



Risk Assessment

Adequacy of Lift Car Top Controls

Contents

Description	3
Definitions	4
Basic Assumptions	4
Method by which risk is assessed	5
<i>Table 1 — Category of severity</i>	<i>5</i>
<i>Table 2 — Level of frequency</i>	<i>5</i>
<i>Table 3 – Graphical Risk Profile</i>	<i>6</i>
<i>Table 4 — Levels of safety</i>	<i>6</i>
Risk Assessment	7
Results	12
<i>Table 5 – Graphical Risk Profile – Before Measures Taken To Reduce Risk</i>	<i>12</i>
<i>Table 6 – Graphical Risk Profile – After Measures Taken To Reduce Risk</i>	<i>12</i>
Recommendations	13

Description

This risk assessment examines the safety of maintenance and inspection persons working from the roof of a lift car, with respect to the provision of adequate car top controls. It does not address any other risks associated with works carried out from the car top.

Today's current legislation for lifts requires that any given work area shall be safe, and that any risks to persons are minimised. The dutyholder should not consider a safe system of work relying solely on human judgement as being the primary means of controlling any residual work place risks. Legislation guides dutyholder to provide a physical means of prevention (i.e. car top controls) which when coupled with competent operation should result in a safe environment for work.

Car top controls should be installed and designed with an equivalent level of protection to that defined in BSEN81 – 1/2. With older lifts there was no such requirement to have such devices installed.

There are four possible scenarios for the level of safety provided on older lifts :

- a: There are no control devices installed
- b: The lift has a stop device fitted to the car roof
- c: The lift has a car top control system installed but its features are not in compliance with current safety standards applicable to lifts (BSEN81-1/2).
- d: The lift has been fitted with an BSEN81-1/2 compliant car top control system.

It is the first three of these situations which will be the subject of this Risk Assessment.

As a consequence of the situations described in a: to c: above the risks associated with the following actions can be predicted.

- i: Persons work from a car top under normal control.
- ii: Persons ride the car top on normal control and then use the stop device to position the car where work is to be carried out.
- iii: Persons stop the car in a position where work can be carried out and then disconnect the power source. However this will lead to other risks associated with access/egress to the lift car top.
- iv: Old car top controls not in compliance with current safety standards may not operate in ways that are deemed to be safe for persons to use. e.g. excessive speed, non shrouded buttons.

Historical data has shown each of these situations has lead to serious / fatal injuries.

Definition

For the purpose of this Risk Assessment the following definition of a lift has been used :

Passenger Lift ~ Goods / Passenger Lift is a lifting appliance :

- permanently installed,
- intended for the transport of passengers alone or goods and passengers,
- where the lift car is guided,
- where defined levels are served.

The following lifting appliances are excluded:

- those for goods alone, [see point ii) below]
- those for use in mines,
- those in ships,
- moveable stage platforms,
- those having a platform only,
- those connected to a machine used for access to a work place,
- those intended for the lifting of persons on construction sites.

However this risk assessment may be utilised, where appropriate, to ensure the safety of users, maintenance, inspection personnel and other persons

Basic Assumptions

This risk assessment takes into consideration the hazards found on a single lift installation. It is not intended that it covers multiple installations in the same shaft due to other hazards.

The following basic assumptions list requirements to avoid certain risks for users, maintenance and inspection personnel, other persons.

- i) The person(s) present on the roof of the lift car are competent[†] for the task being carried out.
- ii) Goods only lifts are excluded from this risk assessment due to their installations frequently having restricted headroom and lack of safety gear to arrest free fall. In the case of the latter persons should not work from the roof of the car unless it is independently supported and electrically isolated. Where these lifts do conform to the requirements of passenger carrying lifts then this risk assessment can usefully be taken as a basis on which to determine the possibility of safe working from the roof of the car .
- iii) The machine, power supply and the associated parts are located so that unauthorised persons do not have access to them.

[†] **competent person** - As defined in prEN81-80 ~ Rules for the improvement of safety of existing passenger and goods passenger lifts and LOLER 98 ACOP

Method by which risk is assessed

Risk to persons can be determined by Analysis of the Severity of a likely accident and the Probability of the event occurring.

The Severity x The Probability gives a figure for Total Level of Risk.

Listed below are the categories, scores and definitions used in this assessment.

Table 1 — Category of severity

Category of severity	Definition
I Catastrophic	Death, system loss, or severe environmental damage
II Critical	Severe injury, severe occupational illness, major system or environmental damage
III Marginal	Minor injury, minor occupational illness, minor system or environmental damage
IV Negligible	Will not result in injury, occupational illness, system or environmental damage
NOTE: The definition of categories of severity needs to reflect the generic task being analyzed, for example: 1. use of fire-fighting lifts ; 2. use of lifts by persons with physical disabilities.	

