5	Change of complete controller including door operations	9
5.6	Change of drive controller	9
5.7	Change of traffic controller	10
5.8	Change from manual to power-operated doors	10
5.9	Change of address	11
5.10	Change of a safety component	12
5.11	Change of electric safety devices	14
5.12	Change of the drive components	15
5.13	Change of a car enclosure and/or interior finishes	16
5.14	Change of door operator	16
5.15	Change from gates to doors	17
5.16	Change of guide rails or type of guide rails	18
Annex A (informative) Relevant statutory regulations		19
Annex B (informative) Summary of significant hazards		23
Bibliography		29
Figure 1 — Number of UK lift installations (approximate)		2
Table B.1 — Summary of significant hazards		23

© BSI 30 December 2005

Documents
Document Sharing Hub
Full document details: BS 5655-11:2005

Foreword

This British Standard has been prepared by Technical Committee MHE/4. It supersedes BS 5655-11:1989, which is withdrawn.

This edition is a full revision of the standard. It introduces editorial and technical changes to bring the standard up-to-date, and takes into account the publication of BS EN 81-1:1998 and other publications in the BS EN 81 series up to October 2005.

This part of BS 5655 makes reference to the requirements specified in other relevant standards.

Attention is drawn to BS EN 81-80. This provides guidance on the progressive improvement to the safety of existing lifts. BS EN 81-80 is the recognized European standard, which represents the considered thinking of a number of European experts, and it has been approved by all the standards institutions (including BSI). It also contains a checklist to enable verification of the current safety level of the installation being considered.

Where a like-for-like replacement of a safety component (see **3.2**) is not possible, attention is drawn to the legal requirement for any replacement component to have CE marking applied to it. A safety component is defined by the Lifts Regulations 1997 [1].

Attention is also drawn to BS 5655-6. Its scope is limited to the installation of new lifts, but its recommendations may be used as guidance when making modifications to existing lift installations.

Attention is drawn to the legal requirement to ensure that when alterations are made to a lift installed after 1 July 1999, the lift continues to conform to the level of safety defined by the Essential Health and Safety Requirements (EHSRs) of the Lift Regulations 1997.

It is important to note any revisions and amendments to BS EN 81-1:1998, for example the Corrigenda dated March 2000 and any published interpretations in DD CEN/TS 81-29.

Attention is drawn to BS 7255, which indicates the environment for safe working on lifts. BS 7255:2001, Annex B offers suggested improvements for consideration by an owner to improve safe working.

Notes and commentaries are provided throughout the text of this standard. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

Attention is drawn to the regulations listed in Annex A. This part of BS 5655 is recommended for use alongside these regulations.

Users of this British Standard are reminded that as a code of practice it recommends actions to be taken by all persons involved with lifts: it does not specify requirements for the lifts themselves.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

It has been assumed in the drafting of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and competent people.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 31 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

© BSI 30 December 2005

Documents
Document Sharing Hub
Full document details: BS 5655-11:2005

Introduction

In the UK there are over 200 000 passenger and passenger/goods lifts in service — about 50 % of which were installed before 1979 — and the probability is that these often fail to meet modern safety requirements and standards (see Figure 1).

The most important reason for modifications is to enable owners to continue to fulfil their duty to provide for the safe operation of their lift installation(s). Additional reasons for modifications of a lift can be to:

— change the use of a lift, which might result from a change in use of the building;
— improve reliability;
— update technologically;
— improve traffic handling;
— improve ride quality;
— reduce energy consumption;
— improve the aesthetics.

These types of modification are often termed "modernization".

A lift is often refurbished to restore it to, at least, "as good as new condition". Where worn-out equipment and components are simply replaced on a like-for-like basis, this is not considered to be a modification. Some replacements can occur during routine maintenance operations, e.g. the replacement of a burnt-out motor. The status quo of the installation is unchanged and the same level of safety is maintained.

The formulation of a lift upgrading scheme should be undertaken by a person competent to do so in conjunction with the client in order to ensure the client's needs are fully met.

The consequences of a change can depend on a number of factors and each project should be subject to individual risk assessment to identify any issues that should be addressed.

