TECHNICAL REPORT

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Lifts (elevators) — Study of the use of lifts for evacuation during an emergency

Ascenseurs — Étude de l'utilisation des ascenseurs pour l'évacuation lors d'une situation d'urgence
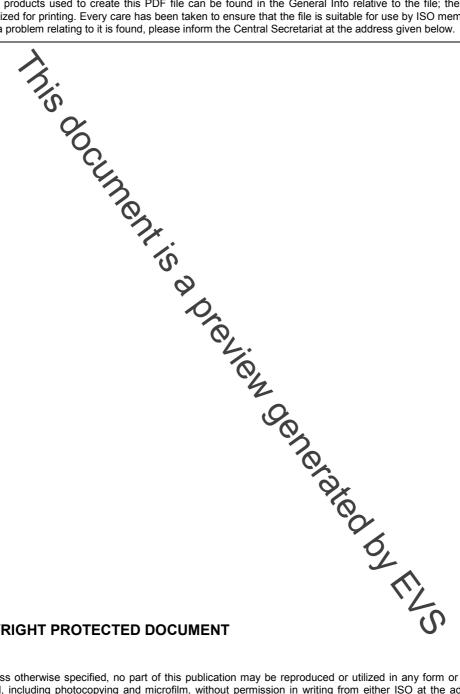
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 25743 was prepared by Technical Committee ISO/TC 178, *Lifts, escalators and moving walks*.

Introduction

This Technical Report has been prepared in response to a request for an investigation into the implications of the use of lifts[1] (elevators) for the evacuation of persons during various types of building emergencies. There has been considerable debate over recent years with regards to the hazards and risk associated with using lifts for evacuation. There is clearly a need to determine what hazards and risks exist and what can be done to the building and lifts to minimize these risks if lifts were to be used.

The purpose of this Technical Report is to investigate the risks to persons using lifts to evacuate a building during an emergency.

Lift engineers and firefighters were involved in the production of this Technical Report. It is fully recognized that lift engineers are not experts in building design or fire engineering; therefore, this Technical Report does not attempt to resolve issues in these areas. It aims to make clear to those persons involved in building design and fire engineering the issues that need to be addressed. Not all of the issues set out in this Technical Report need to be addressed in all building designs.

There are many reasons why a building can need to be evacuated, such as a fire, explosion, chemical or biological attack, flooding, storm damage or earthquake. Not all of these are relevant to every building and other possible risks are so unlikely to occur that they can be disregarded. It is the responsibility of the building designer(s) to determine whether a particular risk is sufficiently great to require addressing.

If, for example, a small office block is being designed for a mid-town area, it is within the realms of possibility that it can be subjected to an explosion or chemical attack (as a result of terrorism). It is not, however, very likely to be the case unless there exists some particular reason to make it attractive or susceptible. In most cases, the risk of these events is probably so low as to make it unnecessary for them to be addressed.

If a building is intended to be the headquarters of the military, this increases the likelihood of it being subjected to some form of attack. It is, in that case, necessary to consider the effect of an explosion in or close to the building or a chemical agent being introduced into the building.

A building constructed in an area where earthquakes do not normally occur need not have provisions made for such an event.

If a building is intended to be located in the centre of a city to form a prestigious landmark, consideration of all the possible events that might occur can be essential.

It is the responsibility of the designer of the building to determine by risk assessment or other methods what events reasonably need to be addressed. Once this is done, the chart provided in Figure 1 can be used to see what needs to be considered, if lifts are to play a part in any evacuation strategy.

A lift or lifts can allow disabled persons to evacuate a building in relative ease, but if it is thought that lifts can play a role in general evacuation, it is possible for them to make a significant contribution to reducing the general evacuation time. This depends on the building size, number of lifts, etc.

This Technical Report does not concentrate on the evacuation of disabled persons, but instead highlights and addresses the hazards and risks to which all users can be exposed if lifts are used for evacuation.

Even if it is thought that lifts can play a part in a general evacuation, it could prove to be uneconomic. It is not suggested that lifts should replace stairs or that using lifts instead of stairs will increase evacuation times in many building designs.

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1) Hereinafter, the term "lift" is used instead of the term "elevator". In addition, the term "lift" is also used instead of the terms "lifts, escalators and moving walks".

Lifts (elevators) — Study of the use of lifts for evacuation during an emergency

1 Scope

This Technical Report investigates and highlights the main risks associated with using lifts (elevators) for the evacuation of persons in various types of emergency.

The types of emergency under study arise from fire, flood, earthquake, explosion, biological or chemical attack, gas leakage, lightning or storm damage in the building being studied or a building adjacent to it.

The purpose of this Technical Report is to provide a process for making decisions relevant to the design of lifts and buildings, in order to determine if a given design can enable the lifts involved to be used with an acceptable level of safety.

It is not intended that all buildings be designed for all risks and, consequently, it is not intended that all lifts incorporate all features mentioned. It is the responsibility of the building designer to determine events that are likely to occur, given the building's importance, function, occupancy, status, location, use, size, etc.

It is not the responsibility of, nor is it possible for, lift manufacturers to determine whether or not a lift can be used safely as a means of evacuation in a given building. It is the responsibility of other parties to make this decision. The lift manufacturer can only advise on the capabilities of a particular lift design or the status of the lift at a particular point in time.

The philosophy adopted in this Technical Report can be applied to any building, be it large, small, new or existing. In practice, its application to existing building designs can prove to be difficult and uneconomic in many instances.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
building management system
BMS
system capable of making intelligent decisions based on information sent to it

2.2
building management
persons or organization responsible for ensuring the day-to-day safe, efficient running of the building and for ensuring that the building is safely evacuated in line with the evacuation strategy in an emergency

2.3
emergency command centre
room, area or location within or outside the building, where those responsible for evacuation receive information, issue instructions and manage events as they unfold