Table 2 — Level of frequency

Level of frequency	Definition
A Frequent	Likely to occur often
B Probable	Will occur several times in the life cycle of the system
C Occasional	Will occur at least once in the life cycle of the system
D Remote	Unlikely, but may possibly occur in the life cycle of the system
E Improbable	So unlikely that it can be assumed occurrence will not be experienced
F Impossible	The hazard incident cannot occur unless caused by a deliberate act

The level of acceptance for the defined risks within this document is dependant on the initial assessment categorisation. The following table gives the decision process for this assessment.

Table 3 – Graphical Risk Profile

A				
B				
C				
D				
E				
F				
	I	II	III	IV
Frequency (hazard cause level): A Frequent B Probable C Occasional, D Remote E Improbable F Impossible			Severity (hazard effect category): I Catastrophic II Critical, III Marginal IV Negligible	

Table 4 — Levels of safety

	Unacceptable – IA, IB, IC, IIA, IIB, IIIA	Corrective action required to eliminate the risks
	Undesirable – ID, IIC, IIIB	Corrective action required to mitigate the risks
	Acceptable with review – IE, IID, IIE, IIIC, IIID, IVA, IVB	Review required, to determine whether any action is necessary
	Acceptable without review – IF, IIF, IIIE, IIIF, IVC, IVD, IVE, IVF	No action required

Risk Assessment

According to ISO TS14798 the following risks to persons have been analysed and, if relevant, measures are proposed.

Case No	Hazard (Hazardous Situation)	Cause - Trigger	Incident - Effect	Assess. Actual		Corrective Action (Risk Reduction Measure)	Assess. Tentative		Residual Risk
				S	F		S	F	
1	Maintenance or Inspection person has to move the lift car to a suitable position to work from..	i) No car top controls are present on the roof of the lift car. This is a category 3 condition	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well whilst positioning the car on normal controls or lift moves unexpectedly.	1	D	a) Lock and tag the electrical supply with the roof of the lift car in a position where work can be carried out. This prevents uncontrolled movement of the lift or its components.	1	E	Access must be gained from the nearest landing to the roof of the car. This may involve the risk of working and falling from ladders etc. see Case No. 2 for further analysis. If there is a risk of falling from a height in excess of the length of the ladder, then additional protective measures will need to be taken. Some old lifts will not have the possibility of locking the isolator.
		ii) Only a stop switch is present on the roof of the car and the person tries to use this to position the car at the work place. This is a category 3 condition	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well whilst positioning the car on normal controls or lift moves unexpectedly.	1	D	b) Fit and use maintenance controls to the car roof compliant with BSEN 81- 1/2. a) Lock and tag the electrical supply with the roof of the lift car in a position where work can be carried out. This prevents uncontrolled movement of the lift or its components.	1	E	The risk of impact with fixed objects at the top of the lift well still exists, therefore the controls should be linked to a limit switch preventing travel beyond a pre-determined safe point. See BS7255 Access must be gained from the nearest landing to the roof of the car. This may involve the risk of working and falling from ladders etc. see Case No. 2 for further analysis. If there is a risk of falling from a height in excess of the length of the ladder, then additional protective measures will need to be taken. Some old lifts will not have the possibility of locking the isolator.

S = Severity; Hazard Effect Category

I Catastrophic II Critical
III Marginal IV Negligible

F = Frequency; Hazard Cause Level (Actual / Tentative)

A Frequent B Probable C Occasional
D Remote E Improbable F Impossible

Case No	Hazard (Hazardous Situation)	Cause - Trigger	Incident - Effect	Assess. Actual		Corrective Action (Risk Reduction Measure)	Assess. Tentative		Residual Risk
				S	F		S	F	
						b) Fit and use car top controls compliant with BSEN 81-1/2 or BS7255.	1	E	The risk of impact with fixed objects at the top of the lift well still exists, therefore the controls should be linked to a limit switch preventing travel beyond a pre-determined safe point. See BS7255
		iii) Car top controls are fitted but they are not in compliance with EN81-1/2 and therefore considered to be inadequate [†] This is a category 3 condition	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well whilst positioning the car on test controls or lift moves unexpectedly.	1	D	Examine car top control system and carry out function tests prior to commencing work. Function tests should be done from lift landing to a prescribed safety procedure. See LEIA and SAFED guidance documents	1	E	If function tests reveal problems then the hazard should be treated as though no controls were present. See Case No 1 i)
		iv) Person working on roof of car with no car top control system fails to isolate car in fixed position to carry out work This is a category 3 condition	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well whilst positioning the car on normal controls or lift moves unexpectedly.	1	B	Fit and use car top control systems compliant with BSEN81-1/2 or BS7255	1	E	Person may still choose not to use the car top controls system. See Case 1 – vii) The risk of impact with fixed objects at the top of the lift well still exists, therefore the controls should be linked to a limit switch preventing travel beyond a pre-determined safe point. See BS7255

[†] All switches should be positive break contacts, controls should be shrouded against accidental operation, lift should move at inspection speed not full speed, etc.