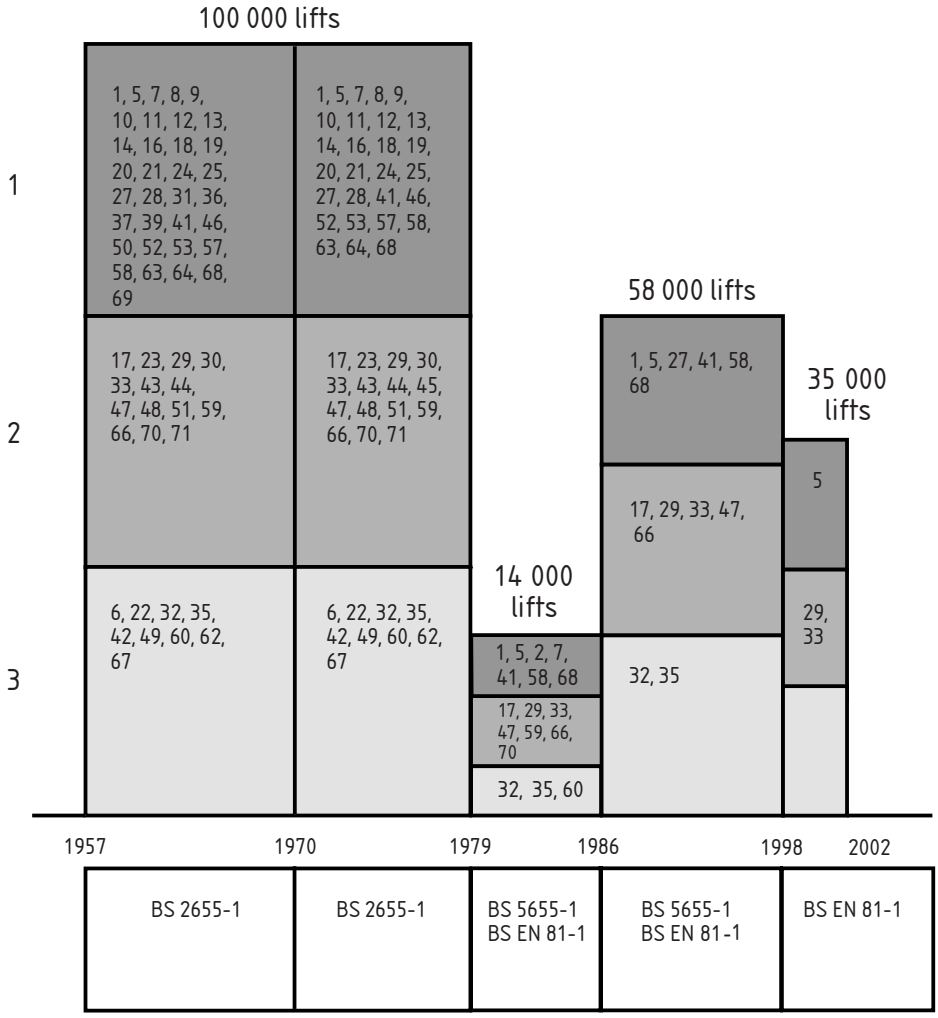
The competent person has a duty to carry out a site-specific risk assessment of the works to be undertaken, in accordance with the Management of Health and Safety at Work Regulations (MHSWA) [2] (see **A.2**). An owner contemplating the modification of a lift is advised to take professional advice.

A lift installed before 1 July 1999, when the Lifts Regulations 1997 came into force, is expected to have been installed in accordance with the safety rules for the construction and installation current at the time it was put into service. The standards could have been to the earlier BS 2655 or BS 5655 series, etc. Some lifts might have been altered from, for example, a BS 2655 standard, to a BS 5655 standard over a period of time. There is no compulsion on an owner to bring a lift up to the latest standard; this is voluntary. However, in the event of an incident it is likely that the owner's attention will be drawn to the best practice contained in the latest safety standards. This situation can be avoided by carrying out a safety audit from time to time and upgrading all lifts to the latest safety standard.

Documents
Document Sharing Hub

© BSI 30 December 2005

Full document details: BS 5655-11:2005



Key

1 High risk

2 Medium risk

3 Low risk

NOTE The numbers indicated refer to the significant hazards identified in BS EN 81-80:2003 and give guidance to those hazards likely to require consideration.

Figure 1 — Number of UK lift installations (approximate)

© BSI 30 December 2005

Documents
Document Sharing Hub
Full document details: BS 5655-11:2005

1 Scope

This part of BS 5655 gives recommendations for the modernization, or modification, and improvement of electric passenger and goods passenger lifts, with traction drive or positive drive, serving defined landing levels, having a car designed for the transportation of persons or persons and goods, suspended by ropes or chains and moving between guide rails inclined not more than 15° to the vertical.

