Changes to unintended lift movement

- Lift standards have been amended to avoid the serious accidents caused by unintended car movement (UCM.) Sometimes lifts would move away from the landing whilst the doors are open so to improve the safety standard BS EN 81 - 1 and 2 were enhanced.

- The main causes of unintended car movement were:
  - Failure of the machine brake system
  - Failure of the load carrying element
  - Failure in the control system
  - Failure of the hydraulic valve or hose connections

The development of compulsory safety devices was planned to enable protection against these situations.

According to amendment 3 (A3), lifts must now be provided with a device to prevent UCM away from the landing when the car and or landing doors are open. Such a device must be able to act in the case of failure of any single component of the machine or drive control system upon which the safe movement of the car depends, except for failure of the suspension ropes or chains and the traction of the machine.
In simple terms
The conditions that are required are:

- The car must stop within 1.2 m of the landing sill (dependent on door height)
- The remaining gap to exit must be at least 1.0 m whereby the vertical distance below the apron must not exceed 0.2 m
- The maximum retardation must not exceed 1.0 g.

To fulfill these requirements the UCM solution must be able to perform a number of activities:

- Detect the movement of the car creeping away from the landing with the doors open
- Stop the car movement
- Keep the car in the stopped position.

Variety of solutions
Research and development has provided a variety of solutions which will involve a combination of the following components:

- Gearless brakes
- Over speed governor
- Hydraulic valves
- Safety gears
- Electronic interfaces
- Inverters
- Car positioning systems.

The main combinations available are:

Solution 1
Electronic over speed governor / bi-directional safety gear / electronic interface.
This system can be retro fitted without modifications to the control system as it only requires a door open/closed signal from the controller to the governor. The electronic governor monitors the lifts movement at all times. Should it detect movement when the doors are open outside specific settings such as for advanced door opening - then the governor is tripped and the safety gear applied. Each single component of the system must be certified A3 compliant by a notified body.

Solution 2
Over speed governor, brake / sheave brake / rope brake, electronic interface.
The heart of the system is again the over speed governor which detects the UCM in this case however it applies the rope or sheave brake to the system. The brakes must be mechanically retracted which keeps the machine stopped. Where the machine brake is used (usually in a gearless system) then the brake must have 50% redundancy i.e. two independent solenoid coils operating independent brake arms, and each side must be electrically monitored to ensure that they are lifting and closing correctly, any failure and the system alarms and shuts down. Again the components must be certified as A3 compliant by a notified body.

Solution 3
Inverter, brake / sheave brake / rope brake
Similar to solution 2 the main difference being that the inverter is used to detect UCM. This system requires major modification to the control system where it is not already A3 compliant.

Solution 4
Hydraulic valve, electronic interface.
This solution requires that an additional stop valve is fitted into the system. It can be retro fitted to most systems. It is usually operated by detecting losses in the hydraulic system but can be by means of shaft positioning or electronic governor systems.
Conclusion
The above solutions are only the main, widely available ones. There are other combinations of
the components being used. BS EN 81-20 now includes the UCM functionality and the
development of solutions is ongoing. It is possibly the biggest safety change in the last 20 years,
and raises the safety of lifts even further.