S = Severity; Hazard Effect Category				F = Frequency; Hazard Cause Level (Actual / Tentative)			
I	Catastrophic	II	Critical	A	Frequent	B	Probable
III	Marginal	IV	Negligible	D	Remote	E	Improbable
						F	Impossible

C Occasional

Case No	Hazard (Hazardous Situation)	Cause - Trigger	Incident - Effect	Assess. Actual		Corrective Action (Risk Reduction Measure)	Assess. Tentative		Residual Risk
				S	F		S	F	
		v) Person working on roof of car with only a stop switch fails to isolate car in fixed position to carry out work This is a category 3 condition	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well whilst positioning the car on normal controls or lift moves unexpectedly.	1	D	Fit and use car top control systems compliant with BSEN81-1/2 or BS7255	1	E	Person may still choose not to use the car top controls system. See Case 1 – vii) The risk of impact with fixed objects at the top of the lift well still exists, therefore the controls should be linked to a limit switch preventing travel beyond a pre-determined safe point. See BS7255
		vi) Person working on roof of car fails to carry out adequate system function tests on controls prior to use.	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well whilst positioning the car on normal controls or lift moves unexpectedly.	1	D	Education and training required to ensure person follow procedures backed up with correct supervision and management	1	E	Person may still choose not to use the car top controls system. See Case 1 – vii)
		vii) Person working on roof of car with no car top controls or only a stop switch fails to isolate car in fixed position to carry out work due to no clear labels or instructions advising of safe working procedure This is a category 3 condition	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well whilst positioning the car on normal controls or lift moves unexpectedly.	1	E	Fit new labels and instructions giving clear indication of isolation and access procedures in machine room and on the car roof.	1	E	Does nothing to eliminate the basic hazard of not having suitable maintenance controls on the roof of the lift car.

S = Severity; Hazard Effect Category				F = Frequency; Hazard Cause Level (Actual / Tentative)					
I	Catastrophic	II	Critical	A	Frequent	B	Probable	C	Occasional
III	Marginal	IV	Negligible	D	Remote	E	Improbable	F	Impossible

Page 9 of 13

Case No	Hazard (Hazardous Situation)	Cause - Trigger	Incident - Effect	Assess. Actual		Corrective Action (Risk Reduction Measure)	Assess. Tentative		Residual Risk
				S	F		S	F	
		viii) Person working on roof of car uses existing car top controls which have no or inadequate labels This is a category 3 condition	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well whilst positioning the car due to unexpected movement of the lift car.	1	E	Fit new labels and instructions giving clear indication of isolation and access procedures in machine room and on the car roof.	1	E	
		ix) Person attempting access to the car roof fails to safely take control of the lift due to the controls being out of reach from the landing. This is a category 2 condition	Person is crushed / sheared / entangled / impacted between the moving lift car and fixed parts in the well due to unexpected movement of the lift car.	1	D	Move controls (particularly stop switch) to within 1m of the landing entrance	1	E	
		x) Person working on roof of lift car without adequate car top controls falls from car roof	Person falls from car roof due to unexpected movement of the car	1	D	a) Fit car top balustrade b) Fit car top controls compliant with EN81-1/2 or BS7255	1 1	D E	Introduces more risks of trapping/crushing if not associated with proper car top controls. Requires balustrade around car roof to be completely safe. Risk of impact with fixed objects at top of the lift well still exists, therefore the controls should be linked to a limit switch preventing travel beyond a pre-determined safe point. See BS7255

S = Severity; Hazard Effect Category

I Catastrophic II Critical
 III Marginal IV Negligible

F = Frequency; Hazard Cause Level (Actual / Tentative)