This part of BS 5655 does not cover any of the following types of lift:

a) new lifts (see Note 2);

b) lifting appliances, such as paternosters, mine lifts, theatrical lifts, appliances with automatic caging, skips, lifts and hoists for building and public works sites, ship's hoists, platforms for exploration or drilling at sea, construction and maintenance appliances;

c) installations where the inclination of the guide rails to the vertical exceeds 15°;

d) lifts with drives other than traction drives or positive drives;

e) like-for-like replacement of lift components (see **3.2**);

f) goods only lifts.

NOTE 1 The recommendations in this part of BS 5655 may, however, be used as a basis for modernization or modification of such lifts.

NOTE 2 Where a lift falls into one of the following categories, it is deemed to be a new lift as defined in the Lifts Regulations 1997 [1] and this part of BS 5655 is not applicable:

— dismantled from an existing site and installed at a new site;

— installed where no lift previously existed;

— completely replaced;

— only retains the guide rails.

NOTE 3 In some situations (e.g. potentially explosive atmosphere, extreme climate conditions, vandalism, transporting dangerous goods, etc.), additional measures might need to be taken to those recommended in this part of BS 5655.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 7255:2001, *Code of practice for safe working on lifts.*

BS EN 81-1:1998, *Safety rules for the construction and installation of lifts and service lifts — Part 1: Electric lifts.*

BS EN 81-80:2003, *Safety rules for the construction and installation of lifts and service lifts — Part 80: Rules for the improvement of safety of existing passenger and goods passenger lifts.*

BS EN 12015, *Electromagnetic compatibility — Product family standard for lifts, escalators and passenger conveyors — Emission.*

BS EN 12016, *Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Immunity.*

Documents
Document Sharing Hub

Full document details: BS 5655-11:2005

3 Terms and definitions

For the purposes of this British Standard, the terms and definitions given in BS EN 81-1 and the following apply.

3.1
drive system
system that controls the movement of a lift in a well

NOTE For electric lifts the drive system comprises the hoist motor, any gear, brake, sheave, pulley, ropes, bearing, bedplate, drive controller and signal interface, etc.

3.2
like-for-like replacement of safety component
replacement of a safety component that is identical to the original component

3.3
machinery space
space(s) inside or outside a well where machinery as a whole or part is placed

3.4
modification
change, alteration, upgrading, modernization of a lift or part of a lift

NOTE See also BS EN 81-1:1998, **E.2**.

3.5
owner
legal entity having right of possession of a lift and responsibility for its safe working

NOTE The natural or legal entity can be the owner, lessee, tenant, operator of the equipment, etc.

3.6
traffic controller
system that allocates landing calls to specific lift(s) and causes the lift(s) to stop in response to car calls

4 General

4.1 Upgrading the safety of existing lifts

When undertaking modifications to an existing lift the first consideration should be the retention of at least the existing level of safety. Under no circumstances should the lift installation be less safe after the modifications have been made.

BS EN 81-80 gives recommendations for improvements to the safety of existing lifts. It is strongly recommended that an audit be carried out in accordance with BS EN 81-80:2003, Annex B before altering any lift installation in order to assess the existing level of safety and determine what changes are necessary to bring the level to today's state of the art. BS EN 81-80:2003, Table 1 provides a numbered list of 74 significant hazards and BS EN 81-80:2003, Table B.2 gives recommendations for risk reduction measures. Annex B in the present part of BS 5655 summarizes the 74 significant hazards.

The results of this audit are expected to give the owner a clear indication of which items are of most concern and the priority in which they should be addressed. The items identified and the means used to address them might be in addition to those given in **5.1**, **5.2**, **5.3**, **5.4**, **5.5**, **5.6**, **5.7**, **5.8**, **5.9**, **5.10**, **5.11**, **5.12**, **5.13**, **5.14**, **5.15** and **5.16**. The relevant hazard reference numbers from BS EN 81-80 are indicated in each subclause of the present standard.

4.2 Risk assessment

Whilst levels of risk can be identified using the audit given in BS EN 81-80:2003, Annex B, this document cannot address all of the potential hazards and hazardous situations that might be encountered on existing lift installations. It is therefore important that each project is subject to an individual site-specific risk assessment to identify any issues that need to be addressed.

NOTE A suitable risk assessment method is given in ISO/TS 14798.

© BSI 30 December 2005
Documents
Document Sharing Hub
Full document details: BS 5655-11:2005

4.3 Upgrading of existing CE marked lifts

When undertaking modifications to an existing CE marked lift it is recommended that the following procedure be adopted.

a) If a lift is modified, a risk assessment should be made of the proposed modifications to ensure that safety is not reduced.

b) A file should be compiled and retained of the modifications made.

c) Prior to putting the lift back into service the replacement components, and all other parts that have been affected, should be tested (see **4.4**).

d) Records of tests before placing into service should be retained.

e) The original CE marking in the lift car should be retained.

f) A permanent notice should be fixed on or in the car stating the date of change and company name.

g) Updated information should be provided to the owner where the change will effect the user or maintenance procedures described in the original owner's manual.

h) A record of the change should be provided for inclusion in the original log book previously issued to the owner when the lift was new.

