

Summary

Passenger lifts are means of personal transportation on vertical or inclined direction, travelling on a rigid support and having an enclosed carrier. As a result of the various safety components mandatory to be installed, passenger lifts are among the most reliable and safe means of transportation. Recent regulations require that lift installations should also be protected against unintended movement of the lift car when the car doors are opened. These regulations oblige the installment of Unintended Car Movement Protection (UCMP) for new lift installations and prescribe general performance requirements for UCMP detection and reaction devices, but do not give specific design rules. For this reason, various constructive solutions are currently available on the lift market. This report gives an overview of currently available technical solutions available for both electric traction lifts and hydraulic lifts for preventing Unintended Car Movement (UCM) with open doors.

An UCMP system comprises three inter-related functional systems: detection, evaluation and reaction. UCMP *detection* recognizes the occurrence of lift car movement when the lift car is at landing level with the car or landing doors opened. UCMP detection is mostly done by mechanical or electrical sensors. Mechanical sensors consist of bars, hinges, springs etc. and are actuated by relative movement between the sensor and for example moving drive parts. Electrical detection mostly consists of monitoring the car position, car and landing doors position and car speed. UCMP *evaluation* 'decides' if the detected car movement is unintended or not. Evaluation involves the processing of the detected unintended motion, and actuating of the reaction device(s). Evaluation can be done mechanically or electrically and may in some cases be indistinguishable from the detection. In many UCMP solutions electronical evaluation is part of the overall lift control or safety circuit. UCMP *reaction* devices stop the lift within certain limits when UCMP is evaluated. From a cost and maintenance point of view most manufacturers prefer using existing stopping devices which are already installed in lifts.

In contrary to other mandatory safety devices, UCMP is rather a collective noun for a group of various technical constructive solutions having the same function than one specific device or apparatus. Most UCMP solutions consist of whether or not improved existing safety components. Since the market for passenger lift transport is dominated by electric traction lifts rather than hydraulic lifts, most found UCMP solutions are designed for traction lifts. Nevertheless, many solutions can be used in both traction and hydraulic lifts, since these two types of lifts have similarities in some design aspects. Although UCMP detection and reaction devices are generally conventional devices, there is also some innovation observable, e.g. the use of RFID and intelligent control systems.

The report is structured as following: section 1 gives a short introduction into the subject. In section 2 a brief overview of lift history is given. Section 3 shows the current requirements for UCMP, and section 4 consists the actual UCMP overview. Section 5 contains the conclusion of this report. Appendix A contains a scientific research paper of this report.