A Frequent B Probable C Occasional
 D Remote E Improbable F Impossible

Case No	Hazard (Hazardous Situation)	Cause - Trigger	Incident - Effect	Assess. Actual		Corrective Action (Risk Reduction Measure)	Assess. Tentative		Residual Risk
				S	F		S	F	
2	Maintenance or Inspection person attempts to work from the roof of an electrically isolated lift. Due to car being isolated at the work position the access to the car roof is by way of ladder from the landing entrance.	i) Lift moves whilst person is on ladder (particular problem of hydraulic lifts even though electrically isolated)	Person falls from ladder. Fall may not be arrested by landing on the car roof but instead may fall to pit floor.	1	C	a) Independently support the car e.g. scaffolding or chains	1	D	<p>Procedure will cause person to risk working without isolating the electrical supply</p> <p>Some old lifts do not have the possibility of locking the means of isolation</p> <p>Introduces risks of entanglement</p> <p>The risk of impact with fixed objects at the top of the lift well still exists, therefore the controls should be linked to a limit switch preventing travel beyond a pre-determined safe point. See BS7255</p>
						b) Wear fall protection equipment	2	D	
						c) Fit car top controls compliant with EN81-1/2 or BS7255	1	E	
		ii) Person slips and falls whilst attempting to access the car roof, particularly if carrying tools etc.	Fall may not be arrested by landing on the car roof but instead may fall to pit floor.	1	C	a) Wear fall protection equipment b) Fit car top controls compliant with EN81-1/2 or BS7255	2 1	D E	Introduces risks of entanglement The risk of impact with fixed objects at the top of the lift well still exists, therefore the controls should be linked to a limit switch preventing travel beyond a pre-determined safe point. See BS7255
3	Contact of person with live parts of existing car top control equipment (direct contact) whilst working on the car roof	Inadequate car top controls. Person comes into contact with exposed live parts .	Person receives electrical shock which may lead to other hazards e.g. falling from the car roof.	1	D	Ensure car top controls and their enclosure are to IP2x as a minimum requirement.	1	E	If function tests reveal problems then the hazard should be treated as though no controls were present. See Case No 1 i)

S = Severity; Hazard Effect Category

I	Catastrophic	II	Critical
III	Marginal	IV	Negligible

F = Frequency; Hazard Cause Level (Actual / Tentative)

A	Frequent	B	Probable	C	Occasional
D	Remote	E	Improbable	F	Impossible

Results

Table 5 – Risk Profile – Before Measures Taken To Reduce Risk

A				
B	1 iv)			
C	1 i), 1 ii), 1 v), 1 ix), 1 x), 2 i), 2 ii)			
D	1 iii), 1 vi), 3			
E	1 vii), 1 viii)			
F				
	I	II	III	IV
Frequency (hazard cause level):			Severity (hazard effect category):	
A Frequent	B Probable	C Occasional,	I Catastrophic	II Critical,
D Remote	E Improbable	F Impossible	III Marginal	IV Negligible

Table 6 – Risk Profile – After Measures Taken To Reduce Risk

A				
B				
C	1 x)a			
D	1 i)a, 1 ii)a, 2 i)a, 2 ii)a	2 i)b, 2 ii)b		
E	1 i)b, 1 ii)b, 1 iii), 1 iv), 1 v), 1 vi), 1 vii), 1 viii), 1 ix), 1 x)b, 2 i)c, 2 ii)c, 3			
F				
	I	II	III	IV
Frequency (hazard cause level):			Severity (hazard effect category):	
A Frequent	B Probable	C Occasional,	I Catastrophic	II Critical,
D Remote	E Improbable	F Impossible	III Marginal	IV Negligible

Recommendations

The Supply of Machinery (Safety) Regulations 2008 & The Supply of Machinery (Safety) (Amendment) Regulations 2011 and the subsequent Lifts Regulations 1997 (as amended 2008), give the following requirements regarding the elimination of risk:

“In selecting the most appropriate methods, the manufacturer must apply the following principles, in the order given:

- eliminate or reduce risks as far as possible (inherently safe machinery design and construction),
- take the necessary protection measures in relation to risks that cannot be eliminated,
- inform users of the residual risks due to any shortcomings of the protection measures adopted, indicate whether any particular training is required and specify any need to provide personal protection equipment.”

Whilst this cannot be strictly applied to lifts which were installed before the legislation became mandatory it is considered as being best practice. In addition The Provision and Use of Work Equipment Regulations 1998 includes within regulations 14 – 18 certain requirements for controls and control systems which are applicable to all work equipment.

The results of this risk assessment demonstrate that Car Top Controls which are compliant with BSEN81-1/2: 1998, as a minimum, when fitted on all lifts where persons have to carry out work from the roof of the car, can reduce work related risks.

It is not possible to eliminate, by design, hazards which are present on existing lifts. However it is possible to mitigate the hazards identified in the risk assessment by fitting adequate car top controls.

Note : BS7255 “Code of practice for safe working on lifts” details a recommended, enhanced layout, for car top operating buttons and switches.