NOTE Attention is drawn to the Lifts Regulations 1997 [1], Clause **2.2**, in respect of lifts installed after 1 July 1999.

4.4 Tests and records of important modifications

The following are regarded as important modifications:

a) change of:

1) rated speed;

2) rated load;

3) travel (increase);

4) mass;

b) change or replacement of:

1) travel (decrease);

2) control system;

3) type of door (or the addition of one or more landing or car doors);

4) safety component, including:

— overspeed governor;

— ascending car overspeed protection means;

— buffers;

— safety gear;

— type of locking devices (the replacement of a locking device by a device of the same type is not regarded as an important modification);

— electronic safety devices;

5) electric safety devices;

6) machine, brake or traction sheave;

7) car enclosure;

8) door operator;

9) guide rails or the type of guide rails.

Where any changes listed in a) are made, a full test of the complete lift installation should be carried out. Where any of the changes or replacements listed in b) are made, there might be consequential changes. It is essential that tests be conducted to ensure that the main changes and any consequential changes result in a safe installation.

NOTE The tests given in BS 5655-10.1.1 and PAS 32-1 are deemed to be suitable.

A record can be made using either BS 5655-10.1.1 or PAS 32-1, or a combination of the appropriate parts of these documents, depending on when the lift installation was first put into service.

Documents
Document Sharing Hub

Full document details: BS 5655-11:2005

5 Modification to existing lifts

5.1 Change of rated speed

COMMENTARY ON **5.1**. *A change in rated speed is any increase of speed greater than 5 %, or decrease in speed greater than 8 %. This range is given in BS EN 81-1:1998,* ***12.6*** *as the tolerance permitted under various operating conditions. An increase in rated speed can occur where it is desired to improve performance. A decrease in rated speed can occur for a number of reasons, e.g. change of use from passenger to goods service. The change of rated speed is regarded as an important modification, and tests and records are necessary (see* ***4.4****). Hazards and/or hazardous situations indicated in BS EN 81-80 that are relevant to this subclause are identified in Annex A, Table B.1, numbers 3, 6 to 18, 19 to 24, 40, 47 to 53, 60, 62 to 64, 66 to 72, and 74.*

The following non-exhaustive list of recommendations should be met when changing the rated speed, as this change has an effect on many of the items concerning the safety of the lift installation.

a) The dimensions at the well ceiling and pit should be checked (BS EN 81-1:1998, Clause **5**), in order to ensure that adequate dimensions and safety spaces are provided. Where this is not possible existing safety spaces should not be reduced and an alternative means should be provided to give refuge spaces.

NOTE 1 Where neither of the above can be achieved the rated speed should not be changed.

NOTE 2 Attention is drawn to the Lifts Regulations 1997 [1], Clause **2.2**, in respect of lifts installed after 1 July 1999.

b) The overspeed governor and any ascending car overspeed protection device (BS EN 81-1:1998, **9.10**) should be checked to ensure that it suits the change of rated speed.

c) The suspension (BS EN 81-1:1998, **9.1**), and traction (BS EN 81-1:1998, **9.3**), safety gear (BS EN 81-1:1998, **9.8**), tripping means for safety gears (BS EN 81-1:1998, **9.9**), buffers (BS EN 81-1:1998, **10.3** and **10.4**), guidance system (BS EN 81-1:1998, **10.2**), etc. should be checked to ensure that they are operating within their safe working limits.

d) The limits of the unlocking zone (BS EN 81-1:1998, **7.7.1**), power supply and switchgear (BS EN 81-1:1998, Clause **13**), inspection speed (BS EN 81-1:1998, **14.2.1.3**) and security of the counterweight/balancing weights (BS EN 81-1:1998, **8.18**) should be checked and appropriate measures taken where necessary.

e) The safe working spaces and equipment clearances (BS EN 81-1:1998, Clause **6**) should be maintained, when new equipment is installed into the machine room.

A change of rated speed might necessitate a change of all or part of the drive system (BS EN 81-1:1998, Clause **12**) (see **5.12**).

NOTE 3 For electric lifts the drive system comprises the hoist motor, any gear, brake, sheave, pulley, ropes, bearing, bedplate, drive controller and signal interface, etc.

5.2 Change of rated load

COMMENTARY ON **5.2**. *A change in rated load is a change greater than 5 %, or 75 kg (whichever is the greater). See* ***5.4*** *for a change of suspended mass. A change in rated load can occur as the result of a need to transport heavier loads or can result from changes to the available size of the platform area of the car (see* ***5.13****). The change of rated load is regarded as an important modification, and tests and records are necessary (see* ***4.4****). Hazards or hazardous situations indicated in BS EN 81-80 that are relevant to this subclause are identified in Annex B, Table B.1, numbers 38 to 46, 50 to 53, 55 to 57, 60, 66, 70, 73 and 74.*

© BSI 30 December 2005
Documents
Document Sharing Hub
Full document details: BS 5655-11:2005

The following non-exhaustive list of recommendations should be met when changing the rated load, as this change has an effect on many of the items concerning the safety of the lift installation.

a) Verification should be carried out to ensure that the well structure (BS EN 81-1:1998, Clause **5**) is capable of supporting any increase in load, resulting from the forces transmitted through the lift equipment to the building structure.

b) The suitability of the drive supports, guide rail fixings, buffer supports, etc. (BS EN 81-1:1998, Clause **10**) should be checked.

c) The suspension (BS EN 81-1:1998, **9.1**) and traction (BS EN 81-1:1998, **9.3**), safety gear (BS EN 81-1:1998, **9.8**) and governor (BS EN 81-1:1998, **9.9**), buffers (BS EN 81-1:1998, **10.3** and **10.4**), guidance system (BS EN 81-1:1998, **10.2**), drive system (BS EN 81-1:1998, Clause **12**), etc. should be checked, in order to ensure that they are operating within their safe working limits.

d) The available car area and the new rated load should conform to BS EN 81-1:1998, Clause **8** and Table 1. The load plate (BS EN 81-1:1998, Clause **15**) should be changed to reflect the new rated load.

e) The safe working spaces and equipment clearances (BS EN 81-1:1998, Clause **6**) should be maintained, when new equipment is installed into the machine room.

A change of rated load might necessitate a change of all or part of the drive system (BS EN 81-1:1998, Clause **12**) (see **5.12**).

NOTE For electric lifts the drive system comprises the hoist motor, any gear, brake, sheave, pulley, ropes, bearing, bedplate, drive controller and signal interface, etc.

5.3 Change of travel

COMMENTARY ON **5.3**. *A change of travel is any increase or decrease of the travel distance between the highest and lowest finished floor levels. See **5.9** for the provision of additional entrances. No tolerance can be permitted as even a small change in travel can cause refuge spaces and over-travel distances to be insufficient. A change in travel can occur where a lowest, or highest, finished floor level is raised, e.g. to accommodate a suspended floor, or lowered, e.g. to accommodate access for persons with disabilities. A change in travel can also occur where higher or lower floors are no longer served, e.g. service to a basement level is no longer required or higher floors are removed from a traffic zone. The change of travel is regarded as an important modification, and tests and records are necessary (see **4.4**). Hazards or hazardous situations indicated in BS EN 81-80 that are relevant to this subclause are identified in Annex B, Table B.1, numbers 6 to 37, 40 and 66.*

5.3.1 *General*

The following non-exhaustive list of recommendations should be met when changing the travel, as this change has an effect on many of the items concerning the safety of the lift installation.

a) The dimensions at the well ceiling and pit should be checked (BS EN 81-1:1998, Clause **5**), in order to ensure that adequate dimensions and safety spaces are provided. Where this is not possible existing safety spaces should not be reduced and an alternative means should be provided to give refuge spaces.

NOTE 1 Where neither of the above can be achieved the travel should not be changed.

NOTE 2 Attention is drawn to the Lifts Regulations 1997 [1], Clause **2.2**, in respect of lifts installed after 1 July 1999.

b) The system of guiding (BS EN 81-1:1998, **10.2**) (which might need extension/reduction) and the suspension system and traction (BS EN 81-1:1998, **9.1** to **9.6**) should be checked and appropriate measures taken where necessary.

c) The final limit switches should be repositioned (BS EN 81-1:1998, **10.5**).

d) Any changes to the wiring (BS EN 81-1:1998, Clause **13**) should be checked.

e) Arrangements for access (BS EN 81-1:1998, **5.2.2** and **5.7.3.2**) and rescue (BS EN 81-1:1998, **5.10**) should be made.

f) The machine room and any pulley room might need to be re-located and all changes should conform to the requirements of BS EN 81-1:1998, Clause **6**.

g) The structural and fire integrity of the well should be maintained (BS EN 81-1:1998, **5.3**).

Documents
Document Sharing Hub

Full document details: BS 5655-11:2005